Audit concept

of the Federal Office of Private Insurance FOPI

SST Internal Models

Legal basis: Article 46 para. 1 and article 47 ISA
Article. 43 para. 3 SO

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Schweizerische Eidgenossenschaft
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Contents

1 Preliminary remarks

This audit concept describes the approach taken by the supervisory authority when auditing SST requirements. The main focus is on risk modelling for Internal Models, but also evaluation with respect to market-consistent balance sheets and the organisational integration of Internal Models.

The goal of the audit of internal risk models for the SST is to determine whether the individual risk model of an insurance undertaking or an insurance group or conglomerate (abbreviation: IU) is able to appropriately model the technical risks, market risks and/or credit risks of the IU and whether it is sufficiently integrated into the organisational environment of the IU.

The basis of the audit consists of the relevant rules set out in the Insurance Supervision Act (ISA), the Supervision Ordinance (SO) and the Directive on the Swiss Solvency Test, along with its annexes. If the model has been approved by the supervisory authority pursuant to the legal rules, the model is designated as "appropriate". To the extent that IUs are unable to use the Standard Model of the supervisory authority, they may only use appropriate models to determine the target capital.

The relevant legal foundations are characterised by flexibility and risk orientation, providing general quantitative and qualitative requirements for the supervisory approval of Internal Models for calculating the regulatory equity capital.

The development of the audit concept took account of three target requirements. First, both the audit and the audit result developed by it should meet qualitative minimum standards, in order to satisfy the high demands associated with a supervisory audit. Second, uniformity of the audits of Internal Models, both in terms of form and content, should be ensured, in order to facilitate comparisons among IUs that go beyond the findings in the evaluation of individual IUs. Finally, the goal is to achieve efficient performance of the audits, facilitating cost-effective audits of the IUs without wasting the available audit resources.

Several substantive points of contact between the SQA tools and the requirements for SST Internal Models should be mentioned. The SQA and the requirements for SST Internal Models both contain differentiated requirements especially on risk management. These requirements overlap in part, while some requirements for Internal Models go beyond the SQA requirements. When conducting audits of Internal Models, duplication of work with respect to the SQA should be avoided to the extent possible. The performance of an SQA should be able to draw on the results of a recent model audit, or be able to bracket facts that have already been

audited. Compliance with SQA requirements that do not relate to the Internal Model and its organisational integration, however, has no consequences for the suitability of the Internal Model.

The audit concept encompasses four sections and two annexes. After some preliminary remarks, the second section discusses methodological principles for the performance of a model audit. The third and fourth sections describe the approach taken in the audits. The first annex presents a schematic describing the steps for approval or rejection of an Internal Model. The second annex divides the audit object "Internal Model" into individual audit areas, and the important facts relevant to the audit are set out.

Based on the second annex of the audit concept, a information database is built up to serve as an aid for the auditor and to deepen the audit fields. The information database incorporates the experiences from past audits and the decisions made during those audits. The information database is an important component for ensuring uniform decisions, especially in light of the challenges posed by principle-based supervision. The quality assurance facilitated by the information database within the supervisory authority also serves as a resource in the event of legal disputes with supervised IUs.

The supervisory authority defines processes internally to ensure that the important decisions concerning approval or rejection of an Internal Model are taken by persons with sufficient expertise, on the basis of an audit result secured by quality assurance. Escalation mechanisms up to the general management/board of directors of the supervisory authority are also established.

The use of the Standard Model differs from the use of Internal Models primarily in that the supervisory authority is familiar with the methodology of the Standard Model. However, the methodology is only one building block for the successful employment of a risk model. Currently, it appears that more complex companies use Internal Models, while lesser complex companies are more likely to use the Standard Model. The risk-oriented approach of the supervisory authority explained in more detail below therefore entails that comprehensive audits in the near future will be carried out more frequently with respect to companies using Internal Models.

Where the Standard Model is used, the supervisory authority has so far not required IUs to submit documentation other than the SST report on the assumed risks and on the implementation of the Standard Model within the organisation. Especially in the case where an IU makes material changes to the Standard Model or if the supervisory authority finds indications that the risk landscape of the IU

may be too complex for appropriate modelling by the Standard Model, the supervisory authority will also carry out audits of the Standard Model in such cases pursuant to this concept.

This document constitutes a guideline for auditing Internal Models, with which the supervisory authority provides information to the public on its fundamental approach. The supervisory authority may, however, also choose other approaches without having to justify them.

2 Methodological principles

2.1 Risk orientation

An Internal Model must be able to appropriately model all relevant risks. However, in light of the supervisory authority's limited resources and time, it does not make sense to audit every fact in every audit area with the same intensity. For this reason, the supervisory authority chooses a risk-oriented approach to determining the audit intensity for individual aspects. Using a risk-oriented approach, the audit activities are performed in all areas necessary for the audit, but aspects are emphasised which, due to their volume, complexity, or other relevant indicators, are most likely to constitute a threat to the intended objectives of the SST and thus to the fulfilment of the supervisory authority's responsibilities.

The pre-audit analysis necessary for risk orientation has the task of defining the selection of audit focuses. Important information sources for the analysis may include:

- The model documentation
- Publicly available information such as the business report
- The results from supervisory discussions
- The business plan
- The Swiss Quality Assessment (SQA)
- Components of the tied assets and derivative reporting
- Other information from other supervisory instruments or reporting

The analysis should encompass the following aspects:

- Significance of individual insurance products, product groups, and reinsurance volume
- Significance of investment strategies (based on type, volume, and complexity)
- Goals and implementation of Asset Liability Management
- Risk content of the individual products/portfolios
- Identification of significant risk drivers, which should, where necessary, be reflected in the risk factors of the Internal Model
- Risk vulnerability of certain processes (error-proneness, valuation leeway, conflicts of interest; process risk orientation) that may lead to insufficient risk measurement
- Existing deficiencies in risk management and the internal control system (e.g. system deficits; quality of risk management, insufficient separation of functions in light of potential conflicts of interest)

2.2 System audit

As part of the audit of Internal Models, the supervisory authority carries out system audits. The supervisory authority understands system audits to be the risk and process-oriented audit and analysis of the parts of the organisational and operational structure that are relevant to the Internal Model. The goal of the system audit is to evaluate the appropriateness of the implementation and application of the requirements pursuant to the SO and the Directive on the Swiss Solvency Test, against the background of the risk situation of the IU in question. The system audit consists of the following components:

- Target-target comparison (the system audit as such): The object of the target-target comparison is the concrete design of the Internal Model. The qualitative and quantitative requirements under supervision law with respect to the Internal Model are compared with the requirements set out by the IU (model documentation, fixed written rules regarding integration of the model, business plan).

- Target-actual comparison: With the help of the target-actual comparison, the appropriateness of the Internal Model is audited with respect to the risk landscape and the implementation of the model described in the documentation, including the actual application in the IU. On the basis of suitable audit activities, the supervisory authority verifies whether the system actually corresponds to the system described in the documentation and whether it is able to model concrete risks and provide the resulting information to those responsible within the IU. Suitable audit activities include the sample review of selected insurance transactions, the analysis of selected portfolios and positions, interviews with employees, process observation, and the evaluation of flow charts.

The system audit is designed primarily in the form of a process audit. The principle of materiality and risk orientation constitute the foundation for all audit activities, the selection of the audit method (sample audit, direct audit, etc.), and the determination of the focuses of the audit. These principles also apply to the selection of the information requirements within the context of the audit as well as the selection of the individual business areas/portfolios and portfolio positions.

3 Implementation

IUs wanting or needing to use Internal Models for the SST document the risks assumed in the course of their business, the theory underlying the modelling of their risks, and the implementation of this theory in light of the risks as well as the organisation and structure of the IU. In the Use Test, moreover, the IU shows the extent to which the Internal Model is used in the IU, in particular in the context of risk management. This documentation shows the supervisory authority the target state of the Internal Model submitted for approval for supervisory purposes.

The supervisory authority is responsible for protecting the interests of insured parties from the insolvency risks of the IU. In particular in the case of Internal Models, their effectiveness can only insufficiently be determined through the audit of the target state alone. Moreover, it is probable that the documentation of the target state alone is not able to answer all relevant questions satisfactorily. It may also be that the IUs unknowingly or knowingly represent facts incorrectly or incompletely in the documentation.

The supervisory authority therefore does not do justice to its mandate if it limits itself in principle to a target-target comparison. For this reason, it has the option of carrying out a target-actual comparison as part of an on-site audit.

3.1 Off-site audit

In light of the high volume of model applications in the initial phase, the supervisory authority is unable to carry out on-site audits of all received audit applications with its own resources in a reasonable amount of time. It would also not be desirable to hire additional staff for this purpose, in light of the associated costs for the supervisory authority.

The supervisory authority therefore has the option of issuing model approvals also after a successful target-target comparison as part of an off-site audit. As a rule, the supervisory authority will not announce in advance whether and with which variants of the off-site audit it will evaluate the Internal Model. It makes sense to use a risk-oriented approach in selecting on-site audits at least in the initial phase, so that the audit intensity will be greater especially for IUs whose documentation does not sufficiently demonstrate the relevant facts.

Off-site audits can be carried out in one of the two variants described below.

3.2 Off-site audit without involvement of external experts

In the case of an off-site audit without involvement of external experts, the supervisory authority audits and decides solely on the basis of the available records, consisting primarily of the documentation. Important additional information sources include the harmonization discussions often held prior to a model application between the supervisory authority and the IU. These discussions are often not sufficiently in-depth, however, and are in such cases often part of the target-target comparison. They therefore do not replace a target-actual comparison as part of an on-site audit.

In this variant of the off-site audit, the supervisory authority audits whether the submitted documentation sufficiently describes all relevant facts. If this is the case, it audits whether the described facts meet the supervisory demands. If the documentation suggests that the supervisory requirements are met, the supervisory authority therefore does not have any indications on the basis of the available information that essential points would argue against approval of the Internal Model. In this case, the supervisory authority may issue an approval under the condition of a more detailed subsequent audit in the form of a target-actual comparison. Depending on the weaknesses of the model, the approval may be

subject to conditions, such as remedy of the deficits by a certain deadline and capital surcharges until the deficits are remedied.

3.3 Off-site audit with involvement of external experts

The involvement of external experts in an audit where no staff members of the supervisory authority take part on site may be justified for several reasons. First, external experts can clarify facts that the supervisory authority is unable to trace sufficiently off site due to the lack of required documentation. Second, external experts may be involved to perform a complete or partial target-actual comparison. In consultations with the IU prior to the audit, the supervisory authority determines which fields will be outsourced to external experts on grounds of resources or know-how, and it issues a corresponding audit mandate to the external expert and an audit announcement to the IU. The external expert submits an audit report to the supervisory authority containing a sufficient description of the facts, so that the supervisory authority is then able to take a decision on the basis of the documentation and the audit report. Audit mandates may be assigned to external experts either for target-target comparisons or target-actual comparisons. On the basis of the audit report, the supervisory authority assesses the suitability of the model and, if the audit is sufficiently robust, it also issues approvals that are not subject to conditions or time limits.

3.4 On-site audit

A full audit of the Internal Model or of partial models includes a target-target comparison and a target-actual comparison of all audit fields affected by the model application. Since the target-target audit can in general be conducted off site, the on-site audit should primarily encompass the target-actual comparison of the relevant audit fields. If the documentation shows weaknesses that do not allow a satisfactory target-target comparison to be carried out off site, an on-site audit may combine a target-target comparison and a target-actual comparison in the relevant points. However, the danger then arises that obvious weaknesses of the Internal Model can then only be determined on site and after resources have already been expended.

In order to ensure that supervisory costs are allocated to the responsible party, the supervisory authority bills the audit costs to the IU. This is also necessary to

ensure equal treatment of the IUs for which parts of the audit have been delegated to external experts.

Once the supervisory authority has received the model documentation, it compares the documentation with the supervisory requirements. This comparison should indicate which audit fields/products/business areas/portfolios should be paid more attention to in terms of risk orientation.

Ideally, once the supervisory authority has compared the documentation with the supervisory requirements, it carries out an on-site audit in which all relevant audit areas are assessed, but the focus of which is risk-oriented. The results of the on-site audit should give the supervisory authority sufficient certainty with respect to the functioning of the system, i.e. the appropriateness of the Internal Model with respect to the risks and fulfilment of the qualitative and organisational requirements.

The on-site audit may refer to individual audit areas or partial risks such as the credit risk model. As long as the (partial) model can be adequately assessed by the audit activities and the supervisory authority obtains sufficient certainty with respect to the model's suitability, the supervisory authority will issue an approval. Such approval is limited to the risk situation identified at the time of the audit and the model used at that time.

The supervisory authority may, in some cases, supplement its own on-site audits with audits by external experts in relation to individual audit areas or entire partial models. The reports of external experts will in such cases be treated as in the subsection on "Off-site audit with involvement of external experts".

4 Organisational approach

The supervisory authority approves the use of Internal Models when several requirements are met. The following points describe the organisational framework of the application, audit, and approval process.

4.1 Framework for the use of models

4.1.1 Application

According to article 43, paragraph 3 SO, IUs may use Internal Models upon approval by the supervisory authority. The formulation in the SO presupposes that the IU applies for approval of an Internal Model on its own initiative.

The formless application to be submitted to the supervisory authority must address the following points:

- Notice that an Internal (partial) Model will be used instead of the Standard Model or, where applicable, for the first time.
- Types of risk and, where applicable, partial portfolios covered by the model application.
- Date from which use of the Internal Model is planned.
- Signature of the persons responsible for use of the Internal Model (board of directors or, if responsibility has been delegated, the general management).

4.1.2 Demand to use an appropriate Internal Model

The supervisory authority may call upon the IU to develop appropriate Internal (partial) Models, if the Standard Model is unable to model all relevant risks appropriately or if no Standard Model is available, such as for reinsurance business. The demand will generally be in writing. The IU must then present a time schedule indicating which development steps of the Internal Model will be concluded by which dates.

For the time period up to development of the appropriate Internal Model, therefore, no suitable risk model exists to appropriately model all relevant risks. However, the supervisory authority must still protect insured parties from insolvency risks of the IUs even in such cases. Moreover, the supervisory authority must ensure that a level playing field exists vis-à-vis the IUs that are already using a suitable model, which will already have entailed certain costs and may lead to higher capital requirements. In such cases, the supervisory authority may then impose

surcharges on the Standard Model or on existing but not yet approved Internal Models. Since, due to the lack of information, this can only be undertaken by way of rough estimates, the supervisory authority will try to apply a rather conservative measure. If no reasonable basis can be found for determining the surcharges, the supervisory authority will fix the target capital fully in accordance with its own considerations ("estimation" of the target capital).

The IU must submit an application for use of its Internal Model also in cases where it has been called upon to develop an Internal Model. The written application must contain the same information as set out in 3.1.1. The further process does not distinguish between models that were developed upon the supervisory authority's demand and those Internal Models that were developed on the IU's own initiative.

4.2 Documentation requirements

Upon application for approval of the Internal Model, the supervisory authority requests the IU to submit the information necessary for approval, if such information has not already been submitted with the application. The supervisory authority sets out the documentation requirements individually, depending on the risk profile and the partial model to be approved.

The standard documentation is based on the audit areas and contains documents covering the following topics:

Portfolio analysis:

Portfolio analysis as an audit area should give auditors sufficient insight into the risk landscape of the IU. It contains some of the analysis steps mentioned in section 2.1 for valuation of the relevant risks in the IU, such as the analysis of important products and important business strategies. The most important risk drivers are determined that have a substantial impact on the IU's risk situation.

In order to assess whether the Internal Model or the Standard Model is able to model all relevant risks, both the IU and the supervisory authority must have sufficient knowledge of the risk landscape. The risk drivers identified in the portfolio analysis provide a first indication of which risk factors and which functional correlations between the risk factors and changes to the RBC ("valuation models") are necessary to appropriately model all relevant risks.

The portfolio analysis should thus describe in a suitable form which risks arise at a given point in time from which insurance or financial products or from which combinations of insurance and/or financial products in the market-consistent balance sheet. To the extent that risks are managed from within organisational sub-units, it may be useful to apply the portfolio analysis to those sub-units.

Several examples – simple and complex – will be described below, providing indications of what a portfolio analysis should accomplish.

Example A, interest rate risk of a non-life insurer with exclusively Swiss business: On the asset side, the IU mainly has Swiss government bonds with maturities of only rarely more than 5 years. Occurring claims can be settled almost always within two years. There are no indications that contractual rights may influence settlement patterns.

Example B, interest rate risk for a life insurance with classic business: Interest rate risks are ideally managed at the highest level or, where possible, transferred to asset management. The portfolio analysis could show which maturities result from which products (insurance *and* financial products), and at what points and in what volume risks are assumed or hedged using which simple or more complex interest rate instruments. The actual portfolio at a given time as well as the basic strategy with respect to assumption or hedging of certain risks should be represented. The analysis should show how strong effects of a higher order are, for instance, or how strongly net risks and/or basis risks arise from the combination of positions that may or may not work in opposite directions (policies with guaranteed interest rate vs. bonds; guaranteed interest rate vs. swaptions or swaps, cancellation rights vs. swaps, etc.).

Example C, structuring of credit products, dynamic hedging of individual tranches: Portfolio analysis is probably possible on the basis of organisational criteria. The portfolio analysis should show how the interest rate risk is dealt with; it may be transferred into the treasury (where available) via an internal transaction. The portfolio analysis should show how spread risks arise in the case of hedged tranches via the underlying credits and which instruments are counterposed. It should be evident which basis risk arises. It should also be evident what underlying credit risks determine the business. In conjunction with the hedge instruments, it should be evident what is being hedged (interest rate, spread, default, correlations) and in what form basis risks remain.

Conclusions for Example A would be that the supervisory authority should be able to see from the description how granular the interest rate curve should be. Indications exist in this case that the curve of the supervisory authority is sufficiently granular. The simplicity of the products with respect to their interest rate risks and the short maturities also suggest that the market risk Standard Model of the supervisory authority with its linear approximation of the interest rate risk should be sufficient for this business.

Example B should be described in such a way that the supervisory authority can, for instance, identify how granular the interest rate curve and the structure of the implied volatility surface should be, whether a model with linear functional correlation suffices, whether squared correlation may in some instances suffice, or whether a complete revaluation of the positions within the risk model is necessary.

For Example C, it should be apparent how relevant interest rate and spread risks are, whether the volume of the business is so large that defaults at the level of the underlying assets/credits must be modelled, how strongly default correlations drive the risk, and whether the abovementioned default correlations must be modelled as risk factors in the risk model. It should be evident whether the hedges are structured in a way that the model can show the modelling of the basis risks.

Especially in the case of small and simple IUs, the supervisory authority already has comparatively good information from other instruments concerning the risk landscape of the IU. The documentation on the portfolio analysis may in such cases emphasize special characteristics that are not yet known to the supervisory authority. The risk drivers known to the supervisory authority should thus be briefly described.

In the case of complex portfolios, it may be useful both for the supervisory authority and for the IU to demand only a rough illustration of the risk landscape in written form and to develop more detailed information in conversations with the persons who have the authority to assume risks (underwriters, asset managers, traders). The approach should be agreed individually between the IU and the supervisory authority.

Methodology and parameters:

In this audit area, the key questions concerning the modelling method and the parameters used therein should be discussed. For this purpose, the methodology of the risk modelling in each of the sub-areas should be described in detail. It

should be shown which considerations have led to the selection of the methodology described. The risk factors, their stochastic distribution, and their interplay should be illustrated with a view to the model approach. It should be described on what basis (data, expert knowledge, etc.) and with what methods the parameters used in the risk model were estimated. Where necessary, sensitivity analyses should be carried out and documented for important parameters that are difficult to observe or cannot be observed at all.

The functional correlation (valuation model) between risk factors and the distribution of the RBC must also be described. Since simplified valuation models (e.g. linear or quadratic approximations or other simplifications) may have been used for purposes of risk modelling, this simplification should be juxtaposed with the possibly more complex valuation procedures used for the market-consistent balance sheet. Depending on the approach taken in modelling and valuation, this juxtaposition may also be carried out under the heading of "valuation". Since a risk model necessarily simplifies reality, the illustration of the mapping is important. This means that it should be described which actually existing risk drivers are modelled in the risk factors contained in the model, and which considerations were taken at least in material cases.

It should also be shown whether and how the model was validated in which areas and with which methods, and which results these validations generated.

The Internal Model is not expected to be perfect from the outset. However, the IU must demonstrate to the supervisory authority which risks the model simplifies or does not model at all, and what the scope of these risks is. This is important especially because it reduces the efforts necessary on both sides to assess the facts. If improvements are planned in these areas, they should also be described.

The results from the scenarios supplied by the supervisory authority and from the scenarios devised by the IUs themselves must be described. The valuation methodology for the scenarios must also be described. Ideally, and especially in the case of complex positions, a complete revaluation should be performed. If this is not done, it must be analysed what error occurs in the case of an approximate valuation. The IU's own scenarios should show the effects of extreme events on the IU-specific portfolio and should illustrate the parts of the portfolio in which the Internal Model exhibits deficits. It should be documented how the results of these scenarios are taken into account by risk management. To the extent that the IU concludes, in the course of the model validation, that the Internal Model does not sufficiently take account of extreme events, it should be documented how at least

the scenarios given by the supervisory authority are integrated in the determination of the target capital.

Valuation:

The valuation of all assets and liabilities for purposes of the SST Directive is of critical importance to the determination of the residual "core capital" parameter. The documentation on valuation must show which positions or groups of positions have been valued with the help of marking-to-market and for which of these positions uncertainties may have arisen, for instance due to shallow market conditions .

The proper valuation of the provisions is an important precondition for the performance of the SST. However, given the current organisational structure of the supervisory authority, it is not generally audited as part of the SST audit processes.

In the case of valuation with the help of marking-to-model, the valuation models for the positions valued in this way must be shown. It should be described on the basis of which information (other traded instruments, statistical data,...) the valuation models were calibrated. To support the audit process, sensitivity analyses with respect to important valuation parameters may be used, together with an indication of the uncertainty ranges of these parameters.

Organisational and operational structure:

The audit field "organisational and operational structure" mainly covers the points necessary to fulfil the qualitative and organisational requirements for the SST.

The structure of the processes for risk management and especially for the SST must be shown, for instance using organisational charts and process diagrams as well as descriptions of the processes, as well as which persons carry out which process steps for the SST. Depending on the detail included in the SQA documentation, this documentation or excerpts thereof may be referred to.

For the Use Test, it must be shown to what extent the Internal Model or the architecture of the Internal Model is used within the IU. At the very least, the risk limitation system must be documented, which ensures that, on a permanent basis, no excessive risks are assumed that might endanger the interests of insured parties. This can be done for instance by describing the limit system based on the results. In this case, it should also be shown how these results are broken down

according to lower organisational units, so that risk limitation is ensured on a permanent basis within the limits set by the SST. Also to be shown are the mechanisms that are triggered if the limits are exceeded. Reports to the general management may, for instance, document that the general management at least steers the business within the framework of the risk capacity given by the SST. Under certain circumstances, variants of the model approved by the supervisory authority may be used for internal purposes, for instance if the IU includes the risks arising from the supplemental capital when managing risks. In such cases, it should be shown that the risk limitation system is structured on the basis of the *architecture* of the Internal Model in such a way that the risks ultimately fall within the scope established by the SST.

The IU should also describe how it ensures that compliance of the Internal Model with the supervisory requirements is reviewed at least once a year. In the case of most IUs, the review is probably conducted by the risk management function. The reviewer must document the review and its results in such a way that external experts can trace it. It should be shown how the results of this review are reported to the board of directors. At the time of the first acceptance of the model, it may be that no annual review has taken place so far. In the course of follow-up audits or audits arising from substantial changes to the model or the risk landscape, the supervisory authority will inspect the documentation in this regard.

Data:

Careful keeping of data for risk determination is the foundation of appropriate risk management and for ensuring that all relevant risks are compiled by the Internal Model. The IT landscape must be shown, to the extent that it concerns data for the Internal Model. It should also be shown how the integrity of the data used is ensured (backup systems, access privileges, back office,...).

The IU must show in what form raw data are generated, and how they are processed so that they can be used by the Internal Model. In the case of transitions between different systems, e.g. through automatic or manual interfaces, the IU must show how it ensures that the data are transferred completely.

In particular, the data architecture of the risk model must be described. The IU must answer questions concerning which data flows into the model from which sources, and how those data are further processed within the model.

4.3 Audit process

The full audit of the SST requirements includes an on-site audit.

Before the audit is carried out, an analysis of the relevant risks helps determine the audit focuses with respect to partial modules and audit areas. Depending on the analysis, the supervisory authority then appoints an audit team with the necessary qualifications and experience. To the extent possible, this team performs the target-target comparison on the basis of the submitted documentation and other available information.

During the target-target comparison, the on-site audit is also prepared. This means that ambiguities concerning significant points in the documentation are identified, which must then be clarified on site. In addition to auditing the functionality of the system, which can be assessed by tracing the relevant processes, risk-oriented focuses on individual processes and approaches are defined.

Interviews are an important audit technique. Interviews with various employees of the IU give the auditors, within a relative short time, insight on whether and how the approach described in the documentation is carried out. If a coherent picture emerges from interviews with several employees, the probability is high that the employees have described the actual state. To verify the impressions gained from the interviews, samples are taken. For this purpose, individual processes may be traced in whole or in part, e.g. the path of a complex risk from the person accepting the risk to the risk model.

Since this is a system audit and not the audit of the result, the audit is only conducted once the supervisory authority has obtained sufficient certainty on the functionality of the system.

4.4 Audit report

At the end of the audit, the supervisory authority prepares an audit report. The audit report shows which (partial) models have been submitted for approval by the IU, or which circumstances in the use of the Standard Model have led the supervisory authority to conduct an audit within the framework of this audit concept.

The audit report briefly describes the audit activities performed and the facts encountered, including model or implementation deficits. If the IU does not completely meet the supervisory requirements for its model or the implementation thereof, this is marked as "findings" in the report. The supervisory authority classifies findings on a scale ranging from "minor" via "moderate" to "serious".

If external experts are involved, these experts also prepare an audit report on the facts they clarified in accordance with their audit mandate.

The audit report of the supervisory authority and/or of the external expert is transmitted to the IU. The IU then has the opportunity to comment on the most important facts and findings. Since misunderstandings and incorrect assessments cannot be ruled out entirely with respect to the evaluation of the documentation as well as during the on-site audit, the comments serve to eliminate misunderstandings, especially concerning important points. This is a particularly important interim step when external experts are involved as intermediaries.

The documentation, the audit activities described in the audit report, and the comments serve as a basis for the supervisory authority to perform the legal act of approving or rejecting the model, along with associated measures.

4.5 Quality assurance

In principle-based supervision, the quality assurance of supervisory decisions is a challenge that is especially important in ensuring uniform decisions in the case of comparable data patterns.

The first critical point for the supervisory authority is to fix the proper level of regulation. Every data pattern must be evaluated by the supervisory authority with respect to its impact on the functionality of the system (SST and/or risk management). Since, in the majority of cases, the scope for interpretation is rather substantial, the first decision on the basis of an identified fact pattern constitutes a restriction of this scope for interpretation in the future. The supervisory authority therefore takes such initial decisions also in consideration of the fact that this fixes future supervisory practice.

Another critical point arises after establishment of a supervisory practice. The supervisory authority must then ensure that comparable data patterns at different IUs lead to uniform decisions.

As an aid for quality assurance, the supervisory authority maintains an information database containing the relevant data and the decisions taken. If decisions by the supervisory authority are legally contested, the supervisory authority refers to the principle-based legal foundations, the justified interpretation and the decision in the individual case, and the verifiable, uniform supervisory practice with the help of the database. Ideally, the database is designed in such a way that decisions from the past are easily accessible by entering audit areas and keywords.

The supervisory authority must also ensure that, when external experts are employed, their audit reports contain sufficient decisions on data patterns, so that it can use these decisions and the submitted documentation to take uniform, quality-assured decisions in the future, which are then also entered into the information database.

As a further instrument for ensuring uniform supervisory practice, the supervisory authority compiles a guideline for internal purposes, in which fundamental decisions, important decisions on individual cases, and position papers are included. This makes sense in order to ensure supervisory continuity, e.g. in the case of staff turnover. The guideline becomes especially relevant once the information database for quality assurance has grown in volume over time and contains many routine decisions. Fundamental decisions and important decisions in individual cases may then be marked as such in the information database and linked with the guideline. The guideline makes it easier for new staff members to adjust to their new responsibilities.

4.6 Approval

The documentation, the audit activities described in the audit report, and the comments serve as a basis for the supervisory authority to perform the legal act of approving or rejecting the model, along with associated measures.

The approval of an Internal Model is issued in the following variants:

Provisional approval: The supervisory authority issues a provisional approval if it has no indications otherwise that the Internal Model of the IU is not suitable. This situation may arise for instance when the supervisory authority, especially in the first phase of model audits, in many cases initially only carries out a target-target comparison, generating a satisfactory result. Any approval is then provisional, subject to a more detailed audit (target-actual comparison).

Conditional approval: The supervisory authority issues a conditional approval if the Internal Model has certain deficits, but these are such that the model does not have to be rejected in any case. It can then be approved subject to certain conditions, such as a modification of the parameters or implementation of another approach in partial areas by a certain deadline. Where necessary, a capital surcharge is imposed until the condition is met.

Approval: An approval as such is unconditional and not limited in time. However, an approval refers to a certain risk situation, which will change over time. In many cases, moreover, insignificant adjustments of the model may add up to substantial changes over time. Over time, modelling and IT technologies will also change, so that in the medium term, an adjustment to the state of technology will be expected. The supervisory authority therefore also plans to carry out follow-up audits at longer intervals even in the case of approvals. Follow-up audits may also serve as an instrument to audit the implementation of conditions in the case of conditional approvals.

Rejection: The consequence of the rejection of an Internal Model is that the model may not be used to determine the solvency requirements. Since the supervisory authority must nevertheless ensure that solvency requirements are set out and met, the rejection of a model is always accompanied by alternative solvency requirements. These may be set out by the Standard Model, if it is suitable or if its deficits can be compensated to a certain degree with surcharges. If this is not the case, the supervisory authority decrees alternative solvency requirements (estimation).

Annex:

- Schema for audit concept
- Audit areas