Polish Financial Supervision Authority

Guidelines

on flood risk management in the insurance sector

Warsaw, 16th December 2014.

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Introduction

Taking into account the objectives of the supervision over the financial market as defined in article 2 of the Act on Financial Market Supervision of 21 July 2006 (consolidated text in Journal of Laws of 2012, item 1149 as amended, hereinafter referred to as the Act), such as ensuring proper functioning of the market, its stability, security and confidence in the market, as well as ensuring protection of the interests of its participants, and taking into account the responsibility of the Polish Financial Supervision Authority (hereinafter: KNF), defined in article 4 item 1 point 2 of the Act, to undertake actions necessary to correct the functioning of the financial market, these "Guidelines on Flood Risk Management in the Insurance Sector" (hereinafter: the Guidelines) have been issued.

Floods are the biggest natural catastrophes that take place in Poland and are hazardous for human life and health, natural environment, cultural heritage and business activity. According to the available data, in Poland, floods have become more frequent, more violent and they cause social and economic losses of high value. The volume of losses caused in Poland by floods, the results of supervisory actions taken by the KNF in the area of catastrophic risk management and modelling by insurance undertakings, as well as the requirements resulting from Solvency II, have confirmed the KNF's belief, that it is necessary to create uniform standards on flood risk management. These Guidelines are the result of the joint work of the representatives of the supervisory authority, insurance undertakings and the Polish Insurance Association that had lasted over one year, within the framework of the flood risk experts group (hereinafter: NatCat Forum) appointed by the supervisory authority on 10 August 2012.

This document contains 20 guidelines divided into the following areas:

1. Obligations of the Management Board and the Supervisory Board in relation to flood risk
2. Flood risk management
3. Data
4. Selection and updating of external flood risk model
5. Validation of flood risk model
6. Documentation

The Guidelines were also supplemented with examples of actions that should help with their compliance. The resulting document presents in particular the requirements of the supervisory authority in relation to the flood risk modules of internal models.

The Guidelines form the framework for the flood risk management and should be applied by the insurance and reassurance undertakings operating in the area of non-life insurance, that record significant flood risk exposure, in compliance with the principle of proportionality. The Guidelines are applied in compliance with "comply or explain" principle. Information on application of the Guidelines should be provided on a form that is to be completed by insurance or reinsurance companies as their own assessment of compliance with the Guidelines, and that will be one of the methods of the supervisory authority's verification of compliance with requirements defined in the Guidelines. An insurance or reinsurance undertaking keeps responsibility for fulfilment of the requirements provided in the Guidelines, in particular it is prohibited to outsource the fulfilment of the requirements defined in the Guidelines to any third party.

The Polish Financial Supervision Authority expects that respective activities aimed at implementation of the Guidelines will be implemented in the insurance and reinsurance undertakings in the same timeframe as Solvency II implementation. For the insurance and reinsurance undertakings that wish to use an internal model for flood risk modelling, such an implementation should take place before an application is filed or before 1 January 2016 (whichever of them falls earlier) or on 1 January 2016 in case of other insurance and reassurance undertakings. The supervisory authority will accept later completion of the Guidelines implementation process if it has been earlier agreed with the KNF.

Glossary

CRO – **Chief Risk Officer**, a person responsible for organisation and administration of risk management, who at the same time is a member of the Senior Management. Pursuant to the Directive 2009/138/EC, in case of Undertakings that apply the internal model, the risk management function includes the following additional activities:
– To design and implement the internal model,
– To test and validate the internal model,
– To document the internal model and any subsequent changes made to it,
– To analyse the performance of the internal model and to produce summary reports thereof,
– To inform the administrative, management or supervisory body about the performance of the internal model, suggesting areas needing improvement, and updating this body on the status of work done to improve previously identified weaknesses.

External data – data used in the model or another flood risk measurement tool that do not come from the internal systems of the Undertaking.

Solvency Capital Requirement (SCR) – the amount corresponding to the Value-at-Risk of the basic own funds of an insurance or reinsurance undertaking subject to a confidence level of 99,5 % over a one-year period. According to the requirements of Solvency II, solvency capital requirement could be calculated with the internal model or the standard formula.

Sensitivity curves – curves presenting dependency between severity of a natural catastrophy and the volume of loss. In case of flood risk, these may be the curves presenting, for instance, dependency between a water level and a percentage of disbursed sum insured, as per different groups of properties, e.g. residential buildings, industrial buildings and agricultural buildings.

Internal model – a set of interconnected elements, the function of which is determination of the SCR in compliance with the Solvency II requirements. Until the Solvency II enters into force, it is also understood as a tool that is intended to be used by the Undertakings to determine their SCR (e.g. through participation in the pre-application processes or presentation of the model results in the quantitative impact studies conducted by the KNF).

Flood risk model – a part of the internal model used for measuring the flood risk.

Flood risk measurement tool – set of interconnected elements used for measuring the flood risk and also used in the management process of this risk.

Flood[1] – an event in form of temporary coverage of an area with water, resulting from the following factors:
a. Climate factors, e.g. intensive rainstorms or snowfalls, sudden warming,
b. Other factors independent from the climate, e.g. ice dams, landslides causing water accumulation, damages of flood embankments, damages of dams, landform or changes in the nature of land use.

Flood risk – the risk of loss or adverse change of the value of insurance liabilities of the Undertaking in result of floods.

Risk management system – the system comprising strategies, policies and procedures necessary to identify, measure, monitor, manage and report, on a continuous basis, the risks to which the Undertaking is or could be exposed.

Senior Management – persons (including members of the Management Board) who manage areas in which the knowledge of flood risk is used as well as the heads of organisational units involved in flood risk management process, including persons responsible for risk management, actuarial, internal audit and compliance functions. The above mentioned areas include at least:
a. actuarial area,
b. risk management (including reassurance and retrocession),
c. underwriting,
d. management of products that include flood risk coverage.
Organisational units are deemed to be the organisational unit in the headquarters of the Undertaking and selected branches (in case of significant flood risk concentration of the Undertaking in a given area).

Undertaking – non-life insurance company or reinsurance company.

Flood risk management – part of the risk management system that includes policies and procedures, necessary to identify, measure, monitor, manage and report, on a continuous basis the flood risk, to which the Undertaking is or could be exposed.

External flood risk model – flood risk model designed wholly or partially by an external party.

External tool for flood risk management – flood risk measurement tool designed wholly or partially by an external party.

[1] This definition adds elements specific for the Undertakings to the definition presented in the Floods Directive.

List of guidelines

1. Obligations of the Management Board and the Supervisory Board in respect to the flood risk

Guideline no 1

Within the scope of their functions and responsibility for the risk management system, the Supervisory Board of the Undertaking should approve and supervise the fulfilment of the risk management strategy including the flood risk management.

Guideline no 2

The Management Board of the Undertaking is responsible for the flood risk management.

2. Flood risk management

Guideline no 3

Within the risk management system, the Undertaking should implement policy and procedures for the flood risk management that are necessary for the purpose of identification, measurement, monitoring, managing and reporting of risk, that are proportionate to the scale, complexity and business profile of the Undertaking. The Undertaking should implement their provisions in the manner ensuring that all activities related to the flood risk management are undertaken transparently and in compliance with the risk management strategy adopted.

Guideline no 4

The Senior Management should have a knowledge about the flood risk and know major weaknesses and strengths of the flood risk model, if it is used, or another flood risk measurement tool used by the Undertaking. This knowledge should be adequate to the position held and the individual scope of responsibilities of a particular person. If the CRO is not a member of the Management Board, also the member of the Management Board responsible for the risk management should know and understand the operation of the model or another flood risk measurement tool in its economic and statistical aspects.

Guideline no 5

The Undertaking should have a system of measures enabling measurement and monitoring of flood risk and verify them on a regular basis. It should also create a system of reports and define scenarios supporting the Senior Management in the decision making processes.

Guideline no 6

If it is reasonable due to the scale, complexity and business profile of the Undertaking, it should hire an expert or a group of experts to support the Senior Management in the flood risk management, , in particular through identification, measurement, monitoring and reporting of flood risk.

Guideline no 7

Flood risk model should be used in the flood risk management process and related decision making processes.

Guideline no 8

Terms and conditions of cooperation with an external party in respect to recalculation and handling of the flood risk model should be regulated in a respective agreement.

3. Data

Guideline no 9

In respect to the insurance activity, the Undertaking should ensure that collected and registered claims data, policy data and data from inward reinsurance

agreements related to flood risk are of appropriate quality and are accurate, complete and appropriate.

Guideline no 10

The IT systems that register or process claims data, policy data or data from inward reinsurance agreements should have a functionality enabling proper risk management, in particular its measurement, monitoring, managing and reporting.

Guideline no 11

The Undertaking should have a structured process of transfer of own data used in the model or another flood risk measurement tool to an external party, that ensures consistency of provided data with the expectations of a recipient.

Guideline no 12

The expert or a group of experts should have a knowledge of the sources of external data used in the model or another flood risk measurement tool, as well as the methods and stages of its processing.

4. Selection and updating of external flood risk model

Guideline no 13

The selection of an external flood risk model should take place on the basis of assessment of strengths and weaknesses of a model. Such an assessment should pay a particular attention to the proper reflection of the risk profile of the Undertaking regardless of whether it was conducted by the Undertaking on its own or externally.

Guideline no 14

Every update of the external flood risk model should be documented, additionally an update that according to the internal model change policy means a major change should be additionally validated. After every update, the external flood risk model should be recalculated in order to measure the impact of updating on results.

5. Validation of flood risk model

Guideline no 15

The Undertaking should have a validation policy for the flood risk model that forms an integral part of the internal model validation policy. Validation policy may be prepared in a separate document or be a part of the internal model validation policy.

Guideline no 16

Validation of the flood risk model should be a systematic, independent process which ends with a validation report.

Guideline no 17

Validation should include all essential elements of the flood risk model.

Guideline no 18

Validation of the flood risk model should pay special attention to the assessment of its adjustment to the local specificity, that is, it should reflect the specific national characteristics and the risk profile of the Undertaking.

6. Documentation

Guideline no 19

The Undertaking should have a documentation of the flood risk measurement tool, including documents regarding data used. Such a documentation should be subject to periodical reviews and should be updated when necessary.

Guideline no 20

The Undertaking should have a documentation of the flood risk model, including also the documentation regarding data and methodology used. The documentation of the flood risk model methodology should contain a detailed description of all elements of the flood risk model to enable knowledgeable third party to understand its functioning and, having access to relevant input data, to reproduce the outputs of the flood risk model. Such a documentation should be subject to periodical reviews and should be updated when necessary.

1. Obligations of the Management Board and the Supervisory Board in respect to the flood risk

Guideline no 1

Within the scope of their functions and responsibility for the risk management system, the Supervisory Board of the Undertaking should approve and supervise the fulfilment of the risk management strategy including the flood risk management.

1.1. The Supervisory Board shall be responsible inter alia for:

a. Approval of the risk management strategy including the flood risk management,
b. Monitoring the risk management system including flood risk,
c. Monitoring efficiency of the internal audit system, including in the field of the Undertaking operations related to flood risk.

1.2. The Supervisory Board should have professional qualifications, knowledge and relevant experience that make it possible to understand the results of realisation of flood risk, to which the Undertaking is exposed in relation to its insurance or inward reinsurance underwriting activity for insurance products protecting against flood risk.

1.3. Periodically and at least once a year, the Supervisory Board should receive reports with the information on fulfilment of the risk management strategy including the flood risk management.

1.4. Within the scope of monitoring of the risk management system, the Supervisory Board should receive reports on flood risk to which the Undertaking is exposed - periodically and with a frequency adjusted to the scale and complexity of conducted business in respect to the protection against the flood risk.

Guideline no 2

The Management Board of the Undertaking is responsible for the flood risk management.

2.1. The Management Board shall be responsible for:

a. Preparation and fulfilment of the flood risk management strategy, that forms the integral part of risk management strategy,
b. Approval and implementation of the principles of flood risk management (in compliance with Guideline no 3),
c. Approval and implementation of the internal model validation policy if the internal model (in compliance with Guideline no 15) is used by the Undertaking.

2.2. The members of the Management Board should have professional qualifications, knowledge and relevant experience necessary for efficient flood risk management in the Undertaking, and the member of the Management Board responsible for the risk management process should also know and understand operation of the model or another flood risk measurement tool used by the Undertaking for the purpose of flood risk management in respect to its economic and statistical aspects (in compliance with Guideline no 4).

2. Flood risk management

Guideline no 3

Within the risk management system, the Undertaking should implement policy and procedures for the flood risk management that are necessary for the purpose of identification, measurement, monitoring, managing and reporting of risk, that are proportionate to the scale, complexity and business profile of the Undertaking. The Undertaking should implement their provisions in the manner ensuring that all activities related to the flood risk management are undertaken transparently and in compliance with the risk management strategy adopted.

General requirements regarding policy and procedures for flood risk management

3.1. The policy and procedures for the flood risk management should be prepared in Polish in the written form; they may be separate documents or parts of other documents.

3.2. The policy and procedures for the flood risk management should be:
   a. Adjusted to the business of the Undertaking,
   b. Reviewed and verified periodically (at least once a year) and in case of every significant changes in the business of the Undertaking.

3.3. Every review or verification of the policy or procedures should be documented, and implementation of changes should be made in such a way, that the respective employees are made aware of it.

3.4. The Management Board shall be responsible for approval and implementation of the flood risk management policy and its changes.

3.5. The policy for the flood risk management, as implemented through the completion of respective procedures and processes, should be coherent with the risk management strategy. The flood risk management procedures should define in detail the activities performed.

3.6. On the basis of the policy and procedures for the flood risk management, an independent knowledgeable third party should be able to understand the flood risk management process. Policies and procedures for the flood risk management should ensure possibility of the verification of decisions made.

3.7. The assessment of adequacy and efficiency of the internal control system and other management elements defined in the policy and procedures for the flood risk management should be subject to an assessment performed by the internal audit function.

Elements of the policy for the flood risk management

3.8. The policy for the flood risk management shall include principles of its identification, measurement, monitoring, management and reporting and it should specify the tools to be used for this purpose. For instance, the tools that support these processes may be the tools and scenarios referred to in Guideline no 5.

3.9. The Undertaking should define the principles based on which the limits of the flood risk exposure can be determined, that should be connected inter alia with risk assessment, product pricing, reinsurance, as well as calculation of solvency ratios (if any) and the policy for the flood risk management should define documents where these principles are specified. An example of such principles could be the target share of the solvency capital requirement related to the flood risk in the total value of required capital, with an acceptable deviation.

3.10. The policy for the flood risk management should define at least:

a. List of the Senior Management positions; it should specify the minimum frequency of its updating (e.g. once a year) and situations, in which an additional verification is necessary (e.g. in relation to the introduction of a new product protecting against the flood risk),
b. Positions or organisational units responsible for particular elements of the flood risk management process (identification, measurement, monitoring, management and reporting), together with their scopes of responsibilities,
c. Activities planned to be undertaken in the event of flood, if they are possible from legal and organisational perspective,
d. The need to document activities undertaken in respect to the risk acceptance, mitigation or avoidance, together with the manner how they should be documented,
e. Rules for information exchange in respect to flood risk (including specification of the scope of such an information and dates of its disclosure) between the Supervisory Board and the Management

Board, and persons performing the risk management function, actuarial function, internal audit function and compliance function,

f. The definition of the flood risk exposure in form of a specification of its measure, e.g. sum insured, sum insured corresponding to the probable maximum loss (PML) or aggregated liability under inward reinsurance agreements or the solvency capital requirement, which is of particular importance for proper interpretation of analysed scenarios and preparation of reports referred to in Guideline no 5,

g. Frequency (at least annual) and scope of regularly conducted stress tests and description of situations, which could entail a need to conduct additional tests.

Additional requirements when the flood risk model is applied

3.11. In case of Undertakings using the flood risk model, the policy for the flood risk management should include description of how such a model is used. Moreover, the policy for the flood risk management should include description of elements that should be taken into account in reports on flood risk, such as analyses of changes of the internal model results and specification of the reason of such changes.

3.12. The flood risk model should be subject to the general process of internal model governance, in particular it should be covered by the model change policy and internal model validation policy and should meet the data quality requirements.

Guideline no 4

The Senior Management should have a knowledge of the flood risk and know major weaknesses and strengths of the flood risk model, if it is used, or another flood risk measurement tool used by the Undertaking. This knowledge should be adequate to the position held and the individual scope of responsibilities of a particular person. If the CRO is not a member of the Management Board, also the member of the Management Board responsible for the risk management should know and understand the operation of the model or another flood risk measurement tool in its economic and statistical aspects.

The Senior Management knowledge of the flood risk

4.1. The Senior Management should have a knowledge about the flood risk factors.

4.2. The Senior Management should know selected scenarios related to the realisation of flood risk, including the ones that may lead to significant losses, no coverage of the solvency capital requirement or inability to settle liabilities. The flood risk related scenarios should include other risk categories specified in Guideline no 5.

4.3. The scope of knowledge related to flood risk that is necessary for conscious and responsible decision making should be defined in relation to each member of the Senior Management. The scope of knowledge should include inter alia:
   a. The flood risk exposure (inter alia information on the most exposed regions and insurance or inward reinsurance agreements characterised by the highest exposure),
   b. Methods of the flood risk management with regard to the insurance portfolio,
   c. Reinsurance or retrocession applied,
   d. Possible risks related to the selected form of reinsurance or retrocession,
   e. The largest risks (both before and after the reinsurance or retrocession cover),
   f. Selected scenarios related to the flood risk materialisation.

4.4. The knowledge of the flood risk should be acquired by the Senior Management in a systematic way. A member of the Senior Management (e.g. CRO) of the Undertaking should be appointed as a person responsible for the coordination of determination of the scope of flood risk related knowledge that is adequate in relation to the position held and the form in which such a knowledge should be acquired. The knowledge may be acquired through, for instance, dedicated trainings, presentations, reports. The appointed person should be involved in determination of the scope of trainings and preparation of the annual plan of trainings.

The knowledge by the Senior Management of the model or another flood risk measurement tool used by the Undertaking

4.5. The Undertaking should have a documented justification for the choice of the external flood risk model (referred to in Guideline no 13) or another flood risk measurement tool chosen, with particular stress on quality and level of reflection of its risk profile.

4.6. The Senior Management should know the main reasons of a mismatch of the results of the model or another flood risk measurement tool as compared to real events that took place in the past (e.g. through a comparison of results of real floods and the ones resulting from the model or another flood risk measurement tool).

4.7. If the results of the model or another flood risk measurement tool change significantly, the Senior Management should know the reasons for such changes, in particular if they result from changes in exposure or updating of the model or another flood risk measurement tool.

4.8. The Senior Management should be aware of the limitations of the model or another flood risk measurement tool and consequences resulting from the identified weaknesses, for instance:
   a. A failure to take account of the probability of flood embankment damage,
   b. A failure to take account of a possibility of the so called second flood wave or backwater as a result of raising water level in the end reservoir,
   c. No possibility to take account of some insurance products exposed to flood risk.

Role of the CRO

4.9. The CRO should have the understanding of the flood risk model, as well as another flood risk measurement tool. The CRO should know and understand the stages leading to the end results and should know the data that are used and the way in which their change affects the results.

4.10. If the Undertaking applies the standard formula for the calculation of the solvency capital requirement, the CRO should have a knowledge of assumptions and simplifications used therein and adequacy in relation to the risk profile of the Undertaking.

4.11. If the Undertaking uses the flood risk model, the CRO, as a person responsible for the validation process, should know and understand conducted tests and analyses included in the validation report referred to in Guideline no 16.

Guideline no 5

The Undertaking should have a system of measures enabling measurement and monitoring of flood risk and verify them on a regular basis. It should also create a system of reports and define scenarios supporting the Senior Management in the decision making processes.

5.1. The Undertaking should define a system of measures of both the exposure and the burden of claims in respect to flood risk. The system should support the process of flood risk measurement and monitoring and at the same it should serve as the basis for generation of adequate reports and scenarios.

5.2. The Undertaking should create a system of reports ensuring that the reporting needs are fulfilled and containing report templates (including the

minimum contents and level of details, as well as the threshold above which the exposure is considered to be significant for the Undertaking) and their recipients.

5.3. The system of reports should consist mainly of periodical reports prepared at least on quarterly basis and additional supplementary reports that suit specific needs and risk profile. Examples of periodical reports may be:

a. Specification of number of losses from flooding and the total gross and net of reinsurance amount of flood insurance claims paid in a reporting period,
b. Specification of the biggest flood risk exposures together with information on their locations, limits, deductibles and franchises,
c. Specification of the number of losses from flooding and the total gross and net of reinsurance amount of flood insurance claims paid, by products, for selected historical floods,
d. Specification of the number of losses from flooding and the total gross and net of reinsurance amount of flood insurance claims paid, by dates of events, for selected historical floods.

5.4. The Undertaking should define events resulting in a need to create additional reports and should determine positions that decide in such a case on the need and scope of their creation.

5.5. The examples of events resulting in a need to create additional reports are events that may transform into natural catastrophes (e.g. continuing heavy rainstorms, backwater, ice dams, rising underground water) or events when a catastrophy has already taken place (e.g. moving flood wave). Examples of additional reports may be:

a. Specification of the number of active insurance agreements with flood risk exposure and their total sum insured in the areas where flood is expected (e.g. in relation to continuing heavy rainstorms),
b. Specification of the number of losses and the total gross and net of reinsurance amount of claims paid, by products and inward reinsurance agreements, in the area that is currently covered with flood,
c. Specification of the number of losses and the total gross and net of reinsurance amount of claims paid, by the date of an event, in the area that is currently covered with flood,
d. Specification of the biggest flood insurance claims paid (gross and net of reinsurance) together with sums insured and information on their location, in the area that is currently covered with flood,
e. Specification of flood insurance claims paid (gross and net of reinsurance) for the most affected areas at the moment.

5.6. If the Undertaking uses the flood risk model, reports should include analysis of changes in its results and explain reasons of such changes.

5.7. The Undertaking should define flood risk scenarios enabling an analysis of the severity of the flood risk materialisation.

5.8. Scenarios should be grouped into two types of scenarios: with probability assigned and without it. If it is not possible to precisely define probability, probability level (e.g. low, medium, big) may be defined. It is necessary for the scenarios to cover not only flood risk, but also its impact on other accompanying risk categories, for instance:

a. Credit risk – reinsurer's insolvency, delays in reinsurance payments,
b. Concentration risk – too extensive exposure in a given region (lack of regional diversification),
c. Liquidity risk – lack of funds to pay off current liabilities when they fall due,
d. Reputation risk– related to negative perception of the Undertaking among customers, contractors, investors, shareholders, supervisors, regulators or public opinion.

5.9. It is necessary to use the knowledge obtained from prior experience, which means it is necessary to rely on historical events and results. The result of the model or another flood risk measurement tool should be compared with historical data, e.g. in respect to the amount of losses, geographical area of flood and probability of flood occurrence.

5.10. The Undertaking should create the minimum set of scenarios (e.g. through specification of groups of products that are to be taken into account) and determine positions that are responsible for their preparation.

5.11. Created scenarios should correspond to the extreme situations related, for instance, to no meeting of the solvency capital requirement or the Undertaking's inability to pay off liabilities when they fall due.

5.12. Created reports and scenarios should fulfil the needs of the members of the Senior Management.

Guideline no 6

If it is reasonable due to the scale, complexity and business profile of the Undertaking, it should hire an expert or a group of experts to support the Senior Management in flood risk management, , in particular through identification, measurement, monitoring and reporting of flood risk.

6.1. The Undertaking should hire an expert or a group of experts, if it is reasonable due to the scale, complexity and business profile of the Under-

taking in respect to flood risk, and such experts should have respective detailed knowledge of flood risk, as well as respective knowledge and level of understanding of operation of the model or another flood risk measurement tool.

6.2. The expert or a group of experts should be responsible for identification, measurement, monitoring and reporting of flood risk referred to in Guideline no 5, including preparation of appropriate scenarios.

6.3. The tasks of the expert or a group of experts should include monitoring of quality of claims data, policy data and data from inward reinsurance agreements related to flood risk, in particular data used in the model or another flood risk measurement tool.

6.4. The expert or a group of experts should have knowledge of external data sources used in the model or another flood risk measurement tool within the scope defined in Guideline no 12.

6.5. The expert or a group of experts should monitor results received from the model or another flood risk measurement tool, in particular they should explain the reasons of significant changes in such results.

6.6. The expert or a group of experts should signal needs of changes in the model or another flood risk measurement tool in result of a change in the risk profile in respect to flood risk, for instance changes in exposure or changes in product portfolio.

6.7. The expert or a group of experts should closely cooperate with the CRO and inform the CRO about any significant changes in the risk profile and gaps and shortcomings in respect to the data and construction of the model or another flood risk measurement tool. Moreover, they should inform the CRO about the reasons of significant changes in end results of the model or another flood risk measurement tool. The CRO should inform the other members of the Senior Management, if he/she finds it necessary, about the identified gaps and support the Management Board in activities aimed at their elimination.

Guideline no 7

Flood risk model should be used in the flood risk management process and related decision making processes.

7.1. The Undertaking should use the flood risk model in the process of establishing or monitoring of the limits of flood risk exposure and defining risk management strategy for the flood risk.

7.2. The Undertaking should use the flood risk model to support respective decision making processes, including the definition of the business strategy.

7.3. Description of use of the results of the flood risk model should be included in the flood risk management policy, in compliance with Guideline no 3. Conducted analysis of the end results of the flood risk model and their use should be properly documented.

7.4. The Undertaking should work out a system of transferring information about the end results of the flood risk model to appropriate organisational units that make business decisions, as well as it should create the adequate feedback system.

Guideline no 8

Terms and conditions of cooperation with an external party in respect to recalculation and handling of the flood risk model should be regulated in a respective agreement.

8.1. If the Undertaking uses an external flood risk model, an agreement with an external party that defines respective rights and obligations of the parties should define the rules of cooperation in the scope defined in Guidelines no 11 and 12.

8.2. Provisions of the agreement should ensure an appropriate scope, level of detail and timeliness of information received from an external party for the purpose of measurement, monitoring and decision making in relation to flood risk referred to in Guideline no 5.

8.3. An agreement with an external party should guarantee a possibility of additional recalculation of the flood risk model at each request of the Undertaking.

8.4. If external data is used in the flood risk model, an agreement should guarantee that the data used for the purpose of calculations is accurate, complete and appropriate.

8.5. An agreement with an external party should guarantee an appropriate form and scope of information supplied in respect to the requirements re-

lated to the validation and documentation in compliance with Guidelines no 16, 17, 18 and 20.

8.6. To ensure proper quality and continuity of flood risk management processes, an agreement with an external party should indicate the need to obtain by the Undertaking the information on planned changes in the flood risk model (their dates and scope) properly in advance.

8.7. If a change in the flood risk model requires approval of a supervisory authority, an agreement with an external party should guarantee a possibility for the Undertaking to use the previous version of the flood risk model until respective decision on introduction of the above mentioned change is issued by a respective supervisory authority.

3. Data

Guideline no 9

In respect to the insurance activity, the Undertaking should ensure that collected and registered claims data, policy data and data from inward reinsurance agreements related to flood risk are of appropriate quality and are accurate, complete and appropriate.

9.1. The process of collecting and registering data, including its scope and level of detail, should be based on the written internal regulations of the Undertaking.

9.2. Activities of the Undertaking in respect to data quality should include:
   a. Data quality assessment,
   b. Data cleaning,
   c. Identification of reasons of errors occurring in the data.

9.3. The data quality should be subject to regular verifications and ongoing monitoring, while processes related to its collection and registration – to regular audits.

Minimum data scope and level of detail

9.4. The scope and level of detail of the data collected and registered by the Undertaking should be adjusted to the current and planned use (e.g. for the purpose of pricing, technical provisions calculation, reporting, designing the reinsurance programme, quantitative impact studies conducted by the KNF, solvency capital requirement calculation), if there are no reasons for exceptions referred to in clauses 9.8 – 9.12.

9.5. In case of policy data, at least the following should be collected and registered:
   a. Location of each subject-matter insured with an accuracy of 5-digit postal code and address understood as the set of the following information: town/city, street, home and dwelling number,

b. Information enabling determination of situation of a property with unspecified location, e.g. containing geographical coordinates,
c. Sums insured, limits, deductibles, franchises and excess for flood risk in compliance with the provisions of an insurance contract,
d. The main characteristics of a subject-matter insured that have essential impact on flood risk assessment. The examples of such characteristics are as follows: type of a subject-matter insured (building, content), designation of a building (residential, commercial, industrial, agricultural), number of floors in a building, construction material of a building, existence of a cellar or an underground garage, floor where the flat is located.

9.6. In case of claims data, at least the following information should be collected and registered:
a. Gross amount of flood insurance claims paid and compensations, allocated to specific subject-matter insured,
b. Reinsurers' share of flood insurance claims paid,
c. Records of payments,
d. Information on location of flood damage understood as 5-digit postal code and address,
e. Information enabling determination of situation of damages of a property with unspecified location, e.g. containing geographical coordinates,
f. Statistically representative sample of claims data, containing information necessary for validation of the flood risk model or another flood risk measurement tool. These may be, for example, data on the maximum water level observed in the area or in a property affected with flood, that could be used for validation of the flood risk model that applies the sensitivity curves based on the height of inundation.

9.7. If the Undertaking uses the flood risk model, the collected and registered claims data, policy data and data from inward reinsurance agreements should have the quality and level of detail enabling its validation.

Exceptions from the minimum scope and level of detail

9.8. All data modifications and additions of missing data that have significant impact on flood risk assessment should be justified and documented.

9.9. Exceptions from requirements concerning the quality and level of detail of flood risk related data should be documented as a list of exceptions. The Undertaking should define rules for including a given case in a list of exceptions.

9.10. A list of exceptions should include every situation when it is not possible to collect or register claims data or policy data of appropriate quality or at appropriate level of detail or where it would not be cost effective, for instance due to their marginal significance.

9.11. In case of every situation (that may refer to a policy or a group of policies or an inward reinsurance agreement or a group of inward reinsurance agreements) included in a list of exceptions, at least the following information should be presented:

a. Description of a given exception: specification what product and in what scope (what part of data within the product concerned), what is the share of the product in the total written premium and flood risk exposure,
b. Specification of reasons of a given exception,
c. Assessment of the impact of a given exception on the flood risk management process, in particular information whether and how such an exception may disturb interpretation of created reports or scenarios,
d. Information whether the data subject to such an exception are used in the model or another flood risk measurement tool and what is their percentage share in all data used in the model or another flood risk measurement tool,
e. Information whether and in what way the exception may affect the quality of results of the model or another flood risk measurement tool,
f. Information since when given exception has taken place,
g. Plans to eliminate the exception or justification for the lack of such plans when for instance such an exception is of marginal significance or benefits obtained from its elimination are disproportionate to costs.

9.12. List of exceptions should be updated on an ongoing basis.

Guideline no 10

The IT systems that register or process claims data, policy data or data from inward reinsurance agreements should have a functionality enabling proper risk management, in particular its measurement, monitoring, managing and reporting.

Role of IT systems

10.1. The IT systems operating in the Undertaking should support flood risk management, enable its measurements, reporting and monitoring.

10.2. The IT systems operating in the Undertaking should enable sufficiently detailed registration of claims data, policy data and data from inward reinsurance agreements related to flood risk, in compliance with Guideline no 9, and ensure a possibility of its processing.

10.3. Proper (functional) registration of claims data, policy data and data from inward reinsurance agreements has an impact on the quality of the model or another flood risk management tool, enabling its validation and contributing to more detailed risk measurement. It is also essential due to reduction of uncertainty of the model or another flood risk management tool.

10.4. The IT systems operating in the Undertaking should enable generation of relevant reports defined in Guideline no 5, referring also to past reporting periods, enabling determination of frequency of the flood risks materialisation and associating this risk with both the location and the subject-matter insured.

Characteristics of IT systems

10.5. When designing an IT system, the Undertaking should include a possibility of its future modification resulting inter alia from adoption of plans to eliminate exceptions (from principles regarding data quality and level of detail) in compliance with Guideline no 9.

10.6. In respect to the insurance activity, the Undertaking should work out control mechanisms and standards related to data input, e.g. dictionaries or selection lists that should be specified in the appropriate documentation.

Guideline no 11

The Undertaking should have a structured process of transfer of own data used in the model or another flood risk measurement tool to an external party, that ensures consistency of provided data with the expectations of a recipient.

Description of data transfer process

11.1. The process of collecting, processing and transferring the data used in the model or another flood risk measurement tool should be structural. All stages should be described in detail, including assignment of positions responsible for them, and the process should have appropriate checkpoints and be subject to regular audits.

11.2. The data coming from the Undertaking and transferred to a third party for the purpose of calibration of individual modules of the model or an-

other flood risk measurement tool, as well as assumptions and modifications related to it, should be documented and archived.

11.3. In order to ensure the consistency of provided data with the expectations of a third party, the Undertaking should define the sources of data, as well as their scope and level of detail in an appropriate documentation (e.g. an agreement with third party).

Rules of cooperation with an external party

11.4. The rules of cooperation with an external party with respect to data transfer should be documented (e.g. in an agreement with an external party).

11.5. It should be ensured that the data transferred to a third party reflect appropriately the flood risk exposure. The level of detail and scope of provided data should be agreed precisely with an external party in order to enable correct calibration of the flood risk.

11.6. The process of data transfer (including their scope and level of detail) should be documented, and all exceptions or inability to fulfil third party's requirements concerning the data should be communicated on an ongoing basis both to the third party and to the members of the Senior Management.

Guideline no 12

The expert or a group of experts should have a knowledge of the sources of external data used in the model or another flood risk measurement tool, as well as the methods and stages of its processing.

12.1. The expert or a group of experts should have a knowledge of the sources of external data used in the model or another flood risk measurement tool, as well as the methods and stages of its processing, and should be aware of the assumptions used and limitations resulting from them.

12.2. The expert or a group of experts should indicate the level of detail of data used in the calibration process of individual modules of the model or another flood risk measurement tool. Moreover, they should be aware of data modification in the process of obtaining the final result, that is, transformations, additions and exclusions, and they should have respective documentation of these modifications. It is particularly important to have an access to information on changes of external data that have an impact on the risk measurement by the Undertaking.

12.3. An access to the information enabling the acquisition of the knowledge referred to above as well as appropriate quality of external data used in the flood risk model should be guaranteed by respective provisions of an agreement with an external party.

4. Selection and updating of external flood risk model

Guideline no 13

The selection of an external flood risk model should take place on the basis of assessment of strengths and weaknesses of a model. Such an assessment should pay a particular attention to the proper reflection of the risk profile of the Undertaking regardless of whether it was conducted by the Undertaking on its own or externally.

13.1. The external flood risk model assessment may be carried out by the Undertaking or externally (by a party belonging to an insurance group of the Undertaking or another external party). In case of an assessment made by external parties, the Undertaking should know the results of such an assessment and their explanation.

13.2. The external flood risk model assessment should be documented.

13.3. The assessment should be concerned with the adequacy and the level of detail of the external flood risk model in respect to the proper reflection of the risk profile of the Undertaking. In particular:

a. The location and characteristics of the subjects-matter insured, including properties with unspecified location, such as farmland, orchards, roads, railroads, transmission networks,
b. The terms and conditions of insurance (e.g. limits, deductibles, franchises) and reinsurance programme,
c. Division into groups of properties that it has been applied to,
d. Types and level of detail of sensitivity curves.

13.4. The adequacy of the external flood risk model should be assessed from the perspective of proper representation of the phenomenon of floods in Poland. In particular:

a. Accounting for historical experience, e.g. existence of two flood waves, prolonged duration of floods,

b. The level of detail of accounting for the drainage system,
c. Accounting for flood embankments.

13.5. The assessment should also cover the other elements of the methodology of the external flood risk model, e.g.:
a. Accounting for different types of floods (occurring in result of rainstorms or snow melting, rivers overflowing its banks, and other not related with the drainage system) and their connections with meteorological phenomena,
b. Techniques allowing for taking into account the uncertainty of modelled events,
c. Quality of documentation and tests conducted to verify the functioning of the model.

13.6. In the course of carrying out the assessment of the external flood risk, one should take account of the quality of explanations of simplifications made (e.g. in respect to the construction of sensitivity curves).

13.7. The assessment should also cover:
a. Possibility to recalculate the external flood risk model or carry out additional analyses at every request of the Undertaking,
b. Experience of persons involved in the external flood risk model development,
c. Experience from hitherto cooperation with the provider of the external flood risk model.

13.8. The external flood risk model should be compared with other flood risk models available on the market, unless such a comparison would lead to the significant costs which are disproportionate to the benefits obtained or would generate significant risk of loss of confidentiality of insurance data that are essential for the Undertaking.

Guideline no 14

Every update of the external flood risk model should be documented, additionally an update that according to the model change policy means a major change should be additionally validated. After every update, the external flood risk model should be recalculated in order to measure the impact of updating on results.

14.1. The CRO and the expert or a group of experts should have a knowledge of reasons and consequences of every update of the external flood risk model, including its impact on the end results. In case of material changes in the results of the external flood risk model, other members of the

Senior Management should also have a respective knowledge in compliance with Guideline no 4.

5. Validation of flood risk model

Guideline no 15

The Undertaking should have a validation policy for the flood risk model that forms an integral part of the internal model validation policy. Validation policy for the flood risk model may be prepared in a separate document or be a part of the internal model validation policy.

15.1. The validation policy for the flood risk model should be written down and adhered to, and the Management Board is responsible for its approval and implementation. The policy should be reviewed regularly (at least once a year) and updated.

15.2. The validation policy for the flood risk model should define at least:

a. The frequency and scope of regular validation of every element of the flood risk model,

b. Events which lead to a need of an additional validation and the deadline for its carrying out. An example of such an event can be flood in result of which, within a certain period, claims which exceed the threshold defined by the Management Board were reported, and an example of deadline for a completion of the validation may be a month after the end of the specified period. The members of the Senior Management should be informed about every such an event and an additional validation, carried out in such circumstances, should include at least validation of the results of the flood risk model,

c. Positions of persons involved in a validation and their tasks,

d. Methods and tools used for specific types of validation (regular, additional and related to major changes in the internal model in respect to the flood risk model, as understood in compliance with the model change policy),

e. Rules of cooperation with external parties in respect to the validation,

f. Criteria for materiality assessment of recommendations resulting from validation carried out - for each materiality level it is necessary to define the way how information is delivered to the Senior Management (escalation path) as well as the decision making process in respect to implementation of recommendations; delivery of information in a written form other than a validation report is also allowed.

Guideline no 16

Validation of the flood risk model should be a systematic, independent process which ends with a validation report.

16.1. CRO is responsible for validation of the internal model.

16.2. Validation of the results and the most important assumptions made in the flood risk model (in accordance with the list of the most important assumptions included in the documentation of the flood risk model) should be carried out at least once a year.

16.3. Every major change of the internal model in respect to the flood risk model, understood in compliance with the model change policy of a given Undertaking, requires additional validation. Additional validation of the flood risk model should be carried out also in case of material changes in the risk profile of the Undertaking (in respect to flood risk).

16.4. In case of validation carried out by an external party, the rules concerning the process and its independence should be defined in an agreement concluded with this party.

16.5. The validation process should be subject to periodical reviews to verify inter alia its efficiency and independence.

Independence of the validation process

16.6. The validation process of the flood risk model should be independent in its nature, which means that it should be carried out by persons not involved in the flood risk model development or its current use, subject to circumstances referred to in clause 16.8.

16.7. The requirement of independence should be met regardless of whether validation is carried out by the Undertaking or an external party.

16.8. The independence of the validation process is not infringed if persons involved in the flood risk model development or its current use carry out only some validation tasks (e.g. conduct selected tests or calculations) and the Undertaking ensures that the person responsible for the validation does not rely only on the results of tests or calculations carried out by a person who was earlier involved in the model development or its use, and the tests and recalculations of key importance are conducted by a person who was not involved earlier in the model development or its use. The independence of the validation process is not infringed either if persons carrying out the validation are employees of the same organisational unit as the persons involved in the model development or its use and the Undertaking ensures an escalation path allowing for reporting of the validation outcome directly to the Management Board or another collegial body designated by the Management Board as competent. Each situation when a person, who was earlier involved in the flood risk model development is involved in its validation, should be considered on an individual basis, by taking account of the scale of changes in the flood risk model that have occurred since the involvement of such a person has ceased. If there have been no changes or such changes were immaterial, a person who was earlier involved in the flood risk model development may not carry out the validation except selected tests or recalculations, and tests, analyses and recalculations of key importance should be conducted by a person who has not been earlier involved in the model development. The grace period should not be shorter than one year. The above does not preclude a situation when a person involved in development of a part of the flood risk model is involved in the validation of its other elements.

16.9. In case of validation carried out by an external party, in principle the independence of this process should be understood analogically to the one presented in clause 16.8.

Validation report

16.10. When the validation is completed, validation report shall be prepared by the Undertaking.

16.11. A validation report should contain recommendations with an indication of their materiality level. It is recommended to consult the draft version of the report with persons involved in the flood risk model development, but it must not influence the independence of recommendations given.

16.12. In case of a validation carried out by an external party, an agreement concluded with this party should guarantee that the form and scope of delivered outcomes enable their full understanding, e.g. through specifi-

cation of the need to deliver a validation report containing additional information or ensuring possibility of holding a meeting with persons who have prepared this report.

16.13. Final outcomes of the validation should be presented to members of the Senior Management and persons who developed the flood risk model.

Knowledge and understanding of conducted tests and analyses

16.14. It is necessary that apart from the CRO also respective employees of the Undertaking (who use knowledge of flood risk or they are involved in flood risk management process) have an appropriate knowledge and understanding of tests and analyses carried out within the validation process.

Guideline no 17

Validation should include all essential elements of the flood risk model.

17.1. Validation should include all key assumptions of the model. In particular it should include assessment of how realistic and verifiable they are, and test alternative assumptions, if possible. The assessment should cover in particular those assumptions in case of which expert judgement is used to a large extent due to the fact that there is no data.

17.2. Verification should cover the process of generation of the scope of floods, for instance through an increase of the number of generated water levels, change of methods applied for the purpose of interpolation and extrapolation of the range of water level, change of assumptions concerning adopted models of physical phenomena.

17.3. Validation should cover methods of accounting for the drainage system by the flood risk model.

17.4. Validation of the generated flood events (water level or water flow volume) may be carried out, for instance, through an analysis of the impact of end results on changes of assumptions concerning distributions of individual flood monitoring stations, in particular change of applied interpolation or extrapolation methods. Moreover, it should be checked whether and in what way such a flood event is related to the reason of its occurrence, e.g. occurrence of heavy rainstorms or snow melting.

17.5. In order to maintain consistency and completeness of the validation process, the process should include also the following elements:

a. Impact assessment of a level of detail of the flood risk model on its results (such an analysis must be accompanied by awareness that higher level of detail may lead to a reduction of the number of available data, and consequently deterioration of the quality of estimations),
b. Methods to take account for modelled dependency in an explicit or inexplicit way. In the first case, validation may be carried out, for instance, through examination of sensitivity of the results of the flood risk model to changes in applied dependency structure. In the other case validation may be based e.g. on analysis of implied correlation. Moreover, the adequacy of the dependency structure applied to the description of extreme dependency should be assessed,
c. Methods to take account for an uncertainty e.g. through change of assumptions concerning distributions used for taking this uncertainty into account or change in the parameterisation of distributions,
d. Verification of adequacy of the methods and statistical tools used , e.g. estimators,
e. Assessment of the numerical stability of the flood risk model, e.g. through an increase in the number of simulations or change of seed of random number generator.

Guideline no 18

Validation of the flood risk model should pay special attention to the assessment of its adjustment to the local specificity, that is, it should reflect the specific national characteristics and the risk profile of the Undertaking.

18.1. It is necessary to analyse individual elements of the flood risk model. Accuracy, completeness and appropriateness of input data from the Undertaking are of key importance for such an analysis.

18.2. It is also necessary to assess the adequacy of the flood risk model in respect to its accounting for the exposure of the Undertaking, checking for instance whether it covers all insurance products exposed to flood risk and how the properties with unspecified location, such as e.g. farmlands, orchards, roads, railroads, transmission networks, are taken into account. Moreover, when the level of detail of the flood risk model does not correspond to the level of detail of exposure, validation should cover also assumptions and simplifications made in order to ensure proper reflection of exposure in the flood risk model. It is also essential to assess the impact of aggregation of the part or the whole location data of the subject-matters insured on the result of the flood risk model (e.g. through allocation of the total sum insured to the headquarters).

18.3. Validation should cover techniques used for transformation from a flood event to volume of loss. In particular, it should be assessed whether sensitivity curves are detailed enough to reflect the risk profile of the Undertaking and whether they reflect historical experience. Taking into account the requirement resulting from Guideline no 9 regarding collection of claims data containing information on maximum water level, the Undertaking shall be finally able to answer a question whether the sensitivity curves properly reflect the historical events.

18.4. Validation should include sensitivity analyses of techniques used for transformation from a flood event to volume of loss, e.g. verify the impact of modification of sensitivity curves, such as parallel shifts (all or part of them) or rescaling (all or part of them) on the end results.

18.5. Validation should cover also the way in which flood embankments or reservoirs are taken into account, for instance through total or partial exclusion of flood embankments from the flood risk model.

18.6. Validation should also cover the methods how terms and conditions of insurance are taken into account, e.g. through recalculation of the flood risk model (for specified group of policies or a group of inward reinsurance agreements) and with exclusion or modification of amounts of limits, deductibles and franchises.

18.7. Validation should cover flood events generated by the flood risk model. For this purpose, for instance, it is possible to create (on the basis of all events) cumulative distribution functions of volume of losses for selected postal codes and compare them to historical data of the Undertaking with possible correction related to a change in exposure.

18.8. In the course of validation, the real losses resulting from historical floods should be compared with losses resulting from the flood risk model. It should be checked whether the flood risk model takes account of historical experience, e.g. two flood waves, long duration of flood.

6. Documentation

Guideline no 19

The Undertaking should have a documentation of the flood risk measurement tool, including documents regarding data used. Such a documentation should be subject to periodical reviews and updating, when necessary.

19.1. The documentation of the tool used by the Undertaking should include description of quality and level of detail of data used in the process of calibration of the flood risk measurement tool, as well as related assumptions and modifications (in compliance with Guidelines no 9, 11, 12), description of the process of their delivery (in compliance with Guideline no 11) and description of controls applied (in compliance with Guidelines no 10 and 11).

19.2. The way in which documentation is prepared should enable its use by appropriate persons in compliance with the scope of their responsibilities. For this purpose, the Undertaking should define the system of recording of all versions of documents related to the flood risk measurement tool and prepare a list of all these documents (at least in electronic version). Such a list should contain information regarding authors, periods of validity of individual versions and brief description of each document.

Guideline no 20

The Undertaking should have a documentation of the flood risk model, including also the documentation regarding data and methodology used. The documentation of the flood risk model should contain a detailed description of all elements of the flood risk model to enable knowledgeable third party to understand its functioning and, having access to relevant input data, to reproduce the

outputs of the flood risk model. Such a documentation should be subject to periodical reviews and should be updated when necessary.

20.1. The flood risk model documentation should meet all requirements defined in relation to the flood risk measurement tool defined in Guideline no 19 and additional requirements defined in this Guideline, including the one referring to the documentation of the flood risk model.

The minimum scope of the methodology documentation of the flood risk model

20.2. The documentation of the model should contain a description of methodology used and specification of other approaches taken into account, together with explanation why they were not selected. In particular it should contain a precise description of mutual relationships between individual elements of the flood risk model and description of the way in which historical experience is taken into account.

20.3. The documentation should contain a description of the terrain maps used (inter alia description of their resolution, specification of map type, e.g. DEM - Digital Elevation Model, DTM - Digital Terrain Model) and the way in which the drainage system is presented in the flood risk model (methods in which rivers are placed on a terrain map, scope and level of detail of the drainage system).

20.4. The methods in which exposure of the Undertaking is reflected by the flood risk model should be described. Assumptions made and simplifications, as well as techniques enabling inclusion of properties with unspecified location, such as farmlands, orchards, roads, railroads, and transmission networks should be described in detail.

20.5. Moreover, the process of generation of the scope of floods (e.g. determination of the number of water levels generated, description of waterflow models used) should be described precisely and it should be defined what is understood under the term of a flood event, in particular whether it is a water level or volume of waterflow and whether it is associated with the reasons of its occurrence. It is important that documentation contains information how different physical phenomena are reflected in the flood risk model, e.g. heavy rainstorms, snow melting, water absorption by soil, creation of ice dams and water damming up. Moreover, it should be indicated what methods and statistical tools were used in this process, for instance what are probability distributions and how they were parameterised.

20.6. The documentation should include a description of methods of taking into account the dependencies in the flood risk models, in particular their

adequacy in reflecting extreme dependency, use of statistical methods and tools (e.g. estimators, statistical tests). It should describe the level of detail of the flood risk model in respect to the number of flood monitoring stations and methods of uncertainty inclusion therein (primary uncertainty, secondary uncertainty) in relation to its different elements.

20.7. The methods used for a transformation from a flood event to the volume of loss should be described in a comprehensive way, in particular methods of construction of so-called sensitivity curves, including information whether they were established on the basis of data (if so, what data) or expert judgement (e.g. of construction engineers). Information on the way in which flood embankments (including the probability of their damage), reservoirs and methods of inclusion of terms and conditions of insurance (e.g. limits, deductibles, franchises) is also essential in the documentation.

20.8. From the external flood risk model use perspective, an exact description of key objects, e.g. construction methods of Occurrence Exceedance Probability (OEP) curves and Aggregate Exceedance Probability (AEP) curves, as well as Event Loss Tables is very important. The documentation should also include a description of their use (including the methods of representing reinsurance programme), as well as all their modifications. If results of more than one model are used (so-called blending approach), the way of their combination should also be reflected.

20.9. Furthermore, it should be pointed out in the documentation what IT systems are used at individual stages of the flood risk model calculation.

Limitations and simplifications of the flood risk model

20.10. The documentation of the flood risk model should contain a precise description of limitations or simplifications of the flood risk model. In case of limitations or simplifications of the flood risk model, beside their description, plans for closing the gaps or justification why such a closing is not planned should be pointed out (e.g. due to their marginal significance or if it would not be cost effective). It is also reasonable to point out in what circumstances the flood risk model may work incorrectly or produce unreliable results, e.g. in case of an increase in exposure to an insurance product that is not covered within the scope of the flood risk model or in the case of replacement of the reinsurance programme by another one that may not be reflected by the flood risk model.

Documentation of assumptions made and areas and scope of expert judgement

20.11. The documentation of the flood risk model should contain specification and description of assumptions made, and areas and scope of expert judgement. Description of the assumptions made must be precise and include justification for their making in the flood risk model. Thus, it is necessary to point out the reason of making of a given assumption, analyse its role (taking into account the consequences of the failure to meet it), assess verifiability and reality in respect to occurred historical events (together with pointing out to rational situations or circumstances, in which such an assumption becomes false). Moreover, description of the history of such an assumption should be taken into consideration, checking its functioning in the previous versions of the flood risk model. One should also acknowledge the alternative assumptions that could be possibly made.

20.12. The documentation of the area and scope of expert judgement used in the flood risk model is connected with inter alia indication of the expert, what is the experience of the expert in the area in which expert judgement is made and what are arguments supporting a particular decision taken by the expert in relation to a given element of the flood risk model.

20.13. In the documentation the Undertaking should point out the most important assumptions made in the flood risk model that are subject to annual validation (in compliance with Guideline no 16).