

**GUIDANCE ON APPLICATION PROCEDURES
FOR ADOPTION OF THE IRB APPROACH BY BANKS LICENSED IN
SAUDI ARABIA**

**BANKING SUPERVISION DEPARTMENT
APRIL - 2008**

TABLE OF CONTENTS

	<u>Page #</u>
1. Application Process concerning Request for Approval to use IRB Approaches	3
2. Details on Bank's Request for IRB Recognition	3
3. Branches of Foreign Banks	4
4. Validation of Risk Ratings and Risk Estimates	4
5. SAMA's Detailed Guidance Document Consultative Draft No. 2 of 6 June 2006	5
6. Self Assessment Questionnaire	5
 <u>ATTACHMENTS</u>	
Attachment 1: Flow Chart for IRB Recognition	6
Attachment 2: IRB Recognition Request Form and Other Supporting Documentation	7
Attachment 3: Details and Documentation Requirements on IRB Approaches and Options Adopted	9
Attachment 4A: Self-Assessment Questionnaire concerning Rating System Design	10
4A-1: Corporate, Sovereign and Bank Portfolio	11
4A-2: Retail Portfolio	31
Attachment 4B: Self-Assessment Questionnaire concerning Risk Quantification	37
4B-1: Corporate Sovereign and Bank Portfolio	38
4B-2: Retail Portfolio	48
Attachment 4C: Validation for Risk Rating and Risk Estimates	58

1. Application Process concerning Request for Approval to use IRB Approaches:

The supervisory approval for Banks to implement Foundation or Advanced IRB Approaches begins with the bank submitting to SAMA a formal application. Such an application should be submitted to SAMA at least two months before the planned implementation of IRB Approaches.

In this regard, the following documents must be submitted:

1. Completed application form as described in Attachment 2.
2. Details and Documentation on IRB Approaches and Options in Attachment 3.
3. Completed Questionnaire and supporting documentation if necessary as described in Attachment 4.
4. Implementation plans detailing Roll Out Plans, Major Milestone, Time Lines, Resourcing, Governance structures, Consultants used, etc. In this regard, the relevant section of a bank's Implementation Plan's time lines and the Questionnaire should be cross referenced.

With reference to the above, the Roll Out Plan will detail the application of IRB Approach across all significant asset classes and business units. With regard to the Questionnaire, banks must complete it by providing "Yes" or a "No" answers to the statements and provide supporting documentation, if necessary. The questionnaire is organized on the following basis:

Section A: Rating System's – Attachment 4A.

Section B: Risk Qualification – Attachment 4B.

Section C: Detailed on Validation for Risk Rating and Risk Estimates – Attachment 4C.

Further, supporting documentation concerning the above questionnaire will generally include details such as explanation of models, test results, data, etc.

2. Details on Banks Request for IRB Recognition and Process:

Only those banks with a firm commitment to implement the IRB Approach for capital adequacy purposes should make an application to SAMA. Banks must provide information on their IRB implementation plans which should include, the target date for adopting the IRB Approach, the estimated level of IRB coverage, and the estimated timing of establishing their Risk Ratings and Risk Estimates.

Banks planning to use FIRB, will need to develop and validate PD's. Whilst Banks planning to use AIRB, will need to develop and validate PD's LGDs and EAD. Banks planning on using the IRB Approach should submit their IRB Application to SAMA two (2) months prior to implementation. This is to ensure that their IRB recognition and validation request can be taken into account in SAMA's own schedule. The priority for conducting IRB validations will be given to those with an earlier IRB adoption date.

Upon receipt of the IRB recognition request documentation detailed in Section 1, SAMA will work with the Bank concerned to satisfy itself that the IRB systems/models and the risk management practices surrounding the use of such systems/models meet the minimum standards specified by SAMA. The IRB recognition process, as depicted in Attachment 1, generally includes the following steps:

- Bi-lateral meeting – On receipt of a complete documentation described in section I regarding the application of IRB recognition request, SAMA will arrange a bilateral meeting with the Bank to discuss the details of its implementation plan, as well as the self-assessment questionnaire, and other matters related to the approval process, such as the approximate time-frame for conducting the on-site examination purposes for validations.
- On-site Review for Validation of Risk Rating Systems and Risk Estimates – For purposes of validations of risk ratings and risk estimates, SAMA will conduct an on-site visit to review in detail both the technical details of the systems/models and the risk management practices that govern the use of such systems/models. SAMA will also review the implementation plan to assess the work done and relate it to the questionnaire.
- SAMA's examination will be detailed and may involve external expertise, depending on the quality of the bank's self-assessment, the complexity of its IRB systems and any compliance issues identified. After concluding the assessment, SAMA will issue an examination report, including the decision of whether to allow the Bank to use the IRB Approach.

3. Branches of Foreign Banks:

In case of branches of foreign banking groups, SAMA will liaise with the relevant home supervisor, particularly on the validation arrangements, to assess the extent of reliance that it may place on the validation work done by the home supervisory authority.

4. Validation of Risk PD Estimates:

The validation will address both qualitative and quantitative aspects, including back testing, stress testing, robustness of data and models.

5. SAMA's Detailed Guidance Document Consultative Draft No. 2 of 6 June 2006:

All references to the above document are described as "SAMA's Document."

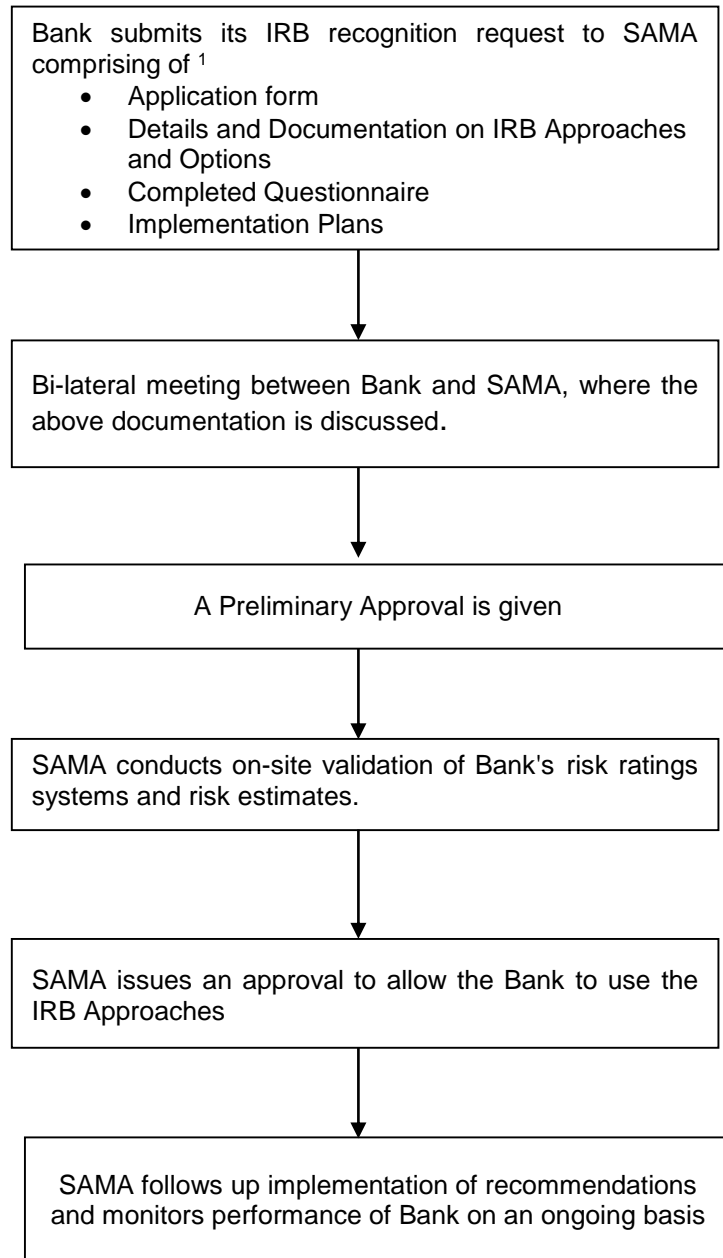
6. Self Assessment Questionnaire:

Please provide "Yes" or "No" answers with a tick (✓) to the criteria or condition your bank plans to incorporate or employ in the implementation of IRB Approaches and provide where relevant the supporting documentation.

- 4A relates to Rating System.
- 4B relates to Risk Quantification.
- 4C relates to the detailed Validation requirements for Risk Rating (4A), and Risk Estimates (4B).

There is some duplication in various sections of the questionnaire. These cannot be avoided as SAMA is aiming to seek information under different sections with their own objectives.

Flow Chart
IRB Recognition Process



¹To be done at least two months prior to or before the planned implementation of IRB Approaches

APPLICATION FORM

**IRB Recognition Request Form
and Other Supporting Documentation**

This form is to be completed by all Saudi Banks planning to apply the IRB Approach for measurement of credit risk capital charge. Please return the completed form and if necessary, other information described below to Mr. Fahd Al-Mufarrij, Director of Banking Supervision.

1. Name of Bank:
2. Please provide information regarding the Bank's IRB implementation plan by completing Table 1.
3. In the case of a phased rollout implementation plan, please specify the target dates for the first and last phases of rollout by providing additional documentation.
 - Portfolios to be rolled out in phases and relevant dates.
 - Approximate date of Validation of Risk Estimates by Portfolio as per the roll out data.

4. Contact person for the IRB implementation project:

Name: _____
Position: _____
Telephone no: _____
Fax no: _____
Email Address: _____

Signed by: _____
Managing Director, _____ (Name)
Chief Executive Officer or
General Manager _____
_____ (Signature)

Date: _____

(Table -1)

CONFIDENTIAL

IRB Implementation Plan
Name of Bank

Asset classes under IRB ⁽¹⁾	Standardized Approach indicate whether transition to IRB at a later date Yes (Y) or No (N)	Types of IRB Approach to be adopted FIRB and/or AIRB	Methodology employed Moody's, Fitch & S&P	Number of Risk Classification or Ratings by Portfolio	Amounts, % ⁽²⁾ As of _____		Geographical location of exposures Country Name	Internal Rating System(s) and Risk Estimates			
					Solo basis ⁽³⁾	Consolidated basis ⁽³⁾		Target Date <u>Estimates for Developing</u>		<ul style="list-style-type: none"> ▪ Developed by Bank (A) ▪ Centrally developed by Bank (B) or Parent / Group (C) (please specify (A) or (B)) or (C) ₍₄₎ 	Date ready for SAMA's Recognition ⁽⁵⁾
								<u>Risk Estimate</u>	<u>Risk Rating</u>		
SOVEREIGNS AND CENTRAL BANKS											
▪ SAMA and Saudi Government											
▪ Others											
MULTILATERAL DEVELOPMENT BANKS											
PUBLIC SECTOR ENTITIES											
BANKS AND SECURITIES FIRMS											
CORPORATES											
RETAIL-NON MORTGAGES											
▪ SBFE's											
MORTGAGES											
▪ Residential											
▪ Commercial											
SECURITIZED ASSETS											
EQUITY											
OTHERS											
TOTAL											

Note:

- (1) Banks should categorise banking book exposures into different asset classes, subject to definitions set out in SAMA's Detailed Guidance document Consultation Draft No. 2 issued in June 2006 (SAMA Document).
- (2) Percentage should be calculated based on the total portfolio.
- (3) The definition of solo or consolidated basis follows SAMA's Document section #2.
- (4) In case of Banks individually developing (A), for centrally developed, i.e. NDP (B), branches of foreign banking groups, (C) all or part of their IRB systems may be centrally developed by the parent bank.
- (5) For the purpose of this table, an internal rating system is regarded as ready for SAMA's recognition if the bank considers that it meets all the minimum qualifying criteria.

**Details and Documentation Requirements
on IRB Approaches and Options Adopted**

Banks are expected to provide the following details and documentation on the IRB Approach and options adopted. This information should be submitted along with the other application documentation:

1. Indicate the IRB option (Foundation or Advanced) adopted and identify Internal Portfolios by description which are to be moved to IRB Approaches, i.e. Sovereign, Banking, Corporate, Retail, etc.
2. Risk classifications or ratings established for each internal portfolio.
3. The overall IRB methodology adopted by your Bank, i.e. Moody's, Fitch, S&P on which your portfolio classification and internal risk estimates are based.
4. The actual mapping of your Bank's risk classification or ratings by portfolio to the external risk classification, i.e. Moody's, Fitch, S&P, etc.
5. The technological ability and status of the linkage of borrower financial statements and default history to the IRB system as a whole within your bank.
6. Definition of default in your bank for each type of portfolio (i.e. Retail, Corporate, Others.)
7. Data definition (external or internal) availability, storage and integrity regarding PD's, LGD's and EAD's.
8. Details on data availability and storage should include the number of years your bank has relevant data and whether this data is in an electronic format linked to internal models.
9. Relevant details on Models employed to generate PD's, LGD's and/or EAD's.

SELF-ASSESSMENT QUESTIONNAIRE
RATING SYSTEM DESIGN

- This section of the questionnaire covers a bank's risk classification or rating system for the various types of internal portfolio which are to be moved to IRB Approaches.
- The first part of the questionnaire 4A-1 is common to all or any of the Corporate, Sovereign and Bank Exposures, while the second part 4A-2 relates to the Retail Exposures.
- Banks should clearly identify separately the Internal Portfolio, the questionnaire relates to i.e. Sovereign and Central Banks, Multilateral Development Banks, Public Sector Entities, Banks and Security Firms or Retail.
- For Retail Portfolio, the particular "Pool" covered should be indicated.
- Please provide "Yes" or "No" answers with a tick (✓) to the criteria or condition your bank plans to incorporate or employ in the Implementation of IRB Approaches and provident where relevant, supporting documentation.

QUESTIONNAIRE RELATING TO
RATING SYSTEM

RATING SYSTEM DESIGN

- SOVEREIGN AND CENTRAL BANKS
- MULTILATERAL DEVELOPMENT BANKS
- PUBLIC SECTOR ENTITIES
- BANKS AND SECURITIES FIRMS
- CORPORATES

TABLE OF CONTENTS

Rating System Design

	<u>Page #</u>
4.1 Rating Dimension	14
4.2 Rating Structure	15
4.3 Nature of Rating Systems	16
4.4 Rating Criteria	17
4.5 Rating Assessment Horizon	17
4.6 Use of Models	18
4.7 Documentation of rating system design	19
4.8 Rating System Operations	21
4.9 Corporate Governance and Oversight	25
4.10 Use of Internal Ratings	27
4.11 Disclosure requirements	28
4.12 Assessment Factors in assigning rating	28
4.13 Rating Approaches	29

RATING SYSTEM DESIGN

The particular portfolio covered should be indicated i.e. Sovereign and Central Banks, Multilateral Development Banks, Public Sector entities, Banks and Security Firms, Corporates, etc.

Banks are expected to use and or employ the following qualifying criteria, standards, or tests, relating to implementing the IRB Approaches. Consequently, Banks must respond either by a "yes" or "no" answer. A "yes" answer may be provided in instances where a bank is planning to fully incorporate or employ a given criteria or condition in its IRB Implementation plans. In such instances, details will need to be provided covering the time frame for achieving a given criteria or condition. Further, banks will provide supporting documentation where necessary to facilitate the bi-lateral discussion with SAMA prior to its approval to implement IRB Approaches.

4.1 Rating Dimension

4.1.1 Banks adopting the IRB Approach should have a two dimensional rating system that provides separate assessment of borrower and transaction characteristics. This approach assures that the assignment of borrower ratings is not influenced by consideration of transaction specific factors. (Yes __ , No __)

Borrower rating

4.1.2 The first dimension should reflect exclusively the risk of borrower default. Collateral and other facility characteristics should not influence the borrower rating.¹Banks should assess and estimate the default risk of a borrower based on the quantitative and qualitative information regarding the borrower's credit-worthiness (see subsection 4.4 below for risk assessment criteria). Banks should rank and group borrowers into individual grades each associated with an average PD. (Yes __ , No __)

4.1.3 Separate exposures to the same borrower should be assigned to the same borrower grade, irrespective of any differences in the nature of each specific transaction. Once a borrower has defaulted on any credit obligation (5% threshold) to a bank (or the banking group² of which it is a part), all of its facilities with that bank (or the banking group of which it is a part) are considered to be in default. (Yes __ , No __)

4.1.4 There are two exceptions that may result in multiple grades for the same borrower. First, to reflect country and transfer risk,³ a bank may assign

¹ For example, in an eight-grade rating system, where default risk increases with the grade number, a borrower whose financial condition warrants the highest investment grade rating should be rated a 1 even if the bank's transactions are unsecured and subordinated to other creditors. Likewise, a defaulted borrower with a transaction fully secured by cash should be rated an 8 (i.e. the defaulted grade) regardless of the remote expectation of loss.

² The banking group covers all entities within the group that are subject to the capital adequacy regime in Saudi Arabia.

³ Country and transfer risk is the risk that borrowers may not be able to secure foreign currency to service its external debt obligations due to adverse changes in the country in which it is operating suffers economic, political or social problems.

different borrower grades, and second depending on whether the facility is denominated in local or foreign currency. (Yes __ , No __)

- 4.1.5 In assigning a borrower to a borrower grade, banks should assess the risk of borrower default over a period of at least one year. However, this does not mean that banks should limit their consideration to outcomes for that borrower that is most likely to occur over the next 12 months. Borrower ratings should take into account all possible adverse events that might increase a borrower's likelihood of default (see subsection 4.5 below). (Yes __ , No __)

Facility rating

- 4.1.6 The second dimension should reflect transaction specific factors (such as collateral, seniority, product type, etc.) that affect the loss severity in the case of borrower default. (Yes __ , No __)
- 4.1.7 For banks adopting the Foundation IRB Approach, Banks can use a quantifiable LGD rating Percentage %, i.e. 45% and 75% of subordinated exposures. (Yes __ , No __)
- 4.1.8 LGD measure should represent the severity of loss, should default occur from the credit facilities. (Yes __ , No __)
- 4.1.9 For banks using the Advanced IRB Approach, facility ratings should reflect exclusively LGD. These ratings should cover all factors that can influence LGD including, but not limited to, the type of collateral, product, industry, and purpose. Borrower characteristics may be included as LGD rating criteria only to the extent they are predictive of LGD. (Yes __ , No __)

4.2 Rating structure

- 4.2.1 Banks should have a meaningful distribution of exposures across grades with no excessive concentrations, on both borrower-rating and facility-rating scales (also see paragraph 4.2.4). The number of borrower and facility grades used in a rating system should be sufficient to ensure that management can meaningfully differentiate risk in the portfolio. Perceived and measured risk should increase as credit quality declines from one grade to the next. (Yes __ , No __)

Borrower rating

- 4.2.2 Rating systems should have a minimum of seven borrower grades for non-defaulted borrowers and one for defaulted borrowers¹. While banks with lending activities focused on a particular market segment may satisfy this requirement with the minimum number of grades, banks lending to borrowers of diverse credit quality may need to have a greater number of borrower grades. (Yes __ , No __)

¹ For the purpose of reporting under SAMA's loan classification framework, banks should also be able to identify/differentiate defaulted exposures that fall within different categories of classified assets (i.e. Substandard, Doubtful and Loss).

- 4.2.3 In defining borrower grades, “+” or “-“ modifiers to alpha or numeric grades will only qualify as distinct grades if the bank has developed complete rating descriptions and criteria for their assignment, and separately quantifies PDs for these modified grades. (Yes __ , No __)
- 4.2.4 Banks with loan portfolios concentrated on a particular market segment and a range of default risk should have enough grades within that range to avoid undue concentration of borrowers in particular grades.¹ Significant concentration within a single grade should be supported by convincing empirical evidence that the grade covers a reasonably narrow PD band and that the default risk posed by all borrowers in the grade falls within that band. (Yes __ , No __)
- 4.2.5 For banks using the supervisory slotting criteria for SL² exposures, the rating system for such exposures should have at least four grades for non-defaulted borrowers and one for defaulted borrowers. Refer to SAMA's document P. 39 Paras 4.1.6 to 4.1.8 and Para 6.2.

SL exposures that qualify as corporate exposures under the Foundation IRB Approach or the Advanced IRB Approach are subject to the same requirements as those for general corporate exposures (i.e. a minimum of seven borrower grades for non-defaulted borrowers and one for defaulted borrowers). (Yes __ , No __)

Facility rating

- 4.2.6 There is no minimum number of facility grades. Banks using the Advanced IRB Approach should ensure that the number of facility grades is sufficient to avoid facilities with widely varying LGDs being grouped into a single grade. The criteria used to define facility grades should be grounded in empirical evidence. (Yes __ , No __)

4.3 Nature of Rating Systems

- 4.3.1 A bank's portfolio characteristics and complexity of business, as well as the range of products it offers, will affect the type and number of rating systems it has to employ. (Yes __ , No __)
- 4.3.2 The rationale for assigning a borrower to a particular rating system should also be documented and applied in a manner that best reflects the level of risk of the borrower. (Yes __ , No __)

4.4 Rating criteria

- 4.4.1 To ensure the transparency of individual ratings, banks should have clear and specific rating definitions, processes and criteria for assigning exposures to grades within a rating system. The rating definitions and criteria should be both plausible and intuitive, and have the ability to differentiate risk. In particular, the following requirements should be observed:

¹ In general, a single corporate borrower grade assigned with more than 30% of the gross exposures (before on-balance sheet netting) could be a sign of excessive concentration.

² Specialized lending.

- The grade descriptions and criteria should be sufficiently detailed and specific to allow staff responsible for rating assignments to consistently assign the same grade to borrowers or facilities posing similar risk. This consistency should exist across lines of business, departments and geographic locations. (Yes __ , No __)
- Written rating definitions should be clear and detailed enough to allow independent third parties (e.g. SAMA, internal or external audit) to understand the rating assignments, replicate them and evaluate their appropriateness. The criteria should be consistent with a banks internal lending standards and its policies for handling troubled borrowers and facilities. (Yes __ , No __)

4.4.2 Banks should take into account all relevant and material information that are available to them when assigning ratings to borrowers and facilities. Information should be current. The less information a bank has, the more conservative should be its rating assignments. An external rating can be the primary factor determining an internal rating assignment. However, the bank should ensure that other relevant information is also taken into account. (Yes __ , No __)

SL exposures within the corporate asset class

4.4.3 Banks using the supervisory slotting criteria for SL exposures should assign these exposures to internal rating grades based on their own criteria, systems and processes, subject to compliance with the IRB requirements. The internal rating grades of these exposures should then be mapped into five supervisory rating categories. The general assessment factors and characteristics exhibited by exposures falling under each of the supervisory categories are provided on p. 129 in the Attachment. 5.9 Table 2 entitled Supervisory slotting criteria for specialized lending of SAMA's document. (Yes __ , No __)

Banks should demonstrate that their mapping process has resulted in an alignment of grades consistent with the preponderance of the characteristics in the respective supervisory category. (Yes __ , No __)

4.5 Rating assessment horizon

4.5.1 Although the time horizon used in PD estimation is one year, banks are expected to apply a longer time horizon in assigning ratings. A borrower rating should represent the bank's assessment of the borrower's ability and willingness to contractually perform despite adverse economic conditions or the occurrence of unexpected events. In other words, the Bank's assessment should not be confined to risk factors that may occur in the next 12 months. (Yes __ , No __)

4.5.2 Banks may satisfy this requirement by: basing rating assignments on specific, appropriate stress scenarios (see subsection 4.8.5); or taking appropriate consideration of borrower characteristics that are reflective of the borrower's vulnerability to adverse economic conditions or unexpected

events. The range of economic conditions should be consistent with current conditions and those likely to occur over a business cycle within the respective industry/geographic region. (Yes __ , No __)

4.5.3 Given the difficulties in forecasting future events and the influence they will have on a particular borrower's financial condition, banks should take a conservative view of projected information. Where limited data are available, banks should adopt a conservative bias to their analysis. (Yes __ , No __)

4.5.4 Banks should articulate clearly their rating approaches in their credit policies, particularly how quickly ratings are expected to migrate in response to economic cycles and the implications of the rating approaches for their capital planning process. (ICAAP) (Yes __ , No __)

4.6 Use of models

Risk assessment techniques

4.6.1 There are generally two basic methods by which ratings are assigned: (i) a model-based process; and (ii) an expert judgment-based process. The former is a mechanical process, relying primarily on quantitative techniques such as credit scoring/default probability models or specified objective financial analysis. The latter relies primarily on personal experience and subjective judgment of credit officers.

Indicate the options adopted:

- Model based: (Yes __ , No __)
- Judgment based: (Yes __ , No __)
- Both: (Yes __ , No __)

In practice, the distinction between the two is not precise. In many model-based processes, personal experience and subjective judgment play a role, at least in developing and implementing models, and in constructing their inputs. In some cases, models are used to provide a baseline rating that serves as the starting point in judgment-based processes. (Yes __ , No __)

4.6.2 For IRB purposes, credit scoring models and other mechanical procedures are permissible as the primary or partial basis of rating assignments, and may play a role in the estimation of loss characteristics. (Yes __ , No __)

Nevertheless, sufficient human judgment and oversight is necessary to ensure that all relevant and material information is taken into consideration and that the model is used appropriately. (Yes __ , No __)

Requirements for using models

4.6.3 Banks should meet the following requirements for use of statistical models and other mechanical methods in rating assignments or in the estimation of PD, LGD or EAD:

- Banks should demonstrate that a model or procedure has good predictive power and its use will not result in distortion in regulatory capital requirements. The model should not have material biases. Its input variables should form a reasonable set of predictors and have explanatory capability. (Yes __ , No __)
- The data used to build the model should be representative of the population of the bank's actual borrowers or facilities. (Yes __ , No __)
- When model results are combined with human judgment, the judgment should take into account all relevant information not considered by the model. Banks should have written guidance describing how human judgment and model results are to be combined. (Yes __ , No __)
- Banks should have procedures for management review of model based rating assignment. Such procedures should focus on finding and limiting errors associated with model weakness. Banks should have a regular cycle of model validation that includes monitoring of model performance and stability, review of model relationships, and testing of model outputs against outcomes. (Yes __ , No __)
- Since the evaluation of actual performance to expected performance over time provides a basis for banks to refine and adjust internal models on an ongoing basis, it is expected that banks using internal models will have established well-articulated model review standards. These standards are especially important for situations where actual results significantly deviate from expectations and where the validity of the internal model is called into question. These standards must take account of business cycles and similar systematic variability in equity returns. All adjustments made to internal models in response to model reviews must be well documented and consistent with the bank's model review standards. (Yes __ , No __)

(Refer Paragraph 534 of International Convergence of Capital Measurement and Capital Standards – June 2006)

4.7 Documentation of rating system design

- 4.7.1 Banks should document in writing the design of their rating systems and related operations (see section 4.8 below on rating system operations) as evidence of their compliance with SAMA's requirements.
(Yes __ , No __)
- 4.7.2 The documentation should provide a description of the design of the rating system, including the purpose of the rating system portfolio differentiation; and the rating approach (Yes __ , No __)
- 4.7.3 Rating criteria and definitions should be clearly documented. These include:
- The relationship between borrower grades in terms of the level of risk each grade implies, and the risk of each grade in terms of both a description of the probability of default typical for borrowers assigned the grade and the criteria used to distinguish that level of credit risk; (Yes __ , No __)

- The relationship between facility grades in terms of the level of risk each grade implies, and the risk of each grade in terms of both a description of the expected severity of the loss upon default and the criteria used to distinguish that level of credit risk; (Yes __ , No __)
- Methodologies and data used in assigning ratings; (Yes __ , No __)
- An analyses demonstrating that risk criteria and procedures should be able to provide meaningful risk differentiation; (Yes __ , No __)
- Definitions of default (Yes __ , No __)
- The definition of what constitutes a rating exception (including an override). (Yes __ , No __)

4.7.4 Documentation of the rating process should include the following:

- The organization of rating process and assignment; (Yes __ , No __)
- Responsibilities of parties that rate borrowers and facilities; (Yes __ , No __)
- Parties that have authority to approve exceptions (including overrides); (Yes __ , No __)
- Situations where exceptions and overrides can be approved and the procedures for such approval; (Yes __ , No __)
- The procedures and frequency of rating reviews to determine whether they remain fully applicable to the current portfolio and parties responsible for conducting such reviews; (Yes __ , No __)
- The process for updating borrower and facility information; (Yes __ , No __)
- The history of major changes in the rating process and criteria, in particular to support identification of changes made to the rating process subsequent to the last supervisory view;¹ (Yes __ , No __)

4.7.5 In respect of the internal control structure, the documentation should cover the following:

- The organisation of the internal control structure; (Yes __ , No __);
- Management oversight of the rating process; (Yes __ , No __)
- The operational processes ensuring the independence of the rating assignment process; and the procedure, frequency and reporting of performance reviews of the rating system (on rating accuracy, rating criteria, rating processes and operations), and parties responsible for conducting such reviews. (Yes __ , No __)

4.7.6 Banks employing statistical models in the rating process should document their methodologies. The documentation should include:

- A detailed outline of the theory, assumptions and/or mathematical and empirical basis of the assignment of estimates to grades, individual borrowers, exposures, or pools, and the data sources used to estimate the model; (Yes __ , No __)

¹ The supervisory review could be a review conducted by either SAMA and or the home supervisor of the bank concerned (in the case of a foreign bank branch).

- The guidance describing how human judgment and model results are to be combined; (Yes __ , No __)
- The procedures for review of model-based rating assessments; (Yes __ , No __)
- A rigorous statistical process for validating the model; (Yes __ , No __) and
- Any circumstances under which the model does not work effectively. (Yes __ , No __)

4.7.7 Use of a model obtained from a third-party vendor that claims proprietary technology is not a justification for exemption from documentation or any other requirements for internal rating systems. The burden is on the model's vendor and the bank to satisfy SAMA. (Yes __ , No __)

4.8 Rating system operations

4.8.1 Coverage of ratings

For corporate, sovereign and bank exposures, each borrower and all recognised guarantors should be assigned a rating and each exposure should be associated with a facility rating as part of the loan approval process. Similarly, for retail exposures, each exposure should be assigned to a pool as part of the loan approval process. (Yes __ , No __)

Each separate legal entity to which a bank is exposed should be separately rated. A bank should demonstrate to SAMA that it has acceptable policies regarding the treatment of individual entities in a connected group, including circumstances under which the same rating may or may not be assigned to some or all related entities. (Yes __ , No __)

4.8.2 Integrity of rating process

Banks should ensure the independence of the rating assignment process. Rating assignments and periodic rating reviews should be completed or approved by a party that does not stand to benefit from the extension of credit. Credit policies and approval/review procedures should reinforce and foster the independence of the rating process. (Yes __ , No __)

Borrower and facility ratings should be reviewed and updated at least annually. Higher risk borrowers or problem exposures should be subject to more frequent review. (Yes __ , No __)

In addition, borrower and facility ratings should be reviewed whenever material information on the borrower or facility comes to light.¹ Bank

¹ The rating should generally be updated within 90 days for performing borrowers and within 30 days for borrowers with weakening or deteriorating financial condition.

should establish an effective process to obtain and update relevant and material information on the borrower's financial condition, and on facility characteristics that affect LGD and EAD (e.g. the condition and value of collateral). (Yes __ , No __)

4.8.3 Overrides

Banks should clearly articulate the situations where human judgment may override the inputs or outputs of the rating process. They should identify overrides and separately track their performance. (Yes __ , No __)

For model-based ratings, banks should have guidelines and processes for monitoring cases where human judgment has overridden the model's rating, variables were excluded or inputs altered. These guidelines should include identifying personnel that are responsible for approving the overrides. (Yes __ , No __)

For ratings based on expert judgment, banks should clearly articulate the situations where staff may override the outputs of the rating process, including how and to what extent such overrides can be used and by whom. (Yes __ , No __)

4.8.4 Data maintenance

Banks should collect and store data on key borrowers and facility characteristics to support their internal credit risk measurement and management process and to enable them to meet SAMA requirements. SAMA's requirements include that the data collection and IT systems should serve the following purposes:

- Improve banks' internally developed data; (Yes __ , No __)
- PD/LGD/EAD estimation and validation; (Yes __ , No __)
- Provide an audit trail to check compliance with rating criteria; (Yes __ , No __)
- Enhance and track predictive power of the rating system; (Yes __ , No __)
- Modify risk rating definitions to more accurately address the observed drivers of credit risk; (Yes __ , No __) and
- Serve as a basis for supervisory reporting. (Yes __ , No __)

Corporate, sovereign and bank exposures

Bank should maintain complete rating histories on borrowers and recognised guarantors, which include:

- The ratings since the borrower/guarantor was assigned a grade;

(Yes __ , No __)

- The dates the ratings were assigned; (Yes __ , No __)
- The methodology and key data used to derive the ratings; (Yes __ , No __)
- The person/model responsible for the rating assignment; (Yes __ , No __)
- The identity of borrowers and facilities that have defaulted, and the date and circumstances of such defaults; (Yes __ , No __) and
- Data on the PDs and realised default rates associated with rating grades and rating migration. (Yes __ , No __)

Banks adopting the Advanced IRB Approach should also collect and store a complete history of data on facility ratings and LGD and EAD estimates associated with each facility or facility grouping. These include:

- The dates the ratings were assigned and the estimates done; (Yes __ , No __)
- The key data and methodology used to derive the facility ratings and estimates; (Yes __ , No __)
- The person/model responsible for the rating assignment and estimates; (Yes __ , No __)
- Data on the estimated and realised LGDs and EADs associated with each defaulted facility; (Yes __ , No __)
- Data on the LGD of the facility before and after evaluation of the credit risk mitigating effects of the guarantee/credit derivative; (Yes __ , No __) and
- Information on the components of loss or recovery for each defaulted exposure, such as amounts recovered, source of recovery (e.g. collateral, liquidation proceeds and guarantees), time period required for recovery, and administrative costs. (Yes __ , No __)

Banks utilising supervisory estimates under the Foundation IRB Approach are encouraged to retain:

- Data on loss and recovery experience for corporate exposures under the Foundation Approach; (Yes __ , No __) and
- Data on realised losses for SL exposures where supervisory slotting criteria are applied. (Yes __ , No __)

4.8.5 Stress tests

Banks adopting the IRB Approach should perform a sound stress-testing process for use in the assessment of capital adequacy. Stress testing should identify possible events or changes in economic conditions that could have unfavorable effects on banks' credit exposures, and assess the bank's ability to withstand such changes. Stress tests conducted by a bank should cover a wide range of external conditions and scenarios, and the sophistication of techniques and stress tests used should be commensurate with the bank's activities. (Yes __ , No __)

Described below are some common risk factors that are relevant to credit risk stress tests:

- Counterparty risk characterized by the increase in PDs (e.g. the rise in delinquencies and charge offs) and worsening of credit spreads. Banks should be aware of the major drivers of repayment ability, such as economic/industry downturns and significant market shocks, that will affect entire classes of counterparties or credits; (Yes __ , No __);
- Concentration risk in terms of the exposures to individual counterparties, industries, market sectors, countries or regions. Banks should assess the contagion effects and possible linkages between different markets, countries and regions. (Yes __ , No __)
- Market or price risk arising from adverse changes in asset prices (e.g. equities, bonds and real estate) and their impact on relevant portfolios, markets and collateral values; (Yes __ , No __) and
- Liquidity risk as a result of the tightening of credit lines and market liquidity under stressed situations. (Yes __ , No __)

In designing stress scenarios, banks should review lessons from history and tailor the events, or develop hypothetical scenarios, to reflect the risks arising from latest market developments. (Yes __ , No __)

SAMA will consider the results of stress tests conducted by a bank and how these results relate to its capital plans. (ICAAP) (Yes __ , No __)

In addition to the general stress tests described above, banks should conduct a regular credit risk stress test to assess the effect of certain specific conditions on their total regulatory capital requirements for credit risk. The test should be meaningful and reasonably conservative. For this purpose, banks should at least consider the effect of mild recession scenarios on their PDs, LGDs and EADs. (Yes __ , No __)

At a minimum, a mildly stressed scenario chosen should resemble the economic recession in Saudi Arabia in the past. Banks should assess the impact of this stress scenario based on a one-year time horizon and take into account the lag effect of an economic downturn on their credit exposures. (Yes __ , No __)

Where the results of a bank's stress test indicate a deficiency of the capital calculated based on the IRB Approach (i.e. the capital charge cannot cover the losses based on the stress-testing results), SAMA will discuss the concern with the bank's management. Depending on the circumstances of each case, SAMA will require the bank to reduce its risks and/or to hold additional capital/provisions

Through the review of stress-testing results, regulatory capital could be calculated based on a more forward-looking basis, thereby reducing the impact of rising capital requirements during an economic down turn.

(Yes __ , No __)

4.9 Corporate governance and oversight

4.9.1 Corporate governance

Effective oversight by a bank's Board of Directors and senior management is critical for sound risk rating system operations.

(Yes __ , No __)

The Board Audit Committee and senior management should approve key elements of the risk rating and estimation processes. These parties should possess a general understanding of the bank's risk rating system. Information provided should be sufficiently detailed to allow the directors or committee members to confirm the continuing appropriateness of the banks rating approach and to verify the adequacy of the controls supporting the rating system.

(Yes __ , No __)

Senior management should:

- Have a good understanding of the rating system's design and operations, and approve material differences between established procedures and actual practice; (Yes __ , No __)
- Ensure, on an ongoing basis, that the rating system is operating properly; (Yes __ , No __)
- Meet regularly with staff in the credit control function to discuss the performance of the rating process, areas requiring improvement, and the status of efforts to improve previously identified deficiencies; (Yes __ , No __) and
- Provide notice to Audit committee of material changes or exceptions from established policies that will materially impact the operations of the bank's rating system. (Yes __ , No __)

Information on internal ratings should be reported to the Board, or Audit Committee and senior management regularly. The scope and frequency of reporting may vary with the significance and type of information. The reports should cover the following information:

- Risk profile by grade; (Yes __ , No __)
- Risk rating migration across grades; (Yes __ , No __)
- Estimation of relevant parameters per grade; (Yes __ , No __)
- PDs LGDs and EADs (where applicable) against expectation; (Yes __ , No __)
- Reports measuring changes in regulatory and economic capital; (Yes __ , No __)
- Results of credit risk stress-testing; (Yes __ , No __) and
- Reports generated by rating system review, audit, and other control units. (Yes __ , No __)

4.9.2 Risk control

Banks should have independent risk control units that are responsible for the design or selection, implementation and performance of their internal rating systems. The unit(s) should be functionally independent from the staff and management functions responsible for originating exposures. (Yes __ , No __) Areas of responsibility should include:

- Design of the rating system; (Yes __ , No __)
- Testing and monitoring internal grades; (Yes __ , No __)
- Reviewing the compliance with policies and procedures, including application of rating criteria, processes of overrides and policy exceptions; (Yes __ , No __)
- Producing and analyzing summary reports from the banks' rating system, to include historical default data sorted by ratings (Yes __ , No __)
- Implementing procedures to verify that rating definitions are consistently applied across departments and geographic areas; (Yes __ , No __)
- Reviewing and documenting any changes to the rating process, including the reasons for changes; (Yes __ , No __)
- Assuming oversight and supervisory responsibilities for any models used in the rating process, and ultimate responsibility for the ongoing review of and alterations to rating models. (Yes __ , No __)

4.9.3 Internal and external audit.

Internal audit or an equally independent function should review at least annually a bank's rating system and its operations, including the operations of the credit function and the estimation of PDs, LGDs and EADs. (Yes __ , No __)

Internal audit should document its findings and report them to the Audit Committee and senior management. The findings would facilitate the bank to disclose information in relation to its rating processes and controls surrounding these processes, which is required under Pillar-III. (Yes __ , No __)

SAMA may commission an external audit under Banking Control Law to review rating assignment process and estimation of loss characteristics or risk drivers i.e. PD, LGDs and EAD's (Yes __ , No __)

4.9.4 Staff competence

Senior management should ensure that the staff responsible for any aspect of the rating process, including risk control and internal validation, are adequately qualified and trained to undertake the role. In particular, staff responsible for assigning or reviewing ratings should receive adequate training to generate consistent and accurate rating assignments. (Yes __ , No __)

4.10 Use of internal ratings

4.10.1 Use test

Internal ratings and default and loss estimates should play an essential role in the credit approval, risk management, internal capital allocations, and corporate governance functions of bank using the IRB Approach. (Yes __ , No __)

Rating systems and estimates designed and implemented exclusively for the purpose of qualifying for the IRB Approach and used only to provide IRB inputs are not acceptable. (Yes __ , No __)

It is recognised that bank may not necessarily be using exactly the same estimates for both IRB and all internal purposes. For example, pricing models are likely to use PDs and LGDs relevant to the life of the asset. Where there are such differences, banks should document their justifications. (Yes __ , No __)

4.10.2 Credible track record

A bank should have a credible track record in the use of information generated by its internal rating system. The bank should demonstrate that it has been using a rating system that was broadly in line with the requirements of this document. Improvements to a bank's rating system will not render the bank non-compliant with this requirement. (Yes __ , No __)

If the internal rating systems of a branch, which is owned by a foreign bank, have been developed and used at the group level for an extended period of time, the bank is still required to meet the "use" test locally. (Yes __ , No __)

4.11 Disclosure requirements

In order to be eligible for the IRB Approach, banks should meet the requirements set out in the disclosure rules under Pillar III. Failure to meet the disclosure requirements will render a bank ineligible to use the relevant IRB Approach. (Yes __ , No __)

4.12 Assessment factors in assigning ratings

Borrower ratings

The following are the relevant factors that banks should consider in assigning borrower ratings. However, these factors are not intended to be exhaustive or prescriptive, and certain factors may be of greater relevance for certain borrowers than for others:

- The historical and projected capacity to generate cash to repay a borrower's debt and support its other cash requirements (e.g. capital expenditures required to keep the borrower a going concern and to sustain its cash flow); (Yes __ , No __)
- The capital structure and the likelihood that unforeseen circumstances could exhaust the borrower's capital cushion and result in insolvency; (Yes __ , No __)
- The quality of earnings (i.e. the degree to which the borrower's revenue and cash flow emanate from core business operations as opposed to unique and non-recurring sources); (Yes __ , No __)
- The quality and timeliness of information about the borrower, including the availability of audited financial statements and their conformity with applicable accounting standards; (Yes __ , No __)
- The degree of operating leverage and the resulting impact that deteriorating business and economic conditions might have on the borrower's profitability and cash flow; (Yes __ , No __)
- The borrower's ability to gain additional funding through access to debt and equity markets; (Yes __ , No __)
- The depth and skill of management to effectively respond to changing conditions and deploy resources, and the degree of prudence reflected from business strategies employed; (Yes __ , No __)
- The borrower's position within the industry and its future prospects; (Yes __ , No __)
- The risk characteristics of the country the borrower is operating in, and the extent to which the borrower will be subject to transfer risk or currency risk if it is located in another country. (Yes __ , No __)

Facility ratings

Banks should look at the following transaction specific factors, where applicable, when assigning facility ratings.

A standard approach is to consider further adjustment to the facility rating (after adjusting for third-party support), taking into account and the remaining term to maturity.

The presence of third-party support (e.g. owner/guarantor). Considerable care and caution should be exercised if ratings are to be improved because of the presence of any third-party support. In all cases, banks should be convinced that the third party is committed to ongoing support of the borrower. Banks should establish specific rules for third-party support. (Yes __ , No __)

The maturity of the transaction. It is recognized that higher risk is associated with longer-term facilities while shorter-term facilities tend to have lower risk. (Yes __ , No __)

The structure and lending purposes of the transaction, which influence positively or negatively the strength and quality of the credit. These may refer to, priority of security, any covenants attached to a facility, etc. For example, a facility that has a lower rating due to its extended maturity. However, if there are very strong covenants which can mitigate the effects of its term of maturity by means of default clauses, it may be appropriate to adjust its facility rating to offset (often partially) the effect of the maturity term. (Yes __ , No __)

The presence of recognised collateral. This factor can have a major impact on the final facility rating because of its significant effect on the LGD of a facility. Banks should review carefully the quality of collateral (e.g. documentation and valuation) to determine its likely contribution in reducing any loss. While collateral value is often a function of movements in market rates, it should be assessed in a conservative manner (e.g. based on net realizable value or forced-sale value where necessary). (Yes __ , No __)

4.13 Rating approaches

Background

In choosing the rating system approach, borrowers can be graded according to their expected default rates over the following year (i.e. a point-in-time rating system) or alternatively their expected default rates over a wider range of possible stress outcomes (i.e. a through-the-cycle rating system).

Indicate the system adopted¹:

- Point in time (Yes __ , No __)
- Through the cycle (Yes __ , No __)

¹ Refer to Note the next page.

A Note On Point in Time Rating System and Through the Cycle Rating System

Point-in-time rating system

In a point-in-time rating system, an internal rating reflects an assessment of the borrower's current condition (such as its financial strength) and/or most likely future condition over the forecast horizon (say one year). As such, the internal rating changes as the borrower's condition changes over the course of the economic/business cycle. As the economic circumstances of many borrowers reflect the common impact of the general economic environment, the transitions in point-in-time ratings will reflect fluctuations in the economic cycle.

Through-the-cycle rating system

A through-the-cycle process requires assessment of the borrower's risk based on a worst-case scenario, i.e. the bottom of an economic/business cycle. In this case, a borrower rating would tend to stay the same over the course of an economic cycle unless the borrower experiences a major unexpected shock to its perceived long-term condition or the original "worst" case scenario used to rate the borrower proves to have been too optimistic.

Similar to point-in-time ratings, through-the-cycle ratings also change from year to year to reflect changes in borrowers' circumstances. However, year-to-year transitions in through-the-cycle ratings will be less influenced by changes in the actual economic environment as this approach abstracts from the immediate economic circumstances and considers the implications of hypothetical stressed circumstances.

RATING SYSTEM DESIGN
RETAIL PORTFOLIO

- **RETAIL NON MORTGAGES**
- **SMALL BUSINESS ENTERPRISES**
- **RESIDENTIAL MORTGAGES**

TABLE OF CONTENTS

Rating System Design **Retail Portfolio**

	<u>Page #</u>
4.1 Pooling Dimension	33
4.2 Pooling Structure	34
4.3 Nature of Pooling Systems	34
4.4 Pooling Criteria	34
4.5 Documentation of Pooling design	34
4.6 Pooling System Operations	35
4.7 Integrity of Pooling Process	35
4.8 Data Maintenance	35
4.9 Disclosure requirements	35

RATING SYSTEM DESIGN

RETAIL PORTFOLIO

Retail Portfolio should include Retail Non Mortgages, Small business facilities exposure (SBFE's), Residential Mortgages, etc.

Banks should separate exposures into pools with homogenous risk characteristics that reliably differentiate risk and produce accurate and reliable estimates of the risk parameters. Banks should determine their own unique pools, contingent on the nature of their business, products and markets they are engaged in.

The particular "Pool" covered should be indicated.

4.1 Pooling Dimension

4.1.1 Rating systems for retail exposures should reflect both borrower and transaction risks, and capture all relevant borrower and transaction characteristics. Banks should assign each retail exposure to a particular pool. For each pool, banks should estimate PD, LGD and EAD.
(Yes __ , No __)

4.1.2 Banks should demonstrate that this grouping process provides for a meaningful differentiation of risk and results in sufficiently homogeneous pools that allow for accurate and consistent estimation of loss characteristics at the pool level. (Yes __ , No __)

4.1.3 Banks should have specific criteria for slotting an exposure into a pool. These should cover all factors relevant to the risk analysis. At a minimum, banks should consider the following risk drivers when assigning exposures to a pool:

Borrower risk characteristics (e.g. borrower type, demographics such as, age/occupation, etc):

Transaction risk characteristics including product and/or collateral type. One example of split by product type is to group exposures into credit cards, installment loans, revolving credits, residential mortgages, and small business facilities. When grouping exposures by collateral type, consideration should be given to factors such as loan-to-value ratios, guarantees and seniority (first vs. second lien).
(Yes __ , No __)

4.1.4 Delinquency status: Banks should separately identify delinquent and non-delinquent exposures. (Yes __ , No __)

4.2 Pool Structure

4.2.1 The level of differentiation for IRB purposes should ensure that the number of exposures in a given pool is sufficient to allow for meaningful quantification and validation of the loss characteristics at the pool level. There should be a meaningful distribution of borrowers and exposures across pools to avoid undue concentration of a bank's retail exposures in particular pools. (Yes __ , No __)

4.3 Nature of Pooling Systems

4.3.1 A bank's portfolio characteristics and complexity of business, as well as the range of products it offers, will affect the type and number of pooling systems it has to employ. (Yes _____ , No _____)

4.3.2 The rationale for assigning a borrower to a particular rating system should also be documented and applied in a manner that best reflects the level of risk of the borrower.

4.4 Pooling criteria

4.4.1 To ensure the transparency of individual pools, banks should have clear and specific pooling definitions, processes and criteria for assigning exposures within a pooling system. The definition of each pool should be both plausible and intuitive, and have the ability to differentiate risk. In particular, the following requirements should be observed:

- The pool descriptions and criteria should be sufficiently detailed and specific to allow responsible staff to consistently assign facilities posing similar risk. This consistency should exist across lines of business, departments and geographic locations. (Yes __ , No __)
- Written definitions of pools should be clear and detailed enough to allow independent third parties (e.g. SAMA, internal or external audit) to understand the rating assignments, and evaluate their appropriateness. The criteria should be consistent with a banks internal lending standards and policies. (Yes __ , No __)

4.4.2 Banks should take into account all relevant and material information that are available to them when assigning exposure to a retail pool (Yes __ , No __)

4.5 Documentation of Pooling system design

Banks should document in writing the design of their pooling systems. (Yes __ , No __)

4.6 Pooling system operations

Coverage of ratings

Each exposure should be assigned to a pool as part of the loan approval process. (Yes __ , No __)

4.7 Integrity of Pooling process

Banks should review the risk characteristics of each identified risk pool at least on an annual basis. It should include a review of the status of individual borrowers within each pool as a means of ensuring that exposures continue to be assigned to the correct pool. (Yes __ , No __)

4.8 Data maintenance

Banks should collect and store data on key borrowers and facility characteristics to support their internal credit risk measurement and management process and to enable them to meet the following SAMA requirements.

- Data used in the process of allocating exposures to pools, including data on borrower and transaction risk characteristics used either directly or through use of a model, as well as data on delinquency; (Yes __ , No __)
- Data on the estimated PDs, LGDs and EADs associated with pools of exposures; (Yes __ , No __)
- The identity of borrowers and details of exposures that have defaulted; (Yes __ , No __) and

4.9 Disclosure requirements

In order to be eligible for the IRB Approach, banks should meet the requirements set out in the disclosure rules under Pillar III. Failure to meet the disclosure requirements will render a bank ineligible to use the relevant IRB Approach. (Yes __ , No __)

QUESTIONNAIRE RELATING TO
RISK QUANTIFICATION

SELF-ASSESSMENT QUESTIONNAIRE
RISK QUANTIFICATION

- This section of the questionnaire covers a bank's risk estimation or quantification systems for the various types of internal portfolios which are to be moved to IRB Approaches. These estimates include PD's, LGD's and EADs.
- The first part of the questionnaire 4B-1 is common to all or any of the Corporate, Sovereign and Bank Portfolios, while the second part 4B-2 relates to the Retail Portfolio only.
- Banks should clearly identify or covers separately the Internal Portfolio, the questionnaire relates retail. Therefore, if a bank proposes to move corporate and banking portfolios separately, distinct responses should be provided for each of these portfolios.
- Please provide "Yes" or "No" answers with a tick (✓) to the following statements, criteria, conditions, your Bank incorporates or employs in the implementation of IRB Approaches and plans, and where relevant provide supporting documentation.
- For Retail Portfolio, the particular "Pool" covered should be indicated.

RISK QUANTIFICATION

- **SOVEREIGN AND CENTRAL BANKS**
- **MULTILATERAL DEVELOPMENT BANKS**
- **PUBLIC SECTOR ENTITIES**
- **BANKS AND SECURITIES FIRMS**
- **CORPORATES**

TABLE OF CONTENTS

	<u>Page #</u>
4.1 Risk Quantification	40
4.2 Definition of Default	43
4.3 Definition of Loss	44
4.4 Requirements for PD Estimation	44
4.5 Requirements for own LGD Estimates	45
4.6 Requirements for own EAD Estimates	46
4.7 Validation of Internal Estimates	47

RISK QUANTIFICATION
SELF-ASSESSMENT CHECKLIST

- The particular portfolio covered should be indicated.
- Please provide "Yes" , "No" answers with a tick (✓) to the following statements, and when relevant, provide supporting documentation.
- This section addresses the broad standards for generating a bank's own estimates of PD, LGD, and EAD. Except for certain equity and specialized lending exposures.
- Banks are expected to incorporate, employ and or use the following qualifying criteria, standards, or tests, relating to implementing the IRB Approaches. Consequently, Banks must respond either by a "yes" or "no" answer. A "yes" answer may be provided in instances as described below, where a bank is planning to fully implement, incorporate or utilize a given criteria or condition. In such instances, details will need to be provided covering the time frame for achieving a given criteria or condition. Further, banks will provide supporting documentation where necessary to facilitate the bi-lateral discussion SAMA plans to engage in with each applicant bank prior to going its approval to implement IRB Approaches.

B. Risk Quantification:

4.1 General requirements for risk estimation

- 4.1.1 All banks using the IRB Approach should estimate a PD for each internal borrower grade. (Yes __ , No __)
- 4.1.2 PD estimates should be a long run average of one-year default rates for borrowers in the grade. Requirements specific to PD estimation are provided in section 4.4. (Yes __ , No __)
- 4.1.3 Banks on the Advanced IRB Approach should estimate an appropriate LGD (as defined in paragraph 4.5.1) for each of their facilities. Requirements specific to LGD estimation are set out in subsection 4.5. They should also estimate EAD for each of their facilities (as defined in paragraphs 4.6.1 and 4.6.2). (Yes __ , No __)
- 4.1.4 Banks that are on the Foundation IRB Approach or do not meet the requirements for their own estimation of EAD or LGD should use the supervisory estimates of these parameters. (Yes __ , No __)

Risk Quantification Process

- 4.1.5 The risk quantification process should be fully documented. It should cover all stages of the estimation process including data collection, estimation, mapping, etc. Adequate documentation would promote consistency and allow third parties to review and replicate the entire process. (Yes __ , No __)
- 4.1.6 Periodic updates to the quantitative process should be conducted to ensure that new data and analytical techniques and evolving industry practices are incorporated into the process. (Yes __ , No __)

PD/LGD/EAD estimation

- 4.1.7 Estimates of PD, LGD and EAD measured by the quantification process should be updated at least annually or whenever it is considered necessary (e.g. when new data and other information have become available or methods for estimation have changed). The updating process should be documented in banks' internal policies. Particular attention should be given to new business lines or portfolios in which the mix of obligors is believed to have changed substantially. (Yes __ , No __)
- 4.1.8 Estimates should be grounded in historical experience and empirical evidence, and not based purely on subjective or judgmental considerations. They should incorporate all relevant, material and available data, information and methods. Any changes in lending practice or the process for pursuing recoveries over the data observation period should be taken into account. (Yes __ , No __)
- 4.1.9 Banks may utilize internal data and data from external sources (including pooled data) in their own estimation. Where such data are used, banks should demonstrate that their estimates are representative of long run experience. (Yes __ , No __)
- 4.1.10 The population of exposures represented in the external data used for estimation, and the lending standards in use when the data were generated, and other relevant characteristics should be closely matched to or at least comparable with those of a bank's exposures and standards. The bank should also demonstrate that economic or market conditions underlying the data are relevant to current and foreseeable conditions. (Yes __ , No __)

For estimates of LGD and EAD, banks should take into account paragraphs 4.5.1 to 4.5.2 and 4.6.3 to 4.6.5 respectively.

Conservatism

- 4.1.13 Judgmental adjustments may form a part of the quantification process. Consistent signs of judgmental decisions that lower parameter estimates materially may be evidence of bias. The reasoning and empirical support for any adjustments, as well as the mechanics of the calculation, should be documented. Banks should conduct sensitivity analysis to demonstrate that the adjustment procedure is not biased toward reducing capital requirements. (Yes __ , No __)
- 4.1.14 Estimates of PD, LGD and EAD should incorporate a degree of conservatism that is appropriate for the overall robustness of the quantification process. In general, such estimates are likely to involve unpredictable errors. In order to avoid undue optimism, banks should add to their estimates a margin of conservatism that is related to the likely range of errors. (Yes __ , No __)
- 4.1.15 There should be an appropriate degree of conservatism to adequately account for all uncertainties and weaknesses relating to risk quantification. Improvements in the quantification process (e.g. use of better data and estimation techniques) may reduce the appropriate degree of conservatism over time. (Yes __ , No __)

Review and validation

- 4.1.16 Banks should subject all aspects of the quantification process, including design and implementation, to an appropriate degree of independent review and validation. An independent review is an assessment conducted by persons not accountable for the work being reviewed. The reviewers may either be internal or external parties. (Yes __ , No __)
- 4.1.17 The review serves as a check on the quantification process to ensure that it is sound and works as intended; it should be broad-based, and should include all of the elements of the quantification process that lead to the ultimate estimates of PD, LGD and EAD. (Yes __ , No __)
- 4.1.18 The review should cover the full scope of validation, including:
- an evaluation of the integrity of data inputs; (Yes __ , No __)
 - an analysis of the internal logic and consistency of the process; (Yes __ , No __)
 - appropriate back-testing based on actual outcomes. (Yes __ , No __)
 - detailed requirements for ongoing validation and back testing of estimates are set out in section 5. (Yes __ , No __)

4.2 Definition of default

4.2.1 A default is considered to have occurred with regard to a particular obligor when either or both of the two following events have taken place :

- A bank considers that the obligor is unlikely to pay in full its credit obligations to the bank (or the banking group¹ of which it is a part), without recourse by the bank to actions such as realizing security (if held); (Yes __ , No __)
- The obligor is past due for more than 90 days² on any material portion of its credit obligations to the bank (or the banking group of which it is a part). Past due credit obligations are regarded as material if they represent 5% or more of the obligor's outstanding credit obligations. Banks may however set a lower threshold or choose not to apply the threshold based on their individual circumstances. Overdrafts will be considered as past due once the customer has breached an advised limit or been advised of a limit smaller than the current outstanding balance (see also paragraph 4.2.6). The criteria for determining overdue assets are set out in SAMA's circular BCS # 312 of 19.1.2004 entitled "SAMA's Rules Concerning Loan Classifications, Provisioning and Credit Review". (Yes __ , No __)

4.2.2 The elements to be taken as indicators of unlikeliness to pay include:

A Bank puts the credit obligation on non-accrual status. (Yes __ , No __)

- The criteria for putting an obligation on non-accrual status and those for restoring the "accrual" status are set out in SAMA's circular # 312 of 19.1.2004 entitled "SAMA circular on loan classification, provisioning and credit review"; (Yes __ , No __)
- A bank makes a charge-off or account-specific provision resulting from a significant perceived decline in asset quality subsequent to the bank taking on the exposure;³ (Yes __ , No __)
- A bank gives consent to a distressed restructuring/rescheduling of the credit obligation where this is likely to result in a diminished financial obligation caused by the material forgiveness, or postponement, of principal, interest or, where relevant, fees.⁴ The criteria for determining rescheduled assets and those for uplifting the "rescheduled" status are set out SAMA's circular # 312.⁵ (Yes __ , No __)
- A bank has filed for the obligor's bankruptcy or a similar order in respect of the obligor's credit obligation to the bank; (Yes __ , No __)

¹ The banking group covers all entities within the group that are subject to the capital adequacy regime in Saudi Arabia.

² In the event that a branch owned by a foreign banking group wants to use a different default trigger set by its home supervisor for particular exposures (e.g. 180 days for exposures to retail or public sector entities), the bank will need to satisfy SAMA that such a difference in the definition of default will not result in any material impact on the default and loss estimates generated. Where necessary, if the relevant models are centrally developed and validated at the home country, the views of the home supervisor will be sought.

³ Specific provisions on equity exposures set aside for price risk do not necessarily signal default.

⁴ Including, in the case of equity holdings assessed under a PD/LGD approach, such distressed restructuring of the equity itself.

⁵ Also see "Rescheduled Loans", SAMA circular # 312 of 19.1.2004, which provides guidance on the definition of "rescheduled loans".

- The obligor has sought or has been placed in bankruptcy or similar protection where this would avoid or delay repayment of the credit obligation to the bank. (Yes __ , No __)

4.2.3 Treatment of overdrafts

Overdraft facilities authorized by a bank to a customer should be subject to a formal credit limit. Any breach of this limit should be monitored. If the account were not brought under the limit after 90 days, it would be considered as defaulted.

(Yes __ , No __)

4.3 Definition of loss

4.3.1 The definition of loss used in estimating LGD is economic loss. When measuring economic loss, all relevant factors should be taken into account. This should include material discount effects and material direct and indirect costs associated with collecting on the exposure.

(Yes __ , No __)

4.3.2 Banks should not simply measure the loss recorded in accounting records. They should be able to compare accounting and economic losses (some Banks may also adopt the concept of economic loss in their accounting records). Banks' own workout and collection expertise significantly influences their recovery rates, and should be reflected in their LGD estimates. However, adjustments to estimates for such expertise should be conservative until a bank has maintained sufficient internal empirical evidence to manifest the impact of its expertise.

(Yes __ , No __)

4.4 Requirements for PD estimation

Data observation period

4.4.1 Irrespective of whether a bank is using external, internal, or pooled data sources, or a combination of the three, for its PD estimation, the length of the underlying historical observation period used should be at least 3 years from at least one source. If the available observation period spans a longer period for any source, and the data are relevant and material, this longer period should be used. Bank need not give equal importance to historical data if it can convince SAMA that more recent data are a better predictor of default rates. (Yes __ , No __)

4.4.2 SAMA applies the transitional requirement of a minimum of two years of data at the time of adopting IRB Approach for Banks that can implement such approaches during the period from 1 January 2009 to 31 December 2011. (Yes __ , No __)

- 4.4.3 Bank should use information and techniques that take appropriate account of the long run experience when estimating the average PD for each rating grade. For example, banks may use one or more of the standard three available specific techniques (i.e. internal default experience, mapping to external data, and statistical default models). (Yes___, No___)
- 4.4.4 Banks may map their internal grades to the scale used by a recognized ECAI¹, and then attribute the default rate observed for the ECAI's grades to the bank's grades. Mappings should be based on a robust comparison of internal rating criteria to the criteria used by the ECAI and on a comparison of the internal and external ratings of any common borrowers. (Yes __ , No __)
- 4.4.5 Banks that aggregate the PD of individual portfolio obligors when calculating PD estimates for internal grades should have a clear policy governing the aggregation process. (Yes __ , No __)

4.5 Requirements for LGD estimates²

- 4.5.1 Banks should estimate an LGD for each facility that aims to reflect economic downturn conditions where necessary to capture the relevant risks. The loss is to be calculated based on the average economic loss of all observed defaults for that type of facility. In addition, a bank should take into account the potential for the LGD of the facility to be higher during a period when credit losses are substantially higher than average. (Yes __ , No __)
- 4.5.2 In its analysis, a bank should consider the extent of any dependence between the risk of the borrower and that of the collateral or collateral provider. Cases where there is a significant degree of dependence should be addressed in a conservative manner. Any currency mismatch between the underlying obligation and the collateral should also be considered and treated conservatively in the bank's assessment of LGD. (Yes __ , No __)
- 4.5.3 LGD estimates should be grounded in historical recovery rates and, when applicable, should not solely be based on the estimated market value of collateral. This requirement recognises the potential inability of banks to gain both control of their collateral and liquidate it expeditiously. To the extent, that LGD estimates take into account the existence of collateral, bank should establish internal requirements for collateral management, operational procedures, legal certainty and risk management process. (Yes __ , No __)

¹ External Credit Assessment Institution (ECAI).

² Applicable only for AIRB Approach

- 4.5.4 Recognising the principle that realised losses can at times systematically exceed expected levels, the LGD assigned to a defaulted asset should reflect possibility that the bank would have to recognise additional, unexpected losses during the recovery period. For each defaulted asset, the bank should also construct its best estimate of the expected loss on that asset based on current economic circumstances and facility status. (Yes __ , No __)
- 4.5.5 Banks that aggregate LGD estimates for facility grades from individual exposures should have a clear policy governing the aggregation process. (Yes __ , No __)
- 4.5.6 Estimates of LGD should be based on a minimum data observation period that should ideally cover at least one complete economic cycle but should in any case be no shorter than a period of three to five years. If the available observation period spans a longer period for any source, and the data are relevant, this longer period should be used. (Yes__, No__)

4.6 Requirements for own-EAD estimates

- 4.6.1 EAD for an on-balance sheet or off-balance sheet item is defined as the expected gross exposure of the facility upon default of the obligor. (Yes __ , No __)
- 4.6.2 The additional minimum requirements for internal estimation of EAD under the Advanced IRB Approach, therefore, focuses on the estimation of EAD for off-balance sheet items. Banks using the Advanced IRB Approach should have established procedures in place for the estimation of EAD for off balance sheet items. These should specify the estimates of EAD to be used for each facility type. Banks' estimates of EAD should reflect the possibility of additional drawings by the borrower up to and after the time a default event is triggered. (Yes __ , No __)
- 4.6.3 Banks using the Advanced IRB Approach should assign an estimate of EAD for each facility. (Yes__, No__)
- 4.6.4 If a positive correlation can reasonably be expected between the default frequency and the magnitude of EAD, the EAD estimate should incorporate a larger margin of conservatism. Moreover, for exposures for which EAD estimates are volatile over the economic cycle, banks should use EAD estimates that are appropriate for an economic downturn. (Yes__, No__)
- 4.6.5 Estimates of EAD should be based on a time period that should ideally cover a complete economic cycle but should in any case be no shorter than a period of 3 to 5 years. If the available observation period spans a longer period for any source, and the data are relevant, this longer period should be used. (Yes __ , No __)

4.7 Validation of internal estimates

4.7.1 General requirements

- a. Validation is an integral part of a bank's internal systems estimates.
(Yes __ , No __)
- b. The validation process should include a comparison of predicted estimates to actual outcomes (i.e. back-testing, as described paragraphs in 4.7.2. (Yes __ , No __)
- c. Banks should regularly compare realised default rates with estimated PDs for each grade and be able to demonstrate that the realised default rates are within the expected range for that grade. The methods and data used in such comparisons by banks should be clearly documented. This analysis and documentation should be updated at least annually.
(Yes __ , No __)
- d. Banks using the Advanced IRB Approach should complete such analysis for their estimates of LGD and EAD. Such comparisons should make use of historical data that are over as long a period as possible.
(Yes __ , No __)
- e. Bank should have well-articulated internal standards for situations where deviations in realised PDs, LGDs and EADs from expectations become significant enough to call the validity of the estimates into question. These standards should take account of business cycles and similar systematic variability in default experiences. Where realised values continue to be higher than expected values, banks should revise estimates upward to reflect their default and loss experience.
(Yes __ , No __)

4.7.2 Back-testing

Back-testing is the comparison of predictions with actual outcomes. It is the empirical test of the accuracy and calibration of the estimates, i.e. PDs, LGDs and EADs, associated with borrower and facility ratings, respectively. (Yes __ , No __)

At a minimum, banks should:

- develop their own statistical tests to back-test their risk estimates systems;
(Yes __ , No __)
- establish internal tolerance limits for differences between expected and actual outcomes; (Yes __ , No __) and
- have a policy that requires remedial actions be taken when policy tolerances are exceeded. (Yes __ , No __)

Where banks rely on supervisory, rather than internal, estimates of risk parameters, they are encouraged to compare realised LGDs and EADs to those set by the SAMA. The information on realised LGDs and EADs should form part of a bank's assessment of economic capital.
(Yes __ , No __)

RISK QUANTIFICATION
RETAIL PORTFOLIO

- **RETAIL NON MORTGAGES**
- **SMALL BUSINESS ENTERPRISES**
- **RESIDENTIAL MORTGAGES**

TABLE OF CONTENTS

	<u>Page #</u>
4.1 Risk Quantification	50
4.2 Definition of Default	53
4.3 Definition of Loss	53
4.4 Requirements for PD Estimation	53
4.5 Requirements for own LGD Estimates	54
4.6 Requirements for own EAD Estimates	55
4.7 Validation of Internal Estimates	56

RETAIL PORTFOLIO

RISK QUANTIFICATION REQUIREMENTS

SELF-ASSESSMENT CHECKLIST

- The particular retail pool covered should be indicated.
- Please provide "Yes" or "No" answers with a tick (✓) to the following statements, criteria or conditions are utilized, or incorporated in the IRB Implementation plans and where relevant, provide supporting documentation.
- This section addresses the broad standards for generating a bank's own estimates of PD, LGD, and EAD. Except for certain equity and specialized lending exposures.
- Banks should separate exposures into pools with homogenous risk characteristics that reliably differentiate risk and produce accurate and reliable estimates of the risk parameters. Banks should determine their own unique pools, contingent on the nature of their business, prudential and markets they are engaged in.

4.1 Risk Quantification

4.1.1 All banks using the IRB Approach should estimate a PD for each each pool in the retail exposures.
(Yes __ , No __)

4.1.2 PD estimates should be a long run average of one-year default rates for each pool. Requirements specific to PD estimation are provided in section 4.4. (Yes __ , No __)

4.1.3A Banks on the Advanced IRB Approach should estimate an appropriate LGD (as defined in paragraph 4.5.1) for each of their (retail pools).
(Yes __ , No __)

4.1.3B Requirements specific to LGD estimation are set out in subsection 4.5. They should also estimate an appropriate long run default weighted average EAD for each of their pools (as defined in paragraphs 4.6.1 and 4.6.2). Requirements specific to EAD estimation are set out in subsection 4.6. (Yes __ , No __)

4.1.3C At a minimum, banks should consider the following risk drivers when assigning exposures to a pool:

- Borrower risk characteristics (e.g. borrower type, demographics such as age/occupation) (Yes __ , No __);

- Transaction risk characteristics, including product and/or collateral types (e.g. loan to value measures, seasoning, guarantees; and seniority (first vs. second lien). Banks must explicitly address cross-collateral provisions where present. (Yes __ , No __);
- Delinquency of exposure: Banks are expected to separately identify exposures that are delinquent that are not. (Yes __ , No __);
- Written rating definitions must be clear and detailed enough to allow third parties to understand the assignment of ratings, such as internal audit or an equally independent function and supervisors, to replicate rating assignments and evaluate the appropriateness of the grade/pool assignments. (Yes __ , No __);
- The criteria must also be consistent with the bank's internal lending standards and its policies for handling troubled borrowers and facilities. (Yes __ , No __);

4.1.4 The quantification process, including the role and scope of expert judgment, should be fully documented. It should cover all stages of the estimation process including data collection and estimation. Adequate documentation would promote consistency and allow third parties to review and replicate the entire process. (Yes __ , No __)

4.1.6 Periodic updates to the quantitative process should be conducted to ensure that new data and analytical techniques and evolving industry practices are incorporated into the process. (Yes __ , No __)

PD/LGD/EAD estimation

4.1.7A Estimates of PD, LGD and EAD measured by the quantification process should be updated at least annually or whenever it is considered necessary (e.g. when new data and other information have become available or methods for estimation have changed). The updating process should be documented in banks' internal policies. (Yes __ , No __)

4.1.7B Particular attention should be given to new business lines or portfolios in which the mix of obligors is believed to have changed substantially. (Yes __ , No __)

4.1.8 Estimates should be grounded in historical experience and empirical evidence, and not based purely on subjective or judgmental considerations. They should incorporate all relevant, material and available data, information and methods. Any changes in lending practice or the process for pursuing recoveries over the data observation period should be taken into account. (Yes __ , No __)

4.1.9 Banks should make use of other quantitative validation tools and comparisons with external data sources. The analysis must be based on data that are appropriate to the portfolio, are updated regularly, and cover a relevant observation period. Banks' internal assessments of the performance of their own model must be based on long data histories, covering a range of economic conditions, and ideally one or more complete business cycles. (Yes __ , No __)

(Refer Paragraph 532 of International Convergence of Capital Measurement and Capital Standards – June 2006)

4.1.10 Given the A1-specific basis of assigning exposures to pools, A1s should regard internal data as the primary source of information for estimating loss characteristics. A1s are permitted to use external data or statistical models for quantification provided a strong link can be demonstrated between: (i) the A1's process of assigning exposures to a pool and the process used by the external data source; and (ii) the A1's internal risk profile and the composition of the external data. In all cases, A1s should use all relevant and material data sources as points comparison.
(Yes __ , No __)

Conservatism

4.1.11A Judgmental adjustments may form a part of the quantification process. Consistent signs of judgmental decisions that lower parameter estimates materially may be evidence of bias. Banks should conduct sensitivity analysis to demonstrate that the adjustment procedure is not biased toward reducing capital requirements. (Yes __ , No __)

4.1.11B The reasoning and empirical support for any adjustments, as well as the mechanics of the calculation, should be documented. (Yes __ , No __)

4.1.12 Estimates of PD, LGD and EAD should incorporate a degree of conservatism that is appropriate for the overall robustness of the quantification process. In general, such estimates are likely to involve unpredictable errors. In order to avoid undue optimism, banks should add to their estimates a margin of conservatism that is related to the likely range of errors. (Yes __ , No __)

4.1.13 There should be an appropriate degree of conservatism to adequately account for all uncertainties and weaknesses relating to risk quantification. Improvements in the quantification process (e.g. use of better data and estimation techniques) may reduce the appropriate degree of conservatism over time. (Yes __ , No __)

Review and validation

4.1.16 Banks should subject all aspects of the quantification process, including design and implementation, to an appropriate degree of independent review and validation. An independent review is an assessment conducted by persons not accountable for the work being reviewed. The reviewers may either be internal or external parties. (Yes __ , No __)

4.1.17 The review serves as a check on the quantification process to ensure that it is sound and works as intended; it should be broad-based, and should include all of the elements of the quantification process that lead to the ultimate estimates of PD, LGD and EAD for each pool. (Yes __ , No __)
The review should cover the full scope of validation, including:

- an evaluation of the integrity of data inputs; (Yes __ , No __)
- an analysis of the internal logic and consistency of the process;
(Yes __ , No __)
- appropriate back-testing based on actual outcomes.
(Yes __ , No __)

- detailed requirements for ongoing validation and back testing of estimates are set out in section 4.7. (Yes __ , No __)

4.2 Definition of default

The definition of default can be applied at the level of a particular facility, rather than at the level of the obligor. As such, default by a customer on one obligation does not require a bank to treat all other obligations of the customer to the bank (or its banking group) as defaulted. (Yes __ , No __)

Treatment of overdrafts

Overdraft facilities authorized by a bank to a customer should be subject to a formal credit limit. Any breach of this limit should be monitored. If the account were not brought under the limit after 90 days, it would be considered as defaulted.

(Yes __ , No __)

4.3 Definition of loss

4.3.1 The definition of loss used in estimating LGD is economic loss. When measuring economic loss, all relevant factors should be taken into account. This should include material discount effects and material direct and indirect costs associated with collecting on the exposure.

(Yes __ , No __)

4.3.2 Banks should not simply measure the loss recorded in accounting records. They should be able to compare accounting and economic losses (some Banks may also adopt the concept of economic loss in their accounting records). Banks' own workout and collection expertise significantly influences their recovery rates, and should be reflected in their LGD estimates. However, adjustments to estimates for such expertise should be conservative until a bank has maintained sufficient internal empirical evidence to manifest the impact of its expertise.

(Yes __ , No __)

4.4 Requirements for PD estimation

Data observation period

4.4.1 Irrespective of whether a bank is using external, internal, or pooled data sources, or a combination of the three, for its PD estimation, the length of the underlying historical observation period used should be at least 3 years from at least one source. If the available observation period spans a longer period for any source, and the data are relevant and material, this longer period should be used. Bank need not give equal importance to historical data if it can convince SAMA that more recent data are a better predictor of default rates. (Yes __ , No __)

- 4.4.2 SAMA applies the transitional requirement of a minimum of two years of data at the time of adopting the IRB Approach for retail exposures for Banks that can implement such approaches during the period from 1 January 2009 to 31 December 2011. (Yes __ , No __)
- 4.4.3 Given the bank specific basis of assigning exposures to pools, banks should regard internal data as the primary source of information for estimating loss characteristics. Banks are permitted to use external data. (Yes __ , No __)
- 4.4.4 Seasoning can be quite material for some long-term retail exposures characterised by seasoning effects. Banks should anticipate the implications of rapid exposure growth and take steps to ensure that their estimation techniques are accurate, and that their current capital level and earnings and funding prospects are adequate to cover their future capital needs. (Yes __ , No __)
- 4.4.5 Banks are also encouraged to adjust PD estimates upward for anticipated seasoning effects, provided such adjustments are applied in a consistent fashion over time. (Yes __ , No __)

4.5 Requirements for LGD estimates¹

- 4.5.1 Banks should estimate an LGD for each facility that aims to reflect economic downturn conditions where necessary to capture the relevant risks. The loss is to be calculated based on the average economic loss of all observed defaults for that type of facility. In addition, a bank should take into account the potential for the LGD of the facility to be higher during a period when credit losses are substantially higher than average. (Yes __ , No __)
- 4.5.2 LGD estimates should be grounded in historical recovery rates and, when applicable, should not solely be based on the estimated market value of collateral. This requirement recognises the potential inability of banks to gain both control of their collateral and liquidate it expeditiously. To the extent, that LGD estimates take into account the existence of collateral, bank should establish internal requirements for collateral management, operational procedures, legal certainty and risk management process that are generally consistent with those required for the Standardised Approach for calculating credit risk capital changes. (Yes __ , No __)
- 4.5.3 Recognising the principle that realised losses can at times systematically exceed expected levels, the LGD assigned to a defaulted asset should reflect the possibility that the bank would have to recognise additional, unexpected losses during the recovery period. For each defaulted asset, the bank should also construct its best estimate of the expected loss on that asset based on current economic circumstances and facility status. (Yes __ , No __)

¹ Applicable only for AIRB Approach

- 4.5.4 Banks that aggregate LGD estimates for facility grades (from individual exposures) should have a clear policy governing the aggregation process. (Yes __ , No __)
- 4.5.5 The minimum data observation period for LGD estimates is three to five years. The less data a bank has, the more conservative it should be in its estimation. A bank need not give equal importance to historical data if it can demonstrate to SAMA that more recent data are a better predictor of loss rates. (Yes __ , No __)
- 4.5.6 SAMA applies the transitional requirement of a minimum of three years of data at the time of adopting the IRB Approach for retail exposures to bank that can implement such an approach during the period from 1 January 2009 to 31 December 2011. (Yes __ , No __)

4.6 Requirements for own-EAD estimates

- 4.6.1 EAD for an on-balance sheet or off-balance sheet item is defined as the expected gross exposure of the facility upon default of the obligor. (Yes __ , No __)
- 4.6.2 The additional minimum requirements for internal estimation of EAD under the Advanced IRB Approach, therefore, focuses on the estimation of EAD for off-balance sheet items. Banks using the Advanced IRB Approach should have established procedures in place for the estimation of EAD for off balance sheet items. These should specify the estimates of EAD to be used for each pool. Banks' estimates of EAD should reflect the possibility of additional drawings by the borrower up to and after the time a default event is triggered. (Yes __ , No __)
- 4.6.3 Banks using the Advanced IRB Approach should assign an estimate of EAD for each facility. (Yes __ , No __)
- 4.6.4 If a positive correlation can reasonably be expected between the default frequency and the magnitude of EAD, the EAD estimate should incorporate a larger margin of conservatism. Moreover, for exposures for which EAD estimates are volatile over the economic cycle, banks should use EAD estimates that are appropriate for an economic downturn. (Yes __ , No __)
- 4.6.5 For banks that have been able to develop their own EAD models, this could be achieved by considering the cyclical nature, if any, of the drivers of such models. (Yes __ , No __)
- 4.6.6 The criteria by which estimates of EAD are derived should be plausible and intuitive, and represent what banks believe to be the material drivers of EAD. The choices should be supported by banks' credible internal analysis. Banks should be able to provide a breakdown of their EAD experience by the factors they see as the drivers of EAD. Banks should use all relevant and material information in their derivation of EAD estimates. (Yes __ , No __)

4.6.8 The minimum data observation period for EAD estimates is three to five years. The less data a bank, the more conservative it should be in its estimation. A bank need not give equal importance to historical data if it can demonstrate to SAMA that more recent data are a better predictor of draw-downs. (Yes __ , No __)

4.6.9 SAMA applies the transitional requirement of a minimum of three years of data at the time of adopting the IRB Approach for retail exposures to banks that can implement such an approach during the period from 1 January 2009. (Yes __ , No __)

4.7 Validation of internal estimates

4.7.1 General requirements

- a. Validation is an integral part of a bank's internal system estimate. (Yes __ , No __)
- b. The validation process should include a comparison of predicted estimates to actual outcomes (i.e. back-testing, as described paragraphs in 4.7.2. (Yes __ , No __)
- c. Banks should regularly compare realised default rates with estimated PDs for each pool and be able to demonstrate that the realised default rates are within the expected range for that pool. The methods and data used in such comparisons by banks should be clearly documented. This analysis and documentation should be updated at least annually. (Yes __ , No __)
- d. Banks using the Advanced IRB Approach should complete such analysis for their estimates of LGD and EAD. Such comparisons should make use of historical data that are over as long a period as possible. The actual loss rates experienced on defaulted facilities should not be significantly greater than the LGD estimates assigned to those facilities. (Yes __ , No __)
- e. Bank should have well-articulated internal standards for situations where deviations in realised PDs, LGDs and EADs from expectations become significant enough to call the validity of the estimates into question. These standards should take account of business cycles and similar systematic variability in default experiences. Where realised values continue to be higher than expected values, banks should revise estimates upward to reflect their default and loss experience. (Yes __ , No __)

4.7.2 Back-testing

Back-testing is the comparison of predictions with actual outcomes. It is the empirical test of the accuracy and calibration of the estimates, i.e. PDs, LGDs and EADs. (Yes __ , No __)

At a minimum, banks should:

- develop their own statistical tests to back-test their risk estimates systems; (Yes __ , No __)
- establish internal tolerance limits for differences between expected and actual outcomes; (Yes __ , No __) and
- have a policy that requires remedial actions be taken when policy tolerances are exceeded. (Yes __ , No __)

Where banks rely on supervisory, rather than internal, estimates of risk parameters, they are encouraged to compare realised LGDs and EADs to those set by the SAMA. The information on realised LGDs and EADs should form part of a bank's assessment of economic capital.

(Yes __ , No __)

DETAILED GUIDANCE ON
VALIDATION FOR RISK RATING
AND RISK ESTIMATES

TABLE OF CONTENTS

Detailed Guidance on Validations for Risk Rating and Risk Estimates

	<u>Page #</u>
4.1 General Requirements	60
4.2 Review of Rating System Developments	61
4.3 Ongoing analysis	62
4.4 Back-testing	62

**THIS SECTION COVERS VALIDATION RELATING
BOTH TO: 1) RATING SYSTEMS AND 2) RISK ESTIMATES**

Detailed Guidance on Validation

1. General requirements

- 1.1 Validation is an integral part of a bank's rating system architecture to provide reasonable assurances about its rating system. Banks adopting the IRB Approach should have a robust system in place to validate the accuracy and consistency of their rating systems, processes and the estimation of all relevant risk components. They should demonstrate to SAMA that their internal validation process enables them to assess the performance of internal rating and risk estimation systems consistently and meaningfully. (Yes __ , No __)
- 1.2 The validation process should include review of rating system developments (see subsection 5.2), and comparison of predicted estimates to actual outcomes (i.e. back-testing, as described paragraphs 5.1.3 and 5.1.4 and subsection 5.4). (Yes __ , No __)
- 1.3 Banks should regularly compare realised default rates with estimated PDs for each grade and be able to demonstrate that the realised default rates are within the expected range for that grade. The actual long run average default rate for each rating grade should not be significantly greater than the PD assigned to that grade. (Yes __ , No __)
- 1.4 The methods and data used in such comparisons by banks should be clearly documented. This analysis and documentation should be updated at least annually. (Yes __ , No __)
- 1.5 Similarly, banks using the Advanced IRB Approach should complete such analysis for their estimates of LGD and EAD. Such comparisons should make use of historical data that are over as long a period as possible. The actual loss rates experienced on defaulted facilities should not be significantly greater than the LGD estimates assigned to those facilities. (Yes __ , No __)
- 1.6 Banks' internal assessments of the performance of their own rating systems should be based on long data histories, covering a range of economic conditions, and ideally one or more complete business cycles. (Yes __ , No __)
- 1.7 Banks should have in place a process for vetting data inputs, including the assessment of accuracy, completeness and appropriateness of the data specific to the assignment of an approved rating. (Yes __ , No __)
- 1.8 Detailed documentation of exceptions to data input parameters should be maintained and reviewed as part of the process cycle of validation. (Yes __ , No __)

- 1.9 The process cycle of validation should also include: ongoing periodic monitoring of rating system performance, including the following:
1. Evaluation and rigorous statistical testing of the stability of the models used and their key coefficients;
 2. Identifying and documenting individual fixed relationships in the rating model;
 3. A rigorous change control process, which stipulates the procedures that should be followed prior to making changes in the rating system or model in response to validation outcomes. (Yes __ , No __)
- 1.10 Bank should demonstrate that quantitative testing and other validation methods do not vary systematically with the economic cycle¹ which incorporate the general impact of economic downturn and upswings of the subject economy. Changes in methods and data (both data sources and periods covered) should be clearly documented. (Yes __ , No __)
- 1.11 Bank should have well-articulated internal standards for situations where deviations in realised PDs, LGDs and EADs from expectations become significant enough to call the validity of the estimates into question. These standards should take account of business cycles and similar systematic variability in default experiences. (Yes __ , No __)
- 1.12 Where realised values continue to be higher than expected values, banks should revise estimates upward to reflect their default and loss experience. (Yes __ , No __)

2. Review of rating system developments

- 2.1 The aim of the bank's rating system review is to assess whether the rating system could be expected to work reasonably if it is implemented as designed. Such review should be revisited whenever the bank makes a change to its rating system. As the rating system is likely to change over time as the bank learns about the effectiveness of the system, the review is likely to be an ongoing part of the process. (Yes __ , No __)
- 2.2 Regarding a model-based rating system, and risk estimates the review of such system developments should include information on the logic that supports the model and an analysis of the statistical model-building techniques. Where a bank uses scoring systems for assigning credit ratings, it should demonstrate that those systems have adequate discriminating power. (Yes __ , No __)

¹ Economic cycle refer to ensuring that validation of internal estimates incorporate the general impact of economic downturn and upswings of the subject economy.

- 2.3 Regarding an expert judgment-based rating system, the review of rating system developments requires asking two groups of raters how they would rate credits based on the rating definitions, processes and criteria for assigning exposures to grades within the rating system. These two sets of rating results could then be compared to determine whether the ratings were consistent. Conducting such tests would help identify any factors, which may lead to different or inconsistent ratings. While some differences and inconsistencies may arise from the exercise of judgment, those findings should be considered for the development of the rating system. (Yes __ , No __)

3. Ongoing analysis

- 3.1 The validity of a bank's rating and risk estimates system is the ongoing analysis intended to confirm that such systems are should be implemented and continues to perform as intended. (Yes __ , No __)

Process verification

- 3.2 Specific verification activities depend on the rating approach. If a model is used for rating and or risk estimates, verification requires reviewers who are independent of the model development to evaluate the soundness of the model, including the theory, assumptions and mathematical/empirical basis. (Yes __ , No __)

- 3.3 If expert judgment is used for rating, verification requires other individual reviewers to evaluate whether the rater has followed rating policy. The minimum requirements for verification of ratings assigned by individuals are:

- a transparent rating process;
- a database with information used by the rater; and
- documentation of how the decisions were made.

(Yes __ , No __)

- 3.4 Rating process verification also includes override monitoring. A reporting system should be in place capturing data on reasons for overrides, and whether overrides improve accuracy. (Yes __ , No __)

4. Back-testing

- 4.1 Back-testing is the comparison of predictions with actual outcomes. It is the empirical test of the accuracy and calibration of the estimates, i.e. PDs, LGDs and EADs, associated with borrower and facility ratings, respectively. (Yes __ , No __)

- 4.2 For Back Testing at a minimum, banks should:

- develop their own statistical tests to back-test their rating systems; (Yes __ , No __)
- establish internal tolerance limits for differences between expected and actual outcomes; (Yes __ , No __)
- have a policy that requires remedial actions be taken when policy tolerances are exceeded. (Yes __ , No __)

- 4.3 Given that the data to perform comprehensive back testing would not be available in the early stages of implementing an IRB rating system, banks should rely more heavily on review of rating system developments, process verification, and benchmarking to assure themselves and other interested parties that their rating systems are likely to be accurate. (Yes __ , No __)
- 4.4 Validation in its early stages should also depend on a bank's management exercising informed judgment about the likelihood of the rating system working — not simply an empirical test. (Yes __ , No __)
- 4.5 Where banks rely on supervisory, rather than internal, estimates of risk parameters, they should compare realised LGDs and EADs to those set by the SAMA. (Yes __ , No __)
- 4.6 The information on realised LGDs and EADs should form part of a bank's assessment of economic capital. (Yes __ , No __)