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STAFF PAPER

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Project	**Insurance contracts**		
Paper topic	Measurement of liabilities for infrequent high-severity events		
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Purpose of the paper

1. The purpose of this paper is to consider whether, and if so how, to modify the requirements of the insurance standard in measuring liabilities for infrequent high-severity events, for which:

   (a) The estimates of the expected cash flows can be very volatile in the days and weeks following the first indications of an impending catastrophe, such as a hurricane; and

   (b) The uncertainties affecting the reliability of the estimates at the balance sheet date are sometimes resolved by subsequent events[1], i.e. events that occur after the balance sheet date, but before the financial statements are issued or available to be issued[2].

2. This matter is of particular significance for non-life insurers and reinsurers that issue contracts that provide catastrophe insurance.

[1] 'Subsequent events' are known in IFRS literature as 'events after the reporting period'.
[2] The IFRS definition refers instead to the date on which the financial statements are 'authorised for issue'.

Summary of staff recommendations

3. All staff recommend that, as proposed in the exposure draft and discussion paper, insurers should measure all insurance contract liabilities taking into account estimates of expected cash flows at the balance sheet date.

4. However:

   (a) some staff recommend that, for all insurance contract liabilities, if the effects on the financial statements are material, insurers should update cash flow estimates made at the balance sheet date for events that occur after the balance sheet date but before the financial statements are issued when all of the following conditions are met:

      (i) An infrequent, high-severity event, such as a catastrophe is impending as of the balance sheet date, but has not yet occurred;

      (ii) Where the expected losses related to the event in (a) are based on information that is subject to substantial deviation prior to the event occurring; and

      (iii) The time period between when the insurer first projects loss estimates related to the event to the occurrence of the event is relatively short.

   (b) other staff recommend that insurers should not recognise an onerous contract liability at the balance sheet date if the onerous contract liability is already known to have reversed in the post balance sheet period as a result of subsequent events.

Structure of this paper:

5. The rest of this paper is structured as follows:

   (a) Background, including the nature of the contracts considered, current practice and concerns about the proposed requirements (paragraphs 6-25)

   (b) Staff analysis:

(i) Exception to the expected cash flow model (paragraphs 27-30)

(ii) Using subsequent information (paragraphs 31-68(e)).

(c) Staff recommendations (paragraphs 70-75)

Background

Nature of Contracts

6. The boards propose to define an insurance contract as:

> *A contract under which one party accepts significant insurance risk from another party by agreeing to compensate the policyholder if a specified uncertain future event adversely affects the policyholder*.

7. For many non-life contracts such as property coverage (e.g. home or automobile insurance), an adverse event impacts an insured's property, and expected cash flow estimates are based on frequency and severity factors. These factors are reasonably predictable and can be applied to high frequency claims either before the claim is incurred (liability for remaining coverage) or after the claim is incurred (liability for incurred claims). However, in the case of infrequent high-severity events, such as catastrophes, expected cash flows are much more difficult to estimate, and, before an adverse event has occurred, can be extremely volatile. If the period between (a) the days and weeks following the first indications of an impending catastrophe, and (b) the occurrence of the event, spans the end of an accounting reporting period, in an expected value model, the insurer must recognise the cash flow estimates as of the balance sheet date. As discussed below, this is not required under current guidance for insurance contract liabilities.

8. The staff considered the extent to which an insurer issuing catastrophe coverage can reasonably or reliably determine the cash flow estimates of expected losses. Actuarial techniques are employed by insurance entities to predict the rate of occurrence and amounts of losses from catastrophes over long periods of time for insurance price-setting purposes in most jurisdictions. Predictions over

relatively short periods of time, however, such as individual accounting periods or the terms of many catastrophe contracts (one-year contracts), are subject to substantial deviations.

Example

9. There were numerous catastrophic events in 2011. Hurricane Irene demonstrates that industry loss best estimates varied drastically prior to the event occurring:[3]

   (a) 23 August 2011 – Aggregate industry loss estimates were approximately $7.7 billion;

   (b) 26 August 2011 – Forecasters anticipated the hurricane would directly hit New York, NY, and loss estimates grew to approximately $14.5 billion;

   (c) 30 August 2011 – After the storm passed over New York, NY, loss estimates decreased to approximately $7.4 billion.

10. This data shows industry estimates in the one-week preceding the storm, but insurers' estimates begin with the gradual formation of the storm and evolve over several weeks. Insurers run sophisticated models multiple times a day to determine the path and strength of the storm to assist in determining the expected cash flow estimates. However, the path and strength of the storm can change frequently, therefore changing cash flow estimates. One analyst reported, "…overestimate wind speed by a couple of miles-per-hour, and the loss estimate can change by 50 to 100 percent." Appendix D highlights the various assumptions considered for each of the storms that occurred during the 2011 Atlantic hurricane season.

11. Assume a hurricane occurs after the balance sheet date, but before the financial statements are issued or available to be issued. The expected value approach proposed in the exposure draft could require the insurer to recognise a large loss in one period, even if subsequent events show that no insured event occurs. In the example above, had the period closed as of 26 August, as a result of the

[3] These amounts represent the industry "best estimates," which reflect probability-weighting, but do not take into consideration the time value of money. These amounts are intended to reflect the volatility in estimation over a relatively short period of time.

expected cash flows of $14.5 billion the insurer would have recognised a loss, and recognised an additional liability. In the following period, the insurer would have reduced the liability and recognised a gain when cash flow estimates were only $7.4 billion.

Current practice

12. The staff considered current guidance and the reasons why insurers do not apply an expected value approach at present for insurance contract liabilities. At present, insurers issuing catastrophe contracts do not typically recognise an additional liability related to a catastrophe until an event(s) has occurred and it adversely affects the policyholder(s). For example, an insurer recognises its best estimate of losses from a hurricane when the hurricane makes landfall and impacts a particular policyholder area, and any changes in the best estimate are reflected in the financial statements.

13. FASB ASC Topic 450-10-20 defines a loss contingency as "an existing condition, situation, or set of circumstances involving uncertainty as to possible loss to an entity that will ultimately be resolved when one or more future events occur or fail to occur." Topic 450-20-05-03 specifically states that the risk of loss from catastrophes assumed by property and casualty insurance entities, including reinsurance entities, is considered a loss contingency pursuant to the definition.

14. FASB ASC Topic 450-20-25-2 states that an estimated loss from a loss contingency should be accrued by a charge to income if both of the following conditions are met:

    (a) Information available before the financial statements are issued or are available to be issued indicates that it is probable that an asset had been impaired or a liability had been incurred at the date of the financial statements. Date of the financial statements means the end of the most recent accounting period for which financial statements are being presented. It is implicit in this condition that it must be probable that one or more future events will occur confirming the fact of the loss.

(b) The amount of loss can be reasonably estimated.

15. Condition (a) in FASB ASC Topic 450-20-25-2 states, "...it must be probable that one or more future events will occur confirming the fact of the loss." Here, the future event confirming the fact of the loss (and indicating a liability had been incurred) is the occurrence of a catastrophe. Under current US GAAP and consistent with an incurred loss model, to satisfy the condition that it is probable that a liability has been incurred to existing policyholders, the occurrence of a catastrophe (that is, the confirming future event) would have to be reasonably predictable within the terms of the policies in force. The staff note that in current practice many projected catastrophes do not meet this condition.

16. The purpose of condition (b) in FASB ASC Topic 450-20-25-2 is to require accrual of losses when a reasonable or reliable estimate can be made. Disclosure is required instead of accrual when a reasonable or reliable estimate cannot be made. This is intended to prevent accrual in the financial statements of amounts so uncertain as to impair the integrity of those statements. However, the requirement is not intended to delay accrual of a loss until only a single amount can be determined. When it is probable that a liability has been incurred, and information indicates that the estimated loss is within a range of amounts, it follows that some amount of loss can be reasonably estimated.

17. IFRS 4 *Insurance Contracts* does not specify exactly how an insurer applying IFRSs should recognise and measure catastrophe provisions. However, IAS 37 *Provisions, Contingent Liabilities and Contingent Assets* does provide guidance for contingent liabilities other than insurance contract liabilities.

18. IAS 37 Paragraph 13 distinguishes between:

(a) Provisions – which are recognised as liabilities (assuming that a reliable estimate can be made) because they are present obligations and it is probable that an outflow of resources embodying economic benefits will be required to settle the obligations; and

(b) Contingent liabilities – which are not recognised as liabilities because they are either:

(i) possible obligations, as it has yet to be confirmed whether the entity has a present obligation that could

lead to an outflow of resources embodying economic benefits; or

(ii) present obligations that do not meet the recognition criteria in this standard (because either it is not probable that an outflow of resources embodying economic benefits will be required to settle the obligation, or a sufficiently reliable estimate of the amount of the obligation cannot be made).

19. IAS 37 Paragraph 14 states that a provision shall be recognised when:

(a) an entity has a present obligation (legal or constructive) as a result of a past event;

(b) it is probable that an outflow of resources embodying economic benefits will be required to settle the obligation; and

(c) a reliable estimate can be made of the amount of the obligation.

If these conditions are not met, no provision shall be recognised.

20. The staff note that IAS 37 paragraph 25 states, "...except in extremely rare cases, an entity will be able to determine a range of possible outcomes and can therefore make an estimate of the obligation that is sufficiently reliable to use in recognising a provision."

21. IAS 37 Paragraphs 27-30 states that an entity should not recognise a contingent liability. Instead it should be disclosed unless the possibility of the outflow of resources embodying economic benefits is remote. Further, it states,

> *Contingent liabilities may develop in a way not initially expected. Therefore, they are assessed continually to determine whether an outflow of resources embodying economic benefits has become probable. If it becomes probable...a provision is recognised in the financial statements of the period in which the change in probability occurs (except in extremely rare circumstances where no reliable estimate can be made).*

Concerns about proposed requirements

22. Under the proposals in the ED and DP, the event that creates the insurance liability is the inception of the contract, as that point in time begins the insurer's stand-ready obligation to compensate the policyholder if a specified future uncertain event occurs during the contract's coverage period.[4] The insurance contract liability is measured based on the probability-weighted estimate of the future cash flows related to the future uncertain event, the catastrophe, in this case. From the first indications of an impending hurricane, the measurement of the liability is updated based on the expected cash flows, and it is continually updated until all claims are settled.

23. Using expected cash flows to measure the insurance contract liability means that, in the case of a catastrophe, an insurer could recognise a liability before the insured event occurs, when both the likelihood of the event occurring and the magnitude of the event remain unknown. This is particularly problematic when the information available to determine the expected cash flows is volatile.

24. One comment letter summarized several insurers' views on this point as follows:[5]

> *The building block model, while sophisticated and intellectually appealing, will result in catastrophe or event-driven losses, such as those arising from hurricanes, earthquakes and terrorist attacks, being recorded in financial statements before the underlying events take place and, in many cases, for events that may never take place during the coverage period, resulting in significant additional judgment and subjectivity involved in the financial statements preparation process that will impair consistency and comparability and provide less decision-useful information to the users of financial statements.*

25. Because of the concerns that it would provide less meaningful information in the financial statements to measure insurance contract liabilities based on expected cash flows when those expected cash flows are extremely volatile or

[4] The staff note that the insurance contract liability is first recognised and measured at the start of the coverage period.

[5] Although this letter explicitly refers to the building block model, the arguments included are still relevant when considering recording an additional liability under the premium allocation approach before the underlying events take place and, in many cases, for events that may never take place during the coverage period.

when an adverse event may not occur, the staff considered whether the boards should modify the proposed requirements.

Staff analysis

26. The staff considered two broad ways of modifying the proposed requirements:

    (a) Providing an exception from the expected value model for catastrophe-type insurance (discussed in paragraphs 27-30), or

    (b) Requiring insurers to take subsequent events into account (discussed in paragraphs 31-68(e)).

Exception to the expected cash flow model

Description of exception

27. The staff considered whether an exception to the expected value model for recognising an insurance contract liability for catastrophe-type claims at the reporting date would be appropriate. Applying the exception, the insurer would recognise changes in estimates of future cash flows only when it becomes probable that the insured event will occur and the amount of the loss can be estimated reliably. This exception would be consistent with today's incurred loss model for recognising liabilities for catastrophe-type claims.

Rationale for exception

28. The staff considered this exception because some respondents expressed concerns that recording expected losses in certain circumstances would impair consistency and comparability and provide less decision-useful information to the users of financial statements. The exception is consistent with today's incurred loss model, i.e. that it must be probable that a liability had been incurred at the date of the financial statements and the amount of the loss could be reasonably estimated. Arguably, with a catastrophe, the volatility of estimates of the expected cash flows precludes them from being reasonably estimated before an event occurs. Some question whether this circumstance

could constitute one of the "extremely rare cases" cited in IAS 37 Paragraph 25 where a sufficiently reliable estimate cannot be made. As discussed, disclosure is required instead of accrual when a reasonable or reliable estimate cannot be made.

Arguments against exception

29. However, it can be argued that insurers can make sufficiently reliable estimates before an event occurs. Insurers currently employ sophisticated, complex models to predict probability-weighted expected losses. Some models for catastrophes have dozens of subcomponents, including the storm track and intensity (weather assumptions), vulnerability of structures (engineering assumptions), and inputs based on the insurers' policies, including deductibles, policy limits, etc. Some would argue that the expected cash flows these models generate best reflect the uncertainty as to the likelihood of the event occurring and the magnitude of the event. The models take into account thousands of possible scenarios (and the related probabilities), and are performed multiple times per day, so they capture the best information that existed at the balance sheet date. In addition, as insurers currently run such models anyway, requiring insurers to calculate expected losses would not require systems modifications or additional costs.[6]

Staff recommendation

30. While this exception would address concerns regarding the volatility in, and the reliability of, the measurement of liabilities for infrequent high-severity events, based on the fact that insurers can arguably make sufficiently reliable estimates for use in an expected value model, the staff do not recommend this exception.

[6] The staff understands that smaller insurers may initially rely on industry loss estimates.

Using subsequent information

Introduction

31. If insurers are to apply an expected value model to catastrophe insurance, the question arises as to how to most meaningfully account for subsequent events that significantly change – and resolve uncertainties in – estimates of cash flows made at the balance sheet date.

32. For a catastrophe that occurs after the balance sheet date, the staff considered whether subsequent events guidance would appropriately adjust an estimate of cash flows recorded at the balance sheet date. Because many catastrophes typically begin and end in a relatively short time, information regarding the event, including whether it in fact occurred and impacted policyholders, its magnitude, etc. will likely be known prior to the issuance of the financial statements.

Illustrative Example

33. Assume that an insurer covers property in Mexico against hurricane damage. It prepares financial statements for the period ending 31 August. In August, a hurricane is forming in the Atlantic Ocean. At 31 August, the insurer estimates that there is a 50 percent probability that the hurricane will strike Mexico, resulting in claims against it for insured losses estimated at CU1 billion. Therefore, at 31 August, the expected cash flows are CU0.5 billion. During the first week of September, the hurricane does not strike Mexico, and expected cash flows related to the storm are CU0 billion. For simplicity, this example ignores the effect of discounting and the risk adjustment and considers only two scenarios.

Requirements relating to subsequent events

34. FASB ASC Topic 855-10-20 defines subsequent events as:

> *Events or transactions that occur after the balance sheet date but before financial statements are issued or are available to be issued. There are two types of subsequent events:*

> *(a) The first type consists of events or transactions that provide additional evidence about conditions that existed at the date of the balance sheet, including the estimates inherent in the process of preparing financial statements (that is, recognized subsequent events).*
>
> *(b) The second type consists of events that provide evidence about conditions that did not exist at the date of the balance sheet but arose subsequent to that date (that is, nonrecognized subsequent events).*

35. Regarding recognition of the first type of subsequent events – those that provide additional evidence about conditions that existed at the date of the balance sheet, FASB ASC Topic 855-10-25 states:

> *An entity shall recognize in the financial statements the effects of all subsequent events that provide additional evidence about conditions that existed at the date of the balance sheet, including the estimates inherent in the process of preparing financial statements.*

36. Whereas, regarding recognition of second type of subsequent events – those that did not exist at the date of the balance sheet, FASB ASC Topic 855-10-25 states:

> *An entity shall not recognize subsequent events that provide evidence about conditions that did not exist at the date of the balance sheet but arose after the balance sheet date but before financial statements are issued or are available to be issued.*

37. The IFRS requirements for subsequent events are very similar. Paragraph 3 of IAS 10 *Events after the Reporting Period* states:

> *Events after the reporting period are those events, favourable and unfavourable, that occur between the end of the reporting period and the date when the financial statements are authorised for issue. Two types of events can be identified:*
>
> *(a) those that provide evidence of conditions that existed at the end of the reporting period (adjusting events after the reporting period); and*

> *(b) those that are indicative of conditions that arose after the reporting period (non-adjusting events after the reporting period).*

38. Similarly, Paragraphs 8 and 10 of IAS 10 state, respectively:

> *An entity shall adjust the amounts recognised in its financial statements to reflect adjusting events after the reporting period.*
>
> *An entity shall not adjust the amounts recognised in its financial statements to reflect non-adjusting events after the reporting period.*

39. Further, FASB ASC Topic 855-10-50-2 through 855-10-50-3 and IAS 10 Paragraphs 19 through 22 require some nonrecognized or non-adjusting subsequent events to be disclosed.

40. Applying FASB ASC Topic 855 and IAS 10, some believe that the hurricane striking Mexico the first week in September is a "nonrecognized" or "non-adjusting" event. It does not provide additional evidence of conditions that existed at the balance sheet date. Rather, it provides evidence of conditions that arose after that date. Consistent with this view, FASB ASC Topic 855-10-55 2.d provides the following example of a "nonrecognized" event:[7]

> *Loss of plant or inventories as a result of fire or natural disaster that occurred after the balance sheet date but before financial statements are issued or are available to be issued*

[7] The staff believe this example is not relevant in assessing how an insurer should measure its insurance contract liability. The insurer has a contractual obligation at the reporting date to stand ready to compensate the policyholder for insured events, if any, that occur during the remaining period covered by the insurance contract. The issue here is whether subsequent events provide further information about conditions that existed at the reporting date and are relevant to the measurement of that obligation. In the case of the proposed model for insurance contracts, an adjusting event would be one that provides information about the likelihood, at the reporting date, of each possible outcome (eg the probability that a storm may strike a heavily populated area in the light of the storm's speed and direction at the reporting date). In contrast, if a subsequent event causes damage to plant or inventory, that event cannot affect the depreciated cost of the plant at the reporting date, nor can it affect the cost or net realisable value of the inventory at that date. Therefore, such losses would be a "non-recognizing event" to the *policyholder* because the policyholder does not have a contractual obligation in place, but would not necessarily be a "non-recognizing event" to an insurer. Furthermore, it is beyond the scope of this project to determine the measurement basis that the policyholder should adopt for its rights under the insurance contract. That measurement basis will determine whether the subsequent fire or natural disaster is an adjusting event or a non-adjusting event.

41. Others argue that the formation of the storm represents the culmination of conditions that existed at the balance sheet date, and therefore, it is arguably a "recognized" or "adjusting" event. If so, information about the hurricane's path after the balance sheet date should be considered in determining the expected cash flows as of the balance sheet date. Some analogize this to an example included in FASB ASC Topic 855-10-55 1.b:

> *Subsequent events affecting the realization of assets, such as receivables and inventories or the settlement of estimated liabilities, should be recognized in the financial statements when those events represent the culmination of conditions that existed over a relatively long period of time. For example, a loss on an uncollectible trade account receivable as a result of a customer's deteriorating financial condition leading to bankruptcy after the balance sheet date but before the financial statements are issued or are available to be issued ordinarily will be indicative of conditions existing at the balance sheet date. Thus, the effects of the customer's bankruptcy filing shall be considered in determining the amount of uncollectible trade accounts receivable recognized in the financial statements at balance sheet date.*

42. The subsequent events guidance attempts to identify obligating events to an entity for *recognition* purposes (the guidance explicitly refers to "recognized or "nonrecognized" events), i.e. if and when a liability was incurred and what information existed or exists about that liability. It distinguishes between events that have occurred as opposed to those that are projected to occur.

    (a) In an incurred loss model, recognition and measurement are based on whether an event or transaction has occurred and when they occurred.

    (b) In an expected value model, measurement reflects the probabilities that an event or transaction will occur. The recognition and initial measurement of an insurance contract liability takes place at the start of the coverage period reflecting the insurer's stand-ready obligation to the policyholder. Therefore, the liability exists as of the date of the financial statements (in the example, 31 August) regardless of when the adverse event occurs.

43. Based on the arguments above, the staff conclude that the hurricane striking Mexico the first week in September is a "nonrecognized" or "non-adjusting" event when applying either an incurred loss model or an expected value model.

Exposure Draft proposals

44. The Exposure Draft is consistent with the conclusion that the hurricane in the example above is a "nonrecognized" or "non-adjusting" event. Paragraphs B40 and B41 address this circumstance, and they are included in Appendix B. The Exposure Draft explains that the present value of the fulfilment cash flows under the catastrophe contract should not reflect the storm that, with hindsight, is known to occur after the balance sheet date. It also explains that the cash flows included in measurement of the liability should be probability-weighted at the end of the reporting period with appropriate disclosure that a non-adjusting event occurred after the end of the reporting period in accordance with IAS 10.

Potential Issue

45. If the passage of the hurricane is treated as a "nonrecognized" or "non-adjusting" event, the insurer would have to recognise a liability of CU0.5 billion in its financial statements as of 31 August, even though it knows by the time the financial statements are issued or are available to be issued that it will not have any losses or that the losses will be much less than expected.

46. The issue that we need to consider is whether the requirements of the insurance contracts standard should be amended to avoid such an outcome. In other words, should the proposals be amended to require insurers to take subsequent events into account in the recognition and/or measurement of insurance contract liabilities?

Approaches considered

47. The staff have considered three options:

    (a) OPTION 1: make no amendments to the exposure draft proposals ('expected value approach', paragraph 48).

(b) OPTION 2: amend the exposure draft proposals to require insurers to update measurements of some insurance contract liabilities to take into account subsequent events (paragraph 49-59(b)).

(c) OPTION 3: amend the exposure draft proposals to require insurers to recognize onerous contract liabilities only if the contracts remain onerous after the balance sheet date ('recognition hurdle', paragraphs 64-68(e)).

Option 1: Expected value approach

48. One view is that no changes should be made to the exposure draft proposals. Insurers should not update their cash flow estimates in light of the occurrence or non-occurrence of insured events after the balance sheet date. In support of this view ("the expected value approach"), it can be argued that:

(a) The objective of the insurance contract standard is to measure the current value of insurance contract assets and liabilities *at the end of the reporting period*. The current value of the liability at the end of the reporting period should reflect the expected cash flows as estimated as of that date.

(b) A requirement or exception to update cash flow estimates to take into account subsequent events would be inconsistent with the general principles set forth in FASB ASC Topic 855 and IAS 10 (since the adverse event had not yet occurred), and the specific application of those principles in other standards. Such exceptions to the principles weaken the framework as a whole, making standards less understandable and creating unhelpful precedents that can affect other standards.

(c) FASB ASC Topic 855 and IAS 10 require material 'nonrecognized' or 'non-adjusting' events to be disclosed.[8] Therefore, investors are

[8] FASB ASC Topic 855-10-50-2 and Paragraph 21 of IAS 10 state that "nonrecognized" or "non-adjusting" events may be of such a nature that they must be disclosed to keep the financial statements from being misleading. For such events, an entity shall disclose the following:

a. The nature of the event;
b. An estimate of its financial effect, or a statement that such an estimate cannot be made.

given the information they need to evaluate the liabilities reported in the financial statements.

(d) A requirement to update cash flow estimates to take into account subsequent events could be burdensome. It could make it difficult for insurers to close their accounts in a timely manner.

(e) If, as is proposed in option 2A or option 3, a requirement to take into account subsequent events applies only to onerous contract liabilities (and not liabilities measured using the building block approach), the requirement will increase differences between the building block approach and the premium allocation approach.

Option 2: Update measurement of some insurance contract liabilities

49. A second view is that the proposed requirements should be amended to require insurers to update cash flow estimates for events that occur after the balance sheet date but before the financial statements are issued or available to be issued to reflect information that becomes known after the event(s) occurs, if the effects on the financial statements are material. Option 2 ("update measurement of onerous liabilities") would only apply to insurance contracts covering infrequent high-severity events, such as catastrophes, and subject to specific criteria, for example, when all of the following conditions are met:

(a) An infrequent, high-severity event, such as a catastrophe is impending as of the balance sheet date, but has not yet occurred;

(b) Where the expected losses related to the event in (a) are based on information that is subject to substantial deviation prior to the event occurring; and

(c) The time period between when the insurer first projects loss estimates related to the event to the occurrence of the event is relatively short.

50. Staff supporting option 2 believe that if the boards adopt option 2, the inclusion of criteria (a) through (c) is necessary to distinguish cash flow changes resulting from infrequent high severity events from other cash flow changes in the post balance sheet period. The criteria restrict the use of this modification to specific

circumstances. It is not the staff's intent to allow the modification for a broader use. The following points support the inclusion of these criteria:

(a) The amendment should only apply to an infrequent, high-severity event that is impending as of the balance sheet date, but has not yet occurred. Criterion (a) is intended to contain the amendment to events that are impending, but have not yet occurred.

(b) As discussed previously, there are questions as to whether the cash flow estimates generated in these circumstances are certain enough to generate reliable liability measures, or whether they constitute an outlier in liability measurement. Criterion (b) is intended to limit the application of this modification to expected losses resulting from information or assumptions that are subject to substantial deviation prior to the event occurring. This criterion also contemplates the fact that the event may or may not occur.

(c) Criterion (c) is included to distinguish between infrequent, high-severity events that occur over time and those that occur over a relatively *short* period of time. For example, arguably some product liability claims would also be infrequent, high-severity events, but they would likely not begin just before the balance sheet date and end just after the post balance sheet period.

(d) Importantly, staff supporting option 2 note that *all* of the criteria must be met for the amendment to apply. Combining the criteria distinguishes the circumstance described in this paper from other cash flow changes in the post balance sheet period.

51. There are several arguments in support of this option. In an expected value model, the recognition and initial measurement of an insurance contract liability take place at the start of the coverage period reflecting the insurer's stand-ready obligation to the policyholder. Therefore, the liability exists as of the date of the financial statements (in the example, 31 August) regardless of when the adverse event occurs. Measurement changes in that liability should be reflected once the adverse event(s) has occurred. In the catastrophe example above, it can be argued that the measurement of the liability is only partially complete as of the

balance sheet date. If the event driving the measurement of the liability is short-lived, the staff supporting option 2 do not believe that it is useful to ignore updated information that would impact the cash flow estimates, if such estimates would significantly impact the financial statements. This approach would present to users an estimate subject to much less deviation[9], as the assumptions used to generate that estimate after the event occurs are much more certain.

52. Because the cash flow estimates are subject to substantial deviation, it could be difficult to determine precisely what conditions existed prior to the balance sheet date and what changes occurred to those conditions subsequently. In the case of a hurricane, assumptions such as wind speed, air temperature, air pressure, etc. are constantly changing. An expected value model would require determining the cash flow estimates at 11:59 p.m. on the balance sheet date. This requirement could be viewed as unreasonable for preparers and difficult to substantiate and audit. In addition, an event could occur from 10:00 pm on the balance sheet date and continue for the next 12 hours. In this time, the estimates could vary significantly. Therefore, determining cash flow estimates while the event is ongoing in a relatively short period of time could also put undue pressure on preparers.[10]

53. Updating the measurement of insurance contract liabilities does not only capture upside changes in expected cash flows from an insurer's perspective, it also considers the possibility of downside changes. Insurers could substantially underestimate the expected losses for an infrequent high-severity event. For example, in the case of the floods in Thailand in 2011, insurers originally projected the flooding to occur mainly in certain coastal areas, but instead it impacted several major industrial areas, thus significantly increasing estimates.

54. In addition, updating the measurement of insurance contract liabilities would be consistent with how insurers treat events that happen within a reporting period, such as a quarter. Insurers do not record a liability based on expected losses and

[9] There will be subsequent adjustments throughout the life cycle of the claims which could take several years; these adjustments will be reported in the future period when the changes in expected cash flows are made.

[10] This is even more complex when there are different insurers for the two separate reporting periods, but in this circumstance, it is based on the insurer that provided the coverage when the event actually occurred.

subsequently show changes in that amount through the financial statements. Instead, these amounts are continually re-measured before the end of the reporting period.

55. Updating the measurement of insurance contract liabilities can be viewed as a compromise between (a) recognising the liability on an incurred loss basis (e.g., $0 billion, in the example in paragraph 9) and (b) recognising the liability based on an expected value approach (e.g., $14.7 billion). Even assuming that insurers have sophisticated models that generate the best probability-weighted cash flows available at the balance sheet date (i.e. the amount are arguably certain), staff supporting this option believe that updating the measurement of cash flows is appropriate. The financial statements should reflect decision-useful information and therefore updating the measurement of cash flows is preferable if (a) the insurer knows these amounts to be subsequently incorrect and material to the financial statements, and (b) it has not yet released financial information.[11]

56. FASB ASC Topic 944-60-25 discusses calculating a premium deficiency under US GAAP, but it does not provide explicit guidance as to whether to include estimates in the premium deficiency calculation for losses related to actual events occurring subsequent to the balance sheet date. However, the AICPA Property & Casualty Insurance Entities Audit and Accounting Guide addresses this circumstance (included as Appendix C). The guidance is based on an incurred loss model,[12] but it states that insurers can consider information in the post balance sheet period for performing the premium deficiency calculation:

> *One method is to include estimates for losses occurring subsequent to the balance sheet date, using all available information up through the date that the financial statements are issued.*
>
> …
>
> *In those instances, when the hurricane did hit, expected cash flows relating to the hurricane would be included in*

[11] The current US GAAP guidance for loss contingencies (in which catastrophes are included) reflects this notion, as it intends to prevent accrual in the financial statements of amounts so uncertain as to impair the integrity of those statements.

[12] The staff notes that the catastrophe described in the Property & Casualty Insurance Entities Audit and Accounting Guide would rarely meet the criteria for being probable, but if under an expected model, such potential losses would be taken into consideration.

> *the premium deficiency calculation, using all available information up through the date that the financial statements are issued.*

57. The staff understands that, if the measure of a liability does not reflect cash flow estimates available after the event has occurred, most users will adjust the liability. This indicates that recognising an estimate based on uncertain, out of date information results in including amounts in the financial statements that are not meaningful to users.

58. Although the information necessary to evaluate an insurer's liability measurement would be included in disclosures, the staff acknowledge that regulators and other generalist users of insurers' financial statements may not adjust the amounts recorded to reflect changes in the expected cash flows after the event has occurred. If that is the case, these users could base investing decisions on the amounts that may not accurately reflect the financial position of the insurer.

59. The staff notes that some people, including many users, may view a requirement to update cash flow estimates for events that occur after the balance sheet date differently, depending on whether the contracts are eligible for the premium allocation approach or not. The staff therefore considered two variants of option 2:

    (a) Option 2A: restrict option 2 to the measurement of onerous contract liabilities when the insurer applies the premium allocation approach

    (b) Option 2B: require option 2 for the measurement of all insurance contract liabilities.

60. For contracts measured using the premium allocation approach, insurers should perform an onerous contract test when facts and circumstances indicate that the contract might be onerous – the tests are not routinely required. As such the update of cash flow estimates would only be required when there are indicators that there is an onerous contract and would be used to determine the measurement of the additional liability (i.e., the liability in excess of the liability for remaining coverage already recognised). Some view this as a reason to restrict any exception that requires the updating of information after the balance

sheet date to contracts that apply the premium allocation approach only: given that the onerous contract test is itself performed only when facts and circumstances indicate that the contract might be onerous, it seems unduly burdensome to require the onerous contract test to be performed when later facts and circumstances indicate that the contract is not, after all, onerous.

61. Furthermore, whilst some users advocate a full exception to the expected value model for recognising an onerous contract liability (i.e. the option discussed but rejected in paragraphs 27-30), other users prefer requiring insurers to update expected cash flows for subsequent events because this approach better reflects the economic substance of the expected losses. However those users would not consider the recognition of expected losses that proved not to occur as being a better reflection of economic substance.

62. Staff supporting option 2 think that it should apply at least to the measurement of onerous contracts when the insurer applies the premium allocation approach. This could be achieved by requiring insurers to update cash flow estimates for events that occur after the balance sheet date, but before the financial statements are issued only in measuring the onerous contract liability under the premium allocation approach for insurance contracts that meet the criteria described in paragraph 49 (ie Option 2A).

63. However, in the staff's view, the analysis in this paper applies equally to all insurance contracts that meet the criteria described in paragraph 49. Furthermore, as noted in paragraph 48(e), a requirement to take into account subsequent events that applies only to onerous contract liabilities (and not liabilities measured using the building block approach) would increase differences between the building block approach and the premium allocation approach. Based on this analysis, it can be argued that modifying the expected value model to take account of subsequent events through updating the measurement of onerous contract liabilities is an appropriate way to provide consistency, comparability, and meaningful information to users of financial statements. Therefore, the staff supporting option 2 recommends Option 2B, ie that insurers should update cash flow estimates for events that occur after the balance sheet date, but before the financial statements are issued for all insurance contracts that meet the criteria described in paragraph 49.

Option 3: Recognition hurdle

64. A third option would require insurers to consider subsequent events only for the purposes of *recognising* onerous contract liabilities. Specifically, an insurer would measure the onerous contract liability on the basis of the evidence available at the balance sheet date, but it would recognise the liability only if the contract remains onerous in the period after the balance sheet date. If the onerous contract liability reverses in the post balance sheet period as a result of subsequent events, the liability would not be recognised in the financial statements.

65. In the hurricane example (paragraph 33 above), the liability is measured at CU0.5 billion at 31 August. However, because the hurricane does not strike Mexico and the estimates of expected cash flows are revised to zero during the first week in September, option 3 would mean that the insurer would not recognise an onerous contract liability because the liability reversed before the financial statements were issued or available to be issued. In other words, those contracts were no longer deemed onerous by the time of the issuance of the financial statements. In this approach, future events would be considered as part of the criteria for recognizing onerous contract liabilities, rather than in the measurement of those liabilities.

66. The staff also considered a variation of the hurricane example above in which the hurricane does not strike Mexico directly, but does cause substantial losses in the surrounding area. In this example, assume estimates of expected cash flows are revised CU0.3 billion during the first week in September, resulting in an onerous contract liability. Although the contract becomes less onerous, it remains onerous to some extent. Therefore, an onerous contract liability would be recognised. It would be measured using the estimates of the expected cash flows at 31 August (CU0.5 billion), even though the estimates of expected cash flows reduced to 0.3 billion in the post balance sheet period.

67. This example illustrates how ‘non-adjusting’ subsequent events would be taken into account only as a recognition hurdle for onerous contract liabilities. They would not affect the measurement of any liabilities recognised. The insurer would recognise no onerous contract liability only if the expected cash flows

reduced to such an extent that the liability for remaining coverage already recognised at the year-end is sufficient to cover expected cash flows.

68. In support of Option 3 (requiring recognition of onerous contracts only if they remain onerous in the period after the balance sheet date), it can be argued that:

    (a) it seems counterintuitive to overlay the premium allocation approach with the recognition of a liability for an onerous contract that is known, with certainty, not to have occurred.

    (b) a recognition hurdle would be sufficient to eliminate the most counter-intuitive outcomes of the expected value approach. It would avoid a requirement to recognise onerous contract liabilities for contracts that are known to no longer be onerous by the time the financial statements are issued or available to be issued.

    (c) a recognition hurdle could be less burdensome to apply than a requirement to update measurements because it would apply only to those onerous contract liabilities that have reversed fully in the post-balance sheet period. Thus it avoids the difficulties of updating the cash flows up to the point that the financial statements are issued.

    (d) a recognition hurdle avoids the need to establish criteria that limit the consideration of subsequent events to some types of contract (eg those for which expectations can change markedly over relatively short periods). The nature of the hurdle limits its application to specific types of contract. The absence of additional criteria would reduce complexity.

    (e) a requirement to take account of non-adjusting events is an exception to general principles. Such exceptions should be no wider than necessary to achieve the main aims. A recognition hurdle preventing recognition of some onerous contracts would apply less widely than a general requirement to update cash flow estimates subsequent events.

69. By its nature, because it relates to the recognition of an onerous contract liability, the recognition hurdle would be used only for contracts that fall within the scope of the premium allocation approach. A recognition hurdle would not apply to contracts that fall within the scope of the building block approach

(except in the pre-coverage period), because this approach recognises a liability when expected future cash outflows exceed expected future cash inflows (i.e. separate onerous contract test is unnecessary). This means that Option 3 would not set a precedent for other measurements.

Staff recommendation

70. The staff recommend modifications to the exposure draft proposals to take into account subsequent events in some situations. However, there are different views among staff members about the extent of the modifications.

Support for Option 2 – Update measurement of some insurance contract liabilities

71. Some staff recommend Option 2 (updating measurements of some insurance contract liabilities) because they believe the benefits of reducing volatility in, and increasing the reliability of, the measurement of liabilities outweigh the disadvantages of departing from the expected value model. These staff recommend updating measurements when the following criteria are met:

    (a) An infrequent, high-severity event, such as a catastrophe is impending as of the balance sheet date, but has not yet occurred;

    (b) Where the expected losses related to the event in (a) are based on information that is subject to substantial deviation prior to the event occurring; and

    (c) The time period between when the insurer first projects loss estimates related to the event to the occurrence of the event is relatively short.

72. These staff acknowledge that the recognition hurdle in Option 3 would eliminate the most counter-intuitive outcomes, i.e. recognising an onerous contract liability and loss at the end of the period if it is known to have reversed before the financial statements are issued or available to be issued. However, these staff also believe that the recognition hurdle would be relatively limited in application, as many catastrophes would still leave the insurer in a position that necessitates the recognition of an onerous contract liability. In other words, it

would only address circumstances where the expected cash outflows no longer exceed the related unearned premium.

73. However, staff supporting option 2 believe that the financial statements should reflect decision-useful information, therefore updating the measurement of cash flows is preferable if (a) the insurer knows these amounts to be subsequently incorrect and material to the financial statements, and (b) it has not yet released financial information. That applies equally to the building block approach and the premium allocation approach. Therefore, the staff supporting option 2 also support applying it in both the building block approach and the premium allocation approach, ie option 2B.

Support for Option 3 - Recognition hurdle

74. Other staff recommend a recognition hurdle for onerous contract tests. These staff do not support updating cash flow estimates because they believe the objective of the statement of financial position or the balance sheet is to measure the current value of the insurance contract liability at the end of the reporting period. The current value of the liability at the end of the reporting period should reflect the expected cash flows as estimated as of that date. A requirement to update cash flow estimates to take into account subsequent events would be inconsistent with the general principles set forth in subsequent events guidance. And, re-measuring onerous contract liabilities creates an exception to the principle of an expected value model, which weakens the framework as a whole, making standards less understandable.

75. These staff nevertheless think that subsequent events should be taken into account in the criteria for recognising an onerous contract liability. However, because reflecting subsequent events in the recognition of an onerous contract liability would be an exception to the general approach in IFRSs and US GAAP, these staff think that the exception should be as narrow as possible and avoids as much as possible precedents for other exceptions. For this reason, and for the other reasons in paragraph 68, these staff think that insurers should recognise onerous contract liabilities only if the contracts remain onerous after the balance sheet date.

Questions for board members:Using subsequent information

Which option do you support?

Option 2A: Update measurement of onerous contract liabilities meeting specified criteria

Do you agree that, ***for onerous contracts liabilities under the premium allocation approach,*** if the effects on the financial statements are material, insurers should update cash flow estimates made at the balance sheet date for events that occur after the balance sheet date but before the financial statements are issued when all of the following conditions are met:

(a) An infrequent, high-severity event, such as a catastrophe is impending as of the balance sheet date, but has not yet occurred;

(b) Where the expected losses related to the event in (a) are based on information that is subject to substantial deviation prior to the event occurring; and

(c) The time period between when the insurer first projects loss estimates related to the event to the occurrence of the event is relatively short.

OR

Option 2B: Update measurement of all insurance contract liabilities meeting specified criteria

Do you agree that, ***for all insurance contract liabilities,*** if the effects on the financial statements are material, insurers should update cash flow estimates made at the balance sheet date for events that occur after the balance sheet date but before the financial statements are issued when all of the following conditions are met:

(a) An infrequent, high-severity event, such as a catastrophe is impending as of the balance sheet date, but has not yet occurred;

(b) Where the expected losses related to the event in (a) are based on information that is subject to substantial deviation prior to the event occurring; and

(c) The time period between when the insurer first projects loss estimates related to the event to the occurrence of the event is relatively short.

OR

Option 3: Recognition hurdle

Do you agree that, insurers should not recognise an onerous contract liability at the balance sheet date if the onerous contract liability is already known to have reversed in the post balance sheet period as a result of subsequent events?

Appendix A: Background and Tentative Decisions to Date on Onerous Contracts

A1. An onerous contract is understood to mean a contract in which the future costs of fulfilling the contract are expected to exceed the future benefits expected to arise from that contract.

A2. Insurers are required to perform an onerous contract test in many jurisdictions under current GAAP.[1] The purpose of an onerous contract test is to determine the amount by which the expected cash outflows (i.e., claims, claim adjustment expenses, policyholder dividends, unamortized acquisition costs, and maintenance costs, including unpaid commissions) exceed the related unearned premium, including any future instalment premiums.

A3. Under the building block approach, an insurer recognises an insurance liability that is equal to the present value of the fulfilment cash flows plus a residual or single margin (for the IASB and FASB, respectively). The present value of the fulfilment cash flows is the difference between the expected present value of cash inflows and the expected present value of cash outflows (plus the risk adjustment for the IASB) under the contract. Because the building block approach recognises a liability when expected future cash outflows exceed expected future cash inflows, a separate onerous contract test is unnecessary.

A4. However, there are circumstances where the insurance liability is not measured using the building block approach. Those circumstances include:

(a) The pre-coverage period – The boards have tentatively decided that insurance contract assets and liabilities should initially be recognised when the coverage period begins. This decision means that no liability is recognised under the building block approach between the date the insurer becomes a party to the contract and the start of the coverage period (the pre-coverage period).

(b) The liability for remaining coverage under the premium allocation approach – This liability is not re-measured but allocated to profit or loss over the coverage period. As a result the carrying amount of the

[1] This is referred to the recognition of a premium deficiency under current US GAAP.

liability for remaining coverage may be less than the expected present value of future cash outflows.

A5. The boards tentatively decided that an insurer should perform an onerous contract test if facts and circumstances indicate that the contract has become onerous in the pre-coverage or pre-claims period. The boards have also decided that an insurance contract is onerous if the expected present value of the future cash outflows from that contract (plus the risk adjustment for the IASB) exceeds:

(a) The expected present value of the future cash inflows from that contract (for the pre-coverage period); or

(b) The carrying amount of the liability for the remaining coverage (for the premium allocation approach).

A6. The boards also tentatively decided that an additional liability and a corresponding expense, measured as the difference between the carrying amount of the liability for remaining coverage and the present value of the fulfilment cash flows, measured on a basis that is consistent with the measurement of the liability for claims incurred, should be recorded if a contract is deemed onerous.

Appendix B: Paragraphs B40 and B41 from the Exposure Draft

B40 The probability assigned to each scenario shall reflect conditions at the end of the reporting period. For example, there may be a 20 per cent probability at the end of the reporting period that a major storm will strike during the remaining six months of an insurance contract. After the end of the reporting period and before the financial statements are authorised for issue, a storm strikes. The present value of the fulfilment cash flows under that contract shall not reflect the storm that, with hindsight, is known to have occurred. Instead, the cash flows included in the measurement are multiplied by the 20 per cent probability that was apparent at the end of the reporting period (with appropriate disclosure that a non-adjusting event occurred after the end of the reporting period in accordance with IAS 10 Events after the Reporting Period).

B41 The scenarios developed shall include unbiased estimates of the probability of catastrophic losses under existing contracts. However, the scenarios exclude possible claims under possible future contracts. For example, suppose there is a 5 per cent probability that an earthquake during the remaining coverage period of an existing contract will cause losses with a present value of CU1,000,000. In that case, the expected present value of the cash outflows includes CU50,000 (ie CU1,000,000 X 5 per cent) for those catastrophe losses. But the expected value of the cash outflows for that contract does not include the possible catastrophe losses from an earthquake that could happen after the end of the coverage period.

Appendix C: Excerpts from AICPA Property and Casualty Insurance Entities Audit and Accounting Guide[13]

3.65 FASB ASC 944-60-25 does not provide explicit guidance on whether to include estimates in the premium deficiency calculation for losses relating to actual events occurring subsequent to the balance sheet date. In practice, this is accounted for in multiple ways, with the common starting point being that the event is probable of occurring at the balance sheet date. **One method is to include estimates for losses occurring subsequent to the balance sheet date, using all available information up through the date that the financial statements are issued.** Another method is to include estimates for losses if the extent of the damage is reasonably estimable at the balance sheet date, using only information that theoretically existed at the balance sheet date. The Financial Reporting Executive Committee believes that an entity's determination of how to account for losses relating to actual events occurring subsequent to the balance sheet date within the premium deficiency calculation would be a policy decision that should be applied consistently and disclosed as follows:

a. Probable at the balance sheet date, using all available information up through the date that the financial statements are issued. Estimates should be based on the entity's expectation of the future loss events that are probable at the balance sheet date, using all available information up through the date that the financial statements are issued. However, the estimates should not include losses relating to actual events occurring subsequent to the balance sheet date that were not probable at the balance sheet date. Therefore, estimates for infrequent, high-severity events that are included in expected loss and loss expense ratios based on historical events and trends expected to continue should be included, but the expected cash flows should not include actual events, such as hurricanes or ice storms, that occur subsequent to the balance sheet date and that were not probable of occurring at the balance sheet date. However, in those rare circumstances when an infrequent, high-severity event is probable at the balance sheet date and expected to occur in the near future, expected losses relating to that probable event should be included in the premium deficiency calculation. For example, potential losses from a hurricane sitting off the coast of Florida at period-end that hits the coast and causes damage shortly thereafter in the subsequent accounting period would rarely meet the criteria of being probable. **In those instances, when the hurricane did hit, expected cash flows relating to the hurricane would be included in the premium deficiency calculation, using all available information up through the date that the financial statements are issued.**

b. Probable and reasonably estimable at the balance sheet date, using only information that theoretically existed at the balance sheet date. Estimates should be based on the entity's expectation of future loss events that are probable and reasonably estimable at the balance sheet

[13] Excerpt is from the public draft of the Guide issued in the summer of 2011 for comments.

date, using only information that theoretically existed at the balance sheet date. However, the estimates should not include losses relating to actual events occurring subsequent to the balance sheet date that were not probable and reasonably estimable at the balance sheet date. Therefore, estimates for infrequent, high-severity events that are included in expected loss and loss expense ratios based on historical events and trends expected to continue should be included, but expected cash flows should not include actual events, such as hurricanes or ice storms, that occur subsequent to the balance sheet date that were not both probable of occurring and reasonably estimable at the balance sheet date. The estimate should only be based on information that theoretically existed at the balance sheet date but not thereafter. In general, it would be very rare to have a situation that would meet both criteria of being probable of occurring and being able to reasonably estimate the extent of the damage, using information that theoretically existed at the balance sheet date. For example, potential losses from a hurricane sitting off the coast of Florida at period-end that hits the coast and causes damage shortly thereafter in the subsequent accounting period would very rarely meet the criteria of being both probable and reasonably estimable, using information that theoretically existed at the balance sheet date. As a result, the hurricane would not be included in a premium deficiency calculation.

Appendix D: 2011 Atlantic hurricane season[14]

Tropical Storm Arlene
Duration June 28 – July 1
Intensity 65 mph (100 km/h) (1-min), 993 mbar (hPa)
The origins of Tropical Storm Arlene trace back to a tropical wave that tracked westward across the Caribbean Sea in late June.[18] It proceeded toward the west-northwest along Central America,[19] bringing heavy rainfall to the area that caused flooding and killed three people.[20][21] By June 27, the disturbance had crossed the Yucatán Peninsula and emerged into the Bay of Campeche.[22][23] Despite moderate wind shear, it organized over warm waters and was designated as Tropical Storm Arlene at midnight June 29 about 280 mi (450 km) south-southeast of Tampico, Tamaulipas.[24]

As it continued to strengthen, Arlene began to move to the west along a ridge to its north and northwest.[25] Although forecast models supported intensification to hurricane status,[26] the storm attained a peak intensity of only 65 mph (100 km/h). Arlene moved ashore near Cabo Rojo as a strong tropical storm around 0900 UTC June 30.[27] Turning west-southwestward, the storm began to weaken as it decreased in organization.[28] On July 1, Arlene was downgraded to a tropical depression just before dissipating over the Sierra Madre Mountains;[29] however, rainfall and gusty winds continued to affect portions of Mexico.[30] Arlene's impact resulted in damaging floods and mudslides throughout the country, as well as a total of 22 confirmed deaths.[31] Across the state of Hidalgo, damage from the storm reached 2.6 billion pesos ($207.4 million).[32]

Tropical Storm Bret
Duration July 17 – July 22
Intensity 70 mph (110 km/h) (1-min), 995 mbar (hPa)
In mid July, a cold front extended westward over the North Atlantic,[33] as its westernmost component remained stationary near Florida.[34] On July 16, a low-pressure area developed to the north of the Bahamas along the weakening boundary;[35] it became better organized under abating shear conditions.[36] A closed circulation center formed, and the next day at 2100 UTC, the NHC issued the formation of Tropical Depression Two about 100 mi (160 km) northwest of Great Abaco Island.[37] It strengthened into Tropical Storm Bret just three hours after formation.[38] Moving little, Bret continued to strengthen as thunderstorms intensified around the center.[39] The storm developed an eye-like feature on July 18, indicating peak surface winds of around 65 mph (100 km/h) before it began to accelerate northeastward.[40] Although strong wind shear and dry inhibited further development,[41] Bret maintained a well-defined circulation for the next couple of days, with patches of persistent thunderstorms.[42] However, its center remained exposed, causing it weaken to a tropical depression early on July 22.[43] Despite very hostile wind shear conditions, Bret retained tropical cyclone status for several hours[44] prior to dissipating about 375 mi (605 km) north of Bermuda.[45]

Tropical Storm Cindy

[14] Information obtained from Wikipedia

Duration July 20 – July 22
Intensity 70 mph (110 km/h) (1-min), 994 mbar (hPa)
On July 17, an area of showers and thunderstorms, associated with the same frontal system that spawned Tropical Storm Bret, consolidated around a developing area of low pressure about 345 mi (555 km) west-southwest of Bermuda. Tracking east-northeastward, the system gradually organized and became better defined. Passing south of the territory on July 19, the disturbance produced moderate rains, peaking at 1.16 in (29 mm), and gusty winds across the area. On July 20, the low developed into a tropical depression east of Bermuda. Embedded within the mid-latitude westerlies, the depression moved northeast and maintained this general direction for the remainder of its existence. Hours later, the system strengthened into Tropical Storm Cindy. Convection steadily increased over the storm and a ragged eye-like featured appeared on both visible and microwave satellite imagery. Corresponding with this, Cindy attained its peak intensity late on July 21 with winds of 70 mph (110 km/h) and a barometric pressure of 994 mbar (hPa; 29.35 inHg). Shortly thereafter, the storm moved over waters cooler than 78.8 °F (26 °C). Throughout July 22, convection diminished and Cindy transitioned into a post-tropical cyclone about 985 mi (1,585 km) southwest of Ireland. The remnants persisted for another 12 hours before degenerating into a trough over the North Atlantic, on July 23.[46]

Tropical Storm Don
Duration July 27 – July 30
Intensity 50 mph (85 km/h) (1-min), 997 mbar (hPa)
Toward the end of July, a persistent westward moving tropical wave showed signs of organization in the Yucatan Channel. A Hurricane Hunters flight observed gale force winds and a broad circulation, which prompted the National Hurricane Center to initiate advisories on Tropical Storm Don on July 27.[47] After the storm was named, officials in Texas began making preparations for Don. The University of Texas Medical Branch in Galveston issued a level one alert for Don, and city officials began preparing for a possible evacuation.[48] The NHC later downgraded Don into a tropical depression then a remnant low after it quickly disintegrated upon making landfall and hitting the dry air over Texas as a result of the state's extreme drought, dropping much less than the forecasted rainfall at no more than 2/3 of an inch along the coast.[49]

Tropical Storm Emily
Duration August 1 – August 7
Intensity 50 mph (85 km/h) (1-min), 1003 mbar (hPa)
A strong tropical wave tracked the open Atlantic for several days in late July. The wave remained fairly disorganized, lacking a defined circulation. By July 31, it approached the Lesser Antilles and became better defined, producing inclement weather over much of the area. Late on August 1, it finally developed a closed circulation center, prompting the National Hurricane Center to declare the formation of Tropical Storm Emily just after it had crossed the islands. On August 2, Emily continued to show signs of strengthening, even though most of the convection was off to the south and west of the circulation center. On August 4, Emily weakened into a remnant low but was expected to regenerate at least into a tropical depression. Over the next 2 days, Emily moved over the Bahamas, and up to Florida's southeastern coast, as it slowly strengthened. Later, on August 6, Emily regenerated into a weak tropical storm, dissipating again the next day. The remnants of Emily tracked east-

northeastward toward Bermuda. Soon afterwards, Emily's remnants took an eastward turn, and moved towards the open Atlantic. On August 10, convection significantly re-developed in the middle of the Atlantic Ocean, and the National Hurricane Center assessed the system as having a 10% chance of regeneration into a tropical cyclone.[50]

Tropical Storm Franklin
Duration August 12 – August 13
Intensity 45 mph (75 km/h) (1-min), 1004 mbar (hPa)
During the early afternoon of August 10, a disorganized area of showers and thunderstorms developed off the east coast of Florida, in association with an elongated area of low pressure.[51] Tracking northeastward in response to deep southeasterly flow,[52] the disturbance slowly organized; however, by the morning of August 12, the chances of the system developing into a tropical cyclone remained low.[53] Over the following several hours, marked organization of thunderstorm activity took place around a well-defined low pressure area.[54] Subsequently, the system was classified as Tropical Depression Six that day roughly 260 mi (420 km) north of Bermuda.[55] Although well to the north of Bermuda, the system brought unsettled weather to the archipelago, with rainfall reaching 0.07 in (1.8 mm) at L.F. Wade International Airport.[56]

Maintaining a northeasterly track, the depression intensified into Tropical Storm Franklin early on August 13 following a large burst of convection over its center.[57] Later that morning, Franklin attained its peak winds of 45 mph (75 km/h) before encountering increasing wind shear and decreasing sea surface temperatures.[58] Rapid deterioration of the storm's structure took place as environmental conditions became increasingly hostile for tropical cyclones. Convection was sheared more than 100 mi (155 km) from the center of circulation and Franklin began acquiring characteristics of an extratropical cyclone.[59] Early on August 14, Franklin quickly completed its transition into an extratropical system, prompting the final advisory from the NHC.[60]

Tropical Storm Gert
Duration August 13 – August 16
Intensity 65 mph (100 km/h) (1-min), 1000 mbar (hPa)
During the second week of August, a weak low-pressure area, located east of Bermuda, became associated with a synoptic-scale trough.[61] Dropping west-southwestward, it interacted with an upper low to produce an area of disorganized convection, and by then the NHC began to monitor the system.[62][63] By August 13, the small low had become very well-defined, with a tight wind circulation center and deep convection; it was designated as a tropical depression at 0300 UTC that day, about 360 mi (580 km) south-southeast of Bermuda.[64] As the depression re-curved west-northwestward along the weakening subtropical ridge, it intensified into Tropical Storm Gert, due to light wind shear and moist air, about 15 hours after its formation.[65] As Gert neared Bermuda, a small 7 to 9 mi (11 to 14 km) eye-like feature became apparent on radar imagery. Coinciding with this, Gert reached its peak intensity with winds of 60 mph (100 km/h).[64] Passing roughly 90 mi (150 km) east of Bermuda, Gert brought light rain and winds up to 25 mph (40 km/h) to the islands.[56] By August 16, convection associated with Gert had mostly dissipated and

whether or not the system retained a closed surface low was ambiguous. As a result, Gert degenerated into a post-tropical cyclone over the open Atlantic.[66]

Tropical Storm Harvey
Duration August 19 – August 22
Intensity 65 mph (100 km/h) (1-min), 994 mbar (hPa)
In mid-August, a westward moving tropical wave entered the Caribbean Sea. It eventually gained enough organization to be classified as Tropical Depression Eight on August 18. It was upgraded to Tropical Storm Harvey on August 19. By late August 19 the storm was intensifying rapidly and it was announced that it could become a hurricane just before landfall. However, by Saturday afternoon, August 20, Harvey made landfall, never having reached hurricane strength, resetting the Atlantic record as the first eight named storms of the season did not reach hurricane strength. Harvey was then downgraded into a depression though it briefly regained tropical storm status in the Bay of Campeche. It dissipated on August 22.[67]

Hurricane Irene Category 3 hurricane (SSHS)
Duration August 20 – August 28
Intensity 120 mph (195 km/h) (1-min), 942 mbar (hPa)
Main article: Hurricane Irene (2011)
In the evening of August 20, a large low pressure area became organized enough to be classified as Tropical Storm Irene. It passed over the Leeward Islands early on August 21. Early on August 22, Irene strengthened into a Category 1 hurricane, with winds of 75 mph (120 km/h) and a central pressure of 987 mbar (29.1 inHg), becoming the first hurricane of the season. This broke a streak of eight consecutive tropical cyclones to start the 2011 season, all of which did not strengthen beyond tropical storm force. Early on August 24, Irene became a Category 3 major hurricane, with winds of 120 mph (150 km/h). Irene went through a partial eyewall replacement cycle which weakened it slightly, but caused its wind field to greatly expand. On August 26, New York mayor Michael Bloomberg told coastal residents to 'get moving, now.'[68] The next day, Irene made landfall on Cape Lookout, North Carolina as a category 1 hurricane with 85 mph winds and unusually low pressure for a category 1 hurricane. After weakening to a tropical storm, Irene made a second U.S. landfall at Brigantine Island in New Jersey at 5:35 a.m. On August 28, still a strong tropical storm, Irene made its third U.S. landfall in the Coney Island area of Brooklyn, New York, at approximately 9:00 a.m. on August 28. Irene became a post-tropical storm over Quebec and Atlantic Canada late on August 28.[69]

Forming on August 20, Irene was the second earliest ninth Atlantic tropical cyclone on record, along with an unnamed tropical storm from the 1936 season. At least 55 people were confirmed dead across the Caribbean, 10 U.S. states and Canada in the aftermath[70] and damage from Hurricane Irene totaled $10.1 billion (2011 USD).[71]

Tropical Depression Ten
Duration August 25 – August 26
Intensity 35 mph (55 km/h) (1-min), 1006 mbar (hPa)
In late August, a new, well-defined tropical wave moved off the west coast of Africa into the Atlantic Ocean. By August 25, the system had developed sufficient deep convection for the NHC to classify it as Tropical Depression Ten.[72] At this time,

the depression attained its peak intensity with winds of 35 mph (55 km/h) and a minimum pressure of 1007 mbar (hPa). Shortly thereafter, wind shear and decreasing sea surface temperatures caused the depression to weaken, degenerating into a remnant low by the evening hours of August 26.[73]

Tropical Storm Jose
Duration August 28 – August 29
Intensity 45 mph (75 km/h) (1-min), 1006 mbar (hPa)
On August 17, a tropical wave exited the west coast of Africa.[74] During the first few days, the tropical wave produced convection, as it slowly moved westward, and became associated with an area of low pressure. But by the next week, the wave dissipated to a weak area of low pressure – due to high wind shear – as it began to move northwestward, while fluctuating slightly in intensity. In the next few days, the tropical wave approached Bermuda; while remaining disorganized, and weakening even further. Yet very early on August 28 and during the next few hours, the tropical wave partially strengthened as conditions for development slightly improved. However, early on August 28 – during the morning hours – the tropical wave nearly dissipated due to the high wind shear once again, this time generated by Hurricane Irene, after the tropical wave passed east to the south of Bermuda.[75] But soon afterwards on August 28, the tropical wave managed to develop into Tropical Storm Jose, just to the west of Bermuda; Jose then began to move north-northeast, slowly. It lasted only 27 hours, as it dissipated on August 29.

Hurricane Katia Category 4 hurricane (SSHS)
Duration August 29 – September 10
Intensity 140 mph (220 km/h) (1-min), 942 mbar (hPa)
Main article: Hurricane Katia (2011)
The eleventh named storm of the season formed south of the Cape Verde Islands on August 29. The system became a tropical storm on August 30, at which time it was named Katia. It became the season's second hurricane early on September 1; however, its strength fluctuated until September 4 when it reached category 2 hurricane strength. On September 5 the system reached Category 3 (major hurricane status). Katia further strengthened into a Category 4 hurricane on September 5. It was downgraded to a category 1 storm by the end of the following day, and remained at that strength even as it became extra-tropical. The storm was of potential concern and was being monitored closely as it may have indirectly impacted the east coast of the United States and Canada. Warnings of severe weather were made for Northern Ireland and Scotland for the remnants of Katia.[76] Its remnants struck the UK and the Republic of Ireland on September 11 and September 12, killing one. Its remnants caused blackouts as far east as Saint Petersburg.

Unnamed Tropical Storm
Duration September 1 – September 2
Intensity 45 mph (75 km/h) (1-min), 1002 mbar (hPa)
As part of their routine post-season analysis, the National Hurricane Center identified an Unnamed Tropical Storm that formed near 0000 UTC, on September 1, roughly 290 mi (470 km) north of Bermuda. On August 31, a disturbance formed north of Bermuda, and the NHC classified it as Invest 94L, as they tracked the storm. On September 1, the storm organized into a tropical depression, very early that morning. Despite being embedded within an environment of moderate wind shear, the

depression quickly intensified into a tropical storm, although it was not assigned a name, because it was not recognized operationally. The system reached a peak intensity of 45 mph (75 km/h) early on September 2, prior to its transition into an extratropical cyclone later that day. However, the extratropical remnant of the system continued to move east-northeast, and later eastward, as it slowly weakened. On September 4, at 0000 UTC, the extratropical remnant of the unnamed tropical storm dissipated, to a weak surface trough.[77][78]

Tropical Storm Lee
Duration September 1 – September 5
Intensity 60 mph (95 km/h) (1-min), 986 mbar (hPa)
Main article: Tropical Storm Lee (2011)
In late August, a tropical wave producing scattered showers and thunderstorms entered the Western Caribbean.[79] Moving generally west-northwestward, the wave began to organize in the southeastern portion of the Gulf of Mexico. During the afternoon hours of September 1, the hurricane hunters went out to investigate the well-defined wave, and found a closed low-level circulation. Thus, advisories were initiated on Tropical Depression Thirteen.[80] Moving northwest, the tropical depression was upgraded to a tropical storm, given the name "Lee" on September 2.[81] Continuing to organize, Lee reached a peak intensity of 60 mph (95 km/h) early on September 3, while located just south of Louisiana. At 4 a.m. CDT September 4, Lee made landfall roughly 50 miles (80 km) to the southwest of Lafayette, Louisiana with maximum sustained winds of 45 mph (75 km/h).[82] Further weakening occurred as Lee moved across Louisiana, and Lee was downgraded to a tropical depression on September 5 after causing flash floods in Louisiana and Mississippi and whipping wildfires in Texas.[83]

The last NHC advisory on Lee was issued early on September 5, while its remnants proceeded to wreak havoc (mainly flooding) over the following two to three days northward into Pennsylvania, New York State and Canada (Quebec and Ontario).[84]

Hurricane Maria Category 1 hurricane (SSHS)
Duration September 6 – September 16
Intensity 80 mph (130 km/h) (1-min), 983 mbar (hPa)
On September 5, a low pressure area associated with a tropical wave to the west of Africa quickly organized.[85] It was designated Tropical Depression Fourteen on the evening of September 6.[86] On the morning of September 7, it was upgraded to Tropical Storm Maria.[87] Over the tropical Atlantic, high wind shear hindered its development, and Maria dissipated, before convection began to rebuild by September 9. The following day, it began to encounter more favorable conditions, and the tropical cyclone intensified into a Category 1 hurricane on September 15. On the afternoon of September 16, the storm lost tropical characteristics off the northeast coast of Newfoundland. Landfall was reported on the southern tip of the Avalon Peninsula with winds recorded at 64 mph (103 km/h). The capital city of St. John's experienced heavy rain and gale-force winds, but not as severe as anticipated.[88]

Hurricane Nate Category 1 hurricane (SSHS)
Duration September 7 – September 11
Intensity 75 mph (120 km/h) (1-min), 994 mbar (hPa)
Main article: Hurricane Nate (2011)

During the morning hours of September 6, shower and thunderstorm activity associated with a low pressure system began to gather organization in the Bay of Campeche.[89] The following day, the system gained enough organization to be classified as a tropical storm, earning the name Nate.[90] Moving in an erratic motion at a very slow pace, Nate began to strengthen. During the afternoon hours of September 8, Nate reached its peak intensity of 75 mph (120 km/h), while moving off towards the Mexican coastline. The storm was originally thought to remain a tropical storm, but post-season analysis revealed that Nate was a hurricane for twelve hours based on data from PEMEX oil rigs not available operationally.[91] Due to the storm's slow movement, Nate began to upwell cooler waters in its wake, resulting in weakening. Additionally, very dry air began getting entrained into the system. On September 11, Nate made landfall on the Mexican coastline as a weak tropical storm, with maximum sustained winds of 45 mph (75 km/h).[92] Shortly after making landfall, much of Nate's showers and thunderstorms dissipated, and thus rainfall totals were minimal.[91]

Hurricane Ophelia Category 4 hurricane (SSHS)
Duration September 20 – October 3
Intensity 140 mph (220 km/h) (1-min), 940 mbar (hPa)
Main article: Hurricane Ophelia (2011)
In mid-September, a well-defined tropical wave emerged off the African coastline. Moving westward, the disturbance began to gather organization, and become very well defined on September 20. Subsequently, the National Hurricane Center started issuing advisories on Tropical Storm Ophelia. Almost as soon as it became a tropical storm, vertical wind shear began impacting the system. Ophelia slowly strengthened despite the unfavorable conditions and attained winds of 65 mph (100 km/h) on September 22. The system briefly weakened to a minimal tropical storm before strengthening again. However, because of the extremely strong wind shear, Ophelia was ripped apart and dissipated into a post-tropical remnant low on September 25.

Wind shear remained strong, but not as strong as before. Thus, during the afternoon hours of September 27, Ophelia was able to develop convection near its center, and was designated a tropical depression. Ophelia gradually strengthened further into a tropical storm as it passed to the north of the Caribbean. In Dominica, heavy rains from the storm caused widespread flooding. During the afternoon hours of September 29, despite the relatively unfavorable environment, Ophelia strengthened into a Category 1 hurricane. As wind shear relaxed, early on September 30, Ophelia rapidly intensified and became a Category 2 hurricane. Later that day, Ophelia further strengthened into a Category 3 hurricane, becoming the third major hurricane of the season. The eye of Ophelia passed directly over a NOAA buoy early on October 1, which reported sustained winds of 96 mph (155 km/h) and a pressure of 952 mbar (28.11 inHg). The intensification trend continued, and Ophelia strengthened further to a Category 4 hurricane late that day east of Bermuda. Through the following day (Sunday), increasing southwesterly wind shear and cooler water temperatures combined to cause Ophelia to progressively weaken back into a Category 1 hurricane by the evening and weakened to a tropical storm during the morning hours of October 3. Several hours later, Ophelia was declared as a post-tropical cyclone soon after making landfall on the Avalon Peninsula in Newfoundland.

Hurricane Philippe Category 1 hurricane (SSHS)

Duration September 24 – October 9
Intensity 90 mph (150 km/h) (1-min), 976 mbar (hPa)
On September 23, a well-defined tropical wave emerged off the coast of Africa, associated with plentiful shower and thunderstorm activity.[93] Moving westward and embedded within a favorable environment for development, the wave quickly became organized. During the morning hours of September 24, the National Hurricane Center designated the low as a tropical depression, while located about 290 mi (465 km) south of the southernmost Cape Verde Islands.[94] Later that day, the depression was upgraded to a tropical storm, designated "Philippe". Since that time strong shear from both upper level winds and later on from Ophelia's outflow, as well as periodic entrainment of dry air kept the cyclone both small and disorganized, with the center often exposed to the point where the low level circulation reformed under the convection that defines a tropical system at least once. An exposed cyclone can be seen as a wispy series of clouds circling a small area, rather than under the canopy of thunderstorms. Because of this hostile environment, Philippe remained near the minimum for a tropical storm briefly weakening to a tropical depression at one point. On the afternoon of October 2, an Advanced Scatterometer (ASCAT) pass confirmed that Philippe was a strong tropical storm, contrary to satellite estimates. Despite high wind shear, it remained a strong tropical storm and briefly strengthened to a hurricane when it developed an eye feature. On October 6, Philippe became a strong Category 1 hurricane. On October 8, Philippe weakened to a tropical storm, then became post-tropical hours later, on October 9.

Hurricane Rina Category 3 hurricane (SSHS)
Duration October 23 – October 28
Intensity 115 mph (185 km/h) (1-min), 966 mbar (hPa)
In mid-October, the southern extension of a cold front moved into the western Caribbean. The front, in conjunction with east-southeasterly trade winds, produced a broad area of cyclonic circulation over the southwestern Caribbean.[95] Moving slowly towards the north and northwest, barometric pressures in the area began falling, and the disturbance was expected to move into an environment more conducive for development. Thus, the National Hurricane Center gave the disturbance a medium chance, 30%, of developing into a tropical cyclone within 48 hours.[96] Further organization occurred during the afternoon hours of October 21, as the low pressure area became more consolidated.[97] However, the following day, the disturbance became slightly less organized, depicted by a decrease in tropical cyclone formation probabilities.[98]

On October 23, a reconnaissance aircraft flew into the disturbance, finding a well-defined center of circulation. This, combined with satellite imagery, led to the formation of Tropical Depression Eighteen during the evening hours of that day; it strengthened to a tropical storm just several hours later, and earned the name "Rina".[99] Moving towards the north-northwest, Rina rapidly intensified on October 24, becoming a hurricane just 21 hours after formation. Further strengthening commenced for the remaining of the day, although Rina did not reach peak intensity until the evening hours of October 25, briefly becoming a major hurricane. Shortly thereafter, the increase of wind shear and dry air led to weakening the following day, and Rina weakened to a tropical storm early on October 27. Scraping the Yucatan Peninsula, Rina brought heavy rainfall and gusty winds before turning towards the north. Early the next day, Rina weakened into a tropical depression, and during the

afternoon hours, further dissipated into a remnant low. Rina did not directly affect the United States, but its remnants fueled the 2011 Halloween nor'easter, which hit the northeastern U.S. the next day.

Tropical Storm Sean
Duration November 8 – November 11
Intensity 65 mph (100 km/h) (1-min), 982 mbar (hPa)
During the mid-afternoon of November 4, the non-tropical cyclone that would later become Tropical Storm Sean, emerged off the extreme southern coast of North Carolina.[100] On November 6, the National Hurricane Center began monitoring a non-tropical area of low pressure producing a large area of gale force winds to the southwest of Bermuda. Moving towards the south and southeast, the low pressure area began to enter higher Sea Surface Temperatures and subsequently became better organized. By the early morning hours of November 8, the low had become sufficiently organized to be declared as a subtropical storm, and then a fully tropical storm several hours later. Sean strengthened to attain a peak intensity of 65 mph (100 km/h) on November 9 and 10 before it began to enter an area of higher wind shear. Early on November 12, Sean was absorbed by a cold front, associated with a powerful extratropical cyclone centered just east of Newfoundland, while Sean was located several hundred miles to the northeast of Bermuda.[101]