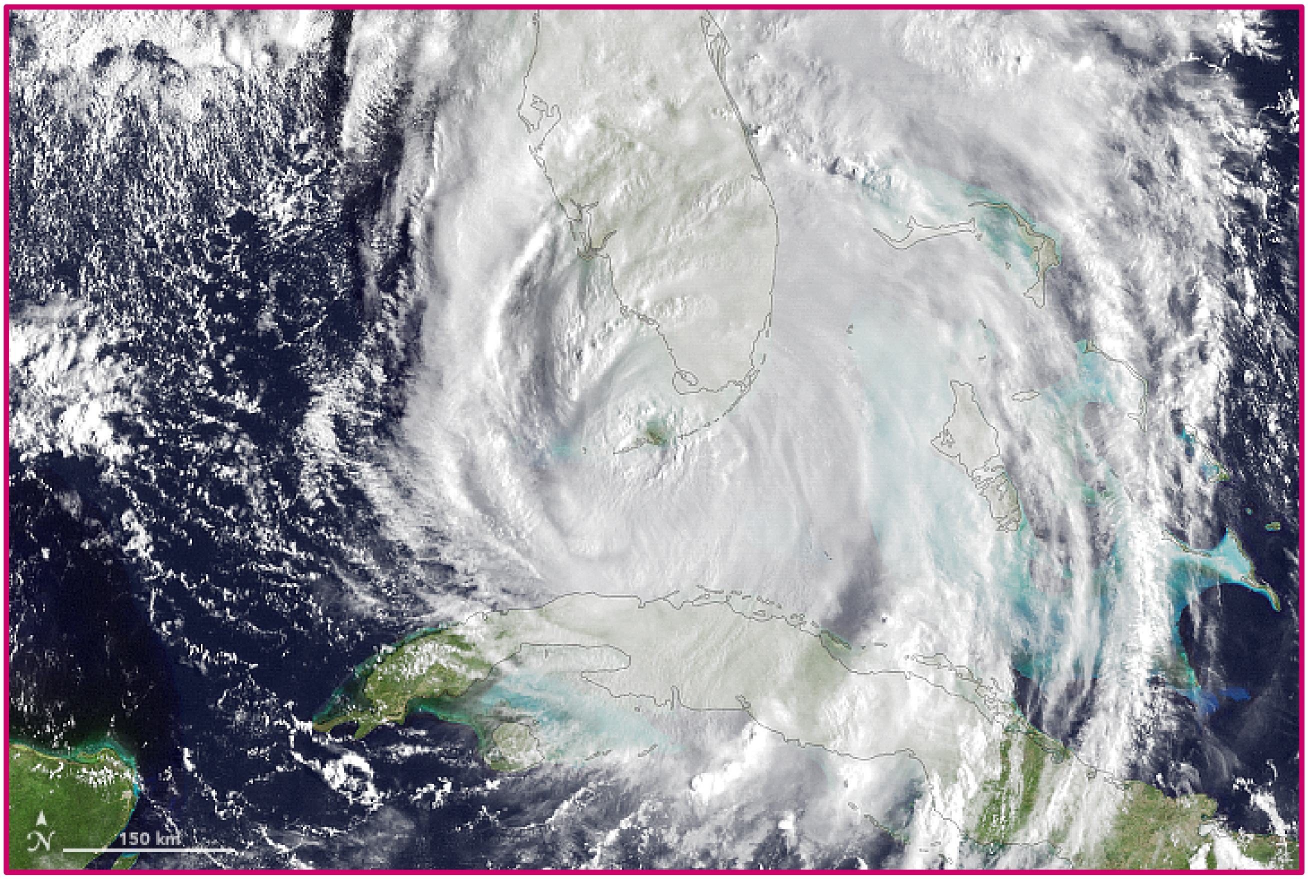
Hurricane Standards Report of Activities as of November 1, ~~2017~~2019



Florida Commission on Hurricane Loss Projection Methodology

FLORIDA COMMISSION ON HURRICANE LOSS PROJECTION METHODOLOGY

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November 1, ~~2017~~2019

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Dear Trustees:

As Chair of the Florida Commission on Hurricane Loss Projection Methodology (Commission), I am pleased to present to you the *Hurricane Standards Report of Activities as of November 1, ~~2017~~2019*. This report documents the twenty-fourth~~second~~ year of the Commission's work.

Section 627.0628, F.S., created the Commission as a panel of experts to be administratively housed in the State Board of Administration but requires the Commission to independently exercise its power and duties. The Commission is required to adopt revisions to "previously adopted actuarial methods, principles, standards, models, or output ranges every odd-numbered year for hurricane loss projections." Such revisions were made in compliance with the statute.

If you have any questions or comments regarding the work of the Commission, please call me at (847) 402-4753.

Sincerely,

Floyd Yager, Chair

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~~I.~~ INTRODUCTION

INTRODUCTION

Legislative Findings and Intent

In 1995, the Florida Legislature enacted s. 627.0628, Florida Statutes (F.S.), creating the Florida Commission on Hurricane Loss Projection Methodology (Commission).[1] The Legislature specifically determined that "reliable projections of hurricane losses are necessary to assure that rates for residential insurance are neither excessive nor inadequate," and that in recent years computer modeling has made it possible to improve on the accuracy of hurricane loss projections. The Legislature found that "it is the public policy of this state to encourage the use of the most sophisticated actuarial methods to ensure that consumers are charged lawful rates for residential property insurance coverage."[2] The Legislature clearly supports and encourages the use of computer modeling as part of the ratemaking process.

In 2014, the Florida Legislature expanded the role of the Commission by passing CS/CS/CS/SB 542 creating s. 627.715, F.S., which allowed for authorized insurers in Florida to write flood insurance. Additionally, several existing statutes were amended including the statute creating the Commission, s. 627.0628, F.S., and the insurance rating law statutory section, s. 627.062, F.S., dealing with rate filings. The new legislation tasked the Commission with adopting "actuarial methods, principles, standards, models, or output ranges for personal lines residential flood loss no later than July 1, 2017." The Commission started the process in 2014, and published *Discussion Flood Standards as of December 1, 2015*, which also provided for various types of feedback leading up to the July 1, 2017, statutory deadline for adopting flood standards. The Commission adopted principles, standards, and output ranges for personal lines residential flood loss in June 2017.

Where appropriate, this *Hurricane Standards Report of Activities* refers to flood and attempts to incorporate the references to flood in the context of the Commission's duties, but the report does not contain any specific flood standards nor does it specifically address the process for reviewing flood models. The flood standards and process for reviewing flood models is published in the ~~*2017*~~ *Flood Standards Report of Activities as of November 1, 2017*. Flood models will be reviewed separately from hurricane models using their respective standards as adopted by the Commission. The adoption of flood standards and the acceptability process for flood models is accomplished in parallel with the Commission's role regarding hurricane models.

The Role of the Commission

Although the statutory section creating the Commission is in the Florida Insurance Code, the Commission is an independent body and is administratively housed in the State Board of Administration of Florida (SBA). The role of the Commission is limited to adopting findings relating to the accuracy or reliability of particular methods, principles, standards, models, or output ranges used to project hurricane losses, flood losses, and probable maximum loss calculations.

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[1] CS/HB 2619 (Ch. 95-276, Laws of Florida).

[2] Section 627.0628(1)(a), F.S.

Section 627.0628(3)(c), F.S., states that "to the extent feasible," the SBA must "employ actuarial methods, principles, standards, models, or output ranges found by the Commission to be accurate or reliable" in formulating reimbursement premiums for the Florida Hurricane Catastrophe Fund (FHCF). Under s. 627.0628(3)(d), F.S., individual insurers are required to use the Commission's findings in order to support or justify a rate filing with the Office of Insurance Regulation (OIR) as follows, "an insurer shall employ and may not modify or adjust actuarial methods, principles, standards, models, or output ranges found by the commission to be accurate or reliable in determining hurricane loss factors and probable maximum loss levels for use in a rate filing under s. 627.062. An insurer may employ a model in a rate filing until 120 days after the expiration of the commission's acceptance of that model and may not modify or adjust models found by the commission to be accurate or reliable in determining probable maximum loss levels."

The Legislature addressed the definition of and the protection of trade secrets used in designing and constructing a hurricane model in 2005 and again in 2010. In s. 627.0628(3)(g), F.S.,[3] the Legislature found that it is a public necessity to protect trade secrets "used in designing and constructing a hurricane or flood loss model," and therefore, allowed an exemption from the public records law requirements and the public meetings law requirements. The goal of this legislation was to enable the Commission to have access to all aspects of hurricane and flood models and to encourage private companies to submit such models for review without concern that trade secrets will be disclosed. The exemption applies to "a trade secret, as defined in s. 812.081, F.S., which is used in designing and constructing a hurricane loss model" being exempt pursuant to s. 627.0628(3)(g), F.S., from the requirements of the public records law s. 119.07(1), F.S., including s. 24(a), Article I of the State Constitution and the public meetings law s. 286.011, F.S., including s. 24(b), Article I of the State Constitution.

In 2010 the Legislature revised the scope of the public records exemption by providing that the definition of "trade secret" in the Uniform Trade Secrets Act would apply in place of the definition in s. 812.081, F.S.[4] The effect of this change was to make the public records exemption for trade secrets consistent with other similar exemptions.

The 2010 legislation also required that ~~any~~ all portions of a closed Commission meeting be recorded. No portion of the closed meeting may be off the record. The bill also created a public records exemption for the recordings of closed meetings.

In 2014 the Legislature expanded the definition ~~of and the protection~~ of trade secrets and the related protection to include those used in designing and constructing a "flood loss model."[5]

In 2019 the Legislature removed the scheduled repeal of the trade secret exemptions making them permanent.[6]

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[3] Created in 2005 by HB 1939 (Ch. 2005-264, Laws of Florida).

[4] HB 7119 (Ch. 2010-90, Laws of Florida). The language in s. 812.081, F.S., defines trade secrets which relate to theft, robbery, and related crimes. Under s. 688.002(4), F.S., "trade secret" means information, including a formula, pattern, compilation, program, device, method, technique, or process that:

(a) Derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from its disclosure or use; and

(b) Is the subject of efforts that are reasonable under the circumstances to maintain its secrecy.

[5] SB 1262 (Ch. 2014-98, Laws of Florida).

[6] HB 7091 (Ch. 2019-35, Laws of Florida).

The Work of the Commission

The Commission was created as a panel of experts to evaluate computer models and other recently developed or improved actuarial methodologies for projecting hurricane losses, flood losses, and probable maximum loss levels so as “to resolve conflicts among actuarial professionals” and “to provide both immediate and continuing improvement in the sophistication of actuarial methods used to set rates.”[7]

Sections 627.0628(3)(a) and (b), F.S., define the role of the Commission:

> The commission shall consider any actuarial methods, principles, standards, models, or output ranges that have the potential for improving the accuracy of or reliability of the hurricane loss projections used in residential property insurance rate filings and flood loss projections used in rate filings for personal lines residential flood insurance coverage. The commission shall, from time to time, adopt findings as to the accuracy or reliability of particular methods, principles, standards, models, or output ranges.
>
> The commission shall consider any actuarial methods, principles, standards, or models that have the potential for improving the accuracy of or reliability of projecting probable maximum loss levels. The commission shall adopt findings as to the accuracy or reliability of particular methods, principles, standards, or models related to probable maximum loss calculations.

The statutory language is clear in that those methods or models that have the potential for improving the accuracy or reliability of hurricane loss projections, flood loss projections, and probable maximum loss levels are the ones to be considered by the Commission. “Improving” suggests that the methods or models should be an improvement over the then existing current methods or models used in the residential rate filing process prior to the Commission’s enactment.

Section 627.0628(3)(~~e~~f), F.S., originally established two deadlines for the Commission to take action. No later than December 31, 1995, the Commission was required to “adopt initial actuarial methods, principles, standards, models, or output ranges.” No later than July 1, 1996, the Commission was required to “adopt revised actuarial methods, principles, standards, models, or output ranges which include specification of acceptable computer models or output ranges derived from computer models.” The Commission met both those deadlines. To achieve the requirements of the Florida Statutes, in 1995 the Commission developed the following three-step evaluation process:

1. Identification of methods or models – models were identified by (1) referral after having been rejected by the Department of Insurance (now OIR), (2) being submitted directly to the Commission, or (3) the Commission’s soliciting them directly from the sponsor or owner.

2. Analysis of the method or model – the Commission adopted standards and five modules to assist in its analysis. The modules were, as follows:

[7] Section 627.0628(1)(b), F.S.

Module 1 – Description of the Model
Module 2 – Background and Professional Credentials of the Modeling Organization
Module 3 – Tests of the Model
Module 4 – Professional Team On-Site Review
Module 5 – Modeling Organization Presentation

3. Adoption of findings – the Commission may (1) accept a method or model, model specifications, or output ranges derived from computer models; or (2) accept the method or model, model specifications, or output ranges subject to modification; or (3) reject the method or model, model specifications, or output ranges.

In an effort to streamline the model submission and eliminate redundancies, the Commission conducted a complete and thorough reorganization of the *Hurricane Standards Report of Activities* in 2003. Part of the reorganization included renaming and incorporating the questions and forms in Modules 1–3 to sub-sections of the standards called disclosures and forms. Module 4 was moved to a separate section called On-Site Review, and Module 5 was moved to the acceptability process. The standards were realigned to facilitate the Commission voting process.

As originally required in s. 627.0628(3)(~~c~~f), F.S., the Commission adopted revisions to actuarial methods, principles, standards, models, or output ranges on an annual basis. The Commission initially adopted standards for the specifications of a computer model on June 3, 1996. Those original standards have subsequently been revised and then adopted on the following dates:

May 29, 1997	August 17 & 18, 2006
April 24 & May 21, 1998	September 20 & 21, 2007
August 17, 1999	September 17 & 18, 2008
September 14 & 15, 2000	September 15 & 16, 2009
September 19 & October 15, 2001	October 19, 20 & November 16, 2011
September 18 & 19, 2002	September 24 & 25, 2013
August 21 & 22, 2003	October 13 & 14, 2015
October 6 & 7, 2004	October 25, 2017~~.~~
September 14 & 15, 2005	October 29, 2019.

The Commission has operated on a biennial cycle since 2009. In 2009 the Legislature amended s. 627.0628(3)(~~c~~f), F.S., to require the Commission to adopt revisions to “actuarial methods, principles, standards, models, or output ranges every odd-numbered year.” Under the prior law, these were adopted annually.[8] The standards in this *Hurricane Standards Report of Activities* were revised and adopted on ~~October 25, 2017~~October 29, 2019. The Commission will again adopt revisions to the standards in ~~2019~~2021.

Also in 2009, the Legislature added subsection (4) to s. 627.0628, F.S., requiring the Commission to “hold public meetings for the purpose of receiving testimony and data regarding the implementation of windstorm mitigation discounts, credits, other rate differentials, and appropriate reductions in deductibles pursuant to s. 627.0629.”[9] The legislation further required the Commission to present a report to the Governor, the Cabinet, the President of the Senate, and the

[8] CS/SB 1758 (Ch. 2009-81, Laws of Florida).
[9] CS/CS/CS HB 1495 (Ch. 2009-87, Laws of Florida).

Speaker of the House of Representatives by February 1, 2010, on its recommendations for "improving the process of assessing, determining, and applying windstorm mitigation discounts, credits, other rate differentials, and appropriate reductions in deductibles pursuant to s. 627.0629."

The Commission held six public meetings for the purpose of receiving testimony and data regarding the implementation of windstorm mitigation discounts. The input and data received during the process, as well as other information gathered by the Commission, resulted in the *Windstorm Mitigation Discounts Report*. The report includes the Commission's findings and recommendations designed to improve the mitigation discount process.

In 2014, the Legislature revised s. 627.0628(3)(e), F.S., establishing a new deadline for the Commission to take action. No later than July 1, 2017, "the Commission shall adopt actuarial methods, principles, standards, models, or output ranges for personal lines residential flood loss." To achieve the requirements of the new ~~Florida Statutes~~statutory mandate, the Commission, in 2014, created a Flood Standards Development Committee. The committee met monthly to develop a set of "discussion flood standards" which were published December 1, 2015. After receiving input during on-site modeling organization feedback visits and further refinement through committee meetings, the Commission adopted flood standards in June 2017. The flood standards and procedures adopted on June 15 & 16, 2017 and October 25, 2017 are published in the ~~*2017*~~ *Flood Standards Report of Activities as of November 1, 2017*.

The Mission Statement

At the September 21, 1995, Commission meeting, the following mission statement was adopted:

> The mission of the Florida Commission on Hurricane Loss Projection Methodology is to assess the efficacy of various methodologies which have the potential for improving the accuracy of projecting insured Florida losses resulting from hurricanes and to adopt findings regarding the accuracy or reliability of these methodologies for use in residential rate filings.

The mission statement closely tracks the statute and restates the critical aspects of the Commission's work. Minor revisions to the mission statement were adopted on November 30, 1995.

The mission statement was revised on September 15, 2009, to reflect the Commission's role in reviewing models for their ability ~~for~~to project~~ing~~ probable maximum loss levels. Thus, the mission statement was modified, as follows:

> The mission of the Florida Commission on Hurricane Loss Projection Methodology is to assess the effectiveness of various methodologies which have the potential for improving the accuracy of projecting insured Florida losses and probable maximum loss levels resulting from hurricanes and to adopt findings regarding the accuracy or reliability of these methodologies for use in residential rate filings and probable maximum loss calculations.

The mission statement was revised again on October 13, 2015, to reflect the Commission's role in reviewing models for their ability ~~for~~ to project~~ing~~ flood losses used in rate filings for personal lines residential flood insurance coverage. Thus, the mission statement was modified, as follows:

> The mission of the Florida Commission on Hurricane Loss Projection Methodology is to assess the effectiveness of various methodologies which have the potential for improving the accuracy of projecting insured Florida losses and probable maximum loss levels resulting from hurricanes and floods and to adopt findings regarding the accuracy or reliability of these methodologies for use in residential rate filings (hurricane loss projections), personal lines residential rate filings (flood loss projections), and probable maximum loss calculations.

Overview

To date, the following hurricane models have been evaluated by the Commission against the standards for the applicable years listed below and were found acceptable.

Modeling Organization	**Standards**
AIR Worldwide Corporation	1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2011, 2013, 2015, 2017
Applied Research Associates, Inc.	1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2011, 2013, 2015, 2017
E.W. Blanch Company~~.~~	1998, 1999, 2000
CoreLogic, Inc.	1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2011, 2013, 2015, 2017
Florida Public Hurricane Loss Model	2006, 2007, 2008, 2009, 2011, 2013, 2015, 2017
Karen Clark & Company	2017
Risk Management Solutions, Inc.	1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2011, 2013, 2015, 2017
Tillinghast–Towers Perrin	1998

~~II.~~ PRINCIPLES

PRINCIPLES

1. The mission of the Florida Commission on Hurricane Loss Projection Methodology is to assess the effectiveness of various methodologies which have the potential for improving the accuracy of projecting insured Florida losses and probable maximum loss levels resulting from hurricanes and floods and to adopt findings regarding the accuracy or reliability of these methodologies for use in residential rate filings (hurricane loss projections), personal lines residential rate filings (flood loss projections), and probable maximum loss calculations. *History-New 9/21/95, rev. 11/30/95, rev. 9/15/09, rev. 10/13/15*

2. The Commission shall recognize that a modeling organization may develop either a hurricane model, a flood model, or both. As a result, the Commission's adoption of standards and the review of each respective model shall be independent and separate of the other type of model. The acceptability or failure of one type of model shall not have an immediate impact on the acceptability or failure of another type of model from the same modeling organization. Although the review process is similar in context for all types of models, the Commission shall recognize the unique process applicable to a hurricane model review and the unique process applicable to a flood model review. Only one type of model shall be submitted at a time by a modeling organization for review for that type of model (hurricane or flood) except as provided for in the Acceptability Process of its most recent *Hurricane Standards Report of Activities* or *Flood Standards Report of Activities*. *History-New 6/16/17*

3. The Commission shall consider the costs and benefits associated with its review process, including costs and benefits to the State and its citizens, to the insurance industry, and to the modeling organizations. *History-New 8/18/06*

4. The general focus of the Commission shall be on those areas of modeling which produce the most variation in output results and have the most promise of improving the science of modeling. *History-New 8/18/06*

5. The Commission shall pursue and promote research opportunities from time to time when issues need resolution and such research would advance the science of modeling. *History-New 8/18/06*

6. All models or methods shall be theoretically sound. *History-New 9/21/95, rev. 8/18/06*

7. The Commission's review process shall be active and designed to test model output for reasonableness and to test model assumptions. *History-New 8/18/06*

8. Models or methods shall not be biased in a way that overstates or understates results. *History-New 9/21/95, rev. 8/18/06*

9. All sensitive components of models or methods shall be identified. *History-New 9/21/95, rev. 8/18/06*

10. The trade secret aspects of models or methods being reviewed by the Commission shall be protected. *History-New 11/30/95, rev. 5/20/96, rev. 9/14/05, rev. 8/18/06*

11. Commission members shall have sufficient information concerning model assumptions and factors used in model development, whether trade secret or not, to make a finding about a model's acceptability. *History-New 8/18/06*

12. The Commission's review process of models or methods shall not restrict competition in the catastrophe modeling industry or thwart innovation in that industry. *History-New 11/30/95, rev. 5/20/96, rev. 8/18/06*

13. The Commission shall consider how advances in science or technology shall be incorporated in its revision of standards, and, where and when appropriate, develop new standards or revise existing standards to reflect these advances. *History-New 8/18/06, rev. 9/16/09*

14. The Commission shall consider how statutory changes shall be incorporated in its revision of standards, and, where and when appropriate, develop new standards or revise existing standards to reflect these statutory changes. *History-New 8/18/06, rev. 9/16/09*

15. The Commission's review of models or methods for acceptability shall give priority to new standards and standards that have been modified. *History-New 8/18/06, rev. 9/16/09*

16. The output of models or methods shall be reasonable and the modeling organization shall demonstrate its reasonableness. *History-New 9/21/95, rev. 8/22/03, rev. 8/18/06*

17. All adoptions of findings and any other formal action taken by the Commission shall be made at a publicly-noticed meeting, by motion followed by a formal member by member roll call vote, all of which shall be transcribed by a court reporter, such transcription to be made a part of the official record of the proceedings of the Commission. The Commission shall not record a transcript for the portion of a Commission meeting where trade secrets used in the design and construction of the model are discussed. No official action or decision shall be made in a closed meeting. *History-New 11/30/95, rev. 8/22/03, rev. 9/14/05, rev. 8/18/06, rev. 9/15/09, rev. 10/13/15*

18. All findings adopted by the Commission are subject to revision at the discretion of the Commission. *History-New 11/30/95*

19. No model or method shall be determined to be acceptable by the Commission until it has been evaluated by the Commission in accordance with the process and procedures which the Commission considers appropriate for that model or method. *History-New 11/30/95, rev. 5/20/96, rev. 8/18/06*

20. The Commission's determination of acceptability of a specific model or method does not constitute determination of acceptability of other versions or variations of that model or method; however, the Commission shall attempt to accommodate routine updating of acceptable models or methods. *History-New 11/30/95, rev. 5/20/96, rev. 8/18/06*

21. The Commission shall consider the educational needs of its members and from time to time implement educational programs that further Commission members' understanding of the science of modeling. *History-New 8/18/06*

~~III.~~ COMMISSION STRUCTURE

COMMISSION STRUCTURE

Oversight

The Commission was created, pursuant to s. 627.0628, F.S., "to independently exercise the powers and duties specified" in that statute. The Commission is administratively housed within the State Board of Administration of Florida (SBA), and as a cost of administration, the Florida Hurricane Catastrophe Fund (FHCF) provides travel reimbursement, expenses, and staff support. The SBA has no governing authority over the Commission; however, the SBA annually appoints one of the Commission members to serve as Chair, appoints one of the Commission members who is the actuary member of the FHCF Advisory Council, and has final approval authority over the Commission's budget.

Membership and Required Expertise

Section 627.0628(2)(b), F.S., requires that the Commission consist of twelve members with the following qualifications and expertise:

1. The Insurance Consumer Advocate;
2. The senior employee of the State Board of Administration responsible for operations of the Florida Hurricane Catastrophe Fund;
3. The Executive Director of the Citizens Property Insurance Corporation;
4. The Director of the Division of Emergency Management;
5. The actuary member of the Florida Hurricane Catastrophe Fund Advisory Council;
6. An employee of the Florida Department of Financial Services, Office of Insurance Regulation who is an actuary responsible for property insurance rate filings and who is appointed by the Director of the Office of Insurance Regulation;
7. Five members appointed by the Chief Financial Officer, as follows:
    a. An actuary who is employed full time by a property and casualty insurer which was responsible for at least 1 percent of the aggregate statewide direct written premium for homeowner's insurance in the calendar year preceding the member's appointment to the Commission;
    b. An expert in insurance finance who is a full time member of the faculty of the State University System and who has a background in actuarial science;
    c. An expert in statistics who is a full time member of the faculty of the State University System and who has a background in insurance;
    d. An expert in computer system design who is a full time member of the faculty of the State University System;
    e. An expert in meteorology who is a full time member of the faculty of the State University System and who specializes in hurricanes;
8. A licensed professional structural engineer who is a full-time faculty member in the State University System and who has expertise in wind mitigation techniques. This appointment shall be made by the Governor.

The licensed professional structural engineer was added by virtue of CS/SB 1770, which was enacted and became law in 2013. This legislation amended the requirements in s. 627.0628(2)(b), F.S., and enhanced the expertise immediately available to the Commission by increasing the membership to provide for the appointment of an additional member with special qualifications and attributes.

Terms of Members

The Insurance Consumer Advocate, Chief Operating Officer of the FHCF, Executive Director of Citizens Property Insurance Corporation, Director of the Division of Emergency Management, and the actuary member of the FHCF Advisory Council shall serve as a Commission member for as long as the individual holds the position listed.

The member appointed by the Director of the Office of Insurance Regulation shall serve until the end of the term of office of the Director who appointed ~~him or her~~the member, unless removed earlier by the Director for cause. The five members appointed by the Chief Financial Officer shall serve until the end of the Chief Financial Officer's term of office, unless the Chief Financial Officer releases them earlier for cause (s. 627.0628(2)(c), F.S.).

Officers

Officers: The officers of the Commission shall be a Chair and a Vice Chair.

Selection: Annually, the SBA shall appoint one of the Commission members to serve as the Chair (s. 627.0628(2)(d), F.S.). After the Chair is appointed, the Commission shall, by majority roll call vote, select a Vice Chair.

Duties of the Chair and Vice Chair:

A. The **CHAIR** shall:

   1. Preside at all meetings except during committee meetings where other Commission members are designated to act as committee chairs;
   2. Conduct a roll call of members at each meeting;
   3. Ensure all procedures established by the Commission are followed;
   4. Designate one of the Commission members to act in the role of Chair at any meeting where the Chair and Vice Chair cannot attend;
   5. Assign members to serve on Committees and appoint Committee Chairs.

B. The **VICE CHAIR** shall:

   In the absence or request of the Chair, preside at Commission meetings and have the duties, powers, and prerogatives of the Chair.

Member Duties and Responsibilities

The purpose of the Commission is to adopt findings relating to the accuracy or reliability of particular methods, principles, standards, models, or output ranges used to project hurricane losses, flood losses, and probable maximum loss levels. This work is extremely technical and requires specialized expertise. Therefore, the Legislature, in s. 627.0628, F.S., limited membership on the Commission to a careful balance of individuals meeting specific employment, education, and expertise requirements. Thus, each member's contribution cannot be underestimated and each member should make every effort to attend all meetings, in person or by telephone, and be prepared to actively participate. In particular, each member has the following responsibilities and duties:

1. Fully prepare for each Commission meeting and committee meeting where the member is designated as a committee member;
2. Attend and participate at each meeting in person or by telephone;
3. Give notice to SBA staff, in advance if possible, when a member must leave a meeting early or cannot attend at all;
4. Abide by the requirements of Florida's Sunshine Law. A summary of the requirements of the law is outlined in this section;
5. Since it is the SBA's responsibility to fund all Commission activities, direct all communications related directly to Commission activities ~~should be directed~~ to SBA staff who are responsible for administrative support of the Commission. ~~Directly related to Commission activities, t~~The following communications, directly related to Commission activities, ~~should~~ shall not take place:
    a. Commission members ~~should~~ shall not contact Professional Team members or modeling organizations directly, except in conjunction with communications during the on-site visit of a Commission member,
    b. Modeling organizations ~~should~~ shall not contact Commission members or Professional Team members directly,
    c. Professional Team members ~~should~~ shall not contact Commission members or modeling organizations directly.

   A Committee Chair or the Commission Chair may, in conjunction with SBA staff, contact a modeling organization or outside party for the purpose of clarifying or refining input or suggested revisions to the *Hurricane Standards Report of Activities* and *Flood Standards Report of Activities*;
6. Give notice of "special" conflicts of interest where the member, the member's relative, business associate, or any principal by whom he or she is retained stands to reap a direct financial benefit or suffer a potential loss from the issue being voted on. Financial benefit which is speculative, uncertain, or subject to many contingencies is not a special benefit that would preclude a member from voting. See Attorney General's Opinion 96-63 (September 4, 1996) and Commission on Ethics Opinion 94-18 (April 21, 1994). If a special conflict of interest arises and the special conflict is apparent prior to the meeting, the member must give advance notice to SBA staff. If the special conflict becomes apparent during a meeting, the member should immediately inform the Commission Chair or Vice Chair. The conflicted member shall recuse himself or herself from any activity of the Commission in the area of the special conflict;
7. Commission members are expected to meet the highest standards of ethical behavior. Commission members may be subject to the Code of Ethics for Public Officers and Employees, ss. 112.311-112.3261, F.S., including, but not limited to, s. 112.313(7), F.S., relating to conflicting employment or contractual relationships; s. 112.3143, F.S., relating

to voting conflicts; and s. 112.3145, F.S., relating to disclosure of financial interests. It is understood, given the nature of the expertise held by Commission members, that general conflicts of interest are inherent. The conflicts of interest which are addressed in s. 112.3143, F.S., and the conflicts which would preclude a Commission member from voting on an issue are only those conflicts which are special. Additionally, Commission members should be mindful of situations which may arise that have the potential to give an unfair advantage to any modeling organization or result in a particular Commission member having unique information and being in a position to exercise greater influence than other Commission members.

New Member Orientation and Continuing Education of Existing Members

As part of the SBA's administrative support of the Commission, the SBA staff is responsible for new member orientation. The SBA staff may also design programs for continuing education at the request of the Commission. The cost of such programs is subject to approval through the state budgetary process as outlined under ***Budget Consideration***.

On-Site Visits to ~~the~~ a Modeling Organization by Commission Members

The 2005 and 2014 legislative changes to s. 627.0628, F.S., specified that the goal was to enable the Commission to have access to all aspects of hurricane and flood models. Since both a public records exemption and a public meetings exemption are provided in the law, Commission members are able to review trade secrets in much more depth and able to inquire into the underlying nature of the hurricane and flood models without exposing such trade secret information to modeling organization competitors.

Although reliance on the expertise of the Professional Team continues to be necessary in the Commission's review process, it is anticipated that Commission members may request to have greater access to the hurricane and flood models by going to the modeling organization's location for an on-site visit.

The procedure for on-site visits and additional verification review visits requires that the Commission member obtain approval from the Commission and obtain authorization from the SBA for reimbursable travel (due to budget considerations). The deadline for requesting on-site visits, which includes any additional verification review visits, is seven days prior to the Commission meeting to review modeling organization hurricane model or flood model submissions in order for the requests to be placed on the meeting agenda.

Travel arrangements are coordinated through SBA staff and in accordance with the SBA's travel policy. Commission members are responsible for their own transportation arrangements to, from, and during the on-site visits.

The Commission member's on-site visit shall take place at the same time as the Professional Team's on-site or additional verification review. The Commission member's presence shall not disrupt the activities or work of the Professional Team. This procedure will limit Commission members' participation to that of an observer during the Professional Team activities and their review process. The Commission member may ask questions of the modeling organization in meetings separate from those of the Professional Team. Given time and resource constraints, all reasonable attempts will be made to schedule meetings between the modeling organization and Commission members, and the modeling organization should make its best effort to be available to answer the Commission member's questions.

If any notes are taken by a Commission member, the notes identified by the modeling organization as trade secret shall be placed in a sealed envelope marked "Confidential" with the date, time, and Commission member's signature across the seal. The notes shall be kept by the modeling organization and returned to the Commission member during the closed meeting to discuss trade secrets. At the conclusion of the closed meeting, all notes shall be returned to the modeling organization.

It should also be noted that the job of the Professional Team while on-site is to review the hurricane or flood model rather than to educate Commission members. The education of Commission members by the Professional Team is better accomplished in other settings.

Commission members shall refrain from discussing the hurricane or flood model among themselves while on-site and shall be mindful of the requirements of the public meeting laws of Florida. Since Professional Team members have signed contracts with the SBA that contain a confidentiality clause accepted by each modeling organization and are prohibited from discussing such proprietary information, Commission members cannot be included in any activities, meetings, or deliberations of the Professional Team.

Trade Secret Documents for Review On-Site by Commission Members: The Professional Team reviews the Audit sections of the *Hurricane Standards Report of Activities* and the *Flood Standards Report of Activities* while on-site, and a Commission member may have additional questions or prefer a more in-depth discussion about a particular audit requirement. In order for the modeling organization to have the necessary personnel and documents available, Commission members shall identify the items from the Audit section of the *Hurricane Standards Report of Activities* or from the Audit section of the *Flood Standards Report of Activities* that they are particularly interested in reviewing on-site. Each Commission member may create a prioritized list of items that should be provided to SBA staff no later than the Commission meeting to review modeling organization hurricane model or flood model submissions. The list will be provided to the modeling organization with the Professional Team pre-visit letter, in preparation for the member's on-site visit.

All items included in the Audit sections are of equal importance since all are required for verification of the hurricane and flood standards. Because the time needed to review the different audit requirements will vary, Commission members should prioritize the items they request to review based upon their expertise and interest. Due to time constraints, it will be the responsibility of the Commission members to allocate their time accordingly while on-site.

Documents Containing Trade Secrets Used in the Design and Construction of Hurricane and Flood Models

Material Containing Potential Hurricane or Flood Model Trade Secrets to be Visually Displayed or Discussed during Closed Meetings (Trade Secret Items): The Commission may develop a list of information, documents, and presentation materials that contain potential trade secrets used in the design or construction of the hurricane or flood model that the Commission wants to review during the closed portion of the Commission meeting to review hurricane or flood models for acceptability in addition to the trade secret items identified in the *Hurricane Standards Report of Activities* and the *Flood Standards Report of Activities*.

The trade secret material shown to the Commission shall be under the control of the modeling organization. This information, by law, shall be confidential and exempt from the State's public records requirements.

Closed Meetings for the Purpose of Discussing Trade Secrets Used in the Design and Construction of Hurricane or Flood Models

There is an exemption from public meeting requirements for those portions of a Commission meeting where trade secrets, used in the design and construction of hurricane or flood models, are discussed. The closed portion of a Commission meeting where trade secrets are reviewed and discussed will be held prior to the public portion of the Commission meeting to review hurricane or flood models for acceptability. Voting regarding the acceptability of a hurricane or flood model shall only take place during the public portion of the meeting. During any closed meeting, Commission members shall confine their discussions to trade secrets related to that particular hurricane or flood model under consideration. Discussions other than those involving trade secrets shall take place during the public portion of the meeting. Only public information that is absolutely essential to the understanding of the trade secret information may be provided along with the trade secret information during the closed meeting. Any such public information discussed must be discussed during the public portion of the meeting to ensure full access of the public to that information.

In accordance with s. 627.0628(3)(g), F.S., the closed portion of a Commission meeting shall be recorded electronically as per SBA policies and procedures. The recording is exempt from s. 119.07(1), F.S., and s. 24(a), Article 1 of the State Constitution.

Attendees: The only authorized attendees of the closed portion of the Commission meeting to review hurricane or flood models for acceptability shall include Commission members, Commission staff, Professional Team members, and modeling organization designated personnel, staff, and consultants.

Role of Professional Team: The discussion of trade secrets may involve verbal explanations, review of documents, and various types of demonstrations. Although the Professional Team will be present during the discussion of trade secrets, they should be viewed by the Commission members as a resource to confirm that the information being provided is consistent with the information provided on-site. Questions related to modeling organization trade secrets shall be addressed directly to the modeling organization rather than to the Professional Team members.

Room Requirements: Before the closed portion of the Commission meeting to review hurricane or flood models for acceptability begins, the room shall be cleared of all unauthorized persons and all their belongings. No briefcases, cellular phones, laptops, or other electronic devices shall be accessible to the authorized attendees during the closed meeting other than equipment needed by the modeling organization and equipment required by the Commission to accommodate Commission members.

All telephone lines and all microphones shall be checked to ensure that discussions cannot be heard, relayed, or recorded beyond the confines of the room. Personnel outside of the meeting room shall be asked to move to a distance where discussions cannot be inadvertently overheard or visual presentations seen. No telephone calls shall be made or received from the meeting room during the discussions of trade secrets other than those needed to meet the needs of the modeling organization. Authorized attendees needing to make or receive telephone calls shall be required to leave the meeting room to handle such communications. Any notes taken by authorized attendees, other than the modeling organization, shall be collected and given to the modeling organization at the conclusion of the closed meeting and prior to anyone leaving the meeting room. During the closed meeting, internet access may be available where modeling organizations may choose to provide direct access to the model by electronic means to help answer questions of Commission members.

Teleconference: Due to security reasons, a teleconference call-in number shall not be available to authorized attendees. If requested by the modeling organization, Commission staff will contact, from the meeting room, additional modeling organization personnel to allow their participation by phone.

Breaks: If a break is taken during a closed meeting, authorized attendees shall not discuss any of the proceedings from the time the meeting doors are open until they are closed following the conclusion of the break. No notes or other recorded information shall be taken out of the meeting room during a break. Other than authorized attendees, no one shall be allowed to enter the meeting room during a break with the exception of building maintenance personnel, food or beverage service personnel, or electronic technicians needed to provide services for the meeting room.

Transcripts: The Commission will not record a transcript for the closed portion of a Commission meeting.

Quorum Requirements: A quorum of Commission members is not required to conduct the closed portion of the Commission meeting.

Additional Closed Meetings: Once the initial closed portion of a Commission meeting has concluded, the public portion of the meeting shall begin. Upon a motion and a second and a majority vote, the Commission may decide to go back into a closed meeting. If such a decision is made by the Commission, all meeting security requirements previously outlined shall apply.

Commission Meetings

Quorum: A majority of the twelve Commission members (i.e., seven members) is required to constitute a quorum. A quorum is the number of members necessary to transact the official business of the Commission. "Presence" shall be defined as either a physical presence or as participation by any other means that allows the Commission member to communicate simultaneously with those members who are present.

Voting Abstentions based on Conflict: For the purpose of determining whether there is a quorum, if a member abstains from voting based on a special conflict of interest (as defined under ***Member Duties and Responsibilities***), that member would still be deemed present for purposes of the quorum requirement (Attorney General's Opinion 75-244; August 29, 1975).

Temporary Absence: "If a member in attendance at a meeting is called away and is unable to return to the meeting, the transcript should reflect the point at which … [the member] left and - if the remaining members constitute a quorum - the meeting should continue." If, however, the member is only temporarily absent, and this member is needed to constitute a quorum, the "appropriate procedure would be to recess the meeting until the member can return or, at least, to postpone a vote on any matter before the body until … [the member's] return" (Attorney General's Opinion 74-289; September 20, 1974).

Meeting Notices: Written notice of a Commission meeting ~~of the Commission~~ shall be provided to each member as soon as possible, and at a minimum, except in the event of an emergency meeting, at least seven days prior to the date scheduled. Section 286.011, F.S., requires public meetings to be noticed, and the notice must contain a time certain, a date, and the location of the meeting. If available, an agenda should be provided. If no agenda is available, it is sufficient if the notice summarizes the subject matter to be covered in the public meeting.

Public Access: Any member of the public shall have access to all Commission meetings that do not involve the discussion of trade secrets used in designing and constructing hurricane or flood models. That portion of a Commission meeting where a trade secret is addressed is confidential and exempt pursuant to s. 627.0628(3)(g)2, F.S., and thus will not be open to the public.

Agendas: Agendas listing topics planned for discussion shall be furnished to each member prior to the meeting. The agenda is to be used merely as a guide and topics not listed may be raised and discussed and the members may choose not to address an issue or topic listed on the agenda.

Location: Meetings shall be in Tallahassee, Florida, unless special circumstances arise.

Recording: The SBA staff shall be responsible for ensuring that all Commission meetings are recorded. A transcribed record shall be taken for all public portions of Commission meetings and an electronic recording shall be taken for all closed portions of Commission meetings. Commission meeting records shall be maintained by SBA staff in accordance with SBA policies and procedures. The Commission will not record a transcript for any closed portion of a Commission meeting.

Voting Requirement: Except in the case of a special conflict of interest (as defined under ***Member Duties and Responsibilities***), no Commission member who is present at any meeting at which an official decision or act is to be taken or adopted by the Commission may abstain from voting (s. 286.012, F.S.).

Designation of an Acting Chair: Depending on the circumstances, the Commission Chair or Vice Chair may temporarily appoint any member to act as Chair in those situations where the physical presence of a Chair is desirable to facilitate conducting the meeting.

Purpose and Conduct of Meetings: The Commission holds six types of meetings:

1. Committee meetings designed to review and revise the hurricane and flood standards, disclosures, audit requirements, forms, acceptability process, and other sections of the *Hurricane Standards Report of Activities* and the *Flood Standards Report of Activities*,
2. Commission meetings to adopt revisions to the hurricane and flood standards, disclosures, audit requirements, forms, acceptability process, and other sections of the *Hurricane Standards Report of Activities* and the *Flood Standards Report of Activities*,
3. Commission meetings to review hurricane or flood model submissions,
4. Commission meetings to review hurricane or flood models for acceptability,
5. Commission meetings to consider an appeal by a modeling organization if a hurricane or flood model is not found acceptable by the Commission, and
6. Planning workshops for the purpose of discussing, studying, and educating Commission members on new scientific developments and advances ~~and new developments~~ in the fields of meteorology, hydrology, hydraulics, engineering, actuarial science, statistics, and computer/information science. The discussions from the planning workshops ~~may be used~~will be instrumental in planning for future hurricane and flood standards, disclosures, audit requirements, and forms.

The meetings to review hurricane or flood models for acceptability may involve the discussion of modeling organization trade secrets. The Commission shall conduct the portion of a meeting where trade secrets used in the design and construction of the hurricane or flood model are discussed as a closed meeting. Each type of meeting is discussed below.

Committee Meetings

Committee meetings are for the purpose of discussing issues, developing hurricane and flood standards, completing necessary groundwork, and reaching a consensus among those present so when the Commission meets later to formally adopt the hurricane and flood standards, the *Hurricane Standards Report of Activities*, and the *Flood Standards Report of Activities*, most of the issues can be easily resolved with less detail and finalizing work required. Committee meetings provide for an informal workshop environment where Commission members, Professional Team members, SBA staff, modeling organizations, insurers, regulators, and the general public are encouraged to participate and provide input. A working draft of proposed revisions to the hurricane and flood standards, disclosures, audit requirements, forms, acceptability process, and other portions of the *Hurricane Standards Report of Activities* and the *Flood Standards Report of Activities* is created. A public notice is required, but it is not necessary that a quorum be present since all official business requiring a vote will be conducted at Commission meetings.

Committee meetings are also for the purpose of reviewing, determining the scope, and establishing priorities for any ideas, issues, and concepts new or previously presented at Commission meetings, Committee meetings, or workshops. The Committee may make a recommendation to the Commission on those that could be subjects for current consideration or for future inquiries and investigation.

The role of the Committee Chair ~~of a committee~~ is to present the draft of proposed hurricane or flood standards and other relevant documents with the aid of the Professional Team and SBA staff. The role of the other ~~c~~Committee members is to thoroughly review the proposed draft and provide input and ideas at the ~~c~~Committee meetings. Committee members have the responsibility of preparing in advance and becoming familiar with all the relevant issues. Such members have the responsibility of reading documents, raising questions, forming opinions, and participating in discussions. The role of the other Commission members is to participate, at their option, in all or various ~~c~~Committee meetings. In this manner the difficult work will be spread among Commission members and specific expertise will be utilized when reviewing and revising hurricane and flood standards. It is beneficial for each Commission member to be fully prepared to participate as an active ~~c~~Committee member and provide quality input and discussion at the ~~c~~Committee stage.

Committee meetings are not Commission meetings. Due to quorum requirements, no formal voting shall take place at ~~c~~Committee meetings, but a consensus among ~~c~~Committee members and others participating is desirable. The ~~c~~Committee ~~c~~Chair is expected to report issues and bring work products to the Commission at properly scheduled and noticed Commission meetings. It is possible for a ~~c~~Committee to meet with one Commission member (the Committee Chair~~ of the committee~~) and other interested parties (non-Commission members), but such ~~c~~Committee meetings shall be publicly noticed and approved by the Commission Chair. ~~The c~~Committee meetings ~~idea~~ work~~s~~ best when Commission members guide the ~~c~~Committee meetings and there is broad participation by the public, modeling organizations, regulators, or other interested parties. Although ~~c~~Committee meetings can be held with a substantial number of Commission members present, care should be taken to include the public and all interested parties to gain maximum participation and input. Committee ~~c~~Chairs should regularly call upon and solicit input from any and all interested parties present.

The recommended way to conduct a ~~c~~Committee meeting for hurricane and flood standards is, as follows:

1. Standard
    a. Each standard should be taken in order and read in its entirety or presented visually to the members.
    b. The Committee Chair asks if the standard is located in the appropriate grouping of standards or if it should be moved to a more appropriate section.
    c. The Committee Chair asks if the standard is still relevant, whether it should be eliminated, or if modifications should be made. If modifications are suggested, the Committee Chair should ask for proposed wording, if anything needs to be added, or if anything needs to be deleted in the standard.
    d. Any proposed changes to the standard are then read and explained.
    e. The Committee Chair next asks if there are any objections to the proposed changes and if any further changes are needed.

   f. The Committee Chair asks whether there are wording issues associated with the standard, are there any ambiguities, or are there ways to further clarify the standard by better drafting.

2. Purpose
   a. The Committee Chair reads or visually presents the purpose of the standard and asks if the purpose is clear and if any changes are needed.
   b. The Committee Chair asks if there are any objections or comments regarding the wording in the Purpose section.
   c. The Committee Chair asks if there are any wording or drafting issues associated with the purpose.
3. Disclosures
   a. The Committee Chair reads or visually presents each disclosure and asks if the disclosure is relevant and located with the appropriate standard.
   b. The Committee Chair asks whether any additions, deletions, or other proposed changes ~~are needed~~ to the disclosures are needed.
   c. The Committee Chair asks if there are any objections to the proposed changes and if any further changes are needed.
   d. The Committee Chair asks whether there are wording issues or additional instructions that need to be addressed to clarify the disclosure requirements.
4. Audit
   a. The Committee Chair reads or visually presents ~~the~~ each audit requirement~~s~~ and asks if it is clear and will be sufficient to help verify if the modeling organization has met the standard.
   b. The Committee Chair asks whether any additions, deletions, or other proposed changes ~~are needed~~ to the audit requirements are needed.
   c. The Committee Chair asks if there are any objections to the proposed changes and if any further changes are needed.
   d. The Committee Chair asks whether there are wording issues or additional instructions that need to be addressed to clarify the audit requirements.
5. Forms
   a. The Committee Chair reads or visually presents each form and asks whether the forms are appropriate, relevant, and located in the appropriate grouping of standards.
   b. The Committee Chair asks if there are any proposed changes suggested for the forms and if additional instructions are needed.
   c. The Committee Chair asks if there are any objections to the proposed changes or if additional wording changes are needed for clarification.
6. Trade Secret Items

   The ~~c~~Committee will identify trade secret information, documents, and presentation materials that contain potential trade secrets used in the design or construction of the hurricane or flood models that the Commission wants the modeling organization to visually display or discuss during the closed portion of a Commission meeting to review hurricane or flood models for acceptability.
7. Consideration of Ideas, Issues, Concepts, Inquiries, and Investigations

   The ~~c~~Committee will discuss, evaluate, and prioritize any ideas, issues, concepts, inquiries, and investigations presented at prior Commission meetings, ~~c~~Committee meetings, or workshops. The ~~c~~Committee will consider the associated costs and time constraints.

The meeting of the Acceptability Process Committee will proceed differently, but will follow a similar logical pattern as described above. The Acceptability Process Committee will start by reviewing the “Process for Determining the Acceptability of a Computer Simulation Hurricane Model,” or the “Process for Determining the Acceptability of a Computer Simulation Flood Model.” All proposed revisions will be discussed and any modifications will be considered. Comments will be solicited from those participating. Finally, any wording or formatting issues will be discussed.

Following the discussion of the acceptability process, the Acceptability Process Committee will take up other various sections of the *Hurricane Standards Report of Activities* or the *Flood Standards Report of Activities* by considering their appropriateness and relevancy, proposed revisions and any modifications, and wording or formatting issues.

As consensus is built and revisions are agreed to, the SBA staff in conjunction with the Professional Team will note the revisions and modifications and produce the draft documents that will be distributed in advance of the Commission meetings that will be held for the purpose of adopting the hurricane and flood standards and finalizing the *Hurricane Standards Report of Activities* for the next odd-numbered year and the *Flood Standards Report of Activities* every four years.

Commission Meetings to Adopt Hurricane and Flood Standards

The Commission Chair ~~of the Commission~~ will open the meeting and ask each ~~c~~Committee ~~c~~Chair, who presided over the revisions to the hurricane and flood standards, to comment as to the purpose of each hurricane and flood standard and any suggested revisions by the ~~c~~Committee under each hurricane and flood standard. This will not only include the hurricane and flood standard, but the purpose, the disclosures, the audit requirements, and the forms. The ~~c~~Committee ~~c~~Chair, along with the Professional Team and SBA staff, will discuss and comment on revisions to the hurricane and flood standards. The Commission members will ask questions and offer further suggestions if necessary and appropriate. The Commission Chair may also ask for comments from others in attendance including modeling organizations, regulators, insurers, or the general public.

Once the discussion is concluded, the ~~c~~Committee ~~c~~Chair should make a motion that the Commission adopt the hurricane or flood standard along with the suggested revisions including those associated with the purpose section, the disclosures, the audit requirements, and the forms. Another ~~c~~Committee member should second the motion. The Commission Chair will then ask if there is any further discussion. The Commission Chair will recognize Commission members for final comments or questions. Once the discussion is completed, the Commission Chair will ask for a roll call vote. Each hurricane and flood standard (including its accompanying purpose section, disclosures, audit requirements, and forms) shall be voted on separately.

The “Process for Determining the Acceptability of a Computer Simulation Hurricane Model” and the “Process for Determining the Acceptability of a Computer Simulation Flood Model” will each be voted on separately. The Commission Chair will ask the Chair of the Acceptability Process Committee to explain the revisions to the acceptability process. Once this is completed and comments are made by the Professional Team and SBA staff, the ~~c~~Committee ~~c~~Chair should make a motion that the Commission adopt the acceptability process as amended. Another Acceptability Process Committee member should second the motion. The Commission Chair will ask if there is any further discussion. After recognizing Commission members for discussion, the Commission Chair will ask for a roll call vote.

The final items to be voted on by the Commission include the remaining sections of the *Hurricane Standards Report of Activities* and the *Flood Standards Report of Activities*. If any of these sections do not change, they can be combined and adopted with one roll call vote. The Acceptability Process Committee will be responsible for these recommendations. The ~~c~~Committee ~~c~~Chair will discuss any revisions and modifications and should make a motion to approve each section separately. Another Acceptability Process Committee member should second the motion. The Commission Chair will recognize Commission members for discussion and questions, and then will ask for a roll call vote.

As a final consideration, the Commission Chair should consider whether it is appropriate to authorize the SBA staff to make any needed editorial changes consistent with the adopted *Hurricane Standards Report of Activities* and the *Flood Standards Report of Activities*. This would be done by a roll call vote after a Commission member makes a motion that is seconded and after discussion.

Once all voting necessary to finalize the *Hurricane Standards Report of Activities* and the *Flood Standards Report of Activities* is completed, the Commission may take up other business or may adjourn.

Commission Meetings to Review Modeling Organization Hurricane or Flood Model Submissions

The purpose of the meeting to review modeling organization hurricane or flood model submissions is to identify any ~~“~~deficiencies~~”~~ in the hurricane or flood model submissions, to create a list of ~~“~~issues~~”~~ to be addressed by each modeling organization, and to determine for a hurricane model submission whether an ~~“~~existing~~”~~ modeling organization is required to submit Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis, prior to the Professional Team on-site review.

Modeling organization hurricane or flood model submissions shall be received by the applicable November 1 deadline or additional deadline options available for flood model submissions under the 2017 flood standards. The hurricane or flood model submissions will have been distributed to each Commission member and the Professional Team for their review. The SBA staff will work with the Professional Team to identify any deficiencies or issues. Prior to the meeting, the Commission Chair, working with SBA staff and the Professional Team, may request that the modeling organization meet with the Commission (in person or by conference call) or provide additional information to clarify the hurricane or flood model submission.

Deficiency: A deficiency is defined as a lack of required documentation. A list of deficiencies shall be created if the hurricane or flood model submission is incomplete, unclear, or non-responsive. Some common deficiencies include failure to respond to all portions of a standard, disclosure, or form; failure to update to the current *Hurricane Standards Report of Activities* or *Flood Standards Report of Activities* language; omission of supporting scientific references; errors and contradictory material in the submission; and insufficient detail for review of methodology. Failure to adequately provide a required written response or the necessary public documentation expected by the Commission in the hurricane or flood model submission shall result in a deficiency. If necessary, the Commission will attempt to further clarify its expectations by providing additional comments or instructions with the deficiency so that the modeling organization is fully aware of what is expected and will have a reasonable opportunity to correct the deficiency. The Commission shall determine the appropriate time frame for correcting deficiencies. Failure to correct the deficiency within the time frame specified shall result in the termination of the review process. The Commission Chair has the discretion to extend the time frame for a modeling organization correcting deficiencies if unusual circumstances are involved.

Issue: Issues are related to the operation and theoretical soundness of the hurricane or flood model. Issues should not require a modeling organization to submit additional public documentation that is not required of all modeling organizations. Issues shall be addressed by the modeling organization with the Professional Team during the on-site review as well as with the Commission when the modeling organization presents the hurricane or flood model to the Commission for acceptability. Should the nature of an issue be such that the Commission feels public documentation is needed, then the documentation shall be added to the disclosure requirements and required of all modeling organizations. Otherwise, some modeling organizations might be put in an awkward position and vulnerable to making more information about their hurricane or flood model public than other modeling organizations thus resulting in a competitive disadvantage. [See **Principle #12**: *The Commission's review process of models or methods shall not restrict competition in the catastrophe modeling industry or thwart innovation in that industry.*]

In conducting the meeting to review the modeling organizations' hurricane or flood model submissions, the Commission Chair will take up one modeling organization's hurricane or flood model submission at a time as indicated on the agenda for the meeting. The Commission Chair will take up each hurricane or flood standard grouping and consider all the responses provided under the hurricane or flood standard including the modeling organization's response to compliance with the hurricane or flood standard, the information provided in the disclosures, any response provided to the audit requirements, and the completeness of the forms.

The first point of discussion will relate to hurricane or flood model submission deficiencies. The SBA staff working with the Professional Team will have provided a report to the Commission members regarding deficiencies that have been identified and that need to be corrected. The Commission shall review those deficiencies and add, delete, or modify the list as appropriate. Following a discussion of the deficiencies, the Commission will next discuss the issues identified under each grouping of hurricane or flood standards. The SBA staff working with the Professional Team will have provided the Commission members with a list of issues prior to the meeting. The Commission shall review those issues associated with each grouping of hurricane or flood standards and add, delete, or modify the list as appropriate. For hurricane model submissions only, a third point of discussion will relate to the requirement of Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis, for an existing modeling organization. The SBA staff working with the Professional Team will have provided, prior to the meeting, a recommendation to the Commission for requiring a completed Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis. The Commission shall determine, based on the recommendation and hurricane model revisions disclosed in the hurricane model submission, whether an existing modeling organization shall be required to provide Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis.

Upon review of ~~each grouping of~~all hurricane or flood standards, the Commission Chair will ask if there is a motion and a second to continue the review process subject to the correction of the deficiencies and to provide Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis, if required. ~~approve the list of issues to be addressed in the review process. The Statistical Standards motion shall also include the decision on the requirement of Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis.~~ ~~Motions~~ The motion shall include a specific time frame for correcting any deficiencies in the hurricane or flood model submission and if required for a hurricane model submission, a specific time frame for providing a completed Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis, prior to the Professional Team on-site review. The modeling organization shall resubmit or amend the original hurricane or flood model submission as specified by the Commission in the acceptability process of the *Hurricane Standards Report of Activities* or the *Flood Standards Report of Activities*. The Commission Chair will call for further discussion. After discussion, the Commission Chair will ask for a roll call vote. ~~The next grouping of hurricane or flood standards will then be addressed.~~ At any point, the Commission can determine that the modeling organization has not been responsive to the hurricane or flood model submission requirements and vote to terminate the review process.

The Commission Chair will next ask if there is a motion and a second to approve the list of issues to be addressed by the modeling organizations during the review process. The Commission Chair will call for further discussion. After discussion, the Commission Chair will ask for a roll call vote.

The Commission Chair shall provide a letter to each modeling organization listing:

1. Deficiencies identified in the hurricane or flood model submission with the time frame assigned for correcting the deficiencies,
2. Issues to be addressed with the Professional Team during the on-site review and with the Commission during the meeting to review the hurricane or flood model for acceptability, and
3. Inquiries and investigations to be addressed with the Professional Team during the on-site review.

Commission Meetings to Review Hurricane or Flood Models for Acceptability

The Commission meeting to review a hurricane or flood model for acceptability will begin with the Commission Chair calling upon the modeling organization to provide an overview presentation as required in the acceptability process of the *Hurricane Standards Report of Activities* or the *Flood Standards Report of Activities*. The modeling organization shall make a presentation and Commission members may ask questions during and after the presentation.

The next portion of the meeting will be closed to the public and will involve the discussion of trade secrets used in the design and construction of the hurricane or flood model identified in the *Hurricane Standards Report of Activities* or the *Flood Standards Report of Activities* as trade secret items and by the Professional Team during the on-site or additional verification reviews.

At the public meeting to determine the acceptability of a hurricane or flood model, once a quorum is present, either in person or by telecommunications, all votes shall be by a roll call vote based on the majority vote of those present. No Commission member, who is present at any Commission meeting at which an official decision or act is taken or adopted by the Commission, may abstain from voting except when a special conflict of interest exists (s. 286.012, F.S., s. 112.3143, F.S.).

For those circumstances in which a hurricane or flood standard does not apply to a particular hurricane or flood model, if the Commission votes affirmatively that the hurricane or flood standard does not apply, then such a vote shall constitute a determination by the Commission that the hurricane or flood standard is not applicable.

The hurricane standards are categorized under six groupings:

1. General Standards,
2. Meteorological Standards,
3. Statistical Standards,
4. Vulnerability Standards,
5. Actuarial Standards, and
6. Computer/Information Standards.

The flood standards are categorized under seven groupings:

1. General Flood Standards,
2. Meteorological Flood Standards,
3. Hydrological and Hydraulic Flood Standards,
4. Statistical Flood Standards,
5. Vulnerability Flood Standards,
6. Actuarial Flood Standards, and
7. Computer/Information Flood Standards.

The minimum number of vote tallies taken to determine the acceptability of a hurricane or flood model shall be one for each group of hurricane or flood standards. If the Commission determines that the hurricane or flood model meets all hurricane or flood standards in a grouping, the hurricane or flood model is found acceptable with respect to each individual hurricane or flood standard in the grouping. Hurricane or flood standards with subparts denoted by a notation of A, B, C, etc. are considered one hurricane or flood standard. At the request of any Commission member, one or more hurricane or flood standards in a grouping may be set aside from the remaining hurricane or flood standards in that grouping for a separate vote.

Based upon a motion of any member that is duly seconded, the Commission may review and modify the voting requirements for any hurricane or flood model as may be appropriate due to the unique aspects of the hurricane or flood model.

At the start of the second public portion of the meeting, the Commission Chair will first ask the modeling organization to explain corrections made for deficiencies identified in the meeting to review modeling organization's hurricane or flood model submissions. The Commission Chair will ask Commission members for questions or comments. Failure to provide the trade secret information required in the *Hurricane Standards Report of Activities* or the *Flood Standards Report of Activities* and the Professional Team report shall result in a deficiency. If the Commission identifies other deficiencies, the Commission shall specify a time frame for correction of those deficiencies that may include a review by one or more Professional Team members.

The Commission Chair will then announce that the Commission is ready to review the hurricane or flood model for acceptability. The Commission Chair will ask Commission members their preference for reading the hurricane or flood standards by title or in entirety. The Commission Chair will read the first hurricane or flood standard and will call upon the modeling organization to discuss the compliance of the hurricane or flood model with the hurricane or flood standard. The Commission Chair will next call upon the Professional Team to comment after which the Commission Chair will ask Commission members for questions or comments. If there are none, or after all questions have been responded to, the Commission Chair will then proceed to begin reading the next hurricane or flood standard. Once all the hurricane or flood standards in a grouping have been presented and discussed, the Commission Chair will ask the Commission members whether there are any hurricane or flood standards that need to be carved out and voted on separately. If no response is heard, the Commission Chair will ask for a motion to find the hurricane or flood model acceptable under that grouping of hurricane or flood standards. A motion will be made and seconded by Commission members at this time. Prior to voting, the Commission Chair will ask if there is any further discussion. If members have questions or comments, they will be recognized. Once the discussion is completed, the Commission Chair will ask for a roll call vote. Any hurricane or flood standards carved out will be voted on separately in a roll call vote.

The Commission Chair will then move to the next grouping of hurricane or flood standards and begin to read the first hurricane or flood standard in the grouping. The review process will follow as indicated in the paragraph above.

The Commission will have completed its determination of the acceptability of the hurricane or flood model when it has completed voting on all hurricane or flood standards. This does not preclude the Commission from revisiting a previous vote or revising the voting procedure as noted above. Upon conclusion of voting on all the hurricane or flood standards, the Commission Chair will instruct SBA staff to tally the votes. The SBA staff member will indicate whether the hurricane or flood model has been found acceptable by noting that the Commission does or does not find the hurricane or flood model to have met all the hurricane or flood standards. If the Commission finds the hurricane or flood model acceptable, the Commission Chair will indicate to the modeling organization that the modeling organization will receive a letter as provided in the acceptability process of the *Hurricane Standards Report of Activities* or the *Flood Standards Report of Activities*.

The voting procedure can be changed only if approved by the Commission members, given a quorum is present. This will require a motion, a second, and approval of a majority by roll call vote.

Commission Meetings to Consider an Appeal by a Modeling Organization if a Hurricane or Flood Model is not Found to be Acceptable by the Commission

If a hurricane or flood model fails to meet one or more hurricane or flood standards and is not found to be acceptable by the Commission, the modeling organization may file an appeal with the Commission and request a meeting with the Commission in order to provide additional information and data to the Commission to justify that the hurricane or flood model complies with the hurricane or flood standards and other requirements. The appeal process is specified in the acceptability process of the *Hurricane Standards Report of Activities* and the *Flood Standards Report of Activities*.

The purpose of the meeting to consider an appeal by a modeling organization is to review the appeal documentation and determine whether or not to reconsider the hurricane or flood model.

The Commission Chair will call upon the modeling organization to provide a presentation which ~~would~~ shall include reasons and justification for reconsideration. Commission members may ask questions during and after the presentation. After discussion, the Commission Chair will ask for a motion to reconsider the hurricane or flood model. A motion will be made and seconded by Commission members. Prior to voting, the Commission Chair will ask if there is any further discussion. Once discussion is completed, the Commission Chair will ask for a roll call vote.

If the motion to reconsider the hurricane or flood model is successfully approved by a majority vote, the Commission shall then determine if additional data and information is necessary prior to reconsideration of the hurricane or flood model. The Commission may formulate additional questions and request additional data and information to be responded to by the modeling organization. Such questions, data, and information may include proprietary information, and if so, may be addressed by the modeling organization in a closed session if requested by the modeling organization. If additional data and information is necessary for reconsideration of the hurricane or flood model, the Commission questions, data, and information request shall be provided to the modeling organization in a letter from the Commission Chair no later than ten days after the meeting to consider the appeal request. The Commission may proceed with scheduling a meeting with the modeling organization for reconsideration of the hurricane or flood model.

If the Commission does not specify any follow up questions or identify any additional data or information needed, the Commission may proceed with the reconsideration of the hurricane or flood model. The Commission shall then determine which hurricane or flood standards should be reconsidered. This may include only the hurricane or flood standards that were previously not found acceptable or it may include other hurricane or flood standards that have come into question as a result of new information and data which cast doubt as to the accuracy or reliability of the hurricane or flood model. The Commission shall vote on which hurricane or flood standards are to be reconsidered prior to reconsideration of the hurricane or flood model. The modeling organization may request more time to prepare for reconsideration if it feels that the nature of the review has become more complex and that it needs additional resources, time, and data to respond.

In reconsidering an earlier decision regarding hurricane or flood standards, the Commission shall be guided by new information and data which was not previously provided by the modeling organization. Each hurricane or flood standard will be discussed and voted upon separately in a roll call vote. The Commission Chair will read the title of the first hurricane or flood standard being reconsidered and will call upon the modeling organization to present new information and data and to discuss the compliance of the hurricane or flood model with the hurricane or flood standard. The Commission Chair may call upon the Professional Team to comment after which the Commission Chair will ask Commission members for questions or comments. The Commission Chair will ask for a motion as to whether the hurricane or flood model meets the hurricane or flood standard under reconsideration. A motion will be made and seconded by Commission members at this time. Prior to voting, the Commission Chair will ask if there is any further discussion. If members have questions or comments, they will be recognized. Once the discussion is completed, the Commission Chair will ask for a roll call vote.

The Commission Chair will then move to the next hurricane or flood standard being reconsidered, and the review process will follow as indicated in the paragraph above. The Commission will have completed its reconsideration of acceptability of the hurricane or flood model when it has completed voting on all hurricane or flood standards being reconsidered. This does not preclude the Commission from revisiting a previous vote on reconsideration of a hurricane or flood standard or revising the voting procedure as noted above. Upon conclusion of voting on all hurricane or flood standards being reconsidered, the Commission Chair will instruct SBA staff to tally the votes. The SBA staff member will indicate whether the hurricane or flood model has been found acceptable by noting that the Commission does or does not find the hurricane or flood model to have met all the hurricane or flood standards being reconsidered. If the Commission finds the hurricane or flood model acceptable under the hurricane or flood standards reconsidered, the Commission Chair will indicate to the modeling organization that the modeling organization will receive a letter as provided in the acceptability process of the *Hurricane Standards Report of Activities* or the *Flood Standards Report of Activities*.

The voting and meeting procedure can be changed only if approved by the Commission members, given a quorum is present. This will require a motion, a second, and approval of a majority by roll call vote.

Planning Workshops

Planning workshops are for the purpose of discussing, studying, and educating Commission members on new scientific developments and advances in the fields of meteorology, hydrology, hydraulics, ~~statistics,~~ engineering, actuarial science, statistics, and computer/information science. The discussions from the planning workshops will be instrumental in planning for future hurricane and flood standards, disclosures, audit requirements, and forms.

The planning workshops will be duly noticed and may require a quorum so that an official vote may be taken on actions resulting from the ideas presented and discussed at the workshop.
The Commission Chair will call the meeting to order and will introduce the ideas for discussion as indicated on the meeting agenda and will solicit any other ideas for discussion from Commission members. The ideas introduced will be discussed, prioritized, and evaluated by the Commission. Included in the discussions will be budget considerations, if any, and further study on the ideas if needed.

Outside Party Input Regarding Hurricane and Flood Standards, Disclosures, Audit Requirements, Forms, or Other Processes Adopted by the Commission

From time to time, parties other than Commission members, Professional Team members, and SBA staff assigned to the Commission make recommendations for the Commission to consider. For the Commission to fully and adequately consider input from outside parties, the following process and organizational framework is established for reviewing such input.

The Commission has a clearly defined statutory responsibility to act as a panel of experts to provide the most actuarially sophisticated guidelines and standards for projection of hurricane and flood losses possible, given the current state of actuarial science. The Commission's role is also narrowly defined as to its scope and purpose. As such, input provided by outside parties shall be considered by the Commission at its sole discretion. Subjects that go beyond the purview of the Commission's jurisdiction shall be rejected without consideration based on a decision by the Commission Chair. The Commission Chair may bring the matter to a vote by the Commission.

In order to enable the Commission and the appropriate Committees to evaluate recommended changes, the Commission requires that each recommendation be in the form of an amendment to specific language in the hurricane or flood standard, disclosure, audit requirement, form, or process. The specific amendatory language ~~must~~ shall be accompanied by a brief statement of the problem being addressed by the amendment and an explanation of how the amendment solves the problem. The problem statement, explanation, and amendatory language shall be received by the Commission at least ten business days prior to the ~~c~~Committee or Commission meeting at which the outside party wishes the amendment to be considered.

Consideration of any proposed amendment is at the discretion of the ~~c~~Committee ~~c~~Chair when the input is provided for ~~c~~Committee consideration. The proposed amendment may later be accepted or rejected for review by the Commission Chair prior to such input being brought before the Commission for a vote.

While comments and recommendations of a more general nature may be provided by outside parties, such recommendations shall be in the form described above in order to be considered at a ~~c~~Committee or Commission meeting called for the purpose of adopting or revising hurricane and flood standards, disclosures, audit requirements, forms, or processes. Nothing in this paragraph prevents a Commission member from proposing alternative language to address an issue raised by an outside party.

Any topics for general discussion shall be addressed to the Commission Chair who will decide, in his or her sole discretion, whether the topic merits discussion by Commission members, when and how the topic will be discussed, and whether or not to accept public comment. The Commission Chair shall reject any topic for discussion that is beyond the scope of the Commission's purview.

Problem Statement: A brief statement of the problem being addressed ~~should~~ shall be provided with all proposed amendatory language.

Explanation: The explanation ~~should~~ shall classify the proposal as general, technical, or editorial and include justification for the modification.

Amendatory Language: Proposed amendatory language will assure that all recommended revisions to hurricane and flood standards, disclosures, audit requirements, forms, and processes suggested by outside parties are in a format that allows the Commission and its committee structure to give appropriate consideration to the substance of a particular proposal with minimum time spent resolving ambiguities, drafting questions, and similar issues.

This framework does not restrict the scope of proposals and allows outside parties the flexibility to present the arguments for their proposal in whatever format and at whatever length they desire.

Budget Consideration

All new projects that have a fiscal impact should be identified prior to January 1 of the calendar year so that appropriate funding can be obtained through the SBA's budgetary review process.

All new projects shall consist of a proposal, an estimated cost, and a time frame for completion. The Commission shall vote on all new proposals for projects. The FHCF will include in its budget the funding for on-going projects and anticipate the potential for new hurricane and flood model submissions or any fiscal impact that revisions to the acceptability process or the hurricane and flood standards might have on the Commission's budget. The Commission's budget is subject to approval by the SBA Trustees for the appropriate fiscal year.

Sunshine Law

Section 286.011, F.S., aka the "Sunshine Law" or "open meeting law" applies to the Commission.

Scope of the Sunshine Law: In any place where two or more Commission members ~~of the Commission~~ are present, there is the potential for violating the Sunshine Law.

Any communication, whether in person, by telephone, ~~computer~~electronic, etc., concerning any information on which *foreseeable action* may be taken by the Commission is a "meeting" that must meet the requirements of Florida's Sunshine Law if the communication takes place between two or more Commission members except as provided in s. 627.0628(3)(g), F.S.

Basic Requirements for Public Meetings: All meetings subject to the Sunshine Law must be:

1. Open to the public,
2. Noticed,
3. Recorded by a court reporter and minutes preserved. The official minutes of the Commission will consist of a verbatim transcript unless special circumstances arise. In addition, SBA staff may prepare a summary of the meeting that will be added to the transcript and together will comprise the minutes of the meeting.

The SBA staff ensures that all scheduled public meetings of the Commission are filed for public notice in the Florida Administrative Register and a transcript is taken and preserved.

Trade Secret Violations: s. 688.002, F.S., defines misappropriation as "disclosure or use of a trade secret of another without express or implied consent by a person who at the time of disclosure or use, knew or had reason to know that her or his knowledge of the trade secret was acquired under circumstances giving rise to a duty to maintain its secrecy or limit its use."

Section 688.004, F.S., provides for damages as a result of a trade secret violation, "a complainant is entitled to recover damages for misappropriation. Damages can include both the actual loss caused by misappropriation and the unjust enrichment caused by misappropriation that is not taken into account in computing actual loss."

If a trade secret also meets the definition of a trade secret in s. 812.081, F.S., the following penalty provided in s. 812.081, F.S., for violating the confidentiality of trade secrets could still apply:

> *"(2) Any person who, with intent to deprive or withhold from the owner thereof the control of a trade secret, or with an intent to appropriate a trade secret to his or her own use or to the use of another, steals or embezzles an article representing a trade secret or without authority makes or causes to be made a copy of an article representing a trade secret commits a felony of the third degree, punishable as provided in s. 775.082 or s. 775.083.*
> *(3) In a prosecution for a violation ~~of the provisions~~ of this section, the fact that the person so charged returned or intended to return the article so stolen, embezzled, or copied is not a defense."*

~~IV.~~ FINDINGS OF THE COMMISSION

FINDINGS OF THE COMMISSION

Concerning Model Accuracy and Reliability

Background

Sections 627.0628(3)(a), (b), and (f), F.S., instructs the Commission to adopt findings from time to time as to the accuracy or reliability of standards and models, among other things, related to hurricane loss projections used in residential property insurance rate filings, flood loss projections used in rate filings for personal lines residential flood insurance coverage, and probable maximum loss calculations. This section also states that the Commission shall revise previously-adopted actuarial methods, principles, standards, models, or output ranges every odd-numbered year for hurricane loss projections and no less than every four years for flood loss projections. The following findings address the accuracy or reliability of the standards that the Commission has adopted since 1996 and the accuracy or reliability of the computer simulation models that the Commission has reviewed. The Commission thus far has reviewed computer simulation models exclusively because these constitute the only widely accepted approach to estimate residential loss costs, personal residential loss costs, and probable maximum loss levels.

The Commission finds that the computer simulation hurricane and flood models that it reviews are stochastic forecasting models. This means that future hurricane and flood events are stochastically generated and the associated hurricane and flood loss costs are accumulated and hurricane and flood probable maximum loss calculations can be made using the applicable model with the consideration of an insurer's individual or unique exposure data. By generating a sufficient body of hypothetical future hurricane and flood events, the sampling uncertainty in the hurricane and flood output ranges owing to the random variate generation process becomes negligible. The Commission finds that an accepted hurricane or flood model will produce accurate and reliable modeled hurricane or flood loss costs and hurricane or flood probable maximum loss levels for the entire state of Florida given the data and research currently available. Hurricane and flood loss costs and hurricane and flood probable maximum loss levels based on the applicable models are based on actuarially sound and theoretically appropriate techniques that also incorporate scientific evidence, findings, and principles from the areas of meteorology, hydrology, hydraulics, engineering, statistics, and computer/information science.

Accurate and Reliable – Defined

The Commission finds that the computer simulation hurricane models that have been reviewed by the Commission and found acceptable include appropriate model representations to simulate hurricanes and the induced damage on residential property in Florida. The basic features of the hurricane model construction are reflected in the six sections of hurricane standards established and refined since June of 1996:

1. General Standards reflecting the professional status of the hurricane model designers and testers and generic aspects of the hurricane model;
2. Meteorological Standards covering all aspects of this infrequent weather phenomenon;

3. Statistical Standards addressing the statistical foundation of the hurricane model and the sensitivity and uncertainty assessment of hurricane model outputs as a function of hurricane model inputs;
4. Vulnerability Standards assessing the impact of the hurricane winds on residential property;
5. Actuarial Standards assessing the damage impact in insurance terms;
6. Computer/Information Standards providing the overall design, construction, and execution of the hurricane model.

The Commission finds and recognizes that the scientific fields underlying hurricane models continue to evolve providing further insights into property damage and insurance implications. As a direct consequence, the Commission reviews and revises the hurricane standards comprising its *Hurricane Standards Report of Activities* every odd-numbered year. Every odd-numbered year is defined as every year ending in an odd number~~,~~ (~~i.~~e.g., ~~2009, 2011,~~ 2013, 2015, 2017, 2019, 2021~~, etc~~). The Commission finds that the hurricane standards adopted every odd-numbered year represent the current state of actuarial science regarding computer simulation hurricane modeling for purposes of producing hurricane loss costs and hurricane probable maximum loss levels for residential property in Florida that are accurate and reliable.

The Commission finds that the computer simulation flood models that will be reviewed by the Commission for acceptability include appropriate model representations to simulate floods and the induced damage on personal residential property in Florida. The basic features of the flood model construction are reflected in the seven sections of flood standards established in June of 2017:

1. General Flood Standards reflecting the professional status of the flood model designers and testers and generic aspects of the flood model;
2. Meteorological Flood Standards covering all aspects of coastal flooding including wind and other meteorological elements that drive storm surge;
3. Hydrological and Hydraulic Flood Standards covering all aspects of inland flooding including riverine, lacustrine, and surface water flooding;
4. Statistical Flood Standards addressing the statistical foundation of the flood model and the sensitivity and uncertainty assessment of flood model outputs as a function of flood model inputs;
5. Vulnerability Flood Standards assessing the impact of the coastal and inland flooding on personal residential property;
6. Actuarial Flood Standards assessing the damage impact in insurance terms;
7. Computer/Information Flood Standards providing the overall design, construction, and execution of the flood model.

The Commission finds and recognizes that the scientific fields underlying flood models continue to evolve providing further insights into property damage and insurance implications. As a direct consequence, the Commission reviews and revises the flood standards comprising its *Flood Standards Report of Activities* no less than every four years. The Commission finds that the flood standards adopted no less than every four years represent the current state of actuarial science regarding computer simulation flood modeling for purposes of producing flood loss costs and flood probable maximum loss levels for personal residential property in Florida that are accurate and reliable.

The words “accurate” and “reliable” are used in s. 627.0628, F.S., but are not defined therein. In the context of computer simulation hurricane and flood modeling, “accurate” means that the hurricane and flood models meet the applicable standards that have been developed to assure scientifically-acceptable hurricane and flood loss cost projections and hurricane and flood probable maximum loss levels. However, “accurate” cannot necessarily mean that a hurricane or flood model conforms exactly to known facts since that contradicts the nature of the hurricane and flood modeling process. “Reliable” is defined for computer simulation hurricane and flood models as meaning that the hurricane or flood model will consistently produce statistically similar results upon repeated use without inherent or known bias.

FINDINGS OF THE COMMISSION

Concerning Trade Secrets

The Commission finds the following with respect to **Principle #10**, *The trade secret aspects of models or methods being reviewed by the Commission shall be protected*~~:~~.

1. Modeling ~~O~~organizations that produce a computer simulation hurricane or flood model may have trade secrets regarding the design and construction of that model~~;~~,

2. Modeling organizations have been unwilling to reveal those trade secrets to the Commission in the context of the public meetings that the Commission holds because their competitors are part of the audience or can ~~get~~ obtain a copy of the publicly available transcript of the meeting~~;~~,

3. Modeling organizations have been willing to reveal all of their trade secrets if that information can remain confidential and within their control~~;~~,

4. Since that trade secret information would become publicly available in the context of a meeting in the "Sunshine," the Commission has authorized:

    a. ~~a~~ A Professional Team to review the hurricane and flood models on-site on behalf of the Commission,

    b. ~~o~~On-site visits to the modeling organizations by Commission members, and

    c. ~~c~~Closed meetings for the purpose of discussing trade secrets~~;~~,

5. The law allows an exception from the public records law for trade secrets used in the design and construction of hurricane and flood models~~;~~,

6. The Commission may require that the modeling organization provide certain documents for direct review by Commission members or the modeling organization may voluntarily provide documents containing trade secrets for the Commission's review~~;~~,

7. The law allows for the discussion of trade secrets to be exempt from public meeting requirements.

FINDINGS OF THE COMMISSION

Concerning Land Use and Land Cover Database

The Commission finds that the hurricane models to be submitted against the 2021 hurricane standards are anticipated to make use of a land use and land cover (LULC) database consistent with National Land Cover Database (NLCD) 2016 or later.

~~V.~~ PROCESS FOR DETERMINING THE ACCEPTABILITY OF A COMPUTER SIMULATION HURRICANE MODEL

PROCESS FOR DETERMINING THE ACCEPTABILITY OF A COMPUTER SIMULATION HURRICANE MODEL

Due to the complex and unique nature of hurricane and flood perils, and recognizing that a modeling organization may submit only a hurricane model or only a flood model, the Commission has determined that the review of hurricane and flood models for acceptability shall be independent of each other. Hence, a hurricane model and a flood model shall be submitted separately and reviewed separately. The Commission has determined, if a model is found acceptable or fails under one set of standards applicable to hurricane or flood, it shall have no bearing or impact on the other type of model's acceptability or failure under the respective set of standards. A modeling organization submitting both a hurricane model and a flood model shall have each model reviewed separately and independently under the respective unique set of standards applicable to hurricane or flood.

It should be understood that if a modeling organization submits both a hurricane model and a flood model, and in the course of a review (e.g., internal review, Professional Team on-site review, Commission review) of the hurricane model or the flood model, an error is discovered that is also likely to co-exist in the flood model or the hurricane model, then it is incumbent on the modeling organization to report this error in accordance with section III. Review of the Readiness Notification or ~~VI. Review by the Commission,~~ subsection F. Discovery of Differences in a Model after a Model has been Determined to be Acceptable by the Commission of section VI. Review by the Commission, as appropriate. Consequently, the onus is on the modeling organization to make this correction if it exists, in keeping with the independence of the two model reviews.

This ~~section~~ chapter specifies the Commission's process for the determination of acceptability of a computer simulation hurricane model (model).

The Commission has determined that prior to November 1 of every odd-numbered year, it will adopt new hurricane standards, revise existing hurricane standards, and if necessary, revise this acceptability process. The effective date of new or revised hurricane standards (standards) will be November 1 unless otherwise specified by the Commission. The standards and procedures published in the *Hurricane Standards Report of Activities as of November 1, ~~2017~~2019*, will not be scheduled for revision until ~~2019~~2021.

The Commission has determined that ~~"~~significant revisions~~"~~ to the standards or to the model are those that either change or have potential to change the hurricane loss costs or hurricane probable maximum loss levels. On the other hand, any minor revisions to the standards, or any revisions to the model by the modeling organization that do not result in changes to hurricane loss costs or hurricane probable maximum loss levels are not considered significant. The Commission may determine in its judgment whether a revision is significant.

The Commission has determined that any modeling organization that desires to have a model reviewed for compliance with the standards adopted by the Commission shall notify the Commission in accordance with the requirements set out below by November 1 of the even-numbered year following the adoption of each odd-numbered year's standards.

The Commission has further determined that the period between the effective date of new and revised standards and November 1 of the following year (the deadline for notification by the modeling organization) is a reasonable length of time for any modeling organization to comply with the standards adopted by the Commission. If the Commission determines that this time frame is not sufficient, based on the nature of the revisions to the standards or based on other circumstances that might necessitate a longer period of time for compliance, then the Commission will adjust this period of time accordingly. If requested by a modeling organization, the Commission Chair shall have the authority to grant a reasonable extension should the Commission Chair determine that an emergency or unusual situation exists that warrants an extension and is determined to be beyond the control of the modeling organization.

I. Scheduling

The following is an anticipated schedule:

September ~~2017~~2019	Committee meetings
October ~~2017~~2019	Adopt ~~2017~~ 2019 Standards and the *Hurricane Standards Report of Activities*
November 1, ~~2017~~2019	*~~2017~~ 2019 Hurricane Standards Report of Activities* published
November 1, ~~2018~~2020	Deadline for notification by modeling organization
December ~~2018~~2020 – January 2021	Commission meeting to review submissions
January ~~– April 2019~~ May 2021	On-site reviews
~~April –~~May ~~2019~~ – July 2021	Additional verification reviews, if necessary
~~April – June 2019~~May – July 2021	Commission meetings to review models for acceptability under ~~2017~~ 2019 Standards

The Commission will endeavor to expedite the review of a model if the Professional Team is able to verify all standards during the initial on-site review.

II. Notification Requirements

An ~~"~~existing~~"~~ modeling organization is defined as an organization whose model was accepted by the Commission under the previous set of standards. All other modeling organizations are considered as ~~"~~new.~~"~~

A. Notification of Readiness for Review. Any modeling organization desiring to have its model reviewed for acceptability by the Commission shall notify the Commission Chair ~~of the Commission~~ in writing by November 1, ~~2018~~2020, that the modeling organization is prepared for review. The notification shall consist of (1) a letter to the Commission, (2) a ~~summary~~ statement of compliance with each individual standard directly below each standard and each standard subpart, and (3) all required disclosure and form information~~, and (4) a completed Hurricane Model Submission Checklist~~.

The notification letter shall include:

1. The name and version of the model ready for review and the name and version of each platform, with the primary platform designated, on which the model is implemented;

~~1.~~2. A reference to the signed Expert Certification Forms G-1, General Standards; G-2, Meteorological Standards; G-3, Statistical Standards; G-4, Vulnerability Standards; G-5, Actuarial Standards; G-6, Computer/Information Standards; and G-7, Editorial Review;

~~2.~~3. A statement that professionals having credentials ~~and/~~or experience in the areas of meteorology, statistics, structural engineering, actuarial science, and computer/ information science have reviewed the model for compliance with the standards; and

~~3.~~4. A statement that the model is ready to be reviewed by the Professional Team.

Any caveats to the expert certifications shall be noted in the letter and accompanied by a detailed explanation.

Notification to the Commission shall also include:

1. A ~~summary~~ statement of compliance with each standard and each standard subpart, and the data and analyses required in the disclosures and forms. For existing modeling organizations, the material shall be updated as appropriate to reflect compliance with the new or revised standards even though the modeling organization submitted this material as part of a determination of acceptability under the previous set of standards;

2. A general description of any trade secret information, other than that required in the Trade Secret forms, that the modeling organization intends to present to the Professional Team and the Commission;

3. Seven bound copies (duplexed) and a link emailed to SBA staff where all required documentation can be downloaded from a single ZIP file. Submission documentation shall be provided in the following manner:

   a. Form M-1, Annual Occurrence Rates; Form M-3, Radius of Maximum Winds and Radii of Standard Wind Thresholds; Form V-2, Hurricane Mitigation Measures and Secondary Characteristics, Range of Changes in Damage; Form V-4, Differences in Hurricane Mitigation Measures and Secondary Characteristics; Form A-2~~A~~, Base Hurricane Storm Set Statewide Hurricane Losses ~~(2012 FHCF Exposure Data), Form A-2B, Base Hurricane Storm Set Statewide Hurricane Losses (2017 FHCF Exposure Data)~~; Form A-3~~A~~, ~~2004~~ Hurricane ~~Season~~ Losses ~~(2012 FHCF Exposure Data), Form A-3B, 2004 Hurricane Season Losses (2017 FHCF Exposure Data)~~; Form A-4~~A~~, Hurricane Output Ranges ~~(2012 FHCF Exposure Data), Form A-4B, Hurricane Output Ranges (2017 FHCF Exposure Data)~~; Form A-5, Percentage Change in Hurricane Output Ranges ~~(2012 FHCF Exposure Data)~~; Form A-7, Percentage Change in Logical Relationship to Hurricane Risk; ~~Form A-8A, Hurricane Probable Maximum Loss for Florida (2012 FHCF Exposure Data),~~ and Form A-8~~B~~, Hurricane Probable Maximum Loss for Florida ~~(2017 FHCF Exposure Data)~~; shall be provided in Excel format;

   b. Form A-1, Zero Deductible Personal Residential Hurricane Loss Costs by ZIP Code, shall be provided in both Excel and PDF format;

   c. Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis, if required, shall be provided in ASCII and PDF format~~, if required~~;

d. Form V-3, Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item); Form V-5, Differences in Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item); and Form A-6, Logical Relationship to Hurricane Risk (Trade Secret Item); if not considered as Trade Secret, shall be provided in Excel format;

~~d.~~e. The remaining portions of the submission shall be provided in PDF format;

~~e.~~f. All data file names shall include the abbreviated name of the modeling organization, the standards year, and the form name (when applicable);

~~f.~~g. The PDF submission files shall support highlighting and hyperlinking, and shall be bookmarked by standard, form, and ~~section~~chapter;

4. Format of the Submission:

    a. Table of Contents shall be included;

    b. Materials submitted shall be consecutively numbered from the first page (including cover) using a single numbering system from the beginning to the end of the submission and shall include the date and time in the footnote;

    c. All tables, graphs, and other non-text items shall be consecutively numbered using whole numbers, specifically listed in the Table of Contents, and clearly labeled with abbreviations defined;

    d. State the standard, disclosure, or form in *italics* and give the response in non-italics. The Purpose and Audit portions ~~should~~ shall not be restated. The modeling organization response shall include a statement in support of compliance following each standard, including each standard subpart. **The response to the standard shall not be a restatement of the standard**, but shall rather explain how the model meets the requirements of the standard by including (1) a statement in support of compliance with the standard, ~~and if applicable~~ (2) a reference to applicable disclosure~~(s)~~, or (3) a general description of applicable trade secret information that will be shown to the Professional Team during the on-site review and how it supports compliance with the standard.

    The disclosures ~~section of each standard is~~are not designed to require trade secret information. Therefore, the response to a disclosure shall not contain a statement similar to “will be shown to the Professional Team” unless a response to the disclosure has been provided and additional test results and documentation will be available for the Professional Team during the on-site review.

    If a standard or disclosure has multiple ~~sections~~parts, respond to each ~~section~~ part separately;

e. Graphs shall be accompanied by legends and labels for all elements:

   1. Individual elements shall be clearly distinguishable, whether presented in original or copy form;

   2. Maps shall use three colors – blue, white, and red; including shades of blue and red, with dark blue and dark red designating the lowest and highest quantities, respectively. The color legend and associated map shall use the maximum and minimum values as the range and shall be comprised of an appropriate number of equally-sized intervals to the extent possible, with at least seven, to provide readability. ~~and n~~No interval shall contain both negative and positive values. Relevant geographic boundaries (e.g., counties, ZIP Codes) shall be shown in black. The maximum and minimum values and their point locations shall be plotted on the maps;

   3. For data indexed by latitude and longitude, by county, or by ZIP Code, a map with superimposed county and ZIP Code boundaries shall be produced. Additional map specifications are indicated on individual form instructions;

f. NA shall be used in cells to signify no exposure;

g. All units of measurement for model inputs and outputs shall be clearly identified;

h. All model outputs of length, windspeed, and pressure shall be in units of statute miles, statute miles per hour, and millibars, respectively;

i. Unless otherwise specified, windfields generated by the model shall be used for completing relevant forms and tables in the submission;

j. All forms, with the exception of those indicated as a Trade Secret Item, shall be included in a submission appendix. If forms designated as a Trade Secret Item are not considered trade secret, those forms are to be included in a submission appendix. A link to the location of the form shall be provided in the corresponding disclosure;

k. ~~If used, a~~Acronyms shall be defined on their first use in the submission. A complete list of all acronyms ~~defined~~ used in the submission shall be listed and defined in a submission appendix;

l. All column headings shall be shown and repeated at the top of each subsequent page for forms and tables.

5. The modeling organization should contact SBA staff for any needed clarification of submission instructions, especially if the instructions necessitate additional assumptions.

6. All modifications, adjustments, assumptions, or other criteria that are included in producing the information required by the Commission in the submission shall be disclosed and will be reviewed.

B. **Revisions to the Standards or the Model – Not Significant.** If the Commission does not revise any standards or makes only minor revisions to some standards so that existing models would otherwise be in compliance with all the standards, and the modeling organization subsequently notifies the Commission in writing that there have been no significant revisions to the previously-accepted model ~~previously determined acceptable~~, then the Commission will meet and review the modeling organization's letter and any other documentation provided to determine whether the model will be considered acceptable for an additional two years, whether an on-site review by the Professional Team is warranted, or whether a further meeting with the Commission to review the model for acceptability is warranted.

C. **Revisions to the Standards or the Model – Significant.** If the Commission makes significant revisions to any existing standards or adopts new standards so that a previously-accepted model ~~already determined to be acceptable~~ is still in compliance with some, but not necessarily all of the standards, then the modeling organization shall inform the Commission in writing as to whether it believes the model is still in compliance with the standards that have been substantially revised or are new.

If an existing modeling organization makes significant revisions to the version of the previously-accepted model ~~previously found acceptable by the Commission~~, then at the time it notifies the Commission that it is ready to have its model reviewed for acceptability, the modeling organization shall notify the Commission in writing of the revisions and describe the magnitude of the revisions. The Commission will then meet and review the modeling organization's notification and any other documentation provided to determine whether the model is acceptable for an additional two years, whether an on-site review by the Professional Team is warranted, or whether an on-site review is not necessary but additional documentation must be provided which will then be reviewed at a Commission meeting.

D. **Notification of Unusual Circumstances.** The modeling organization shall notify the Commission Chair ~~of the Commission~~ in writing, as soon as possible, of any unusual circumstances that may impact the model or the model submission.

III. Review of the Readiness Notification

Once modeling organizations' submissions are received by the November 1 deadline, the Commission will hold a meeting to review the submissions as discussed under the "Commission Structure" ~~section~~ chapter of the *Hurricane Standards Report of Activities*.

Prior to the Professional Team on-site review and in accordance with the time frame specified by the Commission, the modeling organization shall submit, in electronic format via email correspondence to SBA staff, corrections for the deficiencies identified during the meeting, and if required, Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis. In response to the deficiencies identified, only revised pages and forms shall be provided with revision marks as specified under section V. Submission Revisions. If more than ten pages (exclusive of forms in a submission appendix) are impacted by the corrections to the deficiencies, then an entire submission document shall be submitted (seven duplexed bound copies) ~~(duplexed) and~~ along with a link emailed to SBA staff where all required documentation can be downloaded from a single ZIP file~~)~~ in accordance with the time frame specified by the Commission. All revised file names shall include the revision date, the abbreviated name of the modeling organization, the standards year, and the form name (when applicable) in the file name.

If, in addition to responding to the deficiencies specifically, the modeling organization opts to make further minor corrections elsewhere in their submission, it may do so and shall provide an annotated list of the additional revisions along with the corrections to the deficiencies.

Failure of the modeling organization to correct any deficiencies or to submit Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis, if required, within the time frame specified shall result in the termination of the review process. The modeling organization will be notified in writing that the review process has been terminated. Upon termination of the review process, the modeling organization shall be required to wait until after the next revision or review of the standards before requesting the Commission to review the model.

In the event that a modeling organization realizes the initial submission or the model has material errors and needs revision prior to the scheduled on-site review, the modeling organization shall immediately notify the Commission Chair ~~of the Commission~~ in writing. The notification shall detail the nature of the errors and revisions to the submission or the model, why it occurred, what is needed or has been done to correct the problem, the time frame needed for making the corrections, and any other relevant documentation necessary to describe both the errors and the corrections.

The Commission Chair shall (1) review the notification and inform the Commission members as soon as possible; (2) assess, with at least three Professional Team members ~~of the Professional Team~~, the severity of the error; and (3) determine whether to postpone the scheduled on-site review pending consideration of potential deficiencies and the overall schedule of on-site reviews.

If it is determined to proceed with the originally-scheduled on-site review, the modeling organization shall submit revised documentation no less than fourteen days prior to the scheduled on-site review by the Professional Team. If the modeling organization cannot correct the problems and submit revised documentation fourteen days prior to the scheduled on-site review, then all associated standards shall not be verified during the scheduled on-site review.

IV. Professional Team On-Site Review

If a determination has been made that a modeling organization is ready for an on-site review, SBA staff will schedule the on-site review by the Professional Team as discussed under the “On-Site Review” ~~section~~ chapter of the *Hurricane Standards Report of Activities*.

Trade secret items that are to be presented during the closed meeting portion of the Commission meeting to review models for acceptability shall be presented to the Professional Team for review.

There are two possible outcomes of the on-site review regarding auditing for compliance with the standards.

1. The Professional Team determines that, in its opinion, the model is likely to comply with the standards, and so reports to the Commission.

2. The Professional Team determines that, in its opinion, the model is unlikely to comply with the requirements in one or more standards.

   a. The Professional Team may react to possible corrections proposed by the modeling organization, but will not tell the modeling organization how to correct the non-compliance. If the problems can be remedied while the Professional Team is on-site, the Professional Team will review the corrective actions taken, including revisions to the original November 1 submission, before determining verification of a standard.

   b. If the problems cannot be corrected while the Professional Team is on-site, then the modeling organization shall have seven days from the final day of the on-site review to notify the Commission Chair in writing that it will be ready for an additional verification review within thirty days of the notification. The modeling organization shall submit all revised documentation as specified under section V. Submission Revisions, within thirty days of the notification.

      SBA staff will assemble the Professional Team or an appropriate subset of the Professional Team for only one additional verification review to ensure that the corrections have been incorporated into the current, running version of the model.

   c. If a discrepancy in the model or model submission is discovered by the modeling organization after the Professional Team has completed its on-site review, then the modeling organization shall without delay notify the Commission Chair in writing describing the discrepanc~~y(s)~~ies, request an additional verification review, and indicate when it will be ready for the review. The modeling organization shall submit all revised documentation as specified under section V. Submission Revisions.

      If an additional verification review has not been conducted, SBA staff will assemble the Professional Team or an appropriate subset of the Professional Team for an additional verification review to ensure that the corrections have been incorporated into the current, running version of the model.

      If an additional verification review has been previously conducted, the Commission Chair shall place the modeling organization's request for another additional verification review on the agenda for a special or regularly scheduled Commission meeting~~ of the Commission~~.

   d. If any problem necessitates the re-generation of the hurricane output ranges, the modeling organization shall submit revised hurricane output ranges to be received by the Commission no less than fourteen days prior to the initial date of the on-site review or additional verification review. If this is not the case, then Standard A-6, Hurricane Loss Outputs and Logical Relationships to Risk, (along with other related standards depending on the nature of the revision) shall not be verified during the initial on-site review or additional verification review.

In the event that (1) Form A-4~~A~~, Hurricane Output Ranges~~ (2012 FHCF Exposure Data)~~, was modified after the initial submission and prior to the on-site review, or (2) an additional verification review is required and Form A-4~~A~~, Hurricane Output Ranges~~ (2012 FHCF Exposure Data)~~, must be re-generated, the modeling organization shall provide ~~an additional version of~~ a newly completed Form A-5, Percentage Change in Hurricane Output Ranges~~ (2012 FHCF Exposure Data)~~, using the initial submission of Form A-4~~A~~, Hurricane Output Ranges~~ (2012 FHCF Exposure Data)~~, as the baseline for computing the percentage changes.

~~In the event that (1) Form A-4B, Hurricane Output Ranges (2017 FHCF Exposure Data), was modified after the initial submission and prior to the on-site review, or (2) an additional verification review is required and Form A-4B, Hurricane Output Ranges (2017 FHCF Exposure Data), must be re-generated, the modeling organization shall provide a version of Form A-5, Percentage Change in Hurricane Output Ranges, using the initial submission of Form A-4B, Hurricane Output Ranges (2017 FHCF Exposure Data), as the baseline for computing the percentage changes.~~

In the event that (1) Form A-6, Logical Relationship to Hurricane Risk (Trade Secret Item), was modified after the initial submission and prior to the on-site review, or (2) an additional verification review is required and Form A-6, Logical Relationship to Hurricane Risk (Trade Secret Item), must be re-generated, the modeling organization shall provide ~~an additional version of~~ a newly completed Form A-7, Percentage Change in Logical Relationship to Hurricane Risk, using the initial submission of Form A-6, Logical Relationship to Hurricane Risk (Trade Secret Item), as the baseline for computing the percentage changes.

e. If the modeling organization disagrees with the Professional Team as to likelihood of compliance, the modeling organization has two options:

   1. It can proceed to the scheduled Commission meeting to review models for acceptability under the ~~2017~~ 2019 Standards and present its arguments to the Commission to determine acceptability, or

   2. It can withdraw its request for review. Such a withdrawal shall result in the modeling organization waiting until after the next revision or review of the standards before requesting the Commission review its model.

V. Submission Revisions

Revised documentation shall include a distinct notification letter. ~~the~~The revision date shall be included on the submission cover page, the Model Identification page, and in each revised page footnote. All revised file names submitted shall include the revision date, the abbreviated name of the modeling organization, the standards year, and the form name (when applicable) in the file name.

Revisions shall be noted with revision marks, i.e., words stricken are deletions (~~deletions~~) and words underlined are additions (additions). If revision marks are provided in color, material deleted and stricken shall be in red, and material added and underlined shall be in blue.

The Professional Team and the Commission Chair will review the new material upon receipt for deficiencies. The Commission Chair shall notify the modeling organization of any deficiencies and the time frame for correction. An additional verification review will not be held until all deficiencies have been addressed. The Professional Team may provide to SBA staff a second pre-visit letter to be sent to the modeling organization outlining specific issues to be addressed during the additional verification review.

If an additional verification review is requested, revised documentation shall be received within thirty days of the request.

Complete final revised documentation shall be received no less than ten days prior to the Commission meeting to review the model for acceptability. The modeling organization shall email to SBA staff a link where complete final revised documentation with and without revision marks can be downloaded from a single ZIP file. If more than ten pages are revised (exclusive of forms in a submission appendix), seven bound copies (duplexed) of all required documentation with revision marks for all revisions made to the original November 1 submission shall be provided. If ten pages or fewer (exclusive of ~~the~~ forms in ~~the~~ a submission ~~A~~appendix) are revised, only seven bound copies (duplexed) of the revised pages and forms (if revised) shall be submitted. The format of the revised documentation shall be as specified under subsection ~~II. Notification Requirements,~~ A. Notification of Readiness for Review, Items 3 and 4 of the section II. Notification Requirements.

A note will be posted on the Commission website with instructions for obtaining initial submission documents. Final submission documents for a model that has been found acceptable by the Commission ~~will be~~are posted on the Commission website (~~*www.*~~*sbafla.com/methodology*).

VI. Review by the Commission

A. <u>General Review of a Model.</u> For any modeling organization seeking the Commission's determination of acceptability, the Commission may request a meeting with the modeling organization prior to the Commission's review of the model's compliance with the standards. The meeting would provide for a general discussion about the model or its readiness for review and would also provide an opportunity for the Commission and the modeling organization to address any other issues. This meeting may be conducted concurrently with the meeting to determine acceptability. If trade secrets used in the design and construction of the model are discussed, such discussions shall be held in a closed meeting.

B. **Meeting to Determine Acceptability.** The Commission shall meet at a properly noticed public meeting to determine the acceptability of a model once the modeling organization has provided all required material and the Professional Team has concluded its on-site review or any additional verification review. If the Commission Chair determines that more preparation time is needed by Commission members, the Commission Chair may reschedule the meeting date to review a model for acceptability, taking into consideration public notice requirements, the availability of a quorum of Commission members, the availability of a meeting room, and the availability of the particular modeling organization.

All materials shall be reviewed by the Professional Team prior to presentation to the Commission.

If the Commission determines that meeting one standard makes it impossible to meet a second standard, the conflict shall be resolved by the Commission, and the Commission shall determine which standard shall prevail. If at the meeting a unique or unusual situation arises, the Commission shall determine the appropriate course of action to ~~handle~~ address that situation, using its sound discretion and adhering to the legislative findings and intent as expressed in s. 627.0628(1), F.S.

Each modeling organization's model will be reviewed independently of any other modeling organization's model previously accepted or presently applying for review.

Trade secrets used in the design and construction of the model shall be discussed during a closed meeting prior to the Commission voting on the acceptability of the model. No voting regarding the acceptability of a model shall occur during a closed meeting.

C. **Modeling Organization Presentation.** All modeling organizations shall make a presentation to the Commission with respect to the model as used for residential ratemaking purposes in Florida. The presentation shall use a medium that is readable by all Commission members ~~of the~~ ~~Commission~~. The modeling organization presentation is for the purpose of helping the Commission understand outstanding issues, how the modeling organization has resolved various issues, and to explain the basis as to how the model meets the standards. Various issues may relate to:

1. Informational needs of the Commission as provided in the disclosures and forms,
2. The theoretical soundness of the model,
3. Use of reasonable assumptions, and
4. Other related aspects dealing with accuracy or reliability.

~~A~~For a new model, the modeling organization shall give a detailed overview presentation to the Commission (approximately one hour) explaining how the model is designed to be theoretically sound, meets the criteria of being accurate and reliable, and indicate which parts of the model are considered proprietary.

For ~~A~~an existing model, the modeling organization shall present a general, high level overview of the model (no more than ~~10~~ 15 minutes). This presentation should concentrate on the theoretical basis for the model, highlight the measures taken to ensure the model is accurate and reliable, and indicate which parts of the model are considered proprietary.

Modeling organization personnel shall distribute hard copies (eighteen) of the overview presentation to the Commission and Professional Team members at the start of the meeting.

Following the overview presentation, the Commission will hold a closed meeting where trade secrets used in the design and construction of the model will be discussed and reviewed. Modeling organizations that do not utilize the trade secret session shall cover the prescribed material during the public meeting portion.

Closed Meeting Portion

During the closed meeting where trade secrets used in the design and construction of the model are discussed, the modeling organization shall present Form V-3, Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item); Form V-5, Differences in Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item); Form A-6, Logical Relationship to Hurricane Risk (Trade Secret Item); and trade secret items identified and recommended by the Professional Team during the on-site and additional verification reviews to be shown to the Commission which will be documented in the Professional Team's report to the Commission.

The modeling organization shall provide a detailed discussion of Form V-3, Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item) and Form V-5, Differences in Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item), in support of acceptability of Standard V-~~3~~4, Hurricane Mitigation Measures and Secondary Characteristics, including but not limited to the following:

1. Individual hurricane mitigation measures for each windspeed and hurricane loss costs exhibiting logical mitigation impacts within categories and across structure types,

2. The fully mitigated building results relative to the contributions of the various hurricane mitigation measures, and

3. Omission of any individual hurricane mitigation measures.

The modeling organization shall provide a detailed discussion of Form A-6, Logical Relationship to Hurricane Risk (Trade Secret Item), in support of acceptability of Standard A-6, Hurricane Loss Outputs and Logical Relationships to Risk~~, including but not limited to the following:~~.

~~1. The logical relationship to hurricane risk relative to each Notional Set 1-8,~~

~~2. Geographic displays (color-coded maps) or graphical displays as appropriate for each Notional Set 1-8,~~

~~3. Color-coded contour map of the hurricane loss costs for strong owners frame buildings (Notional Set 6),~~

~~4. Scatter plot of the hurricane loss costs (*y*-axis) against distance to closest coast (*x*-axis) for strong owners frame buildings (Notional Set 6), and~~

~~1. Any apparent anomalies in the results in completed Form A-6, Logical Relationship to Hurricane Risk (Trade Secret Item).~~

~~A~~ Modeling organization personnel shall distribute hard ~~copy~~ copies of the modeling organization's prepared presentation and the trade secret forms ~~shall be provided~~ to the Commission and Professional Team members (eighteen comprehensive hard copies numbered 1 through 18) at the start of the closed meeting. The trade secret forms shall be printed separately ~~rather than as part of~~from the presentation. ~~The hard copies shall be returned to the modeling~~ Modeling organization personnel shall collect the hard copies at the conclusion of the closed meeting and prior to anyone leaving the meeting room.

All material presented in the closed meeting shall be complete, (e.g., all axes on graphs labeled).

Proprietary comments initially redacted from the Professional Team report shall be made available by the modeling organization to the Commission.

Items that the modeling organization is precluded from releasing due to third party contracts may be excluded.

In order to meet the public meeting notice requirements for the following public meeting portion, two hours shall be scheduled for the closed meeting.

Public Meeting Portion

At the conclusion of the closed meeting, the Commission will resume the public meeting to continue the review of the model for acceptability. The modeling organization's presentation for this portion of the meeting shall:

1. Provide an explanation of corrections made for deficiencies noted by the Commission,

2. Provide an explanation of revisions to the previously-accepted model and their effect on hurricane loss costs and hurricane probable maximum loss levels, and

3. Provide an explanation of how the model meets the standards:

   a. Each standard number and title shall be stated;

b. Explanation of how each standard was met, with reference to any appropriate disclosures or forms that support compliance; asserting that a standard has been met without providing substantive evidence is not acceptable;

c. If relevant and non-proprietary, material not provided in the submission which was presented to the Professional Team during the on-site review for verification; and

d. Any non-trade secret information that can be provided in order to facilitate a general understanding of the trade secret information presented to the Commission during the closed meeting.

~~Three to five~~Two hours shall be scheduled for review of a new model not previously submitted and ~~two~~ one and a half hours shall be scheduled for review of an existing model during a public meeting.

Modeling organization personnel shall distribute ~~A~~ hard ~~copy~~ copies (eighteen) of the modeling organization's prepared presentation ~~shall be provided~~ to the Commission and Professional Team members ~~(eighteen copies)~~ at the start of the public meeting.

All materials presented to the Commission during the public portions of the meeting to determine acceptability shall be provided to SBA staff in electronic format.

D. Acceptability and Notification. To be determined acceptable, the model shall have been found acceptable for all standards. If the model fails to be found acceptable by a majority vote for any one standard, the model shall not be found acceptable. The modeling organization shall have an opportunity to appeal the Commission's decision as specified under subsection ~~VI. Review by the Commission,~~ E. Appeal Process to be Used by a Modeling Organization if a Model is Not Found to be Acceptable by the Commission in section VI. Review by the Commission.

Once the Commission has determined that a model is acceptable in accordance with the procedures in the acceptability process and that all required documentation as specified in the acceptability process has been provided to the Commission, the Commission Chair ~~of the Commission~~ shall provide the modeling organization with a letter confirming the Commission's action.

The letter shall be in the following format.

Date

(Name and Address of Modeling Organization)

Dear _____:

This will confirm the finding of the Florida Commission on Hurricane Loss Projection Methodology on (date), that the (name of modeling organization) model has been determined acceptable for projecting hurricane loss costs and hurricane probable maximum loss levels for residential rate filings. The determination of acceptability expires on November 1, ~~2021~~2023.

The Commission has determined that the (model name and version identification ~~of the model~~) on the (platform identification) (*primary platform*), and on the (additional platform identifications) (*functionally equivalent platform*), limited to the options selected in the input form and reported in the output form provided in Standard A-1, Hurricane Modeling Input Data and Output Reports, Disclosures 4 and 5:

(1) complies with the hurricane standards adopted by the Commission on (date of adoption), and

(2) ~~concludes that the (name and version identification of the model) limited to the Florida hurricane model options selected (Standard A-1, Hurricane Modeling Input Data and Output Reports, Disclosure 4)~~ is sufficiently accurate and reliable for projecting hurricane loss costs and hurricane probable maximum loss levels for residential property in Florida.

On behalf of the Commission, I congratulate you and your colleagues. We appreciate your participation and input in this process.

Sincerely,

(Name), Chair

A copy of the letter shall be provided to the Commissioner of the Office of Insurance Regulation.

E. Appeal Process to be Used by a Modeling Organization if a Model is Not Found to be Acceptable by the Commission. If a model is not found to be acceptable by the Commission, the modeling organization shall have up to thirty days to file a written appeal of the Commission's finding. The appeal shall specify the reasons for the appeal, identify the specific standard or standards in question, provide appropriate data and information to justify its position, and may request a follow up reconsideration meeting with the Commission to present any relevant or new information and data to the Commission in either a public or closed meeting format.

Within sixty days of receiving the appeal, the Commission shall hold a public meeting for the purpose of reviewing the appeal documentation, formulate additional questions to be responded to by the modeling organization, and request additional data and information if necessary. If the Commission determines additional data and information is necessary for reconsideration of the model, the Commission's questions, data, and information request shall be provided to the modeling organization in a letter from the Commission Chair no later than ten days after the meeting to consider the appeal request. The modeling organization shall respond to the Commission within ten days of receiving the Commission Chair's letter. Any proprietary responses, data, or information shall be noted by the modeling organization indicating the response will be discussed in a closed session with the Commission.

The Commission will meet at a properly noticed public meeting to reconsider the acceptability of the model under the standards established by the Commission. If the Commission Chair determines that more preparation time is needed by Commission members, the Commission Chair may reschedule the meeting date to reconsider the model for acceptability, taking into consideration public notice requirements, the availability of a quorum of Commission members, the availability of a meeting room, and the availability of the modeling organization.

Once the Commission has completed its reconsideration of acceptability and determined that the model has met all the standards being reconsidered and that all required documentation as specified in the acceptability process has been provided to the Commission, the Commission Chair ~~of the Commission~~ shall provide the modeling organization with a letter confirming the Commission's action as specified under subsection ~~VI. Review by the Commission,~~ D. Acceptability and Notification of section VI. Review by the Commission.

If the model fails to be found acceptable by a majority vote for any one standard, the model shall not be found acceptable and the appeal of the modeling organization shall have failed. In this regard, the findings of the Commission shall be final. The modeling organization shall be required to wait until after the next revision or review of the standards before requesting the Commission to review its model.

F. **Discovery of Editorial Errors or Discrepancies in a Submission after a Model has been Determined to be Acceptable by the Commission.** If editorial errors or discrepancies are discovered in a previously-accepted model submission, the modeling organization shall immediately notify the Commission Chair in writing. The notification shall include an errata detailing the nature of the editorial errors or discrepancies and the corresponding revisions to the submission.

The Commission Chair, in consultation with at least three Professional Team members, shall verify the corrections to the previously-accepted model submission. Once the Commission Chair determines that the documentation and explanations provided by the modeling organization are sufficient, no further review by the Commission will be necessary. The Commission Chair shall provide a letter to the modeling organization acknowledging the notification of editorial errors or discrepancies and noting that the Commission accepts the modeling organization's errata and revisions to the previously-accepted submission.

~~F~~G. **Discovery of Differences in a Model after a Model has been Determined to be Acceptable by the Commission.** If the modeling organization discovers any differences between the model as found acceptable by the Commission and the model as used by its clients, the modeling organization shall without delay notify the Commission in writing describing the differences and the impact on hurricane loss costs and hurricane probable maximum loss levels. The notification shall be accompanied by Forms V-2, Hurricane Mitigation Measures and Secondary Characteristics, Range of Changes in Damage; A-1, Zero Deductible Personal Residential Hurricane Loss Costs by ZIP Code; A-4~~B~~, Hurricane Output Ranges ~~(2017 FHCF Exposure Data)~~; A-8~~B~~, Hurricane Probable Maximum Loss for Florida ~~(2017 FHCF Exposure Data)~~; and S-5, Average Annual Zero Deductible Statewide Hurricane Loss Costs – Historical versus Modeled. Additionally, the modeling organization shall state the level of the differences based on the classification scheme below as either Type I, Type II, or Type III differences.

For purposes of complying with this requirement, a ~~“~~difference~~”~~ is anything that results in a model not being exactly the same as the model found acceptable by the Commission under the standards as adopted in this *Hurricane Standards Report of Activities*, but does not include interim model updates/revisions as addressed in subsection ~~VI. Review by the Commission, G~~H. Interim Model Updates after a Model has been Determined to be Acceptable by the Commission;~~,~~ updates to geographical data or other interim data updates as addressed in subsection ~~VI. Review by the Commission, H~~I. Interim Updates to Geographical or Other Data after a Model has been Determined to be Acceptable by the Commission;~~,~~ model updates as addressed in subsection ~~VI. Review by the Commission, J~~K. Model Update for Consistency of Hurricane and Flood Models after the Model has been Determined to be Acceptable by the Commission, all under section VI. Review by the Commission, or other developmental revisions to the model that are of the nature that would be appropriately reviewed according to the standards and procedures in the next *Hurricane Standards Report of Activities* scheduled for publication in ~~2019~~2021.

Upon receipt of the modeling organization’s notification and documentation as specified above, the Commission Chair shall consult with at least three Professional Team members ~~of the Professional Team~~ in order to investigate, determine, and verify the impact of the differences as reported by the modeling organization.

Differences in hurricane loss costs or hurricane probable maximum loss levels within spreadsheets shall be computed without explicit rounding or truncation of floating point values prior to generating the documentation specified above. The type of differences noted shall be classified as falling into one of the following categories:

Type I: The model is not the exact same model as found acceptable~~ or the submission needs to be revised due to the discovery of inaccuracies or errors~~, but there are no differences in hurricane loss costs for any five-digit ZIP Code area and there are no differences in hurricane probable maximum loss levels for any return period.

Type II: There are differences in one or more hurricane loss costs for a five-digit ZIP Code area, but such differences do not exceed ±1% and there are changes in hurricane probable maximum loss levels for one or more return periods, but such differences do not occur at the rounded third significant digit of the hurricane probable maximum loss number.

Type III: There are differences in one or more hurricane loss costs for a five-digit ZIP Code area or there are changes in hurricane probable maximum loss levels for one or more return periods that exceed the threshold levels set in Type II.

In the case of Type I differences:

1. The Commission Chair, in consultation with at least three Professional Team members ~~of the Professional Team~~, shall verify the impact of the differences as reported by the modeling organization, and identify any additional documentation needed by the

Commission. In its investigation and review of the issue, the Commission shall focus solely on the need for documentation explaining and describing the differences and ensuring that there is no impact on hurricane loss costs and hurricane probable maximum loss levels. The modeling organization's response related to differences noted at the Type I level shall only involve providing adequate documentation and shall not involve any further revisions to the model. The modeling organization shall submit an addendum to the submission for the previously-accepted model ~~previously found acceptable by the Commission~~ thereby documenting the reasons, causes, and explanations for the differences. The addendum shall also encompass a discussion of why hurricane loss costs and hurricane probable maximum loss levels remain valid and have not changed from the previously-accepted model~~ which the Commission found acceptable~~.

2. If the Commission Chair determines that the documentation and explanations provided by the modeling organization are sufficient, no further review is necessary by the Commission. The Commission Chair shall provide a letter to the modeling organization acknowledging the notification of differences and noting that the Commission accepts the modeling organization's addendum to its previous submission. The letter shall note that a change in the model version identification is not required and that the model's acceptability shall expire as originally provided for in subsection ~~VI. Review by the Commission,~~ ~~K~~L. Expiration of a Model Found Acceptable under section VI. Review by the Commission, unless additional differences are discovered prior to expiration.

3. If the Commission Chair determines that a new model version identification may be needed or that complexity of the reported differences needs to be addressed by the Commission at a special or regularly scheduled meeting, the Commission Chair shall provide the Commission with detailed recommendations, such as the need for additional documentation or the need for further investigations, the potential need for a revised model version identification, or other appropriate recommendations given the circumstances. Additionally, the Commission Chair shall propose what would constitute adequate documentation and when such documentation shall be provided to the Commission.

   At the Commission meeting, the Commission Vice Chair or, if not available to chair the meeting, a Committee Chair appointed by the Commission Chair, shall preside at the meeting. The Commission Chair shall make a motion for approval of the recommendations which shall require a second. The Commission shall then vote on the recommendations of the Commission Chair, and any other alternative recommendations or amendments that are raised in the form of a motion that has been duly made and seconded by another Commission member.

   If backup documentation required is of a proprietary nature involving trade secrets, the Commission shall discuss only such items in a closed session. All votes shall be taken in a public meeting.

4. The acceptability of the model shall not be suspended on the basis of Type I differences as long as appropriate documentation is provided to the Commission in a timely fashion. No additional actions or revisions to the model shall be required by the modeling organization with respect to Type I differences.

5. If the modeling organization fails to provide documentation that the Commission deems satisfactory within a time frame specified by the Commission, the acceptability of the model shall be suspended pending submission of the necessary documentation. The Commission Chair shall notify the modeling organization by letter of such suspension. Once the documentation is provided by the modeling organization, the Commission Chair shall review the documentation with at least three Professional Team members ~~of the Professional Team~~, and if the Commission Chair determines that the documentation is appropriate, shall send a letter to the modeling organization indicating that the documentation is acceptable and the suspension is lifted.

In the case of Type II differences:

1. The Commission Chair, in consultation with at least three Professional Team members ~~of the Professional Team~~, shall determine whether the modeling organization has already revised the model to address the differences to conform to the standards or is capable of addressing the differences within fourteen days after notifying the Commission of the discovery of Type II differences. If the model has been revised or can be revised within the fourteen day time frame, the modeling organization shall submit an addendum to the submission for the previously-accepted model ~~previously found acceptable~~ thereby documenting the revisions, explaining the reasons for the differences, and providing any necessary backup documentation. If trade secret information is involved, the modeling organization shall include this fact in its notification to the Commission.

2. The Commission Chair shall place the modeling organization's notification on the agenda for a special or regularly scheduled meeting of the Commission. The scheduling of the Commission meeting shall depend on the nature of the differences and the time frame for appropriate revisions to be made. The Commission Chair shall provide Commission members with a copy of the modeling organization's notification and report the status related to the modeling organization's revision plan if ongoing actions are required.

3. If the modeling organization has not made the necessary revisions to the model to conform to the standards, the Commission Chair shall provide in advance of the meeting a proposed plan of action for the Commission's consideration. The Commission Vice Chair or, if not available to chair the meeting, a Committee Chair appointed by the Commission Chair, shall preside at the meeting. The Commission shall consider the Commission Chair's proposal and, upon the proposal being moved and seconded, vote on the Commission Chair's proposed plan of action ~~of the Chair~~, and any other alternative recommendations or amendments that are raised in the form of a motion that has been duly made and seconded by another Commission member. All plans of action shall include specific time frames including deadlines and the required documentation regarding the necessary revisions to conform to the standards.

4. Once the modeling organization has made the appropriate revisions within the Commission's specified time frames, as verified by the Commission Chair in consultation with at least three Professional Team members ~~of the Professional Team~~, the Commission Chair shall call a special meeting or include an agenda item on the Commission's next regularly scheduled meeting for the purpose of reviewing the

revisions to the model needed in order for the model to comply with the standards. The Commission shall review the model as it deems necessary and may go into a closed session for discussion of trade secrets. The Commission shall conduct a minimum of six votes (one for each grouping of standards) with the option of any member being allowed to request a carve out of a specific standard or standards (without the requirement for a second to such motion). The basic process adopted in the *Hurricane Standards Report of Activities*, chapter ~~regarding the~~ "Process for Determining the Acceptability of a Computer Simulation Hurricane Model" under subsections ~~in VI. Review by the Commission,~~ A. General Review of a Model, B. Meeting to Determine Acceptability, C. Modeling Organization Presentation, and D. Acceptability and Notification in section VI. Review by the Commission will be followed. The notification letter regarding the acceptability of the model shall be revised to acknowledge the type of differences discovered and the revisions from the original model related to the previously-~~acceptable~~ accepted model version. The new model version identification as assigned by the modeling organization shall be noted, and the revised model shall supersede the previously-~~acceptable~~ accepted model. The acceptability of the revised model shall expire at the end of the current cycle as provided for in subsection ~~VI. Review by the Commission,~~ ~~K~~L. Expiration of a Model Found Acceptable under section VI. Review by the Commission, unless additional differences are discovered prior to expiration.

5. If the modeling organization fails to make the appropriate revisions within the Commission's specified time frame, the model shall be suspended until the appropriate revisions are made to conform the model such that it meets the standards. The Commission Chair shall send a letter to the modeling organization indicating that the acceptability of the model has been suspended until the Commission votes on the acceptability of the revised model and a new model version identification has been assigned by the modeling organization. Once the Commission has determined acceptability of the revised model, the revised model shall supersede the previously-~~acceptable~~ accepted model. The acceptability of the revised model shall expire at the end of the current cycle as provided for in subsection ~~VI. Review by the Commission,~~ ~~K~~L. Expiration of a Model Found Acceptable under section VI. Review by the Commission, unless additional differences are discovered prior to expiration.

In the case of Type III differences:

1. The acceptability of the model shall be suspended upon receipt of the notification of Type III differences or at any time during a Commission review where the magnitude of such differences are discovered and can be documented. The Commission Chair shall send the modeling organization a letter indicating that the acceptability of the model by the Commission has been suspended immediately upon such notification or discovery and shall remain suspended until the Commission investigates and takes action regarding the modeling organization's steps necessary to address the differences in order to bring the model in compliance with the standards as adopted in this *Hurricane Standards Report of Activities*.

2. The Commission Chair, in consultation with at least three Professional Team members ~~of the~~ ~~Professional Team~~, shall determine whether the modeling organization has already revised the model to address the differences necessary to conform the model to

the standards or is capable of addressing the differences within fourteen days of notifying the Commission or the discovery of the Type III differences by the Professional Team or Commission. If the model has been revised or can be revised within the fourteen day time frame, the modeling organization shall submit an addendum to the submission for the previously-accepted model ~~previously found acceptable~~ thereby documenting the revisions, explaining the reasons for the differences, and providing any necessary backup documentation. If trade secret information is involved, the modeling organization shall so indicate in its notification to the Commission.

3. The Commission Chair shall place the modeling organization’s notification or the discovery by the Professional Team or Commission on the agenda for a special or regularly scheduled meeting of the Commission. The scheduling of the Commission meeting shall depend on the nature of the differences and the time frame for appropriate revisions to be made. The Commission Chair shall provide Commission members with a copy of the modeling organization’s notification and report the status related to the modeling organization’s revision plan if ongoing actions are required.

4. If the modeling organization has not made any revisions to the model to conform to the standards, the Commission Chair shall provide in advance of the meeting a proposed plan of action for the Commission’s consideration. The Commission Vice Chair or, if not available to chair the meeting, a Committee Chair appointed by the Commission Chair, shall preside at the meeting. The Commission shall consider the Commission Chair’s proposal and, upon the proposal being moved and seconded, vote on the Commission Chair’s proposed plan of action, and any other alternative recommendations or amendments that are raised in the form of a motion that has been duly made and seconded by another Commission member. All plans of action shall include specific time frames including deadlines and documentation regarding the needed revisions for the modeling organization in order for the model to conform to the standards.

5. If the modeling organization has already revised the model or once the modeling organization has made the appropriate revisions within the Commission’s specified time frames, as verified by the Commission Chair in consultation with at least three Professional Team members ~~of the~~ ~~Professional Team~~, the Commission Chair shall call a special meeting or include an agenda item on the Commission’s next regularly scheduled meeting for the purpose of reviewing the revisions to the model needed in order for the model to comply with the standards. The Commission shall review the model as it deems necessary and may go into a closed session for ~~a~~ discussion of trade secrets. The Commission shall conduct a minimum of six votes (one for each grouping of standards) with the option of any member being allowed to request a carve out of a specific standard or standards (without the requirement for a second to such motion).

   The basic process adopted in the *Hurricane Standards Report of Activities*, ~~regarding the~~chapter “Process for Determining the Acceptability of a Computer Simulation Hurricane Model” ~~in VI. Review by the Commission,~~ under subsections A. General Review of a Model, B. Meeting to Determine Acceptability, C. Modeling Organization Presentation, and D. Acceptability and Notification in section VI. Review by the Commission will be followed. The notification letter regarding the acceptability of the model shall be revised to acknowledge the type of differences discovered and the revisions from the original submission related to the previously-~~acceptable~~ accepted model version. The new model version identification as assigned by the modeling organization shall be noted, and the revised model shall supersede the previously-~~acceptable~~ accepted model. The acceptability of the revised model shall expire at the end of the current cycle as provided for in subsection ~~VI. Review by the Commission,~~ ~~K~~L. Expiration of a Model Found Acceptable under section VI. Review by the Commission, unless additional differences are discovered prior to expiration.

6. If the modeling organization fails to make the appropriate revisions within sixty days of the Commission being notified or the date where the Commission discovered the Type III differences, the acceptability of the model shall be withdrawn subject to the appeal process as specified in subsection ~~VI. Review by the Commission,~~ E. Appeal Process to be Used by a Modeling Organization if a Model is Not Found to be Acceptable by the Commission under section VI. Review by the Commission. If there is no appeal or the appeal is unsuccessful, the modeling organization shall be required to wait until the next review cycle as determined by time frames established in the next *Hurricane Standards Report of Activities* scheduled for publication in ~~2019~~2021.

~~G~~**H. Interim Model Updates after a Model has been Determined to be Acceptable by the Commission.** If a modeling organization makes updates/revisions to the model where (1) the model update scope and utility is unrelated to Florida hurricane loss costs or Florida hurricane probable maximum loss levels and does not include the Florida hurricane model component, and (2) there are no changes to the hurricane loss costs or hurricane probable maximum loss levels for Florida, the modeling organization shall notify the Commission Chair ~~of the Commission~~ in writing. The notification shall detail the nature of the updates/revisions, the effect on the underlying acceptable model, and the effect on the modeled results.

The notification shall also include Form V-2, Hurricane Mitigation Measures and Secondary Characteristics, Range of Changes in Damage; Form A-1, Zero Deductible Personal Residential Hurricane Loss Costs by ZIP Code; Form A-4~~B~~, Hurricane Output Ranges ~~(2017 FHCF Exposure Data)~~; Form A-8~~B~~, Hurricane Probable Maximum Loss for Florida ~~(2017 FHCF Exposure Data)~~; and Form S-5, Average Annual Zero Deductible Statewide Hurricane Loss Costs – Historical versus Modeled, completed for the current accepted model and the proposed updated/revised version of the model, and a percentage change comparison between the two versions to demonstrate no change. The proposed updated/revised model shall be clearly identified with a new/unique model version identification under the modeling organization's model revision policy.

Depending on the nature of the interim updates/revisions, the Commission Chair in consultation with the Professional Team may recommend that the Professional Team conduct an on-site review or a virtual review provided the modeling organization is in agreement and can provide access to full modeling material.

The Commission Chair shall review the notification and inform the Commission members as soon as possible, and assess, with at least three Professional Team members ~~of the Professional Team~~, the regression test results. If there is no change in the underlying acceptable model and no change in the modeled results, the Commission Chair shall send an updated acceptability notification letter to the modeling organization denoting that the interim model updates/revisions do not produce significant differences in hurricane loss costs and hurricane probable maximum loss levels from the currently-accepted model and the same expiration date shall apply as for the currently-accepted model. The new model version identification as assigned by the modeling organization shall be noted.

If the Commission Chair, in consultation with at least three Professional Team members ~~of the Professional Team~~, determines there is a change in the underlying acceptable model or a change in the modeled results, then the Commission Chair shall send a letter to the modeling organization as soon as practical notifying the modeling organization of a pending review by the Commission. The Commission Chair shall determine the need for a special meeting or whether the issue can be addressed at the next regularly scheduled meeting of the Commission. The purpose of the special Commission meeting shall be to review the interim model updates/revisions and any other aspect of the model which might have changed in order to ensure that the model continues to comply with the standards. The Commission shall conduct a minimum of six votes (one for each grouping of standards) with the option of any member being allowed to request a carve out of a specific standard or standards (without the requirement for a second to such motion). The basic process adopted in the *Hurricane Standards Report of Activities*, ~~regarding the~~chapter “Process for Determining the Acceptability of a Computer Simulation Hurricane Model” ~~in~~ under subsections ~~VI. Review by the Commission,~~ A. General Review of a Model, B. Meeting to Determine Acceptability, C. Modeling Organization Presentation, and D. Acceptability and Notification in section VI. Review by the Commission will be followed. The notification letter regarding the acceptability of the model shall be revised to acknowledge the interim model updates/revisions to the previously-~~acceptable~~ accepted model. The new model identification as assigned by the modeling organization shall be noted. Once the Commission has determined acceptability of the revised model, the revised model shall supersede the previously-~~acceptable~~ accepted model. The acceptability of the revised model shall expire at the end of the current cycle as provided for in subsection ~~VI. Review by the Commission,~~ ~~K~~L. Expiration of a Model Found Acceptable under section VI. Review by the Commission.

If the revised model’s proposed interim model updates/revisions are not found to be acceptable by the Commission, the Commission Chair shall send a letter to the modeling organization noting such and that the previously-accepted model ~~previously found acceptable by the Commission~~ shall continue to be acceptable and expires as originally provided for in subsection ~~VI. Review by the Commission,~~ ~~K~~L. Expiration of a Model Found Acceptable under section VI. Review by the Commission.

The appeal process as specified in subsection ~~VI. Review by the Commission,~~ E. Appeal Process to be Used by a Modeling Organization if a Model is Not Found to be Acceptable by the Commission under section VI. Review by the Commission shall not be applicable. This will require the modeling organization to make any contemplated model updates/revisions for the Commission’s consideration in the next review cycle as determined by time frames established in the next *Hurricane Standards Report of Activities* scheduled for publication in ~~2019~~2021.

~~H~~**I. Interim Updates to Geographical or Other Data after a Model has been Determined to be Acceptable by the Commission.** If a modeling organization updates geographic location data within the model or makes other updates to data where the underlying model determined acceptable by the Commission has not been updated or revised, the modeling organization shall notify the Commission Chair ~~of the Commission~~ in writing. The notification shall detail the nature of the updates and the effect on the modeled results.

The notification shall include Form V-2, Hurricane Mitigation Measures and Secondary Characteristics, Range of Changes in Damage; Form A-1, Zero Deductible Personal Residential Hurricane Loss Costs by ZIP Code; Form A-4~~B~~, Hurricane Output Ranges ~~(2017 FHCF Exposure Data)~~; Form A-8~~B~~, Hurricane Probable Maximum Loss for Florida ~~(2017 FHCF Exposure Data)~~; and Form S-5, Average Annual Zero Deductible Statewide Hurricane Loss Costs – Historical versus Modeled, completed for the current accepted model and the proposed updated/revised version of the model, and a percentage change comparison between the two versions. The proposed interim data update designation as assigned by the modeling organization shall be clearly identified.

If a modeling organization updates geographic location data within the model, the modeling organization shall also provide maps showing ZIP Code centroids (previous and updated) for the entire state of Florida. The modeling organization shall provide a sorted list of all ZIP Code centroid movements of one mile or more, the top ten movements (if fewer than ten move at least one mile), and a list of new and retired ZIP Codes. The corresponding primary county for each ZIP Code listed shall be provided. The modeling organization shall provide a list of all ZIP Code related databases used by the model and describe the impact to these databases due to the updated ZIP Codes (including roughness factors, building construction, and ZIP Code specific vulnerability functions).

If backup documentation required is of a proprietary nature involving trade secrets, the Commission shall discuss only such items in a closed session. If trade secret information is involved, the modeling organization shall include this fact in its notification to the Commission.

In situations involving other data updates as indicated in the modeling organization submission in response to Standard G-1, Scope of the Hurricane Model and Its Implementation, Disclosure ~~6~~8, the modeling organization shall describe the impact of the data updates on hurricane loss costs and hurricane probable maximum loss levels and indicate why such interim data updates are considered necessary. The modeling organization shall provide a list of all databases used by the model related to the data updates and describe the impact to these databases due to the updates. The Commission shall not consider other interim data updates unless such possible updates have been disclosed by the modeling organization in the submission response to Standard G-1, Scope of the Hurricane Model and Its Implementation, Disclosure ~~6~~8.

The Commission Chair shall review the notification and inform the Commission members as soon as possible, and assess, with at least three Professional Team members ~~of the Professional Team~~, the regression test results. If the regression test results confirm that the model has not changed with regard to hurricane loss costs and hurricane probable maximum loss levels, the Commission Chair shall send an updated acceptability notification letter to the modeling organization denoting that the interim data updates do not produce significant differences in hurricane loss costs and hurricane probable maximum loss levels from the currently-accepted model. The same model version identification and a distinction made for the interim data updates as assigned by the modeling organization shall be noted. The acceptability of the model with the interim data updates shall expire at the end of the current cycle as provided for in subsection ~~VI. Review by the Commission,~~ ~~K~~L. Expiration of a Model Found Acceptable under section VI. Review by the Commission.

If the Commission Chair, in consultation with at least three Professional Team members ~~of the Professional Team~~, determines that there are changes due to the geographical data updates reported or other interim data updates as provided for in Standard G-1, Scope of the Hurricane Model and Its Implementation, Disclosure ~~6~~8, then the Commission Chair shall send a letter to the modeling organization as soon as practical notifying the modeling organization of a pending review by the Commission. The Commission Chair shall determine the need for a special meeting or whether the issue can be addressed at the next regularly scheduled meeting of the Commission. The purpose of the special Commission meeting shall be to review the data updates and any other aspect of the model which might have changed in order to ensure that the model continues to comply with the standards. The Commission shall conduct a minimum of six votes (one for each grouping of standards) with the option of any member being allowed to request a carve out of a specific standard or standards (without the requirement for a second to such motion). The basic process adopted in the *Hurricane Standards Report of Activities*, ~~regarding the~~chapter "Process for Determining the Acceptability of a Computer Simulation Hurricane Model" in subsections ~~VI. Review by the Commission~~ A. General Review of a Model, B. Meeting to Determine Acceptability, C. Modeling Organization Presentation, and D. Acceptability and Notification under section VI. Review by the Commission will be followed. The notification letter regarding the acceptability of the model shall be revised to acknowledge the nature of the data updates to the previously-~~acceptable~~ accepted model version. The new model version identification and a distinction made for the interim data updates as assigned by the modeling organization shall be noted. Once the Commission has determined acceptability of the revised model, the revised model shall supersede the previously-~~acceptable~~ accepted model. The acceptability of the revised model shall expire at the end of the current cycle as provided for in subsection ~~VI. Review by the Commission,~~ ~~K~~L. Expiration of a Model Found Acceptable under section VI. Review by the Commission.

If the revised model's proposed data updates are not found to be acceptable by the Commission, the Commission Chair shall send a letter to the modeling organization noting such and that the previously-accepted model ~~previously found acceptable by the Commission~~ shall continue to be acceptable and shall expire as originally provided for in subsection ~~VI. Review by the Commission,~~ ~~K~~L. Expiration of a Model Found Acceptable under section VI. Review by the Commission.

The appeal process as specified in subsection ~~VI. Review by the Commission,~~ E. Appeal Process to be Used by a Modeling Organization if a Model is Not Found to be Acceptable by the Commission under section VI. Review by the Commission shall not be applicable. This will require the modeling organization to make the contemplated data updates for consideration by the Commission in the next review cycle as determined by time frames established in the next *Hurricane Standards Report of Activities* scheduled for publication in ~~2019~~2021.

~~I.~~**J. Review and Acceptance Criteria for Functionally Equivalent Model Platforms.** If a modeling organization has designed its model to operate on two or more platforms, the Commission may find the model as run on the various platforms acceptable under the following circumstances and procedures.

1. The various model platforms shall be submitted for review at one time by the designated submission deadline and shall be capable of being reviewed concurrently by the Commission, including the Professional Team's on-site review, such that all platforms can be reviewed as to their functional equivalence.

2. Functional equivalence shall be recognized as long as no hurricane loss costs differ with regard to any platform at the rounded third decimal place (thus there should be no changes in the published Form V-2, Hurricane Mitigation Measures and Secondary Characteristics, Range of Changes in Damage; Form A-1, Zero Deductible Personal Residential Hurricane Loss Costs by ZIP Code; ~~and~~ Form A-4~~B~~, Hurricane Output Ranges ~~(2017 FHCF Exposure Data)~~; and Form S-5, Average Annual Zero Deductible Statewide Hurricane Loss Costs – Historical versus Modeled), and hurricane probable maximum loss does not differ by more than ±0.5% for any hurricane probable maximum loss level (Form A-8~~B~~, Hurricane Probable Maximum Loss for Florida ~~(2017 FHCF Exposure Data)~~).

3. The model as implemented on the various platforms shall have the same model version identification with a notation to designate the specific model platforms. The modeling organization shall specify which platform is the primary platform and which platforms are the functionally equivalent platforms. This information shall be disclosed in the modeling organization submission in response to Standard G-1, Scope of the Hurricane Model and Its Implementation, Disclosure 1.

4. The modeling organization shall not be allowed to make separate submissions during a review cycle and any difference between model platforms shall be required to be fully described in the modeling organization's original submission.

5. The only differences in modeled results shall be demonstrated to be solely due to the nature of the model platforms or any other technological constraint that would account for no more than the designated variations noted above.

Once the Commission has determined functional equivalence of the model platforms, the Commission Chair shall send an acceptability notification letter to the modeling organization designating specifically which model platforms were found to be functionally equivalent and acceptable by the Commission.

~~J~~**K. Model Update for Consistency of Hurricane and Flood Models after the Model has been Determined to be Acceptable by the Commission.** If the modeling organization proposes to update a previously-accepted hurricane or flood model ~~previously determined acceptable by the Commission~~ as a result of changes to the other model, the modeling organization shall notify the Commission Chair ~~of the Commission~~ in writing. The notification shall detail the nature of the proposed updates, the effect on the modeled results (i.e., the impact on hurricane loss costs and hurricane probable maximum loss levels), and include all submission materials that are impacted. If trade secret information is involved, the modeling organization shall include this fact in the notification to the Commission.

Depending on the nature of the updates, the Commission Chair in consultation with at least three Professional Team members ~~of the Professional Team~~, will review the notification and materials provided to determine whether to process the proposed updates immediately or defer until the next scheduled review cycle. Depending on the nature of the update, the Commission Chair may recommend that the Professional Team conduct an on-site review or a virtual review provided the modeling organization is in agreement and can provide access to full modeling material.

If the Commission Chair, in consultation with at least three Professional Team members ~~of the Professional Team~~, determines that the documentation and explanations provided by the modeling organization are sufficient, no further review is necessary by the Commission. The Commission Chair shall provide an updated acceptability notification letter to the modeling organization acknowledging the update notification and noting that the model update produces minor differences in hurricane loss costs and hurricane probable maximum loss levels from the current accepted model, that the Commission accepts the modeling organization’s addendum to its previous submission, and that the same expiration date shall apply as for the current accepted model.

If the Commission Chair, in consultation with at least three Professional Team members ~~of the Professional Team~~, determines there are significant differences in the underlying acceptable model or there are significant differences in the modeled results, then the Commission Chair shall send a letter to the modeling organization as soon as practical notifying the modeling organization of a pending review by the Commission. The Commission Chair shall determine the need for a special meeting or whether the issue can be addressed at the next regularly scheduled meeting of the Commission. The purpose of the special Commission meeting shall be to review the model update and any other aspect of the model which might have changed in order to ensure that the model continues to comply with the standards. The Commission shall conduct a minimum of six votes (one for each grouping of standards) with the option of any member being allowed to request a carve out of a specific standard or standards (without the requirement for a second to such motion). The basic process adopted in the *Hurricane Standards Report of Activities*, ~~regarding the~~ chapter “Process for Determining the Acceptability of a Computer Simulation Hurricane Model” in subsections ~~VI. Review by the Commission,~~ A. General Review of a Model, B. Meeting to Determine Acceptability, C. Modeling Organization Presentation, and D. Acceptability and Notification under section VI. Review by the Commission will be followed.

The notification letter regarding the acceptability of the model shall be revised to acknowledge the model update to the previously-~~acceptable~~ accepted model. The new model identification as assigned by the modeling organization shall be noted. Once the Commission has determined acceptability of the revised model, the revised model shall supersede the previously-~~acceptable~~ accepted model. The acceptability of the revised model shall expire at the end of the current cycle as provided for in subsection ~~VI. Review by the Commission, ~~ ~~K~~L. Expiration of a Model Found Acceptable under section VI. Review by the Commission.

If the revised model's proposed model update is not found to be acceptable by the Commission, the Commission Chair shall send a letter to the modeling organization noting such and that the model previously-found acceptable by the Commission shall continue to be acceptable and expires as originally provided for in subsection ~~VI. Review by the Commission, ~~ ~~K~~L. Expiration of a Model Found Acceptable under section VI. Review by the Commission.

The appeal process as specified in subsection ~~VI. Review by the Commission, ~~ E. Appeal Process to be Used by a Modeling Organization if a Model is Not Found to be Acceptable by the Commission under section VI. Review by the Commission shall not be applicable. This will require the modeling organization to make any contemplated model update for the Commission's consideration in the next review cycle as determined by time frames established in the next *Hurricane Standards Report of Activities* scheduled for publication in ~~2019~~2021.

~~K~~L. Expiration of a Model Found Acceptable. The determination of acceptability of a model found acceptable under the standards contained in the *Hurricane Standards Report of Activities as of November 1, ~~2017~~2019*, expires on November 1, ~~2021~~2023.

~~Hurricane Model Submission Checklist~~

~~A. Please indicate by checking below that the following has been included in your submission documentation to the Florida Commission on Hurricane Loss Projection Methodology.~~

~~Yes~~	~~No~~	~~Item~~
		~~1. Letter to the Commission~~
		~~a. Refers to the signed Expert Certification forms and states that professionals having credentials and/or experience in the areas of meteorology, statistics, structural engineering, actuarial science, and computer/information science have reviewed the model for compliance with the standards~~
		~~b. States model is ready to be reviewed by the Professional Team~~
		~~c. Any caveats to the above statements noted with a detailed explanation~~
		~~i. Summary statement of compliance with each individual standard and the data and analyses required in the disclosures and forms~~
		~~3. General description of any trade secret information the modeling organization intends to present to the Professional Team and the Commission~~
		~~4. Hurricane Model Identification~~
		~~5. Seven bound copies (duplexed)~~
		~~6. Link emailed to SBA staff containing all required documentation that can be downloaded from a single ZIP file~~
		~~a. Submission document and Form A-1, Zero Deductible Personal Residential Hurricane Loss Costs by ZIP Code in PDF format~~
		~~b. PDF submission file supports highlighting and hyperlinking, and is bookmarked by standard, form, and section~~
		~~c. Data file names include abbreviated name of modeling organization, standards year, and form name (when applicable)~~
		~~d. Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis, if required, in ASCII and PDF format~~
		~~e. Forms M-1, Annual Occurrence Rates, M-3, Radius of Maximum Winds and Radii of Standard Wind Thresholds, V-2, Hurricane Mitigation Measures and Secondary Characteristics, Range of Changes in Damage, V-4, Differences in Hurricane Mitigation Measures and Secondary Characteristics, A-1, Zero Deductible Personal Residential Hurricane Loss Costs by ZIP Code, A-2A, Base Hurricane Storm Set Statewide Hurricane Losses (2012 FHCF Exposure Data), A-2B, Base Hurricane Storm Set Statewide Hurricane Losses (2017 FHCF Exposure Data), A-3A, 2004 Hurricane Season Losses (2012 FHCF Exposure Data, Form A-3B, 2004 Hurricane Season Losses (2017 FHCF Exposure Data), A-4A, Hurricane Output Ranges (2012 FHCF Exposure Data), Form A-4B, Hurricane Output Ranges (2017 FHCF Exposure Data), A-5, Percentage Change in Hurricane Output Ranges (2012 FHCF Exposure Data), A-7, Percentage Change in Logical Relationship to Hurricane Risk, A-8A, Hurricane Probable Maximum Loss for Florida (2012 FHCF Exposure Data), and A-8B, Hurricane Probable Maximum Loss for Florida (2017 FHCF Exposure Data), in Excel format~~
		~~f. Form V-3, Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item), Form V-5, Differences in Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item), and Form A-6, Logical Relationship to Hurricane Risk (Trade Secret Item), in Excel format if not considered as Trade Secret~~
		~~7. All hyperlinks to the locations of forms are functional~~

~~Yes~~	~~No~~	~~Item~~
		~~8. Table of Contents~~
		~~9. Materials consecutively numbered from beginning to end starting with the first page (including cover) using a single numbering system, including date and time in footnote~~
		~~10. All tables, graphs, and other non-text items consecutively numbered using whole numbers, listed in Table of Contents, and clearly labeled with abbreviations defined~~
		~~11. All column headings shown and repeated at the top of every subsequent page for forms and tables~~
		~~12. Standards, disclosures, and forms in *italics*, modeling organization responses in non-italics~~
		~~13. All graphs and maps conform to guidelines in **II. Notification Requirements A.4.e**~~
		~~14. All units of measurement clearly identified with appropriate units used~~
		~~15. All forms included in submission appendix except Trade Secret Items. If forms designated as a Trade Secret Item are not considered as trade secret, those forms are to be included in the submission appendix~~
		~~16. Hard copy documentation identical to electronic version~~
		~~17. Signed Expert Certification Forms G-1 to G-7~~
		~~18. All acronyms listed and defined in submission appendix~~

~~B. Explanation of "No" responses indicated above. (Attach additional pages if needed.)~~

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~~Model Name and Identification~~	~~Modeler Signature~~	~~Date~~

~~VI.~~ ON-SITE REVIEW

ON-SITE REVIEW BY PROFESSIONAL TEAM

General Purpose

The purpose of the on-site review is to evaluate the compliance of the hurricane model with the hurricane standards. The on-site review is conducted in conjunction with the chapter “Process for Determining the Acceptability of a Computer Simulation Hurricane Model.” It is not intended to provide a preliminary peer review of the hurricane model. The goal of the Professional Team’s efforts is to provide the Commission with a clear and thorough report of the hurricane model as required in the acceptability process, subject to non-disclosure conditions. All modifications, adjustments, assumptions, or other criteria that were included in producing the information required by the Commission in the hurricane model submission shall be disclosed to the Professional Team to be reviewed.

The Professional Team will begin the review with a briefing to modeling organization personnel to discuss the review schedule and to describe the subsequent review process.

The on-site review by the Professional Team involves the following:

1. Due diligence review of information submitted by the modeling organization. For existing modeling organizations, the due diligence review concentrates on (1) any changes in the disclosures and forms from the previously-accepted hurricane model, and (2) selected parts of the hurricane model that have not been updated,

2. On-site tests of the hurricane model under the control and supervision of the Professional Team. The objective is to observe the hurricane model in operation and the results it produces during a “real time” run. This is necessary in order to avoid the possibility that the modeling organization could recalibrate the hurricane model solely for producing desirable results,

3. Verification that information provided by the modeling organization in the disclosures and forms is valid and is an accurate and fairly complete description of the hurricane model,

4. Review for compliance with the hurricane standards, and

5. Review of trade secret items.

Feedback regarding compliance of the hurricane model with the hurricane standards will be provided to the modeling organization throughout the review process.

Preparation for On-Site Review

The Professional Team assists the Commission and SBA staff in determining if a modeling organization is ready for an on-site review.

The Professional Team assists the modeling organization in preparing for the on-site review by providing to SBA staff a detailed pre-visit letter (to be sent to the modeling organization) outlining specific issues to be addressed by the modeling organization unique to the hurricane model submission. The Professional Team makes every effort to identify substantial issues with the hurricane model or the hurricane model submission to allow the modeling organization adequate time to prepare for the on-site review. As the Professional Team continues to prepare for the review, it may discover issues not originally covered in the pre-visit letter prior to the on-site review. Such issues will be introduced at the opening briefing of the on-site review. The discovery of errors in the hurricane model by the Professional Team is a possible outcome of the review. It is the responsibility of the modeling organization to assure the validity and correctness of the hurricane model and the hurricane model submission.

Telephone Conference Call: After the Commission has determined the modeling organization is ready to continue in the review process and prior to the on-site review, at the request of the Commission or the modeling organization, SBA staff will arrange a telephone conference call between the modeling organization and the Professional Team or a subset of the Professional Team. The purpose of the call is to review the pre-visit letter, material, data files, and personnel that need to be on-site during the review. This does not preclude the Professional Team from asking for additional information during the on-site review that was not discussed during the conference call or included in the pre-visit letter. The call allows the modeling organization and the Professional Team the opportunity to clarify any concerns or to ask questions regarding the upcoming on-site review. This call is the only scheduled opportunity for the modeling organization to clarify any questions directly with the Professional Team prior to the on-site review.

Scheduling: SBA staff is responsible for scheduling on-site review dates. Each modeling organization will be notified at least two weeks prior to the scheduled review. The actual length of the review may vary depending on the preparedness of the modeling organization and the depth of the inquiry needed for the Professional Team to obtain an understanding of the hurricane model. The Commission expects ~~hurricane models under consideration~~the modeling organization to be well-prepared for a review by the Professional Team. In particular, it is suggested that a modeling organization conduct a detailed self-audit to assure that it is ready for the Professional Team review.

Presentation of Materials: The modeling organization shall have all necessary materials and data on-site for review. All material referenced in the hurricane model submission as “will be shown to the Professional Team” and all material that the modeling organization intends to present to the Commission, including trade secret items, shall be presented to the Professional Team during the on-site review.

The modeling organization shall provide upon arrival of the Professional Team, and ***before the review can officially commence***, six printed copies of:

1. The modeling organization’s presentations,

2. The tables required in CI-1, Hurricane Model Documentation, Audit 7,

3. All figures with scales for the *x*- and *y*-axes labeled that are not so labeled in the hurricane model submission. The figures should be labeled with the same figure number as given in the hurricane model submission,

4. Form V-3, Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item), for the current hurricane model submission and for the previously-accepted hurricane model,

5. Form V-5, Differences in Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item), for the current hurricane model submission and for the previously-accepted hurricane model, and

6. Form A-6, Logical Relationship to Hurricane Risk (Trade Secret Item), for the current hurricane model submission and for the previously-accepted hurricane model, all ~~eight~~ seven worksheets, color-coded contour map of the hurricane loss costs for strong owners frame buildings (Notional Set 6), and scatter plot of the hurricane loss costs (y-axis) against distance to closest coast (x-axis) for strong owners frame buildings (Notional Set 6).

The modeling organization shall also provide upon arrival of the Professional Team, and ***before the review can officially commence***, electronic spreadsheets of all forms ~~where no cell contains an explicitly rounded or truncated value~~. Spreadsheets containing numbers shall be populated with the maximum precision allowed in the hurricane model implementation. This procedure shall hold even if the generation of some forms specify a limited number of decimal places. The electronic files shall be provided on six removable drives. The Professional Team will review and process the electronic files only on the removable drives.

The Professional Team will review selected computer/information components in conjunction with the review of various hurricane standards. Computer/information components shall be readily available and reviewable interactively allowing simultaneous visualization by all Professional Team members.

Access to critical articles or materials referenced in the hurricane model submission or during the on-site review shall be available on-site in hard copy or electronic form for the Professional Team.

The Professional Team shall be provided access to internet connections through the Professional Team members' personal computers for reference work that may be required during the on-site review.

The modeling organization ~~should~~ shall be prepared to have available for the Professional Team's consideration, all insurance claims data received or newly processed since the previous hurricane model submission, and be prepared to describe any processes used to amend or validate the hurricane model that incorporates this data.

The modeling organization ~~should~~ shall be prepared to provide for the Professional Team's review, all engineering data (e.g., post-event site investigations, laboratory or field testing results) received since the previous review by the Professional Team, and be prepared to describe any processes used to amend or validate the hurricane model that incorporates this data.

Professional Team Report

After completing its review of the hurricane standards, the Professional Team will conduct an exit briefing with the modeling organization. During this briefing, the Professional Team will provide a preliminary draft of the Professional Team report. The modeling organization has the right to expunge any trade secret information. The modeling organization will also have the opportunity to check for any factual errors. The Professional Team will consider modeling organization suggestions for changes in its draft to correct factual errors. If the modeling organization and the Professional Team dispute a particular item as a factual error, then the report would adopt the phrasing, "In the opinion of the Professional Team, …"

The preliminary draft of the Professional Team report shall be made available to the Commission at the closed meeting where trade secrets used in the design and construction of the hurricane model are discussed. Any material deemed proprietary will be designated as trade secret. The preliminary draft will be placed in a sealed envelope marked "Confidential" with the date, time, and Professional Team leader's signature across the seal. The draft will be kept by the modeling organization and returned to the Professional Team leader during the closed meeting to discuss trade secrets. At the conclusion of the closed meeting, the draft will be returned to the modeling organization.

The Professional Team report will include:

1. A list of participants,

2. A summary of significant revisions to the hurricane model from the previously-accepted hurricane model,

3. Any changes made to the hurricane model submission that were reviewed by the Professional Team during the on-site review. These changes shall be provided to the Commission in the revised hurricane model submission at least ten days prior to the Commission meeting to review the hurricane model for acceptability,

4. A verification that any deficiencies identified by the Commission have been resolved,

5. A copy of the pre-visit letter,

6. A verification of compliance with the hurricane standards,

7. A description of material reviewed in support of compliance with the hurricane standards,

8. A list of materials needed in preparation for an additional verification review, if applicable,

9. A list of trade secret items that the Professional Team recommends be presented to the Commission during the closed meeting portion of the Commission meeting to review hurricane models for acceptability, and

10. A statement indicating where proprietary information has been removed, if applicable.

After leaving the modeling organization's premises, the Professional Team, in coordination with SBA staff, will finalize its report and provide it to Commission members in advance of the meeting to review the hurricane model for acceptability. Any disparate opinions among Professional Team members concerning compliance with the hurricane standards will be duly noted and explained in the final report.

Additional Verification Review

It is possible that a subset of the hurricane standards or changes made to the hurricane disclosures, forms, and trade secret items may require further review by the Professional Team or a subset of the Professional Team. In such cases, SBA staff will arrange an additional verification review, in accordance with the acceptability process, to verify those hurricane standards.

In preparation for an additional verification review, the Professional Team shall include in their report an initial set of materials needed for preparation prior to the re-visit. Non-trade secret materials shall be received by SBA staff no later than seven days prior to the additional verification review.

Trade secret materials requested shall be provided at the onset of the additional verification review. Additional materials may be requested on-site by the Professional Team in order to verify the hurricane standards.

Trade Secret Information

While on-site, the Professional Team members are expected to have access to trade secret data and information. It is the responsibility of the modeling organization to identify to all Professional Team members what is a trade secret and is not to be made public.

All written documentation provided by the modeling organization to the Commission is considered a public document with the exception of documents provided during the closed meeting where trade secrets used in the design and construction of the hurricane model are discussed.

The modeling organization shall provide any additional information directly to the Commission rather than give it to Professional Team members to be brought back with them. Documents that the modeling organization indicates are trade secret that are viewed by Professional Team members are not public documents.

Any notes made by Professional Team members containing trade secrets will be expunged by the modeling organization and placed in a sealed envelope marked "Confidential" with the date, time, and Professional Team member's signature across the seal. The notes and removable drives will be kept by the modeling organization and returned to the Professional Team member during the closed meeting to discuss trade secrets. At the conclusion of the closed meeting, all notes and the removable drives will be returned to the modeling organization.

Trade secrets of the modeling organization learned by a Professional Team member shall not be discussed with Commission members.

Professional Team members shall agree to respect the trade secret nature of the hurricane model and not use trade secret information in any way detrimental to the interest of the modeling organization.

Professional Team members shall not discuss other hurricane and flood models being evaluated while they are on-site reviewing a particular hurricane model.

On-Site Review Results

The Professional Team will present the results of the on-site review to the Commission and answer questions related to their review.

The job of the Professional Team is to verify information and make observations. It is not part of the Professional Team's responsibilities to opine or draw conclusions about the appropriateness of a particular hurricane model or a component part of a hurricane model.

Refer to the chapter "Process for Determining the Acceptability of a Computer Simulation Hurricane Model" for additional information regarding the on-site review.

PROFESSIONAL TEAM

Composition and Selection of the Professional Team

A team of professional individuals, known as the Professional Team, conducts on-site reviews of modeling organizations seeking a determination of acceptability by the Commission. The Professional Team consists of individuals having professional credentials in the following disciplines with each area represented by one or more individuals:

- ~~Actuarial Science~~
- Meteorology
- Statistics
- ~~Meteorology~~
- Structural Engineering
- Actuarial Science
- Computer/Information Science
- ~~Structural Engineering~~.

SBA staff selects the Professional Team members, and the SBA enters into contracts with each individual selected.

Selection of the Professional Team members is an aggressive recruiting process to seek out qualified individuals who are capable of working closely with the Commission and who are available during specified time frames in order that the Commission can meet its deadlines. Consideration is given to the following factors:

- Professional credentials, qualifications, and specialized experience
- Reasonableness of fees
- Availability and commitment to the Commission
- References
- Lack of conflicts of interest.

Responsibilities of the Professional Team

Team Leader: SBA staff designates one member of the Professional Team as the team leader. The team leader is responsible for coordinating the activities of the Professional Team and overseeing the development of reports to the Commission.

Team Members:

1. Participate in preparations and discussions with the Commission and SBA staff prior to the on-site review.

2. Study, review, and develop an understanding of responses and materials provided to the Commission by the modeling organizations.

3. Participate with the Commission and SBA staff in developing, reviewing, and revising hurricane model tests and evaluations.

4. While on-site, verify, evaluate, and observe the techniques and assumptions used in the hurricane model for each member's area of expertise.

5. Identify and observe how various assumptions affect the hurricane model so as to identify to the Commission various sensitive components and aspects of the hurricane model.

6. Discuss the hurricane model with the modeling organization's professional staff to gain a clear understanding and confidence in the operation of the hurricane model and its description as provided to the Commission.

7. Participate in the administration of on-site tests.

8. Participate in the preparation of written reports and presentations to the Commission.

Responsibilities of SBA Staff

The Professional Team reports to designated SBA staff. SBA staff supervises the Professional Team and coordinates their pre-on-site planning activities, on-site reviews and activities, and post-on-site activities.

These responsibilities include:

1. Setting up meetings with Professional Team members individually and as a group. These meetings include conference calls and other meetings depending on circumstances and needs of the Commission,

2. Coordinating and scheduling on-site reviews,

3. Working with the Commission and Professional Team members in developing, reviewing, and revising hurricane model tests and evaluations,

4. Overseeing the supervision and administration of specified on-site tests and evaluations,

5. Working with the modeling organization to determine which professionals with the modeling organization should be available during the on-site review,

6. Briefing and de-briefing the Professional Team members prior to, during, and after the on-site review,

7. Coordinating the preparation of written reports and presentations to the Commission, and

8. Coordinating the reimbursement of expenses per s. 112.061, F.S., for Professional Team members, Commission members, and SBA staff.

~~VII. 2017~~ 2019 HURRICANE STANDARDS, DISCLOSURES, AUDIT REQUIREMENTS, AND FORMS

Florida Commission on
Hurricane Loss Projection Methodology

Hurricane Model Identification

Name of Hurricane Model: ______________________________________

Hurricane Model Version Identification: ____________________________

~~Interim Hurricane Model Update Version Identification: ______________~~

~~____~~

Hurricane Model Platform Names and Identifications with Primary Hurricane Model Platform and Identification Designated: ______________________________

____

____

Interim Hurricane Model Update Version Identification: ______________

____

Interim Data Update Designation: ___________________________________

Name of Modeling Organization: ____________________________________

Street Address: ____

City, State, ZIP Code: ____

Mailing Address, if different from above: ___________________________

____

Contact Person: ____

Phone Number: ____________________ Fax Number: ________________

Email Address: ____

Date: ____

Hurricane Model Submission Data

The following input data ~~have been~~will be provided to ~~the~~ modeling organizations on ~~the enclosed~~a ~~CD~~USB drive.

Input Data

Name	Description
~~2017FormM1~~2019FormM1.xlsx	Hurricanes used for historical frequencies in Form M-1, Annual Occurrence Rates
~~2017FormM3~~2019FormM3.xlsx	Rmax and Radii format for Form M-3, Radius of Maximum Winds and Radii of Standard Wind Thresholds
~~FormS6Input17~~FormS6Input19.xlsx	Input variables for Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis
~~FormS6Input17Quantiles~~ FormS6Input19Quantiles.xlsx	Corresponding quantiles for input variables for Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis
~~hlpm2012c.exe~~	~~2012 FHCF personal and commercial residential zero deductible exposure data for Form S-2A, Examples of Hurricane Loss Exceedance Estimates (2012 FHCF Exposure Data), Form S-5, Average Annual Zero Deductible Statewide Hurricane Loss Costs – Historical versus Modeled, Form A-2A, Base Hurricane Storm Set Statewide Hurricane Losses (2012 FHCF Exposure Data), Form A-3A, 2004 Hurricane Season Losses (2012 FHCF Exposure Data), Form A-4A, Hurricane Output Ranges (2012 FHCF Exposure Data), and Form A-8A, Hurricane Probable Maximum Loss for Florida (2012 FHCF Exposure Data)~~
hlpm2017c.~~exe~~zip	2017 FHCF personal and commercial residential zero deductible exposure data for Form S-2~~B~~, Examples of Hurricane Loss Exceedance Estimates~~ (2017 FHCF Exposure Data)~~; Form S-5, Average Annual Zero Deductible Statewide Hurricane Loss Costs – Historical versus Modeled; Form A-2~~B~~, Base Hurricane Storm Set Statewide Hurricane Losses~~ (2017 FHCF Exposure Data)~~; Form A-3~~B~~, ~~2004~~ Hurricane ~~Season~~ Losses~~ (2017 FHCF Exposure Data)~~; Form A-4~~B~~, Hurricane Output Ranges~~ (2017 FHCF Exposure Data)~~; and Form A-8~~B~~, Hurricane Probable Maximum Loss for Florida ~~(2017 FHCF Exposure Data)~~

Name	Description
~~NotionalInput17~~NotionalInput19.xlsx	Notional structures and location grids for Form S-2~~A~~, Examples of Hurricane Loss Exceedance Estimates ~~(2012 FHCF Exposure Data), Form S-2B, Examples of Hurricane Loss Exceedance Estimates (2017 FHCF Exposure Data)~~; Form A-1, Zero Deductible Personal Residential Hurricane Loss Costs by ZIP Code; Form A-6, Logical Relationship to Hurricane Risk (Trade Secret Item); and Form A-7, Percentage Change in Logical Relationship to Hurricane Risk
~~FormV1Input17~~FormV1Input19.xlsx	Windspeeds for 96 ZIP Codes and personal and commercial residential exposure data (construction type and ZIP Codes) for Form V-1, One Hypothetical Event
~~2017FormA1~~2019FormA1.xlsx	Hurricane loss cost data format for Form A-1, Zero Deductible Personal Residential Hurricane Loss Costs by ZIP Code
~~2017FormA4A.xlsx~~	~~Hurricane output ranges format for Form A-4A, Hurricane Output Ranges (2012 FHCF Exposure Data)~~
~~2017FormA4B~~2019FormA4.xlsx	Hurricane output ranges format for Form A-4~~B~~, Hurricane Output Ranges ~~(2017 FHCF Exposure Data)~~
~~2017FormA5~~2019FormA5.xlsx	Percentage change in average hurricane loss cost output range data format for Form A-5, Percentage Change in Hurricane Output Ranges ~~(2012 FHCF Exposure Data)~~
~~2017FormA6~~2019FormA6.xlsx	Logical relationship to hurricane risk exhibits format for Form A-6, Logical Relationship to Hurricane Risk (Trade Secret Item)
~~2017FormA7~~2019FormA7.xlsx	Percentage change in logical relationship to hurricane risk exhibits format for Form A-7, Percentage Change in Logical Relationship to Hurricane Risk

Output shall be provided in specified output files as listed below. XXX denotes the abbreviated name of the modeling organization.

Output Data

Name	Description
~~XXX17FormM1~~XXX19FormM1.xlsx	Output data from Form M-1, Annual Occurrence Rates
~~XXX17FormM3~~XXX19FormM3.xlsx	Output data from Form M-3, Radius of Maximum Winds and Radii of Standard Wind Thresholds
~~XXX17Expected~~ XXX19Expected Hurricane Loss Cost.dat and ~~XXX17Expected~~ XXX19Expected Hurricane Loss Cost.pdf	Aggregated hurricane loss cost output data from Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis

Name	Description
~~XXX17Hurricane~~ XXX19Hurricane Loss Cost Contour.dat and ~~XXX17Hurricane~~ XXX19Hurricane Loss Cost Contour.pdf	Mean hurricane loss cost output data from Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis
~~XXX17SA~~XXX19SA.dat and ~~XXX17SA~~XXX19SA.pdf	Hurricane loss cost output data for the sensitivity analysis portion of Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis
~~XXX17UA~~XXX19UA.dat and ~~XXX17UA~~XXX19UA.pdf	Hurricane loss cost output data for the uncertainty analysis portion for CP, Rmax, VT, Shape Parameter, CF, FFP, and Quantile of Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis
~~XXX17FormV2~~XXX19FormV2.xlsx	Output data from Form V-2, Hurricane Mitigation Measures and Secondary Characteristics, Range of Changes in Damage
XXX19FormV3.xlsx	Output data from Form V-3, Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item)
~~XXX17FormV4~~XXX19FormV4.xlsx	Output data from Form V-4, Differences in Hurricane Mitigation Measures and Secondary Characteristics
XXX19FormV5.xlsx	Output data from Form V-5, Differences in Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item)
~~XXX17FormA1~~XXX19FormA1.xlsx and ~~XXX17FormA1~~XXX19FormA1.pdf	Underlying hurricane loss cost data from Form A-1, Zero Deductible Personal Residential Hurricane Loss Costs by ZIP Code
~~XXX17FormA2A.xlsx~~	~~Output data from Form A-2A, Base Hurricane Storm Set Statewide Hurricane Losses (2012 FHCF Exposure Data)~~
~~XXX17FormA2B~~XXX19FormA2.xlsx	Output data from Form A-2~~B~~, Base Hurricane Storm Set Statewide Hurricane Losses ~~(2017 FHCF Exposure Data)~~
~~XXX17FormA3A.xlsx~~	~~Output data from Form A-3A, 2004 Hurricane Season Losses (2012 FHCF Exposure Data)~~
~~XXX17FormA3B~~XXX19FormA3.xlsx	Output data from Form A-3~~B~~, ~~2004~~ Hurricane ~~Season~~ Losses ~~(2017 FHCF Exposure Data)~~
~~XXX17FormA4A.xlsx~~	~~Hurricane output range exhibits from Form A-4A, Hurricane Output Ranges (2012 FHCF Exposure Data)~~
~~XXX17FormA4B~~XXX19FormA4.~~,~~xlsx	Hurricane output range exhibits from Form A-4~~B~~, Hurricane Output Ranges ~~(2017 FHCF Exposure Data)~~
XXX19FormA5.xlsx	Output data from Form A-5, Percentage Change in Hurricane Output Ranges ~~(2012 FHCF Exposure Data)~~
XXX19FormA6.xlsx	Output data from Form A-6, Logical Relationship to Hurricane Risk (Trade Secret Item)

Name	Description
~~XXX17FormA7~~XXX19FormA7.xlsx	Output data from Form A-7, Percentage Change in Logical Relationship to Hurricane Risk
~~XXX17FormA8A.xlsx~~	~~Output data from Form A-8A, Hurricane Probable Maximum Loss for Florida (2012 FHCF Exposure Data)~~
~~XXX17FormA8B~~XXX19FormA8.xlsx	Output data from Form A-8~~B~~, Hurricane Probable Maximum Loss for Florida ~~(2017 FHCF Exposure Data)~~

The modeling organization shall run various scenario hurricane events through the hurricane model on the input exposure data. The referenced output forms shall be completed and hurricane loss files provided in ASCII, Excel, and PDF format as specified.

Forms designated as a Trade Secret Item are to be provided if not considered as ~~t~~Trade ~~s~~Secret.

The file names shall include the abbreviated name of the modeling organization, the hurricane standards year, and the form name. Revised files shall also include the revision date.

Notional Set 1 – Deductible Sensitivity

Name	Policy Form/Occupancy	Construction	Year Built	Number of Stories	Limit A	Limit B	Limit C	Limit D	Deductible	Roof Geometry	Roof Covering	Roof Deck Attachment	Roof Wall Anchorage	Opening Protection
Frame Owners	Owners	Frame	Unknown	Unknown	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Owners	Owners	Frame	Unknown	Unknown	100,000	10% A	50% A	20% A	$500	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Owners	Owners	Frame	Unknown	Unknown	100,000	10% A	50% A	20% A	1% A	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Owners	Owners	Frame	Unknown	Unknown	100,000	10% A	50% A	20% A	2% A	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Owners	Owners	Frame	Unknown	Unknown	100,000	10% A	50% A	20% A	5% A	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Owners	Owners	Frame	Unknown	Unknown	100,000	10% A	50% A	20% A	10% A	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	Unknown	Unknown	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	Unknown	Unknown	100,000	10% A	50% A	20% A	$500	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	Unknown	Unknown	100,000	10% A	50% A	20% A	1% A	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	Unknown	Unknown	100,000	10% A	50% A	20% A	2% A	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	Unknown	Unknown	100,000	10% A	50% A	20% A	5% A	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	Unknown	Unknown	100,000	10% A	50% A	20% A	10% A	Unknown	Unknown	Unknown	Unknown	Unknown
Manufactured Homes	Manufactured Homes	Manufactured Homes	Unknown	1	50,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Manufactured Homes	Manufactured Homes	Manufactured Homes	Unknown	1	50,000	10% A	50% A	20% A	$500	Unknown	Unknown	Unknown	Unknown	Unknown
Manufactured Homes	Manufactured Homes	Manufactured Homes	Unknown	1	50,000	10% A	50% A	20% A	1% A	Unknown	Unknown	Unknown	Unknown	Unknown
Manufactured Homes	Manufactured Homes	Manufactured Homes	Unknown	1	50,000	10% A	50% A	20% A	2% A	Unknown	Unknown	Unknown	Unknown	Unknown
Manufactured Homes	Manufactured Homes	Manufactured Homes	Unknown	1	50,000	10% A	50% A	20% A	5% A	Unknown	Unknown	Unknown	Unknown	Unknown
Manufactured Homes	Manufactured Homes	Manufactured Homes	Unknown	1	50,000	10% A	50% A	20% A	10% A	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	Unknown	Unknown	-	-	25,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	Unknown	Unknown	-	-	25,000	40% C	$500	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	Unknown	Unknown	-	-	25,000	40% C	1% C	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	Unknown	Unknown	-	-	25,000	40% C	2% C	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	Unknown	Unknown	-	-	25,000	40% C	5% C	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	Unknown	Unknown	-	-	25,000	40% C	10% C	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	Unknown	Unknown	-	-	25,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	Unknown	Unknown	-	-	25,000	40% C	$500	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	Unknown	Unknown	-	-	25,000	40% C	1% C	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	Unknown	Unknown	-	-	25,000	40% C	2% C	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	Unknown	Unknown	-	-	25,000	40% C	5% C	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	Unknown	Unknown	-	-	25,000	40% C	10% C	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Condo Unit	Condo Unit	Frame	Unknown	Unknown	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Condo Unit	Condo Unit	Frame	Unknown	Unknown	10% C	-	50,000	40% C	$500	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Condo Unit	Condo Unit	Frame	Unknown	Unknown	10% C	-	50,000	40% C	1% C	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Condo Unit	Condo Unit	Frame	Unknown	Unknown	10% C	-	50,000	40% C	2% C	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Condo Unit	Condo Unit	Frame	Unknown	Unknown	10% C	-	50,000	40% C	5% C	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Condo Unit	Condo Unit	Frame	Unknown	Unknown	10% C	-	50,000	40% C	10% C	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Condo Unit	Condo Unit	Masonry	Unknown	Unknown	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Condo Unit	Condo Unit	Masonry	Unknown	Unknown	10% C	-	50,000	40% C	$500	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Condo Unit	Condo Unit	Masonry	Unknown	Unknown	10% C	-	50,000	40% C	1% C	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Condo Unit	Condo Unit	Masonry	Unknown	Unknown	10% C	-	50,000	40% C	2% C	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Condo Unit	Condo Unit	Masonry	Unknown	Unknown	10% C	-	50,000	40% C	5% C	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Condo Unit	Condo Unit	Masonry	Unknown	Unknown	10% C	-	50,000	40% C	10% C	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	Unknown	20	750,000	-	5% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	Unknown	20	750,000	-	5% A	20% A	2% A	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	Unknown	20	750,000	-	5% A	20% A	3% A	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	Unknown	20	750,000	-	5% A	20% A	5% A	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	Unknown	20	750,000	-	5% A	20% A	10% A	Unknown	Unknown	Unknown	Unknown	Unknown

Name	Policy Form/ Occupancy	Construction	Year Built	Number of Stories	Limit A	Limit B	Limit C	Limit D	Deductible	Roof Geometry	Roof Covering	Roof Deck Attachment	Roof Wall Anchorage	Opening Protection
Frame Owners	Owners	Frame	1989	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Owners	Owners	Frame	1989	1	100,000	10% A	50% A	20% A	$500	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Owners	Owners	Frame	1989	1	100,000	10% A	50% A	20% A	1% A	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Owners	Owners	Frame	1989	1	100,000	10% A	50% A	20% A	2% A	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Owners	Owners	Frame	1989	1	100,000	10% A	50% A	20% A	5% A	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Owners	Owners	Frame	1989	1	100,000	10% A	50% A	20% A	10% A	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	1989	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	1989	1	100,000	10% A	50% A	20% A	$500	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	1989	1	100,000	10% A	50% A	20% A	1% A	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	1989	1	100,000	10% A	50% A	20% A	2% A	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	1989	1	100,000	10% A	50% A	20% A	5% A	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	1989	1	100,000	10% A	50% A	20% A	10% A	Unknown	Unknown	Unknown	Unknown	Unknown
Manufactured Homes	Manufactured Homes	Manufactured Homes	1989	1	50,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Manufactured Homes	Manufactured Homes	Manufactured Homes	1989	1	50,000	10% A	50% A	20% A	$500	Unknown	Unknown	Unknown	Unknown	Unknown
Manufactured Homes	Manufactured Homes	Manufactured Homes	1989	1	50,000	10% A	50% A	20% A	1% A	Unknown	Unknown	Unknown	Unknown	Unknown
Manufactured Homes	Manufactured Homes	Manufactured Homes	1989	1	50,000	10% A	50% A	20% A	2% A	Unknown	Unknown	Unknown	Unknown	Unknown
Manufactured Homes	Manufactured Homes	Manufactured Homes	1989	1	50,000	10% A	50% A	20% A	5% A	Unknown	Unknown	Unknown	Unknown	Unknown
Manufactured Homes	Manufactured Homes	Manufactured Homes	1989	1	50,000	10% A	50% A	20% A	10% A	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	1989	1	-	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	1989	1	-	-	50,000	40% C	$500	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	1989	1	-	-	50,000	40% C	1% C	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	1989	1	-	-	50,000	40% C	2% C	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	1989	1	-	-	50,000	40% C	5% C	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	1989	1	-	-	50,000	40% C	10% C	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	1989	1	-	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	1989	1	-	-	50,000	40% C	$500	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	1989	1	-	-	50,000	40% C	1% C	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	1989	1	-	-	50,000	40% C	2% C	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	1989	1	-	-	50,000	40% C	5% C	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	1989	1	-	-	50,000	40% C	10% C	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Condo Unit	Condo Unit	Frame	1989	3	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Condo Unit	Condo Unit	Frame	1989	3	10% C	-	50,000	40% C	$500	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Condo Unit	Condo Unit	Frame	1989	3	10% C	-	50,000	40% C	1% C	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Condo Unit	Condo Unit	Frame	1989	3	10% C	-	50,000	40% C	2% C	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Condo Unit	Condo Unit	Frame	1989	3	10% C	-	50,000	40% C	5% C	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Condo Unit	Condo Unit	Frame	1989	3	10% C	-	50,000	40% C	10% C	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Condo Unit	Condo Unit	Masonry	1989	3	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Condo Unit	Condo Unit	Masonry	1989	3	10% C	-	50,000	40% C	$500	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Condo Unit	Condo Unit	Masonry	1989	3	10% C	-	50,000	40% C	1% C	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Condo Unit	Condo Unit	Masonry	1989	3	10% C	-	50,000	40% C	2% C	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Condo Unit	Condo Unit	Masonry	1989	3	10% C	-	50,000	40% C	5% C	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Condo Unit	Condo Unit	Masonry	1989	3	10% C	-	50,000	40% C	10% C	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	1989	20	25,000,000	-	5% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	1989	20	25,000,000	-	5% A	20% A	2% A	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	1989	20	25,000,000	-	5% A	20% A	3% A	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	1989	20	25,000,000	-	5% A	20% A	5% A	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	1989	20	25,000,000	-	5% A	20% A	10% A	Unknown	Unknown	Unknown	Unknown	Unknown

Notional Set 2 – Policy Form Sensitivity

Name	Policy Form/Occupancy	Construction	Year Built	Number of Stories	Limit A	Limit B	Limit C	Limit D	Deductible	Roof Geometry	Roof Covering	Roof Deck Attachment	Roof Wall Anchorage	Opening Protection
Frame Owners	Owners	Frame	Unknown	Unknown	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	Unknown	Unknown	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	Unknown	Unknown	-	-	25,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	Unknown	Unknown	-	-	25,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Condo Unit	Condo Unit	Frame	Unknown	Unknown	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Condo Unit	Condo Unit	Masonry	Unknown	Unknown	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	Unknown	20	750,000	-	5% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown

Name	Policy Form/ Occupancy	Construction	Year Built	Number of Stories	Limit A	Limit B	Limit C	Limit D	Deductible	Roof Geometry	Roof Covering	Roof Deck Attachment	Roof Wall Anchorage	Opening Protection
Frame Owners	Owners	Frame	1989	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	1989	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	1989	1	-	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	1989	1	-	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Condo Unit	Condo Unit	Frame	1989	3	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Condo Unit	Condo Unit	Masonry	1989	3	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	1989	20	25,000,000	-	5% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown

Notional Set 3 – ~~Policy Form/~~ Construction Sensitivity

Name	Policy Form/Occupancy	Construction	Year Built	Number of Stories	Limit A	Limit B	Limit C	Limit D	Deductible	Roof Geometry	Roof Covering	Roof Deck Attachment	Roof Wall Anchorage	Opening Protection
Frame Owners	Owners	Frame	Unknown	Unknown	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	Unknown	Unknown	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Manufactured Homes	Manufactured Homes	Manufactured Homes	Unknown	1	50,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown

Name	Policy Form/ Occupancy	Construction	Year Built	Number of Stories	Limit A	Limit B	Limit C	Limit D	Deductible	Roof Geometry	Roof Covering	Roof Deck Attachment	Roof Wall Anchorage	Opening Protection
Frame Owners	Owners	Frame	1989	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	1989	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Manufactured Homes	Manufactured Homes	Manufactured Homes	1989	1	50,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown

Notional Set 4 – Coverage Sensitivity

Name	Policy Form/Occupancy	Construction	Year Built	Number of Stories	Limit A	Limit B	Limit C	Limit D	Deductible	Roof Geometry	Roof Covering	Roof Deck Attachment	Roof Wall Anchorage	Opening Protection
Frame Owners	Owners	Frame	Unknown	Unknown	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	Unknown	Unknown	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Manufactured Homes	Manufactured Homes	Manufactured Homes	Unknown	1	50,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	Unknown	Unknown	-	-	25,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	Unknown	Unknown	-	-	25,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Condo Unit	Condo Unit	Frame	Unknown	Unknown	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Condo Unit	Condo Unit	Masonry	Unknown	Unknown	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	Unknown	20	750,000	-	5% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown

Name	Policy Form/ Occupancy	Construction	Year Built	Number of Stories	Limit A	Limit B	Limit C	Limit D	Deductible	Roof Geometry	Roof Covering	Roof Deck Attachment	Roof Wall Anchorage	Opening Protection
Frame Owners	Owners	Frame	1989	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	1989	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Manufactured Homes	Manufactured Homes	Manufactured Homes	1989	1	50,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	1989	1	-	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	1989	1	-	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Condo Unit	Condo Unit	Frame	1989	3	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Condo Unit	Condo Unit	Masonry	1989	3	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	1989	20	25,000,000	-	5% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown

Notional Set 5 – ~~Building Code/Enforcement (~~Year Built~~)~~ Sensitivity

Name	Policy Form/Occupancy	Construction	Year Built	Number of Stories	Limit A	Limit B	Limit C	Limit D	Deductible	Roof Geometry	Roof Covering	Roof Deck Attachment	Roof Wall Anchorage	Opening Protection
Frame Owners	Owners	Frame	1980	Unknown	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Owners	Owners	Frame	1998	Unknown	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Owners	Owners	Frame	2004	Unknown	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	1980	Unknown	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	1998	Unknown	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	2004	Unknown	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Manufactured Homes	Manufactured Homes	Manufactured Homes	1974	1	50,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Manufactured Homes	Manufactured Homes	Manufactured Homes	1992	1	50,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Manufactured Homes	Manufactured Homes	Manufactured Homes	2004	1	50,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	1980	Unknown	-	-	25,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	1998	Unknown	-	-	25,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	2004	Unknown	-	-	25,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	1980	Unknown	-	-	25,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	1998	Unknown	-	-	25,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	2004	Unknown	-	-	25,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Condo Unit	Condo Unit	Frame	1980	Unknown	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Condo Unit	Condo Unit	Frame	1998	Unknown	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Condo Unit	Condo Unit	Frame	2004	Unknown	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Condo Unit	Condo Unit	Masonry	1980	Unknown	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Condo Unit	Condo Unit	Masonry	1998	Unknown	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Condo Unit	Condo Unit	Masonry	2004	Unknown	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	1980	20	750,000	-	5% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	1998	20	750,000	-	5% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	2004	20	750,000	-	5% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown

Name	Policy Form/ Occupancy	Construction	Year Built	Number of Stories	Limit A	Limit B	Limit C	Limit D	Deductible	Roof Geometry	Roof Covering	Roof Deck Attachment	Roof Wall Anchorage	Opening Protection
Frame Owners	Owners	Frame	1980	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Owners	Owners	Frame	1989	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Owners	Owners	Frame	1998	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Owners	Owners	Frame	2004	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Owners	Owners	Frame	2019	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	1980	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	1989	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	1998	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	2004	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	2019	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Manufactured Homes	Manufactured Homes	Manufactured Homes	1989	1	50,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Manufactured Homes	Manufactured Homes	Manufactured Homes	1972	1	50,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Manufactured Homes	Manufactured Homes	Manufactured Homes	1992	1	50,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Manufactured Homes	Manufactured Homes	Manufactured Homes	2004	1	50,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Manufactured Homes	Manufactured Homes	Manufactured Homes	2019	1	50,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	1980	1	-	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	1989	1	-	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	1998	1	-	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	2004	1	-	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	2019	1	-	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	1980	1	-	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	1989	1	-	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	1998	1	-	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	2004	1	-	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	2019	1	-	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Condo Unit	Condo Unit	Frame	1980	3	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Condo Unit	Condo Unit	Frame	1989	3	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Condo Unit	Condo Unit	Frame	1998	3	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Condo Unit	Condo Unit	Frame	2004	3	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Condo Unit	Condo Unit	Frame	2019	3	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Condo Unit	Condo Unit	Masonry	1980	3	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Condo Unit	Condo Unit	Masonry	1989	3	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Condo Unit	Condo Unit	Masonry	1998	3	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Condo Unit	Condo Unit	Masonry	2004	3	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Condo Unit	Condo Unit	Masonry	2019	3	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	1980	20	25,000,000	-	5% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	1989	20	25,000,000	-	5% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	1998	20	25,000,000	-	5% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	2004	20	25,000,000	-	5% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	2019	20	25,000,000	-	5% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown

Notional Set 6 – Building Strength Sensitivity

Name	Policy Form/Occupancy	Construction	Year Built	Number of Stories	Limit A	Limit B	Limit C	Limit D	Deductible	Roof Geometry	Roof Covering	Roof Deck Attachment	Roof Wall Anchorage	Opening Protection
Weak Frame Owners	Owner	Frame	1980	1	100,000	10% A	50% A	20% A	0%	Gable	Shingle	6d nails	Toe Nail	No
Medium Frame Owners	Owner	Frame	1998	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Strong Frame Owners	Owner	Frame	2007	1	100,000	10% A	50% A	20% A	0%	Hip	Rated Shingle (110 mph)	8d nails HWS	Straps	Yes
Weak Masonry Owners	Owners	Masonry	1980	1	100,000	10% A	50% A	20% A	0%	Gable	Shingle	6d nails	Toe Nail	No
Medium Masonry Owners	Owners	Masonry	1998	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Strong Masonry Owners	Owners	Masonry	2007	1	100,000	10% A	50% A	20% A	0%	Hip	Rated Shingle (110 mph)	8d nails HWS	Straps	Yes
Weak Manufactured Homes	Manufactured Homes	Untied Foundation	1974	1	50,000	10% A	50% A	20% A	0%	Gable	Shingle	Unknown	Unknown	No
Medium Manufactured Homes	Manufactured Homes	Unknown	1992	1	50,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Strong Manufactured Homes	Manufactured Homes	Tied Foudation	2004	1	50,000	10% A	50% A	20% A	0%	Gable	Rated Shingle (110 mph)	Unknown	Unknown	Yes
Weak Frame Renters	Renters	Frame	1980	1	-	-	25,000	40% C	0%	Gable	Shingle	6d nails	Toe Nail	No
Medium Frame Renters	Renters	Frame	1998	1	-	-	25,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Strong Frame Renters	Renters	Frame	2007	1	-	-	25,000	40% C	0%	Hip	Rated Shingle (110 mph)	8d nails HWS	Straps	Yes
Weak Masonry Renters	Renters	Masonry	1980	1	-	-	25,000	40% C	0%	Gable	Shingle	6d nails	Toe Nail	No
Medium Masonry Renters	Renters	Masonry	1998	1	-	-	25,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Strong Masonry Renters	Renters	Masonry	2007	1	-	-	25,000	40% C	0%	Hip	Rated Shingle (110 mph)	8d nails HWS	Straps	Yes
Weak Frame Condo Unit	Condo Unit	Frame	1980	3	10% C	-	50,000	40% C	0%	Gable	Shingle	6d nails	Toe Nail	No
Medium Frame Condo Unit	Condo Unit	Frame	1998	3	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Strong Frame Condo Unit	Condo Unit	Frame	2007	3	10% C	-	50,000	40% C	0%	Hip	Rated Shingle (110 mph)	8d nails HWS	Straps	Yes
Weak Masonry Condo Unit	Condo Unit	Masonry	1980	3	10% C	-	50,000	40% C	0%	Gable	Shingle	6d nails	Toe Nail	No
Medium Masonry Condo Unit	Condo Unit	Masonry	1998	3	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Strong Masonry Condo Unit	Condo Unit	Masonry	2007	3	10% C	-	50,000	40% C	0%	Hip	Rated Shingle (110 mph)	8d nails HWS	Straps	Yes
Weak Commercial Residential	Condo Association	Concrete	1980	20	750,000	-	5% A	20% A	0%	Flat	BUR with gravel	Unknown	Unknown	No
Medium Commercial Residential	Condo Association	Concrete	1998	20	750,000	-	5% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Strong Commercial Residential	Condo Association	Concrete	2007	20	750,000	-	5% A	20% A	0%	Flat	BUR with gravel	Unknown	Unknown	Yes

Name	Policy Form/ Occupancy	Construction	Year Built	Number of Stories	Limit A	Limit B	Limit C	Limit D	Deductible	Roof Geometry	Roof Covering	Roof Deck Attachment	Roof Wall Anchorage	Opening Protection
Weak Frame Owners	Owners	Frame	1980	1	100,000	10% A	50% A	20% A	0%	Gable	Shingle	6d nails	Toe Nail	No
Medium Frame Owners	Owners	Frame	1998	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Strong Frame Owners	Owners	Frame	2007	1	100,000	10% A	50% A	20% A	0%	Hip	ASTM D7158 Class H Shingles	8d nails	Straps	Yes
Weak Masonry Owners	Owners	Masonry	1980	1	100,000	10% A	50% A	20% A	0%	Gable	Shingle	6d nails	Toe Nail	No
Medium Masonry Owners	Owners	Masonry	1998	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Strong Masonry Owners	Owners	Masonry	2007	1	100,000	10% A	50% A	20% A	0%	Hip	ASTM D7158 Class H Shingles	8d nails	Straps	Yes
Weak Manufactured Homes	Manufactured Homes	Untied Foundation	1974	1	50,000	10% A	50% A	20% A	0%	Gable	Shingle	Unknown	Unknown	No
Medium Manufactured Homes	Manufactured Homes	Unknown	1992	1	50,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Strong Manufactured Homes	Manufactured Homes	Tied Foundation	2004	1	50,000	10% A	50% A	20% A	0%	Gable	ASTM D7158 Class H Shingles	Unknown	Unknown	Yes
Weak Frame Renters	Renters	Frame	1980	1	-	-	50,000	40% C	0%	Gable	Shingle	6d nails	Toe Nail	No
Medium Frame Renters	Renters	Frame	1998	1	-	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Strong Frame Renters	Renters	Frame	2007	1	-	-	50,000	40% C	0%	Hip	ASTM D7158 Class H Shingles	8d nails	Straps	Yes
Weak Masonry Renters	Renters	Masonry	1980	1	-	-	50,000	40% C	0%	Gable	Shingle	6d nails	Toe Nail	No
Medium Masonry Renters	Renters	Masonry	1998	1	-	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Strong Masonry Renters	Renters	Masonry	2007	1	-	-	50,000	40% C	0%	Hip	ASTM D7158 Class H Shingles	8d nails	Straps	Yes
Weak Frame Condo Unit	Condo Unit	Frame	1980	3	10% C	-	50,000	40% C	0%	Gable	Shingle	6d nails	Toe Nail	No
Medium Frame Condo Unit	Condo Unit	Frame	1998	3	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Strong Frame Condo Unit	Condo Unit	Frame	2007	3	10% C	-	50,000	40% C	0%	Hip	ASTM D7158 Class H Shingles	8d nails	Straps	Yes
Weak Masonry Condo Unit	Condo Unit	Masonry	1980	3	10% C	-	50,000	40% C	0%	Gable	Shingle	6d nails	Toe Nail	No
Medium Masonry Condo Unit	Condo Unit	Masonry	1998	3	10% C	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Strong Masonry Condo Unit	Condo Unit	Masonry	2007	3	10% C	-	50,000	40% C	0%	Hip	ASTM D7158 Class H Shingles	8d nails	Straps	Yes
Weak Commercial Residential	Condo Association	Concrete	1980	20	25,000,000	-	5% A	20% A	0%	Flat	Unknown	Unknown	Unknown	No
Medium Commercial Residential	Condo Association	Concrete	1998	20	25,000,000	-	5% A	20% A	0%	Flat	Unknown	Unknown	Unknown	Unknown
Strong Commercial Residential	Condo Association	Concrete	2007	20	25,000,000	-	5% A	20% A	0%	Flat	Unknown	Unknown	Unknown	Yes

~~Notional Set 7 – Condo Unit Floor Sensitivity~~

Name	Policy Form/ Occupancy	Construction	Year Built	Number of Stories	Limit A	Limit B	Limit C	Limit D	Deductible	Roof Geometry	Roof Covering	Roof Deck Attachment	Roof Wall Anchorage	Opening Protection	Floor of Interest	Exterior Doors
Condo Unit A	Condo Unit	Concrete	1980	20	10% C	0	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Impact resistant glass	3	Impact resistant sliding doors opening onto small indented patio
Condo Unit A	Condo Unit	Concrete	1980	20	10% C	0	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Impact resistant glass	9	Impact resistant sliding doors opening onto small indented patio
Condo Unit A	Condo Unit	Concrete	1980	20	10% C	0	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Impact resistant glass	15	Impact resistant sliding doors opening onto small indented patio
Condo Unit A	Condo Unit	Concrete	1980	20	10% C	0	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Impact resistant glass	20	Impact resistant sliding doors opening onto small indented patio
Condo Unit B	Condo Unit	Concrete	1980	20	10% C	0	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	No	3	No outward facing sliding doors
Condo Unit B	Condo Unit	Concrete	1980	20	10% C	0	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	No	9	No outward facing sliding doors
Condo Unit B	Condo Unit	Concrete	1980	20	10% C	0	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	No	15	No outward facing sliding doors
Condo Unit B	Condo Unit	Concrete	1980	20	10% C	0	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	No	20	No outward facing sliding doors

Notional Set ~~8~~ 7 – Number of Stories Sensitivity

Name	Policy Form/ Occupancy	Construction	Year Built	Number of Stories	Limit A	Limit B	Limit C	Limit D	Deductible	Roof Geometry	Roof Covering	Roof Deck Attachment	Roof Wall Anchorage	Opening Protection
Frame	Owners	Frame	Unknown	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame	Owners	Frame	Unknown	2	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry	Owners	Masonry	Unknown	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry	Owners	Masonry	Unknown	2	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame	Renters	Frame	Unknown	1	-	-	25,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame	Renters	Frame	Unknown	2	-	-	25,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry	Renters	Masonry	Unknown	1	-	-	25,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry	Renters	Masonry	Unknown	2	-	-	25,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial	Condo Association	Concrete	Unknown	5	750,000	-	5% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial	Condo Association	Concrete	Unknown	10	750,000	-	5% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial	Condo Association	Concrete	Unknown	20	750,000	-	5% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown

Name	Policy Form/ Occupancy	Construction	Year Built	Number of Stories	Limit A	Limit B	Limit C	Limit D	Deductible	Roof Geometry	Roof Covering	Roof Deck Attachment	Roof Wall Anchorage	Opening Protection
Frame Owners	Owners	Frame	1989	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Owners	Owners	Frame	1989	2	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	1989	1	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Owners	Owners	Masonry	1989	2	100,000	10% A	50% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	1989	1	-	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Frame Renters	Renters	Frame	1989	2	-	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	1989	1	-	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Masonry Renters	Renters	Masonry	1989	2	-	-	50,000	40% C	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	1989	5	8,000,000	-	5% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	1989	10	15,000,000	-	5% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown
Commercial Residential	Condo Association	Concrete	1989	20	25,000,000	-	5% A	20% A	0%	Unknown	Unknown	Unknown	Unknown	Unknown

Figure 1

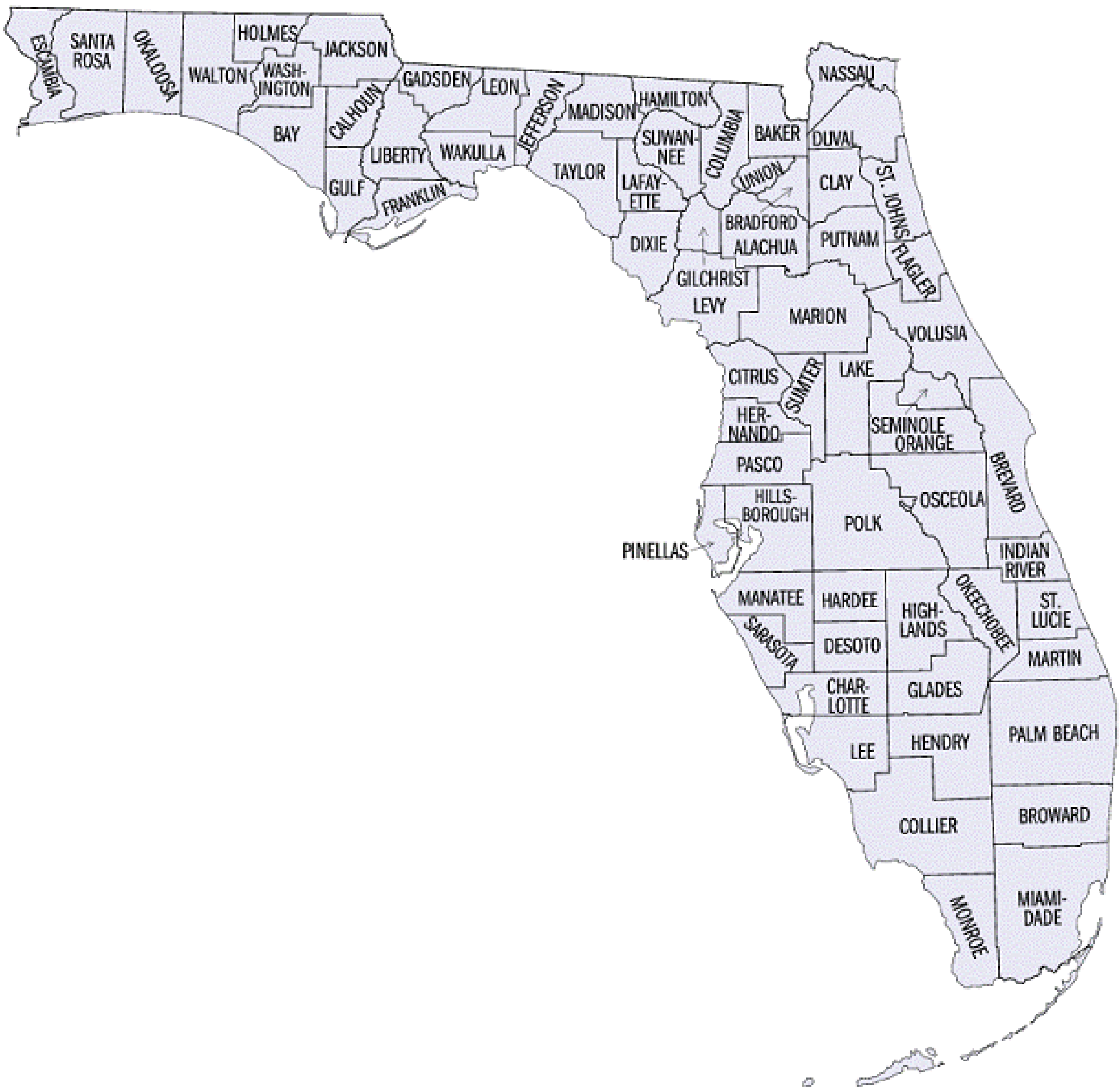
Florida County Codes

County Code	County Name	County Code	County Name	County Code	County Name
001	Alachua	**049**	Hardee	**093**	Okeechobee
003	Baker	**051**	Hendry	**095**	Orange
005	Bay	**053**	Hernando	**097**	Osceola
007	Bradford	**055**	Highlands	**099**	Palm Beach
009	Brevard	**057**	Hillsborough	**101**	Pasco
011	Broward	**059**	Holmes	**103**	Pinellas
013	Calhoun	**061**	Indian River	**105**	Polk
015	Charlotte	**063**	Jackson	**107**	Putnam
017	Citrus	**065**	Jefferson	**109**	St. Johns
019	Clay	**067**	Lafayette	**111**	St. Lucie
021	Collier	**069**	Lake	**113**	Santa Rosa
023	Columbia	**071**	Lee	**115**	Sarasota
027	DeSoto	**073**	Leon	**117**	Seminole
029	Dixie	**075**	Levy	**119**	Sumter
031	Duval	**077**	Liberty	**121**	Suwannee
033	Escambia	**079**	Madison	**123**	Taylor
035	Flagler	**081**	Manatee	**125**	Union
037	Franklin	**083**	Marion	**127**	Volusia
039	Gadsden	**085**	Martin	**129**	Wakulla
041	Gilchrist	**086**	Miami-Dade	**131**	Walton
043	Glades	**087**	Monroe	**133**	Washington
045	Gulf	**089**	Nassau		
047	Hamilton	**091**	Okaloosa		

Note: These codes are derived from the Federal Information Processing Standards (FIPS) Codes.

Figure 2

State of Florida
By County



Comparison of ~~2017~~ 2019 Hurricane Standards to ~~2015~~ 2017 Hurricane Standards

Standard	Title	Comments
General		
G-1	Scope of the Hurricane Model and Its Implementation	Significant Revision
G-2	Qualifications of Modeling Organization Personnel and Consultants Engaged in Development of the Hurricane Model	
G-3	Insured Exposure Location	Significant Revision
G-4	Independence of Hurricane Model Components	
G-5	Editorial Compliance	
Meteorological		
M-1	Base Hurricane Storm Set	Significant Revision
M-2	Hurricane Parameters and Characteristics	
M-3	Hurricane Probability Distributions	
M-4	Hurricane Windfield Structure	
M-5	Hurricane Landfall and Over-Land Weakening Methodologies	
M-6	Logical Relationships of Hurricane Characteristics	
Statistical		
S-1	Modeled Results and Goodness-of-Fit	Significant Revision
S-2	Sensitivity Analysis for Hurricane Model Output	
S-3	Uncertainty Analysis for Hurricane Model Output	
S-4	County Level Aggregation	
S-5	Replication of Known Hurricane Losses	
S-6	Comparison of Projected Hurricane Loss Costs	
Vulnerability		
V-1	Derivation of Building Hurricane Vulnerability Functions	Significant Revision
V-2	Derivation of Contents ~~and Time Element~~ Hurricane Vulnerability Functions	Significant Revision
V-3	Derivation of Time Element Hurricane Vulnerability Functions	Significant Revision
V-~~3~~4	Hurricane Mitigation Measures and Secondary Characteristics	Significant Revision
Actuarial		
A-1	Hurricane Model~~ing~~ Input Data and Output Reports	
A-2	Hurricane Events Resulting in Modeled Hurricane Losses	~~Significant Revision~~
A-3	Hurricane Coverages	
A-4	Modeled Hurricane Loss Cost and Hurricane Probable Maximum Loss Level Considerations	
A-5	Hurricane Policy Conditions	Significant Revision
A-6	Hurricane Loss Outputs and Logical Relationships to Risk	Significant Revision
Computer/Information		
CI-1	Hurricane Model Documentation	~~Significant Revision~~
CI-2	Hurricane Model Requirements	
CI-3	Hurricane Model ~~Architecture~~ Organization and Component Design	~~Significant Revision~~
CI-4	Hurricane Model Implementation	Significant Revision
CI-5	Hurricane Model Verification	
CI-6	Hurricane Model Maintenance and Revision	
CI-7	Hurricane Model Security	

Note: *The Commission has determined that ~~"~~significant revisions~~"~~ are those that result in or have potential for changes to hurricane loss costs or hurricane probable maximum loss levels. The Commission may determine, in its judgment, whether a revision is significant.*

GENERAL STANDARDS

G-1 Scope of the Hurricane Model and Its Implementation*

*(*Significant Revision)*

A. The hurricane model shall project loss costs and probable maximum loss levels for damage to insured residential property from hurricane events.

B. ~~The modeling organization shall maintain a~~A documented process shall be maintained to assure continual agreement and correct correspondence of databases, data files, and computer source code to slides, technical papers, and modeling organization documents.

C. All software and data (1) located within the hurricane model, (2) used to validate the hurricane model, (3) used to project modeled hurricane loss costs and hurricane probable maximum loss levels, and (4) used to create forms required by the Commission in the Hurricane Standards Report of Activities shall fall within the scope of the Computer/Information Standards and shall be located in centralized, model-level file areas.

D. A subset of the forms shall be produced through an automated procedure or procedures as indicated in the form instructions.

Purpose: This standard yields a high level view of the scope of the hurricane model to be reviewed, namely projecting loss costs and probable maximum loss levels for damage to insured residential property (personal and commercial) from hurricane events, including time element losses.

Relevant Forms:
G-1, General Standards Expert Certification
M-1, Annual Occurrence Rates
M-3, Radius of Maximum Winds and Radii of Standard Wind Thresholds
S-1, Probability and Frequency of Florida Landfalling Hurricanes per Year
S-2, Examples of Hurricane Loss Exceedance Estimates
A-3, Hurricane Losses
A-4, Hurricane Output Ranges
A-5, Percentage Change in Hurricane Output Ranges
A-6, Logical Relationship to Hurricane Risk (Trade Secret Item)
A-7, Percentage Change in Logical Relationship to Hurricane Risk
A-8, Hurricane Probable Maximum Loss for Florida

Disclosures

1. Specify the hurricane model version identification. If the hurricane model submitted for review is implemented on more than one platform, specify each hurricane model platform~~. Specify which platform is~~ identifying the primary platform and the distinguishing aspects of each. ~~verify~~ Demonstrate how ~~any other~~these platforms produce the same hurricane model output results, i.e., ~~or~~ are otherwise functionally equivalent as provided for in ~~the "Process for Determining the Acceptability of a Computer Simulation Hurricane Model" in VI. Review by the Commission,~~ subsection ~~I~~J. Review and Acceptance Criteria for Functionally Equivalent Hurricane Model Platforms, Item 2, under section VI. Review by the Commission in the chapter "Process for Determining the Acceptability of a Computer Simulation Hurricane Model."

2. Provide a comprehensive summary of the hurricane model. This summary should include a technical description of the hurricane model, including each major component of the hurricane model used to project loss costs and probable maximum loss levels for damage to insured residential property from hurricane events causing damage in Florida. Describe the theoretical basis of the hurricane model and include a description of the methodology, particularly the wind components, the vulnerability components, and the insured loss components used in the hurricane model. The description should be complete and must not reference unpublished work.

3. Provide a flowchart that illustrates interactions among major hurricane model components.

4. Provide a diagram defining the network organization in which the hurricane model is designed and operates.

5. Provide detailed information on the hurricane model implementation on more than one platform, if applicable.

~~4.~~6. Provide a comprehensive list of complete references pertinent to the hurricane model by standard grouping using professional citation standards.

~~5.~~7. Provide the following information related to changes in the hurricane model from the previously-accepted hurricane model to the initial submission this year.

   A. Hurricane model changes:

      1. A summary description of changes that affect the personal or commercial residential hurricane loss costs or hurricane probable maximum loss levels,

      2. A list of all other changes, and

      3. The rationale for each change.

B. Percentage difference in average annual zero deductible statewide hurricane loss costs based on the ~~2012~~ 2017 Florida Hurricane Catastrophe Fund personal and commercial residential zero deductible exposure data found in the file named "~~*hlpm2012c.exe*~~*hlpm2017c.zip*" for:

   1. All changes combined, and

   2. Each individual hurricane model component change.

C. Color-coded maps by county reflecting the percentage difference in average annual zero deductible statewide hurricane loss costs based on the ~~2012~~ 2017 Florida Hurricane Catastrophe Fund personal and commercial residential zero deductible exposure data found in the file named "~~*hlpm2012c.exe*~~*hlpm2017c.zip*" for each hurricane model component change.

D. Color-coded map by county reflecting the percentage difference in average annual zero deductible statewide hurricane loss costs based on the ~~2012~~ 2017 Florida Hurricane Catastrophe Fund personal and commercial residential zero deductible exposure data found in the file named "~~*hlpm2012c.exe*~~*hlpm2017c.zip*" for all hurricane model components changed.

~~6.~~8. Provide a list and description of any potential interim updates to underlying data relied upon by the hurricane model. State whether the time interval for the update has a possibility of occurring during the period of time the hurricane model could be found acceptable by the Commission under the review cycle in this *Hurricane Standards Report of Activities*.

Audit

1. Automated procedures used to create forms will be reviewed.

~~1.~~2. All primary technical papers that describe the underlying hurricane model theory and implementation (where applicable) should be available for review in hard copy or electronic form. Modeling-organization-specific publications cited must be available for review in hard copy or electronic form.

~~2~~3. Compliance with the process prescribed in Standard G-1.B in all stages of the modeling process will be reviewed.

~~3.~~4. Items specified in Standard G-1.C will be reviewed as part of the Computer/Information Standards.

~~4.~~5. Maps, databases, and data files relevant to the modeling organization's submission will be reviewed.

~~5.~~6.The following information related to changes in the hurricane model, since the initial submission for each subsequent revision of the submission, will be reviewed.

A. Hurricane model changes:

1. A summary description of changes that affect, or are believed to affect, the personal or commercial residential hurricane loss costs or hurricane probable maximum loss levels,

2. A list of all other changes, and

3. The rationale for each change.

~~B. Percentage difference in average annual zero deductible statewide hurricane loss costs based on the 2012 Florida Hurricane Catastrophe Fund personal and commercial residential zero deductible exposure data found in the file named "*hlpm2012c.exe*" for:~~

~~1. All changes combined, and~~

~~2. Each individual hurricane model component and subcomponent change.~~

~~C. For any modifications to Form A-4A, Hurricane Output Ranges (2012 FHCF Exposure Data), since the initial submission, additional versions of Form A-5, Percentage Change in Hurricane Output Ranges (2012 FHCF Exposure Data):~~

~~1. With the initial submission as the baseline for computing the percentage changes, and~~
~~2. With any intermediate revisions as the baseline for computing the percentage changes.~~

~~D. Color-coded maps by county reflecting the percentage difference in average annual zero deductible statewide hurricane loss costs based on the 2012 Florida Hurricane Catastrophe Fund personal and commercial residential zero deductible exposure data found in the file named "*hlpm2012c.exe*" for each hurricane model component change:~~

~~1. Between the previously-accepted hurricane model and the revised hurricane model,~~

~~2. Between the initial submission and the revised submission, and~~

~~3. Between any intermediate revisions and the revised submission.~~

~~E.~~B. Percentage difference in average annual zero deductible statewide hurricane loss costs based on the 2017 Florida Hurricane Catastrophe Fund personal and commercial residential zero deductible exposure data found in the file named "*hlpm2017c.~~exe~~zip*" for:

1. All changes combined, and

2. Each individual hurricane model component and subcomponent change.

~~F.~~C. For any modifications to Form A-4~~B~~, Hurricane Output Ranges ~~(2017 FHCF Exposure Data)~~, since the initial submission, a ~~version of~~ newly completed Form A-5, Percentage

Change in Hurricane Output Ranges~~ using the 2017 FHCF Exposure Data and Form A-4B, Hurricane Output Ranges (2017 FHCF Exposure Data)~~:

1. With the initial submission as the baseline for computing the percentage changes, and

2. With any intermediate revisions as the baseline for computing the percentage changes.

~~G.~~D. Color-coded maps by county reflecting the percentage difference in average annual zero deductible statewide hurricane loss costs based on the 2017 Florida Hurricane Catastrophe Fund personal and commercial residential zero deductible exposure data found in the file named "*hlpm2017c.~~exe~~zip*" for each hurricane model component change:

1. Between the previously-accepted hurricane model and the revised hurricane model,

~~1.~~2. Between the initial submission and the revised submission, and

~~2.~~3. Between any intermediate revisions and the revised submission.

G-2 Qualifications of Modeling Organization Personnel and Consultants Engaged in Development of the Hurricane Model

A. Hurricane model construction, testing, and evaluation shall be performed by modeling organization personnel or consultants who possess the necessary skills, formal education, and experience to develop the relevant components for hurricane loss projection methodologies.

B. The hurricane model and hurricane model submission documentation shall be reviewed by modeling organization personnel or consultants in the following professional disciplines with requisite experience: structural/wind engineering (licensed Professional Engineer in civil engineering with a current license), statistics (advanced degree), actuarial science (Associate or Fellow of Casualty Actuarial Society or Society of Actuaries), meteorology (advanced degree), and computer/information science (advanced degree or equivalent experience and certifications). These individuals shall certify Expert Certification Forms G-1 through G-6 as applicable.

Purpose: Professional disciplines with requisite experience necessary to develop the hurricane model are to be represented among modeling organization staff and consultants. Academic or professional designations are required but not necessarily sufficient for the personnel involved in hurricane model development, implementation, and preparation of material for review by the Commission.

Relevant Forms: G-1, General Standards Expert Certification
G-2, Meteorological Standards Expert Certification
G-3, Statistical Standards Expert Certification
G-4, Vulnerability Standards Expert Certification
G-5, Actuarial Standards Expert Certification
G-6, Computer/Information Standards Expert Certification

Disclosures

1. Modeling Organization Background

   A. Describe the ownership structure of the modeling organization engaged in the development of the hurricane model. Describe affiliations with other companies and the nature of the relationship, if any. Indicate if the modeling organization has changed its name and explain the circumstances.

   B. If the hurricane model is developed by an entity other than the modeling organization, describe its organizational structure and indicate how proprietary rights and control over the hurricane model and its components are exercised. If more than one entity is involved in the development of the hurricane model, describe all involved.

C. If the hurricane model is developed by an entity other than the modeling organization, describe the funding source for the development of the hurricane model.

D. Describe any services other than hurricane modeling provided by the modeling organization.

E. Indicate if the modeling organization has ever been involved directly in litigation or challenged by a governmental authority where the credibility of one of its U.S. hurricane model versions for projection of hurricane loss costs or hurricane probable maximum loss levels was disputed. Describe the nature of each case and its conclusion.

2. Professional Credentials

A. Provide in a tabular format (a) the highest degree obtained (discipline and university), (b) employment or consultant status and tenure in years, and (c) relevant experience and responsibilities of individuals currently involved in the acceptability process or in any of the following aspects of the hurricane model:

1. Meteorology
2. Statistics
3. Vulnerability
4. Actuarial Science
5. Computer/Information Science.

B. Identify any new employees or consultants (since the previous submission) engaged in the development of the hurricane model or the acceptability process.

C. Provide visual business workflow documentation connecting all personnel related to hurricane model design, testing, execution, maintenance, and decision-making.

3. Independent Peer Review

A. Provide reviewer names and dates of external independent peer reviews that have been performed on the following components as currently functioning in the hurricane model:

1. Meteorology
2. Statistics
3. Vulnerability
4. Actuarial Science
5. Computer/Information Science.

B. Provide documentation of independent peer reviews directly relevant to the modeling organization responses to the current hurricane standards, disclosures, or forms. Identify any unresolved or outstanding issues as a result of these reviews.

C. Describe the nature of any on-going or functional relationship the modeling organization has with any of the persons performing the independent peer reviews.

4. Provide a completed Form G-1, General Standards Expert Certification. Provide a link to the location of the form [insert hyperlink here].

5. Provide a completed Form G-2, Meteorological Standards Expert Certification. Provide a link to the location of the form [insert hyperlink here].

6. Provide a completed Form G-3, Statistical Standards Expert Certification. Provide a link to the location of the form [insert hyperlink here].

7. Provide a completed Form G-4, Vulnerability Standards Expert Certification. Provide a link to the location of the form [insert hyperlink here].

8. Provide a completed Form G-5, Actuarial Standards Expert Certification. Provide a link to the location of the form [insert hyperlink here].

9. Provide a completed Form G-6, Computer/Information Standards Expert Certification. Provide a link to the location of the form [insert hyperlink here].

Audit

1. The professional vitae of personnel and consultants engaged in the development of the hurricane model and responsible for the current hurricane model and the submission will be reviewed. Background information on the professional credentials and the requisite experience of individuals providing testimonial letters in the submission will be reviewed.

2. Forms G-1, General Standards Expert Certification; G-2, Meteorological Standards Expert Certification; G-3, Statistical Standards Expert Certification; G-4, Vulnerability Standards Expert Certification; G-5, Actuarial Standards Expert Certification; G-6, Computer/ Information Standards Expert Certification, and all independent peer reviews of the hurricane model under consideration will be reviewed. Signatories on the individual forms will be required to provide a description of their review process.

3. Incidents where modeling organization personnel or consultants have been found to have failed to abide by the standards of professional conduct adopted by their profession will be discussed.

4. For each individual listed under Disclosure 2.A, specific information as to any consulting activities and any relationship with an insurer, reinsurer, trade association, governmental entity, consumer group, or other advocacy group within the previous four years will be reviewed.

G-3 Insured Exposure Location*

(*Significant Revision)

A. ZIP Codes used in the hurricane model shall not differ from the United States Postal Service publication date by more than 24 months at the date of submission of the hurricane model. ZIP Code information shall originate from the United States Postal Service.

B. ZIP Code centroids, when used in the hurricane model, shall be based on population data.

C. ZIP Code information purchased by the modeling organization shall be verified by the modeling organization for accuracy and appropriateness.

D. If any ~~hazard or any~~ hurricane model ~~vulnerability~~ components are dependent on ZIP Code databases, ~~the modeling organization shall maintain~~ a logical process shall be maintained for ensuring these components are consistent with the recent ZIP Code database updates.

E. Geocoding methodology shall be justified.

Purpose: ZIP Code information must be updated at least every two years. Interest in specific ZIP Codes arises in the context of logical relationship to risk or in projecting hurricane loss costs and hurricane probable maximum loss levels.

Accurate insured exposure locations are necessary for projecting hurricane loss costs and hurricane probable maximum loss levels. Hurricane model outputs, including hurricane loss costs, are sensitive to insured exposure locations. Appropriate methods must be used when converting street addresses to geocode locations (latitude-longitude).

Relevant Form: G-1, General Standards Expert Certification

Disclosures

1. List the current ZIP Code databases used by the hurricane model and the hurricane model components to which they relate. Provide the effective (official United States Postal Service) dates corresponding to the ZIP Code databases.

2. Describe in detail how invalid ZIP Codes are handled.

3. Describe the data, methods, and process used in the hurricane model to convert among street addresses, geocode locations (latitude-longitude), and ZIP Codes.

4. List and provide a brief description of each hurricane model ZIP Code-based database (e.g., ZIP Code centroids).

5. Describe the process for updating hurricane model ZIP Code-based databases.

Audit

1. Geographic displays for all ZIP Codes will be reviewed.

2. Geographic comparisons of previous to current locations of ZIP Code centroids will be reviewed.

3. Third party vendor information, if applicable, and a complete description of the process used to validate ZIP Code information will be reviewed.

4. The treatment of ZIP Code centroids over water or other uninhabitable terrain will be reviewed.

5. Examples of geocoding for complete and incomplete street addresses will be reviewed.

6. Examples of latitude-longitude to ZIP Code conversions will be reviewed.

7. Hurricane model ZIP Code-based databases will be reviewed.

G-4 Independence of Hurricane Model Components

The meteorological, vulnerability, and actuarial components of the hurricane model shall each be theoretically sound without compensation for potential bias from the other two components.

Purpose: The primary components of the hurricane model ought to be individually sound and operate independently. In other words, the hurricane model should not allow adjustments to one component to compensate for deficiencies in other components (compensation which could inflate or reduce hurricane loss costs and hurricane probable maximum loss levels). A hurricane model would not meet this standard if an artificial calibration adjustment has been made to improve the match of historical and hurricane model results for a specific hurricane. In addition to each component of the hurricane model meeting its respective standards, the interrelationship of the hurricane model components as a whole must be reasonable, logical, and justifiable.

Relevant Form: G-1, General Standards Expert Certification

Audit

1. The hurricane model components will be reviewed for adequately portraying hurricane phenomena and effects (damage, hurricane loss costs, and hurricane probable maximum loss levels). Attention will be paid to an assessment of (1) the theoretical soundness of each component, (2) the basis of the integration of each component into the hurricane model, and (3) consistency between the results of one component and another.

2. All changes in the hurricane model since the previous submission that might impact the independence of the hurricane model components will be reviewed.

G-5 Editorial Compliance

The submission and any revisions provided to the Commission throughout the review process shall be reviewed and edited by a person or persons with experience in reviewing technical documents who shall certify on Form G-7, Editorial Review Expert Certification, that the submission has been personally reviewed and is editorially correct.

Purpose: A quality control process with regard to creating, maintaining, and reviewing all documentation associated with the hurricane model is to be maintained.

Persons with experience in reviewing technical documents for grammatical correctness, typographical accuracy, and accurate citations, charts, or graphs must have reviewed the submission and certify that the submission is in compliance with the acceptability process.

Relevant Forms: G-1, General Standards Expert Certification
G-2, Meteorological Standards Expert Certification
G-3, Statistical Standards Expert Certification
G-4, Vulnerability Standards Expert Certification
G-5, Actuarial Standards Expert Certification
G-6, Computer/Information Standards Expert Certification
G-7, Editorial Review Expert Certification

Disclosures

1. Describe the process used for document control of the submission. Describe the process used to ensure that the paper and electronic versions of specific files are identical in content.

2. Describe the process used by the signatories on Expert Certification Forms G-1 through G-6 to ensure that the information contained under each set of hurricane standards is accurate and complete.

3. Provide a completed Form G-7, Editorial Review Expert Certification. Provide a link to the location of the form [insert hyperlink here].

Audit

1. An assessment that the person who has reviewed the submission has experience in reviewing technical documentation and that such person is familiar with the submission requirements as set forth in the *Hurricane Standards Report of Activities as of November 1, ~~2017~~ 2019* will be made.

2. Attestation that the submission has been reviewed for grammatical correctness, typographical accuracy, completeness, and no inclusion of extraneous data or materials will be assessed.

3. Confirmation that the submission has been reviewed by the signatories on the Expert Certification Forms G-1 through G-6 for accuracy and completeness will be assessed.

4. The modification history for submission documentation will be reviewed.

5. A flowchart defining the process for form creation will be reviewed.

6. Form G-7, Editorial Review Expert Certification, will be reviewed.

Form G-1: General Standards Expert Certification

Purpose: This form identifies the signatory or signatories who have reviewed the current submission for compliance with the General Standards (G-1 – G-5) in accordance with the stated provisions.

I hereby certify that I have reviewed the current submission of ______________________________
(Name of Hurricane Model)
Version __________________ for compliance with the ~~2017~~ 2019 Hurricane Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1. The hurricane model meets the General Standards (G-1 – G-5);
2. The disclosures and forms related to the General Standards section are editorially and technically accurate, reliable, unbiased, and complete;
3. My review was completed in accordance with the professional standards and code of ethical conduct for my profession;
4. My review involved ensuring the consistency of the content in all sections of the submission; and
5. In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.

Name	Professional Credentials (Area of Expertise)
Signature (original submission)	Date
Signature (response to deficiencies, if any)	Date
Signature (revisions to submission, if any)	Date
Signature (final submission)	Date

An updated signature and form are required following any modification of the hurricane model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories. Additional signature lines shall be added as necessary with the following format:

Signature (revisions to submission)	Date

Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

Include Form G-1, General Standards Expert Certification, in a submission appendix.

Form G-2: Meteorological Standards Expert Certification

Purpose: This form identifies the signatory or signatories who have reviewed the current submission for compliance with the Meteorological Standards (M-1 – M-6) in accordance with the stated provisions.

I hereby certify that I have reviewed the current submission of ______________________________
(Name of Hurricane Model)
Version __________________ for compliance with the ~~2017~~ 2019 Hurricane Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1. The hurricane model meets the Meteorological Standards (M-1 – M-6);
2. The disclosures and forms related to the Meteorological Standards section are editorially and technically accurate, reliable, unbiased, and complete;
3. My review was completed in accordance with the professional standards and code of ethical conduct for my profession; and
4. In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.

Name	Professional Credentials (Area of Expertise)
Signature (original submission)	Date
Signature (response to deficiencies, if any)	Date
Signature (revisions to submission, if any)	Date
Signature (final submission)	Date

An updated signature and form are required following any modification of the hurricane model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories. Additional signature lines shall be added as necessary with the following format:

Signature (revisions to submission)	Date

Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

Include Form G-2, Meteorological Standards Expert Certification, in a submission appendix.

Form G-3: Statistical Standards Expert Certification

Purpose: This form identifies the signatory or signatories who have reviewed the current submission for compliance with the Statistical Standards (S-1 – S-6) in accordance with the stated provisions.

I hereby certify that I have reviewed the current submission of ______________________________
(Name of Hurricane Model)
Version __________________ for compliance with the ~~2017~~ 2019 Hurricane Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1. The hurricane model meets the Statistical Standards (S-1 – S-6);
2. The disclosures and forms related to the Statistical Standards section are editorially and technically accurate, reliable, unbiased, and complete;
3. My review was completed in accordance with the professional standards and code of ethical conduct for my profession; and
4. In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.

______________________________	______________________________
Name	Professional Credentials (Area of Expertise)
______________________________	______________________________
Signature (original submission)	Date
______________________________	______________________________
Signature (response to deficiencies, if any)	Date
______________________________	______________________________
Signature (revisions to submission, if any)	Date
______________________________	______________________________
Signature (final submission)	Date

An updated signature and form are required following any modification of the hurricane model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories. Additional signature lines shall be added as necessary with the following format:

______________________________	______________________________
Signature (revisions to submission)	Date

Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

Include Form G-3, Statistical Standards Expert Certification, in a submission appendix.

Form G-4: Vulnerability Standards Expert Certification

Purpose: This form identifies the signatory or signatories who have reviewed the current submission for compliance with the Vulnerability Standards (V-1 – V-~~3~~4) in accordance with the stated provisions.

I hereby certify that I have reviewed the current submission of ______________________
(Name of Hurricane Model)
Version ______________ for compliance with the ~~2017~~ 2019 Hurricane Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1. The hurricane model meets the Vulnerability Standards (V-1 – V-~~3~~4);
2. The disclosures and forms related to the Vulnerability Standards section are editorially and technically accurate, reliable, unbiased, and complete;
3. My review was completed in accordance with the professional standards and code of ethical conduct for my profession; and
4. In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.

______________________________	______________________________
Name	Professional Credentials (Area of Expertise)
______________________________	______________________________
Signature (original submission)	Date
______________________________	______________________________
Signature (response to deficiencies, if any)	Date
______________________________	______________________________
Signature (revisions to submission, if any)	Date
______________________________	______________________________
Signature (final submission)	Date

An updated signature and form are required following any modification of the hurricane model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories. Additional signature lines shall be added as necessary with the following format:

______________________________	______________________________
Signature (revisions to submission)	Date

Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

Include Form G-4, Vulnerability Standards Expert Certification, in a submission appendix.

Form G-5: Actuarial Standards Expert Certification

Purpose: This form identifies the signatory or signatories who have reviewed the current submission for compliance with the Actuarial Standards (A-1 – A-6) in accordance with the stated provisions.

I hereby certify that I have reviewed the current submission of ______________________________
(Name of Hurricane Model)
Version ___________________ for compliance with the ~~2017~~ 2019 Hurricane Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1. The hurricane model meets the Actuarial Standards (A-1 – A-6);
2. The disclosures and forms related to the Actuarial Standards section are editorially and technically accurate, reliable, unbiased, and complete;
3. My review was completed in accordance with the Actuarial Standards of Practice and Code of Conduct; and
4. In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.

______________________________ Name	______________________________ Professional Credentials (Area of Expertise)
______________________________ Signature (original submission)	______________________________ Date
______________________________ Signature (response to deficiencies, if any)	______________________________ Date
______________________________ Signature (revisions to submission, if any)	______________________________ Date
______________________________ Signature (final submission)	______________________________ Date

An updated signature and form are required following any modification of the hurricane model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories. Additional signature lines shall be added as necessary with the following format:

______________________________ Signature (revisions to submission)	______________________________ Date

Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

Include Form G-5, Actuarial Standards Expert Certification, in a submission appendix.

Form G-6: Computer/Information Standards Expert Certification

Purpose: This form identifies the signatory or signatories who have reviewed the current submission for compliance with the Computer/Information Standards (CI-1 – CI-7) in accordance with the stated provisions.

I hereby certify that I have reviewed the current submission of ______________________________
(Name of Hurricane Model)
Version __________________ for compliance with the ~~2017~~ 2019 Hurricane Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and hereby certify that:

1. The hurricane model meets the Computer/Information Standards (CI-1 – CI-7);
2. The disclosures and forms related to the Computer/Information Standards section are editorially and technically accurate, reliable, unbiased, and complete;
3. My review was completed in accordance with the professional standards and code of ethical conduct for my profession; and
4. In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.

______________________________	______________________________
Name	Professional Credentials (Area of Expertise)
______________________________	______________________________
Signature (original submission)	Date
______________________________	______________________________
Signature (response to deficiencies, if any)	Date
______________________________	______________________________
Signature (revisions to submission, if any)	Date
______________________________	______________________________
Signature (final submission)	Date

An updated signature and form are required following any modification of the hurricane model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories. Additional signature lines shall be added as necessary with the following format:

______________________________	______________________________
Signature (revisions to submission)	Date

Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

Include Form G-6, Computer/Information Standards Expert Certification, in a submission appendix.

Form G-7: Editorial Review Expert Certification

Purpose: This form identifies the signatory or signatories who have reviewed the current submission for compliance with the Notification Requirements and General Standard G-5, Editorial Compliance, in accordance with the stated provisions.

I hereby certify that I have reviewed the current submission of ______________________________
(Name of Hurricane Model)
Version __________________ for compliance with the "Process for Determining the Acceptability of a Computer Simulation Hurricane Model" adopted by the Florida Commission on Hurricane Loss Projection Methodology in its *Hurricane Standards Report of Activities as of November 1, ~~2017~~2019*, and hereby certify that:

1. The hurricane model submission is in compliance with the Notification Requirements and General Standard G-5, Editorial Compliance;
2. The disclosures and forms related to each hurricane standards section are editorially accurate and contain complete information and any changes that have been made to the submission during the review process have been reviewed for completeness, grammatical correctness, and typographical errors;
3. There are no incomplete responses, charts or graphs, inaccurate citations, or extraneous text or references;
4. The current version of the hurricane model submission has been reviewed for grammatical correctness, typographical errors, completeness, the exclusion of extraneous data/information and is otherwise acceptable for publication; and
5. In expressing my opinion I have not been influenced by any other party in order to bias or prejudice my opinion.

Name	Professional Credentials (Area of Expertise)
Signature (original submission)	Date
Signature (response to deficiencies, if any)	Date
Signature (revisions to submission, if any)	Date
Signature (final submission)	Date

An updated signature and form are required following any modification of the hurricane model and any revision of the original submission. If a signatory differs from the original signatory, provide the printed name and professional credentials for any new signatories. Additional signature lines shall be added as necessary with the following format:

Signature (revisions to submission)	Date

Note: A facsimile or any properly reproduced signature will be acceptable to meet this requirement.

Include Form G-7, Editorial Review Expert Certification, in a submission appendix.

METEOROLOGICAL STANDARDS

M-1 Base Hurricane Storm Set*

*(*Significant Revision)*

A. The Base Hurricane Storm Set is the National Hurricane Center HURDAT2 as of ~~April 11, 2017~~ July 1, 2019 (or later), incorporating the period 1900-~~2016~~2018. Annual frequencies used in both hurricane model calibration and hurricane model validation shall be based upon the Base Hurricane Storm Set. Complete additional season increments based on updates to HURDAT2 approved by the Tropical Prediction Center/National Hurricane Center are acceptable modifications to these data. Peer reviewed atmospheric science literature may be used to justify modifications to the Base Hurricane Storm Set.

B. Any trends, weighting, or partitioning shall be justified and consistent with current scientific and technical literature. Calibration and validation shall encompass the complete Base Hurricane Storm Set as well as any partitions.

Purpose: The Base Hurricane Storm Set covers the period 1900-~~2016~~2018. The primary use of this Base Hurricane Storm Set is in both calibration and validation of modeled versus historical hurricanes impacting Florida. Failure to update modeled hurricane landfall statistics based on changes in the Base Hurricane Storm Set through the ~~2016~~ 2018 hurricane season is not acceptable.

The National Hurricane Center periodically updates the online version of HURDAT2 incorporating the latest approved reanalysis updates, including the latest hurricane season, and other modifications to historical storms. Since the online database is the source for HURDAT2, a freeze date has been specified for the HURDAT2 version to be used.

Variations between modeling organization hurricane characteristics and the HURDAT2 fields are expected; however, any variations in the track or intensity data from HURDAT2 must be justified as described in the standard.

Relevant Forms:
- G-2, Meteorological Standards Expert Certification
- M-1, Annual Occurrence Rates
- A-2~~A~~, Base Hurricane Storm Set Statewide Hurricane Losses ~~(2012 FHCF Exposure Data)~~
- ~~A-2B, Base Hurricane Storm Set Statewide Hurricane Losses (2017 FHCF Exposure Data)~~
- S-1, Probability and Frequency of Florida Landfalling Hurricanes per Year
- S-5, Average Annual Zero Deductible Statewide Hurricane Loss Costs – Historical versus Modeled

Disclosures

1. Specify the Base Hurricane Storm Set release date and the time period used to develop and implement landfall and by-passing hurricane frequencies into the hurricane model.

2. If the modeling organization has made any modifications to the Base Hurricane Storm Set related to hurricane landfall frequency and characteristics, provide justification for such modifications.

3. If the hurricane model incorporates short-term, long-term, or other systematic modification of the historical data leading to differences between modeled climatology and that in the Base Hurricane Storm Set, describe how this is incorporated.

4. Provide a completed Form M-1, Annual Occurrence Rates. Provide a link to the location of the form [insert hyperlink here].

Audit

1. The modeling organization Base Hurricane Storm Set will be reviewed.

2. A flowchart illustrating how changes in the HURDAT2 database are used in the calculation of hurricane landfall distribution will be reviewed.

3. Changes to the modeling organization Base Hurricane Storm Set from the previously-accepted hurricane model will be reviewed. Any modification by the modeling organization to the information contained in HURDAT2 will be reviewed.

4. Reasoning and justification underlying any short-term, long-term, or other systematic variations in annual hurricane frequencies incorporated in the hurricane model will be reviewed.

5. Modeled probabilities will be compared with observed hurricane frequency using methods documented in current scientific and technical literature. The goodness-of-fit of modeled to historical statewide and regional hurricane frequencies as provided in Form M-1, Annual Occurrence Rates, will be reviewed.

6. Form M-1, Annual Occurrence Rates, will be reviewed for consistency with Form S-1, Probability and Frequency of Florida Landfalling Hurricanes per Year.

7. Comparisons of modeled probabilities and characteristics from the complete historical record will be reviewed. Modeled probabilities from any subset, trend, or fitted function will be reviewed, compared, and justified against the complete HURDAT2 database. In the case of partitioning, modeled probabilities from the partition and its complement will be reviewed and compared with the complete HURDAT2 database.

M-2 Hurricane Parameters and Characteristics

Methods for depicting all modeled hurricane parameters and characteristics, including but not limited to windspeed, radial distributions of wind and pressure, minimum central pressure, radius of maximum winds, landfall frequency, tracks, spatial and time variant windfields, and conversion factors, shall be based on information documented in current scientific and technical literature.

Purpose: Scientifically sound information is to be used for determining hurricane parameters and characteristics. The stochastic storm set is to include only hurricanes that have realistic hurricane characteristics. Any differences in the treatment of hurricane parameters between historical and stochastic storms must be justified.

Relevant Forms: G-2, Meteorological Standards Expert Certification
S-3, Distributions of Stochastic Hurricane Parameters

Disclosures

1. Identify the hurricane parameters (e.g., central pressure, radius of maximum winds) that are used in the hurricane model.

2. Describe the dependencies among variables in the windfield component and how they are represented in the hurricane model, including the mathematical dependence of modeled windfield as a function of distance and direction from the center position.

3. Identify whether hurricane parameters are modeled as random variables, functions, or fixed values for the stochastic storm set. Provide rationale for the choice of parameter representations.

4. Describe if and how any hurricane parameters are treated differently in the historical and stochastic storm sets and provide rationale.

5. State whether the hurricane model simulates surface winds directly or requires conversion between some other reference level or layer and the surface. Describe the source(s) of conversion factors and the rationale for their use. Describe the process for converting the modeled vortex winds to surface winds including the treatment of the inherent uncertainties in the conversion factor with respect to location of the site compared to the radius of maximum winds over time. Justify the variation in the surface winds conversion factor as a function of hurricane intensity and distance from the hurricane center.

6. Describe how the windspeeds generated in the windfield model are converted from sustained to gust and identify the averaging time.

7. Describe the historical data used as the basis for the hurricane model hurricane tracks. Discuss the appropriateness of the hurricane model stochastic hurricane tracks with reference to the historical hurricane data.

8. If the historical data are partitioned or modified, describe how the hurricane parameters are affected.

9. Describe how the coastline is segmented (or partitioned) in determining the parameters for hurricane ~~frequency~~ annual landfall occurrence rates used in the hurricane model. Provide ~~the hurricane frequency distribution by intensity for each segment.~~ plots of the annual landfall occurrence rates obtained directly from the Base Hurricane Storm Set for two intensity bands (Saffir-Simpson categories 1-2 and 3-5) as functions of coastal segments along Florida and adjacent states. Plot on the same axes the modeled annual landfall occurrence rates over the Base Hurricane Storm Set period. If the modeling organization has a previously-accepted hurricane model, also plot on these axes the previously-accepted hurricane model annual landfall occurrence rates.

10. Describe any evolution of the functional representation of hurricane parameters during an individual storm life cycle.

Audit

1. All hurricane parameters used in the hurricane model will be reviewed.

2. Graphical depictions of hurricane parameters as used in the hurricane model will be reviewed. Descriptions and justification of the following will be reviewed:

    a. The dataset basis for the fitted distributions, the methods used, and any smoothing techniques employed,
    b. The modeled dependencies among correlated parameters in the windfield component and how they are represented, and
    c. The asymmetric structure of hurricanes.

3. The treatment of the inherent uncertainty in the conversion factor used to convert the modeled vortex winds to surface winds will be reviewed and compared with current scientific and technical literature. Treatment of conversion factor uncertainty at a fixed time and location within the windfield for a given hurricane intensity will be reviewed.

4. Scientific literature cited in Standard G-1, Scope of the Hurricane Model and Its Implementation, may be reviewed to determine applicability.

5. All external data sources that affect model-generated windfields will be identified, and their appropriateness will be reviewed.

6. Description of and justification for the value(s) of the far-field pressure used in the hurricane model will be reviewed.

M-3 Hurricane Probability Distributions

A. Modeled probability distributions of hurricane parameters and characteristics shall be consistent with historical hurricanes in the Atlantic basin.

B. Modeled hurricane landfall frequency distributions shall reflect the Base Hurricane Storm Set used for category 1 to 5 hurricanes and shall be consistent with those observed for each coastal segment of Florida and neighboring states (Alabama, Georgia, and Mississippi).

C. Hurricane models shall use maximum one-minute sustained 10-meter windspeed when defining hurricane landfall intensity. This applies both to the Base Hurricane Storm Set used to develop landfall frequency distributions as a function of coastal location and to the modeled winds in each hurricane which causes damage. The associated maximum one-minute sustained 10-meter windspeed shall be within the range of windspeeds (in statute miles per hour) categorized by the Saffir-Simpson Hurricane Wind Scale.

Saffir-Simpson Hurricane Wind Scale:

Category	Winds (mph)	Damage
1	74 – 95	Minimal
2	96 – 110	Moderate
3	111 – 129	Extensive
4	130 – 156	Extreme
5	157 or higher	Catastrophic

Purpose: The modeled probability distributions of hurricane parameters and characteristics are to be consistent with those documented in current scientific and technical literature. Consistent means that spatial distributions of modeled hurricane probabilities accurately depict those of vulnerable coastlines in Florida and neighboring states.

The probability of occurrence of hurricanes is to reasonably reflect the historical record with respect to intensities and geographical locations. Extension beyond Florida’s boundaries demonstrates continuity of methodology.

Relevant Forms: G-2, Meteorological Standards Expert Certification
M-1, Annual Occurrence Rates
A-2~~A~~, Base Hurricane Storm Set Statewide Hurricane Losses ~~(2012 FHCF Exposure Data)~~

~~A-2B, Base Hurricane Storm Set Statewide Hurricane Losses (2017 FHCF Exposure Data)~~
S-1, Probability and Frequency of Florida Landfalling Hurricanes per Year
S-3, Distributions of Stochastic Hurricane Parameters

Disclosures

1. Provide a complete list of the assumptions used in creating the hurricane characteristics databases.

2. Provide a brief rationale for the probability distributions used for all hurricane parameters and characteristics.

Audit

1. Demonstration of the quality of fit extending beyond the Florida border will be reviewed by showing results for appropriate coastal segments in Alabama, Georgia, and Mississippi.

2. The method and supporting material for selecting stochastic storm tracks will be reviewed.

3. The method and supporting material for selecting storm track strike intervals will be reviewed. If strike locations are on a discrete set, the hurricane landfall points for major metropolitan areas in Florida will be reviewed.

4. Any modeling-organization-specific research performed to develop the functions used for simulating hurricane model variables or to develop databases will be reviewed.

5. Form S-3, Distributions of Stochastic Hurricane Parameters, will be reviewed.

M-4 Hurricane Windfield Structure

A. Windfields generated by the hurricane model shall be consistent with observed historical storms affecting Florida.

B. The land use and land cover (LULC) database shall be consistent with National Land Cover Database (NLCD) 2011 or later. Use of alternate datasets shall be justified.

C. The translation of land use and land cover or other source information into a surface roughness distribution shall be consistent with current state-of-the-science and shall be implemented with appropriate geographic-information-system data.

D. With respect to multi-story buildings, the hurricane model ~~windfield~~ shall account for the effects of the vertical variation of winds ~~if not accounted for in the vulnerability functions~~.

Purpose: The windfield model is to be implemented consistently with a contemporary land use and land cover distribution and with the vertical distribution of the hurricane boundary layer winds where applicable. The resulting surface windfield is required to be representative of historical storms in Florida and neighboring states.

Relevant Forms:
- G-2, Meteorological Standards Expert Certification
- M-2, Maps of Maximum Winds
- A-2~~A~~, Base Hurricane Storm Set Statewide Hurricane Losses ~~(2012 FHCF Exposure Data)~~
- ~~A-2B, Base Hurricane Storm Set Statewide Hurricane Losses (2017 FHCF Exposure Data)~~

Disclosures

1. Provide a rotational windspeed (y-axis) versus radius (x-axis) plot of the average or default symmetric wind profile used in the hurricane model and justify the choice of this wind profile. If the windfield represents a modification from the previously-accepted ~~submission~~hurricane model, plot the old and new profiles on the same figure using consistent inputs. Describe variations between the old and new profiles with references to historical storms.

2. Describe how the vertical variation of winds is accounted for in the hurricane model where applicable. Document and justify any difference in the methodology for treating historical and stochastic storm sets.

3. Describe the relevance of the formulation of gust factor(s) used in the hurricane model.

4. Identify all non-meteorological variables (e.g., surface roughness, topography) that affect windspeed estimation.

5. Provide the collection and publication dates of the land use and land cover data used in the hurricane model and justify their timeliness for Florida.

6. Describe the methodology used to convert land use and land cover information into a spatial distribution of roughness coefficients in Florida and neighboring states.

7. Demonstrate the consistency of the spatial distribution of model-generated winds with observed windfields for hurricanes affecting Florida. Describe and justify the appropriateness of the databases used in the windfield validations.

8. Describe how the hurricane model windfield is consistent with the inherent differences in windfields for such diverse hurricanes as ~~Hurricane King (1950),~~ Hurricane Charley (2004), ~~Hurricane Jeanne (2004), and~~ Hurricane Wilma (2005), Hurricane Irma (2017), and Hurricane Michael (2018).

9. Describe any variations in the treatment of the hurricane model windfield for stochastic versus historical storms and justify this variation.

10. Provide a completed Form M-2, Maps of Maximum Winds. Explain the differences between the spatial distributions of maximum winds for open terrain and actual terrain for historical storms. Provide a link to the location of the form [insert hyperlink here].

Audit

1. Any modeling-organization-specific research performed to develop the windfield functions used in the hurricane model will be reviewed. The databases used will be reviewed.

2. Any modeling-organization-specific research performed to derive the roughness distributions for Florida and neighboring states will be reviewed.

3. The spatial distribution of surface roughness used in the hurricane model will be reviewed.

4. The previous and current hurricane parameters used in calculating the hurricane loss costs for the LaborDay03 (1935) and NoName09 (1945) hurricane landfalls will be reviewed. Justification for the choices used will be reviewed. The resulting spatial distribution of winds will be reviewed with Form A-2~~A~~, Base Hurricane Storm Set Statewide Hurricane Losses ~~(2012 FHCF Exposure Data) and Form A-2B, Base Hurricane Storm Set Statewide Hurricane Losses (2017 FHCF Exposure Data)~~.

5. For windfields not previously reviewed, detailed comparisons of the hurricane model windfield with ~~Hurricane King (1950),~~ Hurricane Charley (2004), ~~Hurricane Jeanne (2004), and~~ Hurricane Wilma (2005), Hurricane Irma (2017), and Hurricane Michael (2018) will be reviewed.

~~6. For windfield and pressure distributions not previously reviewed, time-based contour animations (capable of being paused) demonstrating scientifically-reasonable windfield characteristics will be reviewed.~~ {Moved to M-6, Audit 6}

~~7.~~6. Representation of vertical variation of winds in the hurricane model, where applicable, will be reviewed.

~~8.~~7. Form M-2, Maps of Maximum Winds, will be reviewed.

M-5 Hurricane Landfall and Over-Land Weakening Methodologies

A. The hurricane over-land weakening rate methodology used by the hurricane model shall be consistent with historical records and with current state-of-the-science.

B. The transition of winds from over-water to over-land within the hurricane model shall be consistent with current state-of-the-science.

Purpose: Evaluation of hurricane intensity at landfall, weakening of hurricanes over-land, and the transition of winds from ocean to land are to be consistent with up-to-date depictions of appropriate surface characteristics.

Relevant Form: G-2, Meteorological Standards Expert Certification

Disclosures

1. Describe and justify the functional form of hurricane decay rates used by the hurricane model.

2. Provide a graphical representation of the modeled decay rates for Florida hurricanes over time compared to wind observations.

3. Describe the transition from over-water to over-land boundary layer simulated in the hurricane model.

4. Describe any changes in hurricane parameters, other than intensity, resulting from the transition from over-water to over-land.

5. Describe the representation in the hurricane model of passage over non-continental U.S. land masses on hurricanes affecting Florida.

6. Describe any differences in the treatment of decay rates in the hurricane model for stochastic hurricanes compared to historical hurricanes affecting Florida.

Audit

1. The variation in over-land decay rates used in the hurricane model will be reviewed.

2. Comparisons of the hurricane model weakening rates to weakening rates for historical Florida hurricanes will be reviewed.

3. The detailed transition of winds from over-water to over-land (i.e., hurricane landfall, boundary layer) will be reviewed. The region within 5 miles of the coast will be emphasized. Color-coded snapshot maps of roughness length and spatial distribution of over-land and over-water windspeeds for Hurricane Andrew (1992), Hurricane Jeanne (2004), ~~Hurricane Dennis (2005), and Hurricane Andrew (1992)~~ and Hurricane Irma (2017) at the closest time after landfall will be reviewed.

M-6 Logical Relationships of Hurricane Characteristics

A. The magnitude of asymmetry shall increase as the translation speed increases, all other factors held constant.

B. The mean windspeed shall decrease with increasing surface roughness (friction), all other factors held constant.

Purpose: Logical relationships demonstrate physical consistency of the hurricane model windfield.

Relevant Forms: G-2, Meteorological Standards Expert Certification
M-2, Maps of Maximum Winds
M-3, Radius of Maximum Winds and Radii of Standard Wind Thresholds

Disclosures

1. Describe how the asymmetric structure of hurricanes is represented in the hurricane model.

2. Discuss the impact of surface roughness on mean windspeeds.

3. Provide a completed Form M-3, Radius of Maximum Winds and Radii of Standard Wind Thresholds. Provide a link to the location of the form [insert hyperlink here].

4. Discuss the radii values for each wind threshold in Form M-3, Radius of Maximum Winds and Radii of Standard Wind Thresholds, with reference to available hurricane observations such as those in HURDAT2. Justify the appropriateness of the databases used in the radii validations.

Audit

1. Form M-2, Maps of Maximum Winds, will be reviewed with a focus on the comparison between actual terrain and open terrain.

~~1.~~2. Form M-3, Radius of Maximum Winds and Radii of Standard Wind Thresholds, and the modeling organization sensitivity analyses will be reviewed.

~~2.~~3. Justification for the relationship between central pressure and radius of maximum winds will be reviewed. The relationships among intensity, Rmax, and their changes will be reviewed.

~~3.~~4. Justification for the variation of the asymmetry with the translation speed will be reviewed.

~~4.~~5. Methods (including any software) used in verifying these logical relationships will be reviewed.

6. ~~For windfield and pressure distributions not previous reviewed, t~~Time-based contour animations (capable of being paused) of windfield distributions demonstrating scientifically-

reasonable windfield characteristics and logical relationships will be reviewed. {Moved from M-4, Audit 6 and edited}

Form M-1: Annual Occurrence Rates

Purpose: This form illustrates the differences among statewide and regional frequencies of landfalling and by-passing Florida hurricanes for historical and modeled hurricanes. The historical events are derived from the Base Hurricane Storm Set with possible adjustments by the modeling organization as specified in Standard M-1, Base Hurricane Storm Set.

A. One or more automated programs or scripts shall be used to generate and arrange the data in Form M-1, Annual Occurrence Rates.

~~A.~~B. Provide a table of annual occurrence rates for hurricane landfall from the dataset defined by marine exposure that the hurricane model generates by hurricane category (defined by maximum windspeed at hurricane landfall in the Saffir-Simpson Hurricane Wind Scale) for the entire state of Florida and additional regions as defined in *Figure 3*. List the annual occurrence rate per hurricane category. Annual occurrence rates shall be rounded to ~~two~~ three decimal places.

The historical frequencies below have been derived from the Base Hurricane Storm Set as defined in Standard M-1, Base Hurricane Storm Set. If the modeling organization Base Hurricane Storm Set differs from that defined in Standard M-1, Base Hurricane Storm Set (for example, using a different historical period), the historical rates in the table shall be edited to reflect this difference (see below). As defined, a by-passing hurricane (ByP) is a hurricane which does not make landfall on Florida, but produces minimum damaging windspeeds or greater on land in Florida. For the by-passing hurricanes included in the table only, the ~~hurricane~~ intensity entered is the maximum windspeed at closest approach to Florida ~~as a hurricane~~, not the windspeed over Florida.

~~B.~~C. Describe hurricane model variations from the historical frequencies.

~~C.~~D. Provide vertical bar graphs depicting distributions of hurricane frequencies by category by region of Florida (*Figure 3*), for the neighboring states of Alabama/Mississippi and Georgia, and for by-passing hurricanes. For the neighboring states, statistics based on the closest coastal segment to the state boundaries used in the hurricane model are adequate.

~~D~~E. If the data are partitioned or modified, provide the historical annual occurrence rates for the applicable partition (and its complement) or modification as well as the modeled annual occurrence rates in additional copies of Form M-1, Annual Occurrence Rates.

~~E.~~F. List all hurricanes added, removed, or modified from the previously-accepted hurricane model version of the Base Hurricane Storm Set.

~~F.~~G. Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the hurricane standards year, and the form name. Also include Form M-1, Annual Occurrence Rates, in a submission appendix.

Notes on Form M-1, Annual Occurrence Rates:

1. Except where specified, number of hurricanes does not include by-passing hurricanes. Each time a hurricane goes from water to land (once per region) it is counted as a hurricane landfall in that region. However, each hurricane is counted only once in the Entire State totals. Hurricanes recorded for neighboring states need not have reported damaging winds in Florida.

2. Form M-1, Annual Occurrence Rates; Form A-2~~A~~, Base Hurricane Storm Set Statewide Hurricane Losses~~ (2012 FHCF Exposure Data), Form A-2B, Base Hurricane Storm Set Statewide Hurricane Losses (2017 FHCF Exposure Data)~~; and Form S-1, Probability and Frequency of Florida Landfalling Hurricanes per Year, are based on the ~~117~~ 119 year period 1900-~~2016~~ 2018 (consistent with Standard M-1, Base Hurricane Storm Set). It is intended that the storm set underlying Forms M-1, Annual Occurrence Rates; A-2~~A~~, Base Hurricane Storm Set Statewide Hurricane Losses~~ (2012 FHCF Exposure Data), A-2B, Base Hurricane Storm Set Statewide Hurricane Losses (2017 FHCF Exposure Data)~~; and S-1, Probability and Frequency of Florida Landfalling Hurricanes per Year, will be the same.

3. As specified in Standard M-1, Base Hurricane Storm Set, the modeling organization may exclude hurricanes that caused zero modeled damage, or include additional complete hurricane seasons, or may modify data for historical storms based on evidence in current scientific and technical literature. This may result in the modeling organization's Base Hurricane Storm Set differing from the storm set listed in Form A-2, Base Hurricane Storm Set Statewide Hurricane Losses. In this case, the modeling organization should modify the storm set listed in Form A-2, Base Hurricane Storm Set Statewide Hurricane Losses, to make it consistent with the modeling organization's Base Hurricane Storm Set. The modeling organization's Base Hurricane Storm Set shall be used to populate the historical counts and rates of Form M-1, Annual Occurrence Rates, as well as the Florida landfall historical frequency in Form S-1, Probability and Frequency of Florida Landfalling Hurricanes per Year.

~~As specified in Standard M-1, Base Hurricane Storm Set, the modeling organization may exclude hurricanes that caused zero modeled damage, or include additional complete hurricane seasons, or may modify data for historical storms based on evidence in current scientific and technical literature. This may result in the modeling organization including additional hurricane landfalls in Florida and neighboring states to those listed in Form A-2A, Base Hurricane Storm Set Statewide Hurricane Losses (2012 FHCF Exposure Data), and Form A-2B, Base Hurricane Storm Set Statewide Hurricane Losses (2017 FHCF Exposure Data), for Florida or counted in Form M-1, Annual Occurrence Rates, in the case of neighboring states. In this situation, the historical numbers in Form M-1, Annual Occurrence Rates, should be updated to agree with the modeling organization Base Hurricane Storm Set.~~

~~Any additional *Florida* hurricanes should be included in Form A-2A, Base Hurricane Storm Set Statewide Hurricane Losses (2012 FHCF Exposure Data), and Form A-2B, Base Hurricane Storm Set Statewide Hurricane Losses (2017 FHCF Exposure Data), as instructed there, and the historical hurricane landfall counts in Form S-1, Probability and Frequency of Florida Landfalling Hurricanes per Year, should be updated.~~

~~In some circumstances, the modeling organization windfield reconstruction of a historical storm may indicate that it is a by-passing hurricane (the modeling organization windfield results in damaging winds somewhere in the state). In this situation, the historical numbers in Form M-1,~~

~~Annual Occurrence Rates, should be updated to agree with the modeling organization Base Hurricane Storm Set, but no changes are required for Form A-2A, Base Hurricane Storm Set Statewide Hurricane Losses (2012 FHCF Exposure Data), Form A-2B, Base Hurricane Storm Set Statewide Hurricane Losses (2017 FHCF Exposure Data), or Form S-1, Probability and Frequency of Florida Landfalling Hurricanes per Year.~~

Annual Occurrence Rates

	Entire State				Region A – NW Florida			
	Historical		Modeled		Historical		Modeled	
Category	Number	Rate	Number	Rate	Number	Rate	Number	Rate
1	~~22~~ 26	0.~~19~~218			~~13~~16	0.~~11~~134		
2	~~18~~ 14	0.~~16~~118			~~7~~4	0.~~06~~034		
3	15	0.~~13~~126			~~7~~6	0.~~06~~050		
4	~~10~~11	0.~~09~~092			0	0.~~00~~000		
5	~~2~~3	0.~~02~~025			~~0~~1	0.~~00~~008		

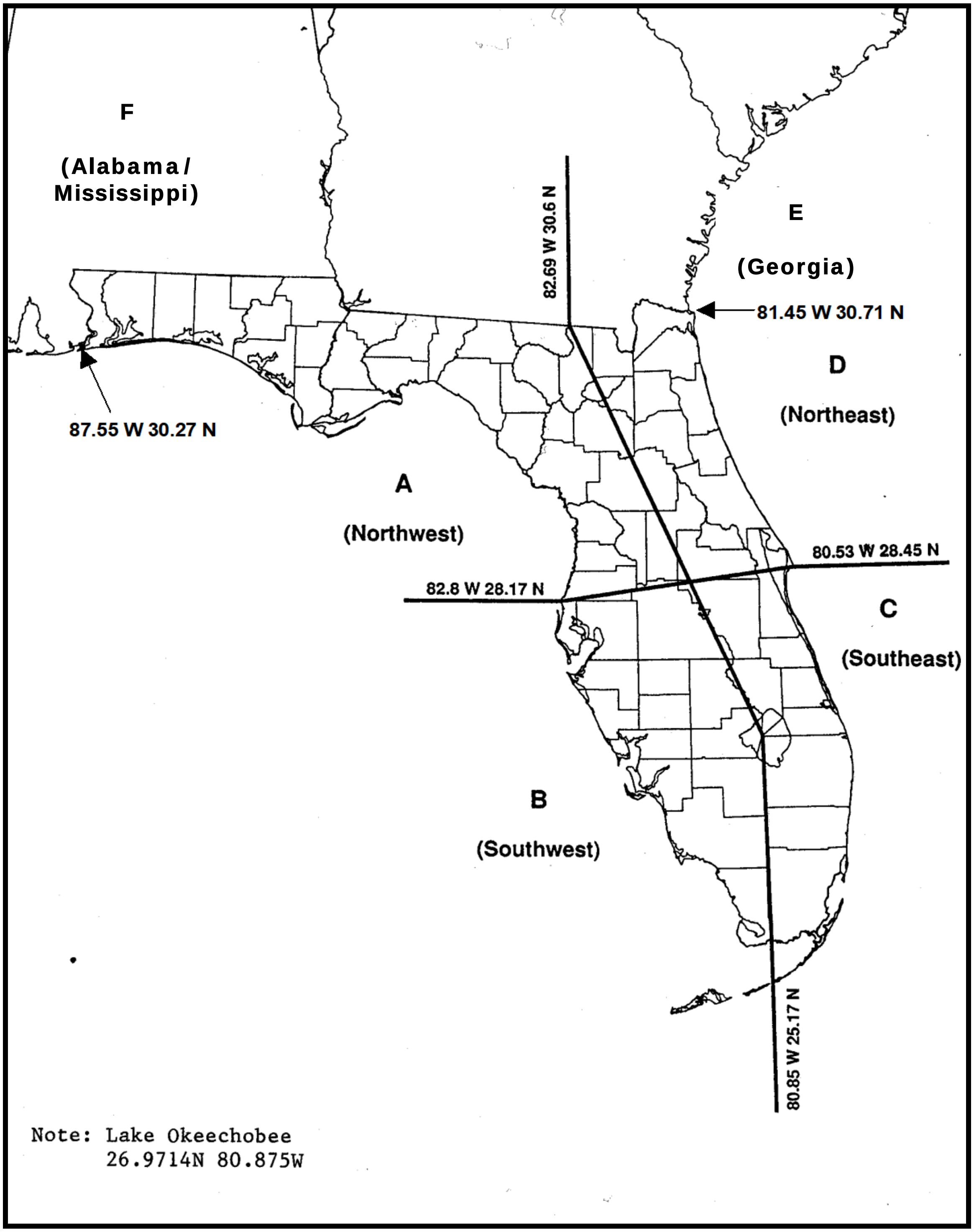
	Region B – SW Florida				Region C – SE Florida			
	Historical		Modeled		Historical		Modeled	
Category	Number	Rate	Number	Rate	Number	Rate	Number	Rate
1	7	0.~~06~~059			~~7~~8	0.~~06~~067		
2	~~4~~3	0.~~03~~025			6	0.~~05~~050		
3	6	0.~~05~~050			5	0.~~04~~042		
4	~~4~~5	0.~~03~~042			6	0.~~05~~050		
5	0	0.~~00~~000			2	0.~~02~~017		

	Region D – NE Florida				Florida By-Passing Hurricanes			
	Historical		Modeled		Historical		Modeled	
Category	Number	Rate	Number	Rate	Number	Rate	Number	Rate
1	1	0.~~01~~008			3	0.~~03~~025		
2	2	0.~~02~~017			2	0.~~02~~017		
3	0	0.~~00~~000			5	0.~~04~~042		
4	0	0.~~00~~000			0	0.~~00~~000		
5	0	0.~~00~~000			0	0.~~00~~000		

	Region E – Georgia				Region F – Alabama/Mississippi			
	Historical		Modeled		Historical		Modeled	
Category	Number	Rate	Number	Rate	Number	Rate	Number	Rate
1	0	0.~~00~~000			~~6~~7	0.~~05~~059		
2	2	0.~~02~~017			2	0.~~02~~017		
3	0	0.~~00~~000			4	0.~~03~~034		
4	0	0.~~00~~000			0	0.~~00~~000		
5	0	0.~~00~~000			1	0.~~01~~008		

Figure 3

State of Florida and Neighboring States By Region



Form M-2: Maps of Maximum Winds

Purpose: This form illustrates the ability of the hurricane model to simulate regional variations in historical windspeeds from hurricanes and the differences between the spatial distributions of maximum winds for open terrain and actual terrain.

A. Provide color-coded contour plots on maps with ZIP Code boundaries of the maximum winds for the modeled version of the Base Hurricane Storm Set for land use set for open terrain and for land use set for actual terrain. Plot the position and values of the maximum windspeeds on each contour map.

B. Provide color-coded contour plots on maps with ZIP Code boundaries of the maximum winds for a 100-year and a 250-year return period from the stochastic storm set for land use set for open terrain and for land use set for actual terrain. Plot the position and values of the maximum windspeeds on each contour map.

Actual terrain is the roughness distribution used in the standard version of the hurricane model, as defined by the modeling organization. For the ~~O~~open terrain maps, the modeling organization shall apply a ~~uses the same~~uniform roughness length of 0.03 meters at all land points, but keep the open-water points the same as the standard version of the hurricane model.

Maximum winds in these maps are defined as the maximum one-minute sustained winds over the terrain as modeled and recorded at each location.

The same color scheme and increments shall be used for all maps.

Use the following eight isotach values and interval color-coding:

(1)	Minimum damaging	Blue
(2)	50 mph	Medium Blue
(3)	65 mph	Light Blue
(4)	80 mph	White
(5)	95 mph	Light Red
(6)	110 mph	Medium Red
(7)	125 mph	Red
(8)	140 mph	Magenta

Contouring in addition to these isotach values may be included.

C. Include Form M-2, Maps of Maximum Winds, in a submission appendix.

Form M-3: Radius of Maximum Winds and Radii of Standard Wind Thresholds

Purpose: This form illustrates the physical consistency of the hurricane model windfield.

A. One or more automated programs or scripts shall be used to generate and arrange the data in Form M-3, Radius of Maximum Winds and Radii of Standard Wind Thresholds.

~~A.~~B. For the central pressures in the table below, provide the first quartile (1Q), median (2Q), and third quartile (3Q) values for (1) the radius of maximum winds (Rmax) used by the hurricane model to create the stochastic storm set, and the first quartile (1Q), median (2Q), and third quartile (3Q) values for the outer radii of (2) Category 3 winds (>110 mph), (3) Category 1 winds (>73 mph), and (4) gale force winds (>40 mph).

~~B.~~C. Describe the procedure used to complete this form.

~~C~~D. Identify other variables that influence Rmax.

~~D~~E. Specify any truncations applied to Rmax distributions in the hurricane model, and if and how these truncations vary with other variables.

~~E~~F. Provide a box plot and histogram of Central Pressure (*x*-axis) versus Rmax (*y*-axis) to demonstrate relative populations and continuity of sampled hurricanes in the stochastic storm set.

~~F~~G. Provide this form in Excel using the format given in the file named *"~~2017FormM3~~2019FormM3.xlsx."* The file name shall include the abbreviated name of the modeling organization, the hurricane standards year, and the form name. Also include Form M-3, Radius of Maximum Winds and Radii of Standard Wind Thresholds, in a submission appendix.

Central Pressure (mb)	Rmax (mi)			Outer Radii (>110 mph) (mi)			Outer Radii (>73 mph) (mi)			Outer Radii (>40 mph) (mi)		
	1Q	2Q	3Q	1Q	2Q	3Q	1Q	2Q	3Q	1Q	2Q	3Q
990												
980												
970												
960												
950												
940												
930												
920												
910												
900												

STATISTICAL STANDARDS

S-1 Modeled Results and Goodness-of-Fit*

*(*Significant Revision)*

A. The use of historical data in developing the hurricane model shall be supported by rigorous methods published in current scientific and technical literature.

B. Modeled and historical results shall reflect statistical agreement using current scientific and statistical methods for the academic disciplines appropriate for the various hurricane model components or characteristics.

Purpose: Many aspects of hurricane model development and implementation involve fitting a probability distribution to historical data for use in generating stochastic storms. Such fitted models must be checked to ensure that the distributions are reasonable. The chi-square goodness-of-fit test may not be sufficiently rigorous for demonstrating the reasonableness of models of historical data.

Relevant Forms:
G-3, Statistical Standards Expert Certification
M-1, Annual Occurrence Rates
S-1, Probability and Frequency of Florida Landfalling Hurricanes per Year
S-2~~A~~, Examples of Hurricane Loss Exceedance Estimates ~~(2012 FHCF Exposure Data)~~
~~S-2B, Examples of Hurricane Loss Exceedance Estimates (2017 FHCF Exposure Data)~~
S-3, Distributions of Stochastic Hurricane Parameters
S-4, Validation Comparisons
S-5, Average Annual Zero Deductible Statewide Hurricane Loss Costs – Historical versus Modeled
A-8, Hurricane Probable Maximum Loss for Florida

Disclosures

1. Provide a completed Form S-3, Distributions of Stochastic Hurricane Parameters. Identify the form of the probability distributions used for each function or variable, if applicable. Identify statistical techniques used for estimation and the specific goodness-of-fit tests applied along with the corresponding *p*-values. Describe whether the fitted distributions provide a reasonable agreement with the historical data. Provide a link to the location of the form [insert hyperlink here].

2. Describe the nature and results of the tests performed to validate the windspeeds generated.

3. Provide the dates of hurricane loss of the insurance claims data used for validation and verification of the hurricane model.

4. Provide an assessment of uncertainty in hurricane probable maximum loss levels and hurricane loss costs for hurricane output ranges using confidence intervals or other scientific characterizations of uncertainty.

5. Justify any differences between the historical and modeled results using current scientific and statistical methods in the appropriate disciplines.

6. Provide graphical comparisons of modeled and historical data and goodness-of-fit tests. Examples to include are hurricane frequencies, tracks, intensities, and physical damage.

7. Provide a completed Form S-1, Probability and Frequency of Florida Landfalling Hurricanes per Year. Provide a link to the location of the form [insert hyperlink here].

8. Provide a completed Form S-2~~A~~, Examples of Hurricane Loss Exceedance Estimates~~ (2012 FHCF Exposure Data)~~. Provide a link to the location of the form [insert hyperlink here].

~~9. Provide a completed Form S-2B, Examples of Hurricane Loss Exceedance Estimates (2017 FHCF Exposure Data). Provide a link to the location of the form [insert hyperlink here].~~

Audit

1. Forms S-1, Probability and Frequency of Florida Landfalling Hurricanes per Year; S-2~~A~~, Examples of Hurricane Loss Exceedance Estimates~~ (2012 FHCF Exposure Data), S-2B, Examples of Hurricane Loss Exceedance Estimates (2017 FHCF Exposure Data)~~; and S-3, Distributions of Stochastic Hurricane Parameters, will be reviewed. Justification for the distributions selected, including for example, citations to published literature or analyses of specific historical data, will be reviewed. Justification for the goodness-of-fit tests used will also be reviewed.

2. The modeling organization characterization of uncertainty for windspeed, damage estimates, annual hurricane loss, hurricane probable maximum loss levels, and hurricane loss costs will be reviewed.

S-2 Sensitivity Analysis for Hurricane Model Output

The modeling organization shall have assessed the sensitivity of temporal and spatial outputs with respect to the simultaneous variation of input variables using current scientific and statistical methods in the appropriate disciplines and shall have taken appropriate action.

Purpose: Sensitivity analysis involves the quantification of the magnitude of the output (e.g., windspeed, hurricane loss cost) by identifying and quantifying the input variables that impact the magnitude of the output when the input variables are varied simultaneously. The simultaneous variation of all input variables enables the modeling organization to detect interactions and to properly account for correlations among the input variables. Neither of these goals can be achieved by using one-factor-at-a-time variation; hence, such an approach to sensitivity analysis does not lead to an understanding of how the input variables jointly affect the hurricane model output. The simultaneous variation of the input variables is an important diagnostic tool and provides needed assurance of the robustness and viability of the hurricane model output.

Relevant Forms: G-3, Statistical Standards Expert Certification
S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis

Disclosures

1. Identify the most sensitive aspect of the hurricane model and the basis for making this determination.

2. Identify other input variables that impact the magnitude of the output when the input variables are varied simultaneously. Describe the degree to which these sensitivities affect output results and illustrate with an example.

3. Describe how other aspects of the hurricane model may have a significant impact on the sensitivities in output results and the basis for making this determination.

4. Describe and justify action or inaction as a result of the sensitivity analyses performed.

5. Provide a completed Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis. (Requirement for hurricane models submitted by modeling organizations which have not previously provided the Commission with this analysis. For hurricane models previously-found acceptable, the Commission will determine, at the meeting to review modeling organization submissions, if an existing modeling organization will be required to provide Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis, prior to the Professional Team on-site review). If applicable, provide a link to the location of the form [insert hyperlink here].

Audit

1. The modeling organization's sensitivity analysis will be reviewed in detail. Statistical techniques used to perform sensitivity analysis will be reviewed. The results of the sensitivity analysis displayed in graphical format (e.g., color-coded contour plots with temporal animation) will be reviewed.

2. Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis, will be reviewed, if applicable.

S-3 Uncertainty Analysis for Hurricane Model Output

The modeling organization shall have performed an uncertainty analysis on the temporal and spatial outputs of the hurricane model using current scientific and statistical methods in the appropriate disciplines and shall have taken appropriate action. The analysis shall identify and quantify the extent that input variables impact the uncertainty in hurricane model output as the input variables are simultaneously varied.

Purpose: Uncertainty analysis involves the quantification of the output (e.g., windspeed, hurricane loss cost) through a variance calculation or by use of confidence intervals. While these statistics provide useful information, uncertainty analysis goes beyond a mere quantification of these statistics by quantifying the expected percentage reduction in the variance of the output that is attributable to each of the input variables. Identification of those variables that contribute to the uncertainty is the first step that can lead to a reduction in the uncertainty in the output. It is important to note that the key input variables identified in an uncertainty analysis are not necessarily the same as those in a sensitivity analysis nor are they necessarily in the same relative order. As with sensitivity analysis, uncertainty analysis is an important diagnostic tool and provides needed assurance of the robustness and viability of the hurricane model output.

Relevant Forms: G-3, Statistical Standards Expert Certification
S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis

Disclosures

1. Identify the major contributors to the uncertainty in hurricane model outputs and the basis for making this determination. Provide a full discussion of the degree to which these uncertainties affect output results and illustrate with an example.

2. Describe how other aspects of the hurricane model may have a significant impact on the uncertainties in output results and the basis for making this determination.

3. Describe and justify action or inaction as a result of the uncertainty analyses performed.

4. Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis, if disclosed under Standard S-2, Sensitivity Analysis for Hurricane Model Output, will be used in the verification of Standard S-3, Uncertainty Analysis for Hurricane Model Output.

Audit

1. The modeling organization uncertainty analysis will be reviewed in detail. Statistical techniques used to perform uncertainty analysis will be reviewed. The results of the uncertainty analysis displayed in graphical format (e.g., color-coded contour plots with temporal animation) will be reviewed.

2. Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis, will be reviewed, if applicable.

S-4 County Level Aggregation

At the county level of aggregation, the contribution to the error in hurricane loss cost estimates attributable to the sampling process shall be negligible.

Purpose: The intent of this standard is to ensure that sufficient runs of the simulation have been made or a suitable sampling design invoked so that the contribution to the error of the hurricane loss cost estimates due to its probabilistic nature is negligible. To be negligible, the standard error of each hurricane output range must be less than 2.5% of the hurricane loss cost estimate.

Relevant Form: G-3, Statistical Standards Expert Certification

Disclosure

1. Describe the sampling plan used to obtain the average annual hurricane loss costs and hurricane output ranges. For a direct Monte Carlo simulation, indicate steps taken to determine sample size. For an importance sampling design or other sampling scheme, describe the underpinnings of the design and how it achieves the required performance.

Audit

1. A graph assessing the accuracy associated with a low impact area such as Nassau County will be reviewed. If the contribution error in an area such as Nassau County is small, the expectation is that the error in other areas would be small as well. The contribution of simulation uncertainty via confidence intervals will be reviewed.

S-5 Replication of Known Hurricane Losses

The hurricane model shall estimate incurred hurricane losses in an unbiased manner on a sufficient body of past hurricane events from more than one company, including the most current data available to the modeling organization. This standard applies separately to personal residential and, to the extent data are available, to commercial residential. Personal residential hurricane loss experience may be used to replicate structure-only and contents-only hurricane losses. The replications shall be produced on an objective body of hurricane loss data by county or an appropriate level of geographic detail and shall include hurricane loss data from both 2004 and 2005.

Purpose: The hurricane model is to reasonably reproduce known hurricane losses for past events.

Relevant Forms: G-3, Statistical Standards Expert Certification
S-4, Validation Comparisons

Disclosures

1. Describe the nature and results of the analyses performed to validate the hurricane loss projections generated for personal and commercial residential hurricane losses separately. Include analyses for the 2004 and 2005 hurricane seasons.

2. Provide a completed Form S-4, Validation Comparisons. Provide a link to the location of the form [insert hyperlink here].

Audit

1. The following information for each insurer and hurricane will be reviewed:

   a. The validity of the hurricane model assessed by comparing projected hurricane losses produced by the hurricane model to actual observed hurricane losses incurred by insurers at both the state and county level,
   b. The version of the hurricane model used to calculate modeled hurricane losses for each hurricane provided,
   c. A general description of the data and its source,
   d. A disclosure of any material mismatch of exposure and hurricane loss data problems, or other material consideration,
   e. The date of the exposures used for modeling and the date of the hurricane,
   f. An explanation of differences in the actual and modeled hurricane parameters,
   g. A listing of the departures, if any, in the windfield applied to a particular hurricane for the purpose of validation and the windfield used in the hurricane model under consideration,
   h. The type of coverage applied in each hurricane to address:
      (1) Personal versus commercial
      (2) Residential structures

(3) Manufactured homes
(4) Commercial residential
(5) Condominiums
(6) Structures only
(7) Contents only
(8) Time element,

i. The treatment of demand surge or loss adjustment expenses in the actual hurricane losses or the modeled hurricane losses, and
j. The treatment of flood losses, including storm surge losses, in the actual hurricane losses or the modeled hurricane losses.

2. The following documentation will be reviewed:

   a. Publicly available documentation referenced in the submission in hard copy or electronic form,
   b. The data sources excluded from validation and the reasons for excluding the data from review by the Commission (if any),
   c. An analysis that identifies and explains anomalies observed in the validation data, and
   d. User input data for each insurer and hurricane detailing specific assumptions made with regard to exposed property.

3. The confidence intervals used to gauge the comparison between historical and modeled hurricane losses will be reviewed.

4. Form S-4, Validation Comparisons, will be reviewed.

5. The results of one hurricane event for more than one insurance company and the results from one insurance company for more than one hurricane event will be reviewed to the extent data are available.

S-6 Comparison of Projected Hurricane Loss Costs

The difference, due to uncertainty, between historical and modeled annual average statewide hurricane loss costs shall be reasonable, given the body of data, by established statistical expectations and norms.

Purpose: The differences between historical and modeled annual average statewide hurricane loss costs are to be plausible from a statistical perspective.

Relevant Forms: G-3, Statistical Standards Expert Certification
S-5, Average Annual Zero Deductible Statewide Hurricane Loss Costs – Historical versus Modeled

Disclosures

1. Describe the nature and results of the tests performed to validate the expected hurricane loss projections generated. If a set of simulated hurricanes or simulation trials was used to determine these hurricane loss projections, specify the convergence tests that were used and the results. Specify the number of hurricanes or trials that were used.

2. Identify and justify differences, if any, in how the hurricane model produces hurricane loss costs for specific historical events versus hurricane loss costs for events in the stochastic hurricane set.

3. Provide a completed Form S-5, Average Annual Zero Deductible Statewide Hurricane Loss Costs – Historical versus Modeled. Provide a link to the location of the form [insert hyperlink here].

Audit

1. Form S-5, Average Annual Zero Deductible Statewide Hurricane Loss Costs – Historical versus Modeled, will be reviewed for consistency with Standard G-1, Scope of the Hurricane Model and Its Implementation, Disclosure ~~5~~7.

2. Justification for the following will be reviewed:

   a. Meteorological parameters,
   b. The effect of by-passing hurricanes,
   c. The effect of actual hurricanes that had two landfalls impacting Florida,
   d. The departures, if any, from the windfield, vulnerability functions, or insurance functions applied to the actual hurricanes for the purposes of this test and those used in the hurricane model under consideration, and
   e. Exposure assumptions.

Form S-1: Probability and Frequency of Florida Landfalling Hurricanes per Year

Purpose: This form illustrates the differences between historical and modeled frequencies of landfalling Florida hurricanes per year. The historical events are derived from the Base Hurricane Storm Set with possible adjustments by the modeling organization as specified in Standard M-1, Base Hurricane Storm Set.

A. One or more automated programs or scripts shall be used to generate and arrange the data in Form S-1, Probability and Frequency of Florida Landfalling Hurricanes per Year.

~~A.~~B. Complete the table below showing the probability and modeled frequency of landfalling Florida hurricanes per year. Modeled probability shall be rounded to three decimal places. The historical probabilities and frequencies below have been derived from the Base Hurricane Storm Set for the ~~117~~ 119 year period 1900-201~~6~~8 (as given in Form A-2~~B~~, Base Hurricane Storm Set Statewide Hurricane Losses ~~(2017 FHCF Exposure Data)~~). Exclusion of hurricanes that caused zero modeled Florida damage or additional Florida hurricane landfalls included in the modeling organization Base Hurricane Storm Set as identified in their response to Standard M-1, Base Hurricane Storm Set, ~~should~~ shall be used to adjust the historical probabilities and frequencies provided.

~~B.~~C. If the data are partitioned or modified, provide the historical probabilities and frequencies for the applicable partition (and its complement) or modification as well as the modeled probabilities and frequencies in additional copies of Form S-1, Probability and Frequency of Florida Landfalling Hurricanes per Year.

~~C.~~D. Include Form S-1, Probability and Frequency of Florida Landfalling Hurricanes per Year, in a submission appendix.

Probability and Frequency of Florida Landfalling Hurricanes per Year

Number of Hurricanes Per Year	Historical Probability	Modeled Probability	Historical Frequency	Modeled Frequency
0	0.~~607~~597		71	
1	0.~~239~~252		~~28~~30	
2	0.~~128~~126		15	
3	0.~~026~~025		3	
4	0.000		0	
5	0.000		0	
6	0.000		0	
7	0.000		0	
8	0.000		0	

9	0.000		0	
10 or more	0.000		0	

~~Form S-2A: Examples of Hurricane Loss Exceedance Estimates (2012 FHCF Exposure Data)~~

~~Purpose: This form provides the modeling organization hurricane loss exceedance estimates for a notional risk dataset (Form A-1, Zero Deductible Personal Residential Hurricane Loss Costs by ZIP Code) and for the 2012 Florida Hurricane Catastrophe Fund personal and commercial residential zero deductible exposure data.~~

~~A. Provide estimates of the annual aggregate combined personal and commercial insured hurricane losses for various probability levels using the notional risk dataset specified in Form A-1, Zero Deductible Personal Residential Hurricane Loss Costs by ZIP Code, and using the 2012 Florida Hurricane Catastrophe Fund personal and commercial residential zero deductible exposure data provided in the file named *"hlpm2012c.exe."* Provide the total average annual hurricane loss for the hurricane loss exceedance distribution. If the modeling methodology does not allow the hurricane model to produce a viable answer for certain return periods, state so and why.~~

~~B. Include Form S-2A, Examples of Hurricane Loss Exceedance Estimates (2012 FHCF Exposure Data), in a submission appendix.~~

~~Part A~~

~~Return Period (Years)~~	~~Annual Probability of Exceedance~~	~~Estimated Hurricane Loss Notional Risk Dataset~~	~~Estimated Personal and Commercial Residential Hurricane Loss 2012 FHCF Dataset~~
~~Top Event~~	~~NA~~		
~~10,000~~	~~0.01%~~		
~~5,000~~	~~0.02%~~		
~~2,000~~	~~0.05%~~		
~~1,000~~	~~0.10%~~		
~~500~~	~~0.20%~~		
~~250~~	~~0.40%~~		
~~100~~	~~1.00%~~		
~~50~~	~~2.00%~~		
~~20~~	~~5.00%~~		
~~10~~	~~10.00%~~		
~~5~~	~~20.00%~~		

~~Part B~~

	~~Estimated Hurricane Loss Notional Risk Dataset~~	~~Estimated Personal and Commercial Residential Hurricane Loss 2012 FHCF Dataset~~
~~Mean (Total Average Annual Hurricane Loss)~~		
~~Median~~		
~~Standard Deviation~~		
~~Interquartile Range~~		
~~Sample Size~~		

Form S-2~~B~~: Examples of Hurricane Loss Exceedance Estimates ~~(2017 FHCF Exposure Data)~~

Purpose: This form provides the modeling organization hurricane loss exceedance estimates for a notional risk dataset (Form A-1, Zero Deductible Personal Residential Hurricane Loss Costs by ZIP Code) and for the 2017 Florida Hurricane Catastrophe Fund personal and commercial residential zero deductible exposure data.

A. One or more automated programs or scripts shall be used to generate and arrange the data in Form S-2, Examples of Hurricane Loss Exceedance Estimates.

~~A.~~B. Provide estimates of the annual aggregate combined personal and commercial insured hurricane losses for various probability levels using the notional risk dataset specified in Form A-1, Zero Deductible Personal Residential Hurricane Loss Costs by ZIP Code, and using the 2017 Florida Hurricane Catastrophe Fund personal and commercial residential zero deductible exposure data provided in the file named "*hlpm2017c.~~exe~~zip*." Provide the total average annual hurricane loss for the hurricane loss exceedance distribution. If the modeling methodology does not allow the hurricane model to produce a viable answer for certain return periods, state so and why.

~~B~~C. Include Form S-2~~B~~, Examples of Hurricane Loss Exceedance Estimates ~~(2017 FHCF Exposure Data)~~, in a submission appendix.

Part A

Return Period (Years)	Annual Probability of Exceedance	Estimated Hurricane Loss Notional Risk Dataset	Estimated Personal and Commercial Residential Hurricane Loss 2017 FHCF Dataset
Top Event	NA		
10,000	0.01%		
5,000	0.02%		
2,000	0.05%		
1,000	0.10%		
500	0.20%		
250	0.40%		
100	1.00%		
50	2.00%		
20	5.00%		
10	10.00%		
5	20.00%		

Part B

	Estimated Hurricane Loss Notional Risk Dataset	Estimated Personal and Commercial Residential Hurricane Loss 2017 FHCF Dataset
Mean (Total Average Annual Hurricane Loss)	__________	__________
Median	__________	__________
Standard Deviation	__________	__________
Interquartile Range	__________	__________
Sample Size	__________	__________

Form S-3: Distributions of Stochastic Hurricane Parameters

Purpose: This form identifies the probability distributions used in the stochastic hurricane model and provides their justification.

A. Provide the probability distribution functional form used for each stochastic hurricane parameter in the hurricane model. Provide a summary of the justification for each functional form selected for each general classification.

B. Include Form S-3, Distributions of Stochastic Hurricane Parameters, in a submission appendix.

Stochastic Hurricane Parameter (Function or Variable)	Functional Form of Distribution	Data Source	Year Range Used	Justification for Functional Form

Form S-4: Validation Comparisons

Purpose: This form illustrates the differences between actual and modeled hurricane loss for a variety of specified conditions.

A. Provide ~~five~~ four validation comparisons of actual personal residential exposures and hurricane loss to modeled exposures and hurricane loss. Provide these comparisons by line of insurance, construction type, policy coverage, county or other level of similar detail in addition to total hurricane losses. Include hurricane loss as a percentage of total exposure. Total exposure represents the total amount of insured values (all coverages combined) in the area affected by the hurricane. This would include exposures for policies that did not have a hurricane loss. If this is not available, use exposures for only those policies that had a hurricane loss. Specify which was used. Also, specify the name of the hurricane event compared.

B. Provide a validation comparison of actual commercial residential exposures and hurricane loss to modeled exposures and hurricane loss. Use and provide a definition of the hurricane model relevant commercial residential classifications.

C. Provide scatter plots of modeled versus historical hurricane losses for each of the required validation comparisons. (Plot the historical hurricane losses on the *x*-axis and the modeled hurricane losses on the *y*-axis.)

D. Include Form S-4, Validation Comparisons, in a submission appendix.

Rather than using a specific published hurricane windfield directly, the winds underlying the modeled hurricane loss cost calculations must be produced by the hurricane model being evaluated and should be the same hurricane parameters as used in completing Form A-2~~A~~, Base Hurricane Storm Set Statewide Hurricane Losses ~~(2012 FHCF Exposure Data) and Form A-2B, Base Hurricane Storm Set Statewide Hurricane Losses (2017 FHCF Exposure Data)~~.

<u>Example Formats for Personal Residential:</u>

Hurricane = ____________________

Exposure = Specify total exposure or hurricane loss only ____________________________

Construction	Company Actual Hurricane Loss / Exposure	Modeled Hurricane Loss / Exposure	Difference
Wood Frame			
Masonry			
Other (specify)			
Total			

Hurricane = ____________________
Exposure = Specify total exposure or hurricane loss only ____________________________

Coverage	Company Actual Hurricane Loss / Exposure	Modeled Hurricane Loss / Exposure	Difference
A			
B			
C			
D			
Total			

Example Format for Commercial Residential:

Hurricane = ____________________
Exposure = Specify total exposure or hurricane loss only ____________________________

Construction	Company Actual Hurricane Loss / Exposure	Modeled Hurricane Loss / Exposure	Difference
Total			

Form S-5: Average Annual Zero Deductible Statewide Hurricane Loss Costs – Historical versus Modeled

Purpose: This form provides an illustration of the differences in actual and modeled average annual zero deductible statewide personal and commercial residential hurricane loss costs corresponding to the ~~2012 and~~ 2017 Florida Hurricane Catastrophe Fund personal and commercial residential zero deductible exposure data.

A. Provide the average annual zero deductible statewide personal and commercial residential hurricane loss costs produced using the list of hurricanes in the Base Hurricane Storm Set as defined in Standard M-1, Base Hurricane Storm Set, based on the ~~2012~~ 2017 Florida Hurricane Catastrophe Fund personal and commercial residential zero deductible exposure data found in the file named "~~*hlpm2012c.exe*~~*hlpm2017c.zip*."

Average Annual Zero Deductible Statewide Personal and Commercial Residential Hurricane Loss Costs
~~(2012 FHCF Exposure Data)~~

Time Period	Historical Hurricanes	Produced by Hurricane Model
Current Submission		
Previously-Accepted Hurricane Model* (~~2015~~ 2017 Hurricane Standards)		
Percent Change Current Submission/ Previously-Accepted Hurricane Model*		
Second Previously-Accepted Hurricane Model* (~~2013~~ 2015 Standards)		
Percent Change Current Submission/ Second Previously-Accepted Hurricane Model*		

**NA if no previously-accepted hurricane model*

B. Provide a comparison with the statewide personal and commercial residential hurricane loss costs produced by the hurricane model on an average industry basis.

C. Provide the 95% confidence interval on the differences between the means of the historical and modeled personal and commercial residential hurricane loss costs.

~~D. Provide the average annual zero deductible statewide personal and commercial residential hurricane loss costs produced using the list of hurricanes in the Base Hurricane Storm Set as defined in Standard M-1, Base Hurricane Storm Set, based on the 2017 Florida Hurricane Catastrophe Fund personal and commercial residential zero deductible exposure data found in the file named "*hlpm2017c.exe*."~~

~~Average Annual Zero Deductible Statewide Personal and Commercial Residential Hurricane Loss Costs (2017 FHCF Exposure Data)~~

~~Time Period~~	~~Historical Hurricanes~~	~~Produced by Hurricane Model~~
~~Current Submission~~		

~~E. Provide a comparison with the statewide personal and commercial residential hurricane loss costs produced by the hurricane model on an average industry basis.~~

~~F. Provide the 95% confidence interval on the differences between the means of the historical and modeled personal and commercial residential hurricane loss costs.~~

~~G~~D. If the data are partitioned or modified, provide the average annual zero deductible statewide personal and commercial residential hurricane loss costs for the applicable partition (and its complement) or modification, as well as the modeled average annual zero deductible statewide personal and commercial residential hurricane loss costs in additional copies of Form S-5, Average Annual Zero Deductible Statewide Hurricane Loss Costs – Historical versus Modeled.

~~H~~E. Include Form S-5, Average Annual Zero Deductible Statewide Hurricane Loss Costs – Historical versus Modeled, in a submission appendix.

Form S-6: Hypothetical Events for Sensitivity and Uncertainty Analysis

Purpose: This form requires the hurricane model to be run under a variety of specified parameter settings in order to perform detailed sensitivity and uncertainty analyses.

Specifications

The Excel file "~~*FormS6Input17*~~*FormS6Input19.xlsx*" contains nine worksheets which are to be used by the modeling organization in performing sensitivity and uncertainty analyses for their hurricane model. The first eight worksheets are classified, as follows:

Sensitivity Analysis (SA)	Uncertainty Analysis (UA)
1. SA all Variables	2. UA for CP 3. UA for Rmax 4. UA for VT 5. UA for Shape Parameter 6. UA for CF 7. UA for FFP 8. UA for Quantile

The first worksheet ("SA all Variables") contains three sets of 100 random combinations of the following seven hurricane model input variables for each of three categories of hurricanes (1, 3, and 5).

1. CP = central pressure (in millibars)
2. Rmax = radius of maximum winds (in statute miles)
3. VT = translational velocity (forward speed in miles per hour)
4. Hurricane model shape parameter such as the Holland B parameter
5. CF = conversion factor for converting the modeled gradient winds to surface winds
6. FFP = far field pressure (in millibars)
7. Quantiles for possible additional input variable (use is optional)

These hurricane model input variables are based on the probability distributions given in *Figure 4*.

These hurricane model input variables may or may not exactly match those used by the modeling organization. A second input file "~~*FormS6Input17Quantiles*~~*FormS6Input19Quantiles.xlsx*" has been provided that contains the corresponding quantiles for the seven hurricane model input variables above, hence there is a one-to-one correspondence between these two files. Modeling organizations may use the quantiles in "~~*FormS6Input17Quantiles*~~*FormS6Input19Quantiles.xlsx*" in lieu of the specific values in "~~*FormS6Input17*~~*FormS6Input19.xlsx.*" Note that the values of CP and Rmax, and the corresponding quantiles, have been produced with a rank correlation of 0.3 in the case of the Category 5 hurricane. No other variables or quantiles are correlated.

A. Disclose how quantiles were used.

B. If any hurricane model input variables are modified, provide the modified input files corresponding to those in the worksheet "SA all Variables."

C. The values of CP and FFP in the Excel file can either be used as the basis for calculating pressure difference, which would then be used as a single hurricane model input, or both CP and FFP can be used as hurricane model inputs. Disclose whether CP and FFP were used as the basis for calculating pressure difference or as direct hurricane model inputs.

Rmax, VT, and CF (as appropriate to the hurricane model) are to be used as direct hurricane model inputs where applicable. An example of CF implementation is presented below.

Figure 4 **Probability Distributions for Hurricane Model Input Variables**

	Category	**Distribution**	**Parameters**
CP	Cat 1	Triangular	a=975, b=982.5, c=990
	Cat 3	Triangular	a=945, b=952.5, c=960
	Cat 5	Triangular	a=900, b=910, c=920
Rmax	Cat 1	Triangular	a=12, b=22, c=40
	Cat 3	Triangular	a=8, b=20, c=40
	Cat 5	Triangular	a=5, b=12, c=25
VT	Cat 1	Triangular	a=10, b=15, c=20
	Cat 3	Triangular	a=10, b=15, c=20
	Cat 5	Triangular	a=10, b=15, c=20
Holland B	Cat 1	Quantile provided	
	Cat 3	Quantile provided	
	Cat 5	Quantile provided	
CF	Cat 1	Uniform	(0.8, 0.95)
	Cat 3	Uniform	(0.8, 0.95)
	Cat 5	Uniform	(0.8, 0.95)
FFP	Cat 1	Uniform	(1006, 1020)
	Cat 3	Uniform	(1006, 1020)
	Cat 5	Uniform	(1006, 1020)
No. 7	Cat 1	Quantile provided	
	Cat 3	Quantile provided	
	Cat 5	Quantile provided	

The fourth hurricane model input variable in the above list specifies quantiles ($0 \leq p \leq 1$) to be used with the modeling organization distribution for the shape of the wind profile parameter, for example the Holland B profile parameter (or suitable alternative). Quantiles from 0 to 1 have been provided in the Excel input file "~~*FormS6Input17Quantiles*~~ *FormS6Input19Quantiles.xlsx*" rather than specific values since modeling organizations may use different ranges and distributions for the Holland B profile parameter.

As an illustration, if the quantile has been specified as 0.345 in the Excel input file, input the specific value of x into the hurricane model such that $P(X \leq x) = 0.345$ where X is a random variable representing the modeling organization distribution for the Holland B profile parameter or other shape parameter used by the modeling organization.

D. If the last quantile input variable is used, describe how it was used and provide the specific values that correspond to the quantiles in Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis. That is, this quantile variable would be treated in the same manner as the Holland B profile parameter.

Note that the fourth and seventh input variables appear as quantiles in both *"~~FormS6Input17~~FormS6Input19.xlsx"* and *"~~FormS6Input17Quantiles~~ FormS6Input19Quantiles.xlsx."*

The CF variable is used to implement uncertainty in the conversion of modeled gradient winds to surface winds CF as a function of the radius (r) from the center of the hurricane to a given point in the hurricane windfield. The following example is provided to illustrate how CF could be implemented based on the following three intervals.

CASE 1: r < Rmax

The value of the random variable CF from the Excel input file *"~~FormS6Input17~~FormS6Input19.xlsx"* is multiplied by r/Rmax. This ratio varies from 0 at the center of the eye to 1 at r = Rmax so CF increases linearly from the center of the eye to its maximum at Rmax. As an example, suppose the value of CF in a particular input vector in the Excel file is 0.84, then the value of CF is zero at the center of the hurricane and 0.84(1) = 0.84 at Rmax. In between these two positions, the value of CF is based on linear interpolation using multiplication by r/Rmax.

CASE 2: Rmax < r < 3*Rmax

Within this interval, the value of the random variable CF is decreased from its maximum at r = Rmax by the following amount:

[(r - Rmax)/(3*Rmax - Rmax)]*(0.1)

Thus, at r = Rmax, CF is not decreased. At r = 3*Rmax, CF is decreased by 0.1. This calculation is simple linear interpolation between Rmax and 3*Rmax.

CASE 3: r > 3*Rmax

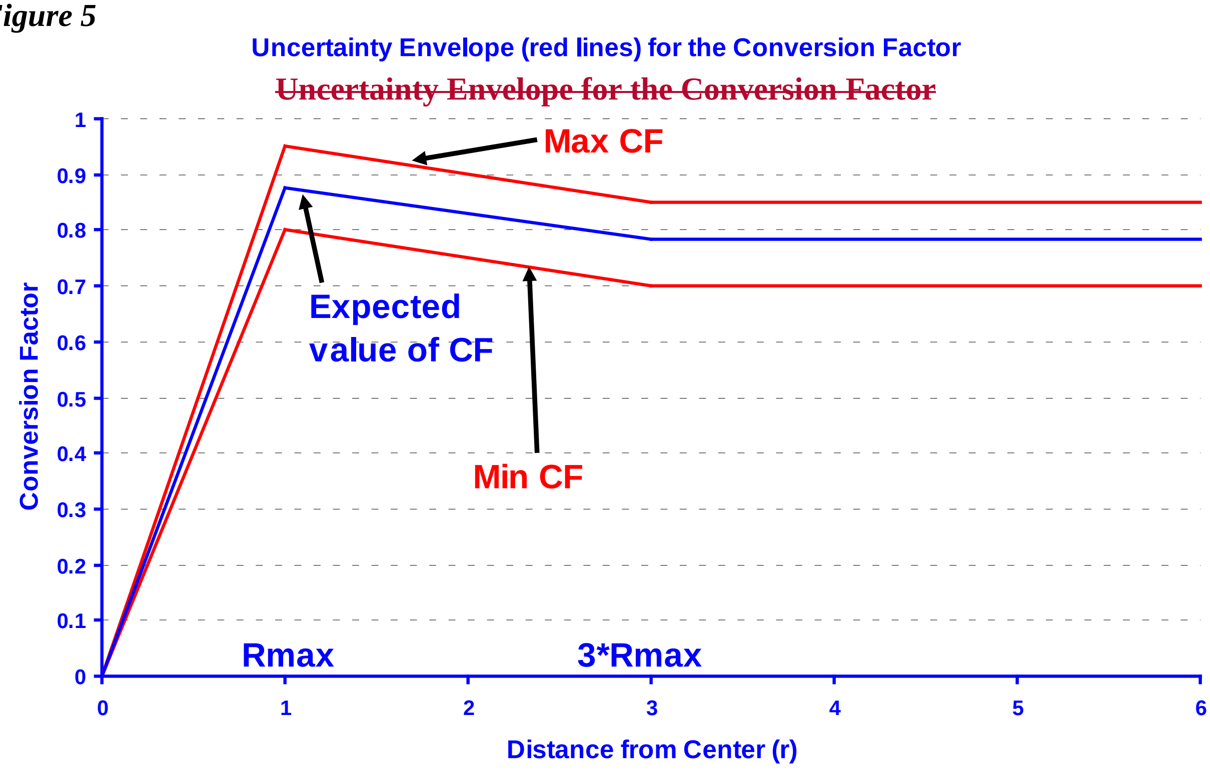
The value of the random variable CF at 3*Rmax is used for the remainder of the outer region, i.e., beyond r = 3*Rmax.

In summary, CF ramps up from its minimum value of 0 at the center of the hurricane to its maximum at Rmax and then ramps down in a linear fashion to 3*Rmax, where it achieves its maximum decrease of 0.1 from its value at Rmax. CF then remains at this value beyond 3*Rmax.

As an example, the previous value of CF = 0.84 would occur at Rmax and then decrease in a linear fashion to 0.84 – 0.1 = 0.74 at 3*Rmax and remain at this value beyond 3*Rmax.

Figure 5 shows an ~~“~~Uncertainty Envelope~~”~~ for CF using the methodology in this example. The horizontal axis in this graph is in units of Rmax. Thus, r = 0*Rmax represents the center of the hurricane, r = 1*Rmax represents Rmax and r = 3*Rmax represents the start of the outer region. Two red lines have been added in *Figure 5* to show the minimum and maximum possible values of CF from the input vectors in the Excel file *“~~FormS6Input17~~FormS6Input19.xlsx”* over the region of the hurricane. The blue line represents the expected value of CF when the distribution is uniform between 0.80 and 0.95. Thus, the minimum value of CF at r = Rmax is 0.8 and the maximum is 0.95. At r = 3*Rmax, these minimum and maximum values are decreased by 0.1 to 0.7 and 0.85, respectively. This description of CF is meant to be illustrative and serve as a guide for the modeling organization to adapt CF to their hurricane model.

Figure 5



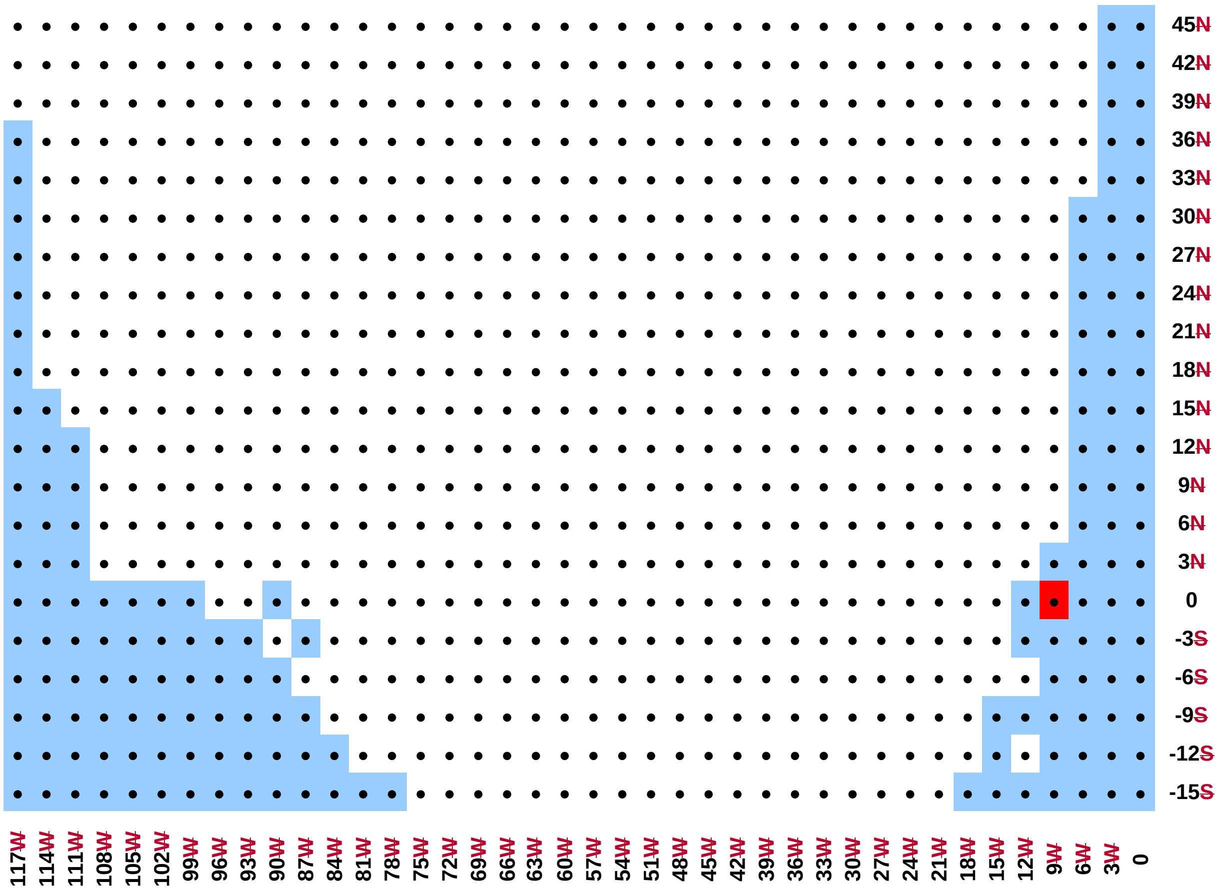
The 100 combinations of these seven hurricane model input variables represent different initial conditions for each of three categories of hurricanes (1, 3, and 5) given in the Excel input file. These hurricanes follow a straight due west track passing through the point (24.8611N, 80.1196W).

The 21×40 grid illustrated in *Figure* ~~6~~ 7 for southern Florida uses an approximate 3 statute mile spacing. For purposes of hurricane decay, use existing terrain consistent with the grid in *Figure* ~~6~~ 7 or *Figure* ~~7~~ 6 (map version with grid identified as a rectangular region).

The point (0, 0) is the location of the center of the hurricane at time 0, and is 9 miles east of the hurricane landfall location (25.8611N, 80.1196W), identified by the red rectangle in *Figure* ~~6~~7. The hurricane is to be modeled for 12 hours starting at time 0. The approximate latitudes and longitudes for the 840 vertices in the 21x40 grid are given in the ninth worksheet of the Excel input file.

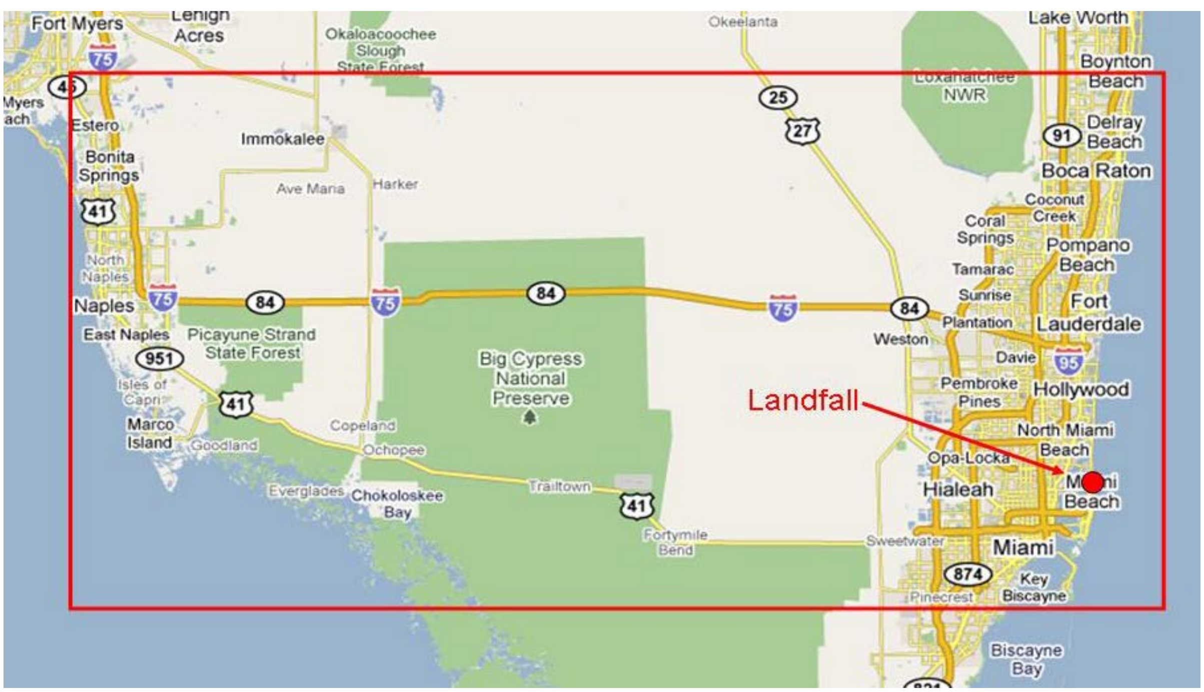
Figure ~~7~~6 **Map Version of Grid for Calculating Hourly Wind Velocities**

Figure ~~6~~7 **Grid for Calculating Hourly Wind Velocities**



Hurricane Path from (0, 0) to (117~~W~~, 0)

~~*Figure 7* **Map Version of Grid for Calculating Hourly Wind Velocities**~~



Hurricane Loss Costs

Successful completion of Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis, demonstrates that the modeling organization is capable of running an insurance portfolio at a latitude/longitude level directly and at a street address level indirectly with appropriate conversion to latitude/longitude.

Hurricane loss costs are to be determined using a $100,000 insured structure with a zero deductible policy, not to include contents, time element, or appurtenant structure coverages, at each of the 682 land-based vertices in *Figure* ~~6~~*7*. The Excel input file contains a ninth worksheet (Land-Water ID) that lists the 840 grid coordinates with an indicator variable defined, as follows:

0 = coordinate is over-water
1 = coordinate is over-land.

The following house is assumed at each of the land-based grid points designated by the indicator variable.

- Single family
- Single story
- Masonry walls
- Truss anchors
- Gable end roof
- No shutters
- Shingles with one layer 15# felt
- 1/2" plywood roof deck with 8d nails at 6" edge and 12" field
- House constructed in 1980

E. Produce hurricane loss costs for each hurricane category in two forms:

1. Aggregated hurricane loss costs over the 682 land-based vertices in the grid in *Figure* ~~6~~ *7* for each input vector and each hurricane category (100 x 3 = 300 values), and

2. The mean hurricane loss cost at each of the 682 land-based vertices in the grid in *Figure* ~~6~~ *7* over all 100 input vectors for each hurricane category (682 x 3 = 2,046 means).

F. Calculate the total hurricane loss cost over the 682 land-based vertices in the grid for each of the 100 input vectors and then divide this sum by $68,200,000 to get the expected hurricane loss cost as a percent of total exposure. The results for each input vector should be reported on a single row with the following information:

1. Hurricane category (1, 3, or 5),
2. Input vector number,
3. Total hurricane loss cost over the 682 land-based vertices in the grid, and
4. The expected hurricane loss cost as a percent of total exposure to two decimal places (i.e., 15.42 for 15.42%).

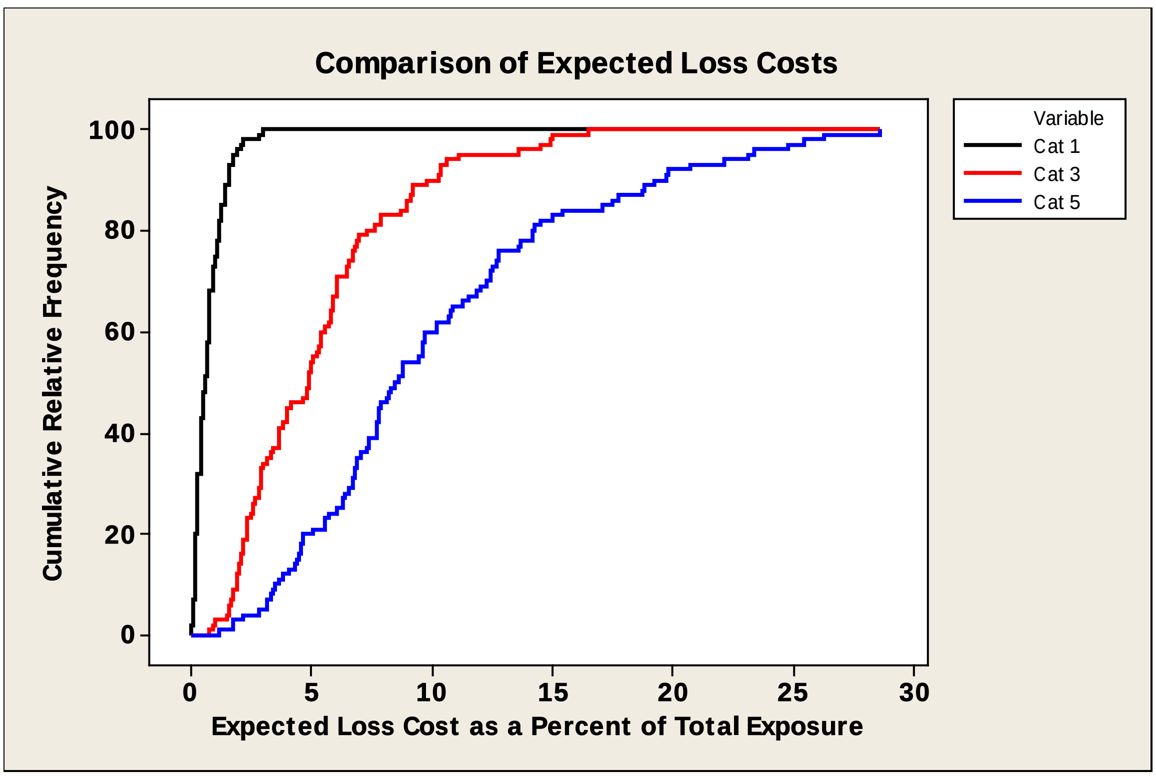
Thus, the entries in this file for input vectors 35-37 for the Category 5 hurricane will appear as in the following format.

5	35	4767326.	6.99
5	36	4365003.	6.40
5	37	2531948.	3.71

G. Provide the results in an ASCII file and a PDF file named *"~~XXX17Expected~~ XXX19Expected Hurricane Loss Cost"* where XXX denotes the abbreviated name of the modeling organization. The ASCII file will have 300 rows.

H. Display these results as cumulative empirical distribution functions as shown in *Figure 8* or its equivalent.

Figure 8



Comparison of CDFs of Hurricane Loss Costs for all Hurricane Categories

I. Report the mean hurricane loss cost at each of the 682 land-based vertices in the grid over all 100 input vectors for each hurricane category. The results should be reported with the following information:

1. Hurricane category (1, 3, or 5),
2. E-W grid coordinate (0, 3, 9, 12, …, 120),
3. N-S grid coordinate (-15, -12, -9, -6, …, 45), and
4. Hurricane loss cost as a percent of the exposure ($100,000) at each land-based coordinate to four decimal places (i.e., 0.1207 for 12.07%).

Thus, the entries in this file for the land-based vertices (12,18), (15,18), and (18,18) for the Category 5 hurricane will appear as in the following format.

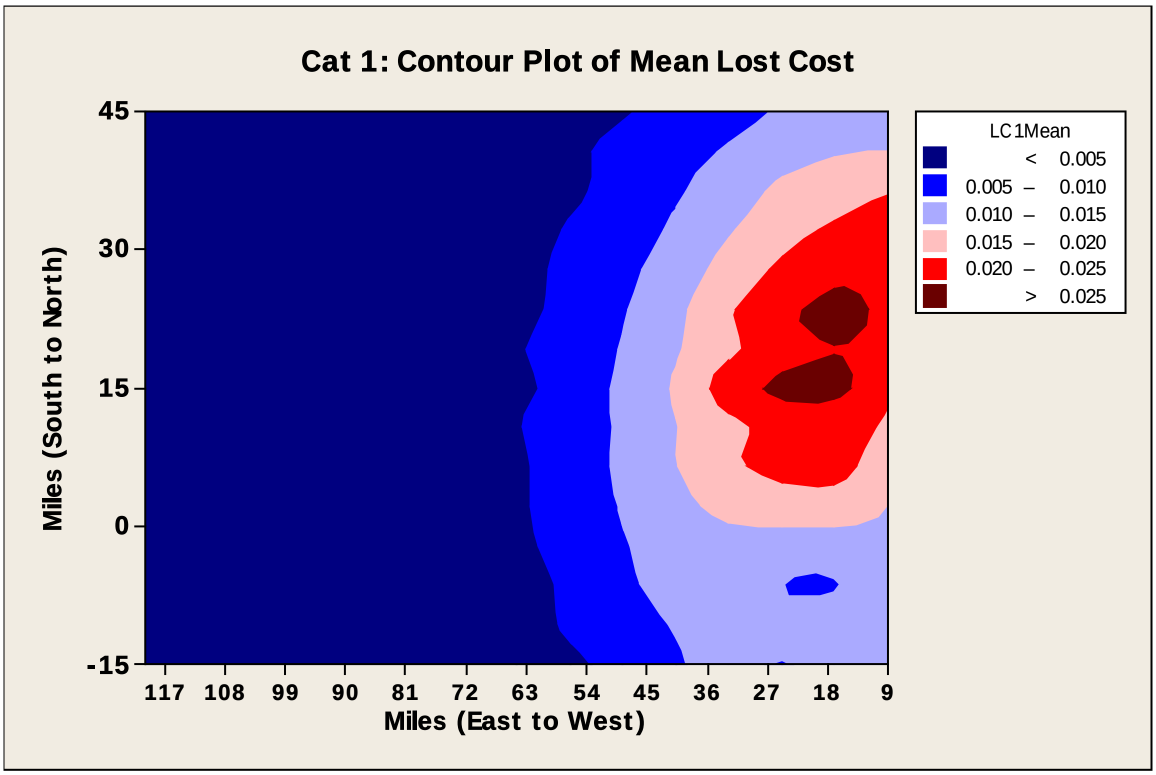
5	12	18	0.5142
5	15	18	0.4533
5	18	18	0.3872

J. Provide the results in an ASCII file and a PDF file named "~~*XXX17Hurricane*~~ *XXX19Hurricane Loss Cost Contour*" where XXX denotes the abbreviated name of the modeling organization. The ASCII file will have 3 x 682 = 2,046 rows.

K. Display the mean of the 100 input vectors as contour plots for each hurricane category as shown in *Figures 9* to *11* (use the suggested contour levels in these figures).

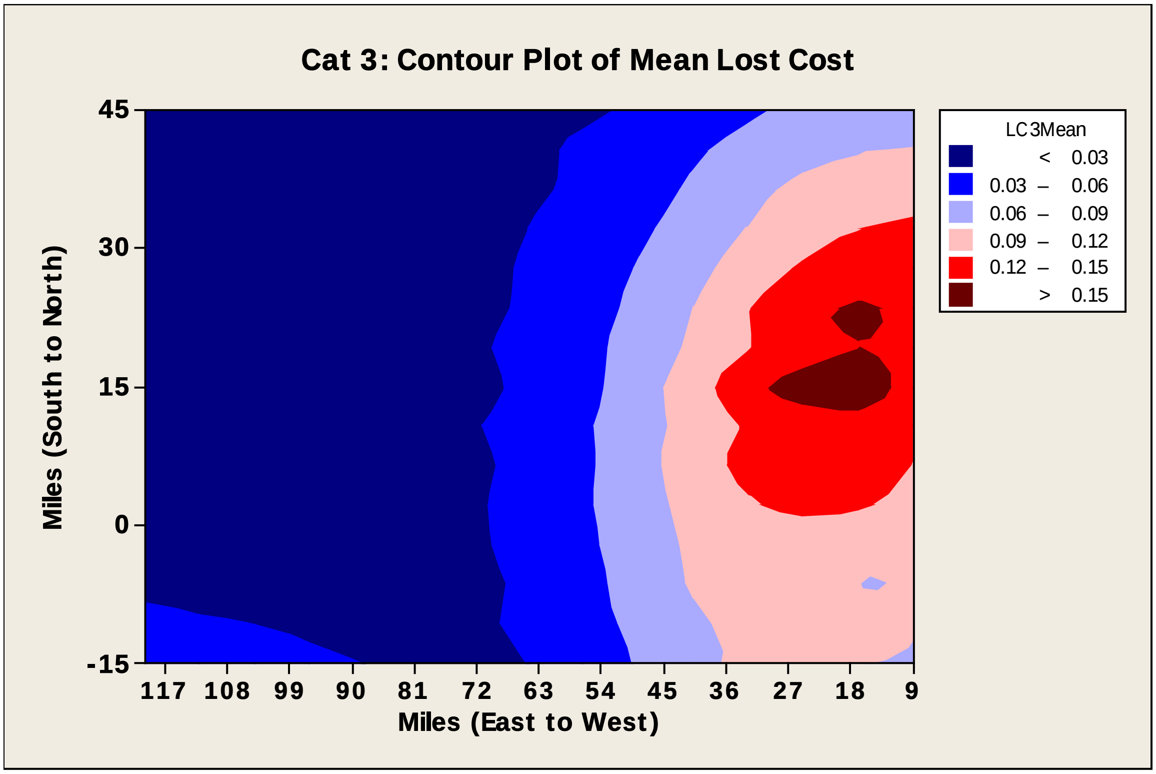
Note for contour plotting: The grid coordinates are written from east to west, but most contour plot software will have the origin in the lower left-hand corner (i.e., west to east). Thus, the X coordinates 18, 15, and 12 in the above example will need to be plotted as 120-18=102, 120-15=105, and 120-12=108 to avoid having a mirror image plot. Labels on the east-west axis will then have to be added to reflect the east to west grid as in *Figures 9* to *11*.

Figure 9



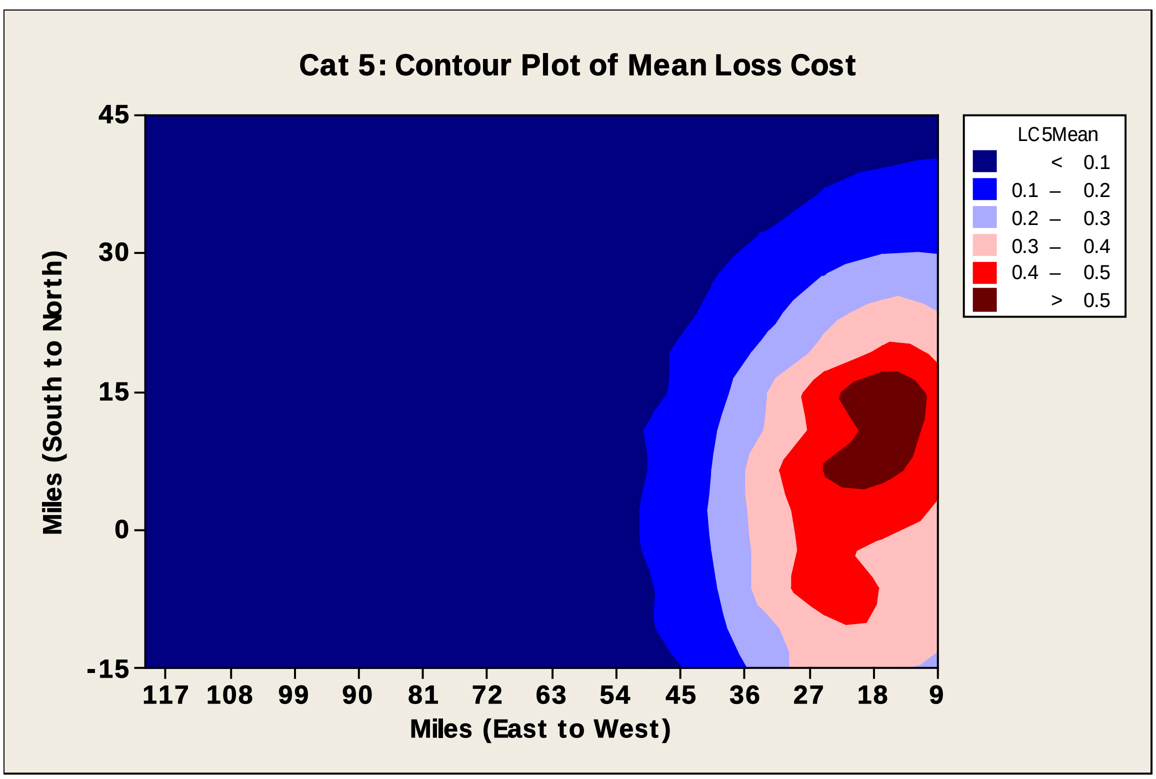
Contour Plot of Hurricane Loss Cost for a Category 1 Hurricane

Figure 10



Contour Plot of Hurricane Loss Cost for a Category 3 Hurricane

Figure 11



Contour Plot of Hurricane Loss Cost for a Category 5 Hurricane

Uncertainty and Sensitivity Analysis for Hurricane Loss Costs

L. The modeling organization shall perform uncertainty and sensitivity analyses for expected hurricane loss costs as outlined below. The Professional Team will perform uncertainty and sensitivity analyses based on the modeling organization expected hurricane loss cost calculations as part of its preparation prior to reviewing the modeling organization internal uncertainty and sensitivity analyses (using the hurricane model actual hurricane vulnerability functions) during the on-site reviews. The modeling organization shall present to the Professional Team during the on-site review their uncertainty and sensitivity analyses using the hurricane model hurricane vulnerability functions.

Sensitivity analyses will be based on standardized regression coefficients (SRC) for each hurricane model input variable in the Excel input file. The calculation of the SRCs is explained on page 22 of the *Professional Team Demonstration Uncertainty/Sensitivity Analysis* by R.L. Iman, M.E. Johnson, and T.A. Schroeder, September 2001, available at ~~www.~~*sbafla.com/method/portals/methodology/CommissionInquiries/UA-SA%20Demo.pdf*.

Hurricane loss costs used in these sensitivity analyses were based on the Professional Team surrogate hurricane vulnerability function. If the SRC is positive for a given hurricane model input variable, then hurricane loss costs increase as the variable increases while negative SRC values indicate that hurricane loss costs decrease as the variable increases. The SRCs in these sensitivity analyses are summarized, as follows.

Category	CP	Rmax	VT	Holland B	CF	FFP
1	-0.3924	0.4350	0.0692	0.5995	0.3633	0.0944
3	-0.2342	0.6996	-0.0488	0.3755	0.4265	0.1181
5	-0.1328	0.9397	-0.0373	0.1129	0.3372	0.0599

Figure 12 presents graphs of these SRCs for all six input variables for each category of hurricane. This figure shows that the Holland B profile parameter has the most influence on the magnitude of hurricane loss costs for a Category 1 hurricane and this relationship is positive. Rmax has the second most influence on the magnitude of hurricane loss costs (positive) followed closely by CP (negative relationship) and CF (positive). FFP and VT had slight influence.

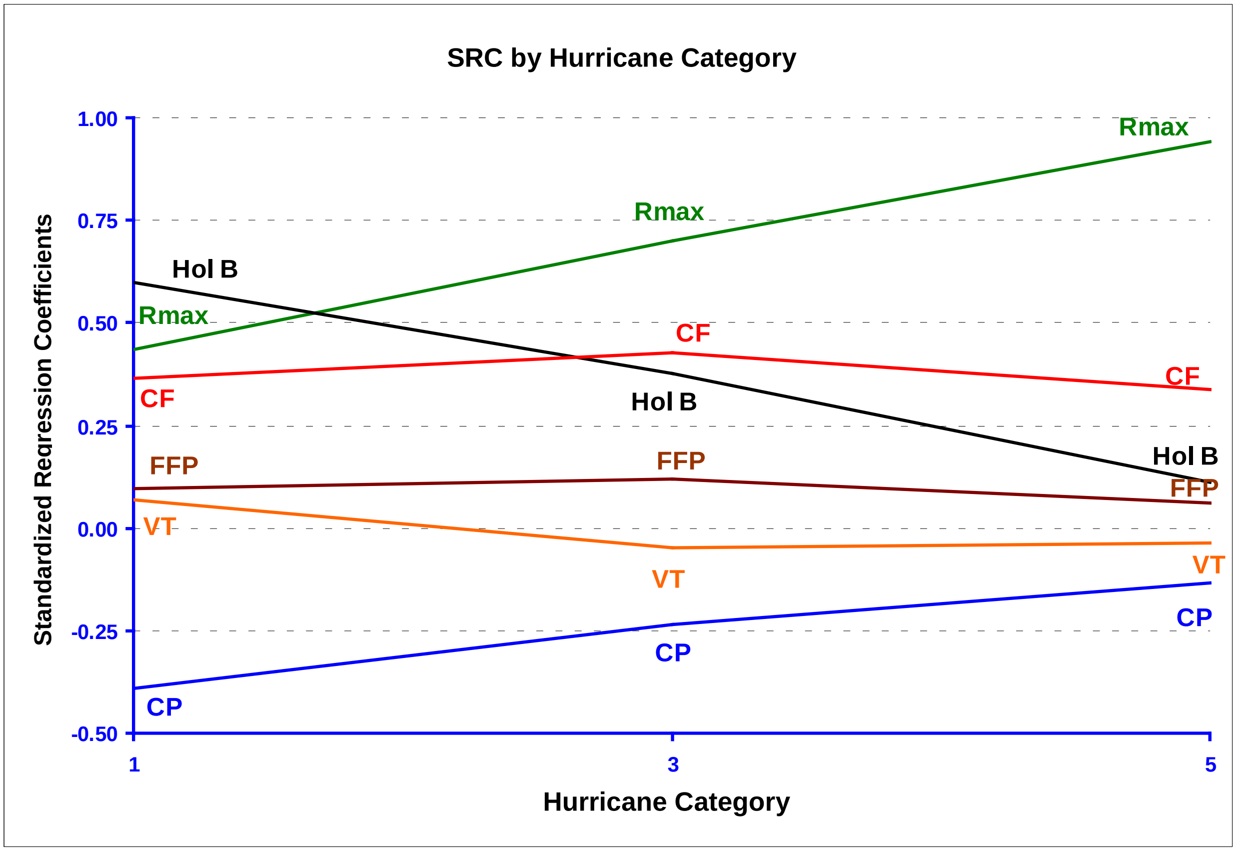
The Category 3 results in *Figure 12* show that Rmax now has the most influence on the magnitude of hurricane loss costs followed by CF and then Holland B and CP. FFP and VT again had the least influence.

The SRCs for Category 5 in *Figure 12* have the same ordering as for a Category 3 with the exception that Holland B and CP interchanged in the middle two positions.

Over all hurricane categories, Rmax, CF, and Holland B have the most influence on the magnitude of hurricane loss costs followed in fourth place by CP and then FFP and VT.

Note: Individual modeling organization results may differ significantly from the demonstration results shown here.

Figure 12



SRCs for Expected Hurricane Loss Costs for all Input Variables for all Hurricane Categories

Uncertainty analyses will be based on expected percentage reduction (EPR) for each hurricane model input variable in the Excel input file. The calculation of the EPRs is explained on page 22 of the *Professional Team Demonstration Uncertainty/Sensitivity Analysis* by R. L. Iman, M. E. Johnson, and T. A. Schroeder, September 2001, available at ~~www.~~*sbafla.com/method/portals/methodology/CommissionInquiries/UA-SA%20Demo.pdf*.

If the EPR is large for a given input variable, that variable makes a large contribution to the uncertainty in hurricane loss costs while a small EPR indicates that the variable contributes much less to the uncertainty in hurricane loss costs. The EPRs in these uncertainty analyses are summarized, as follows.

Category	CP	Rmax	VT	Holland B	CF	FFP
1	14.2%	16.9%	0.6%	37.6%	15.0%	1.4%
3	5.3%	43.7%	0.1%	12.1%	15.7%	0.8%
5	2.8%	88.7%	0.0%	1.7%	12.8%	0.7%

Figure 13 presents graphs of these EPRs for all six input variables for each category of hurricane. This figure shows that the Holland B profile parameter makes the largest contribution to the uncertainty (37.6%) in hurricane loss costs for a Category 1 hurricane. Rmax makes the next largest contribution (16.9%) followed closely by CF (15.0%) and then CP (14.2%). FFP (1.4%) and VT (0.6%) made very little contribution to the uncertainty in hurricane loss costs.

The Category 3 results in *Figure 13* show that Rmax makes the largest contribution to the uncertainty (43.7%) in hurricane loss costs followed by CF (15.7%) and Holland B (12.1%) while CP drops (5.3%). FFP (0.8%) and VT (0.1%) again make very little contribution to the uncertainty in hurricane loss costs.

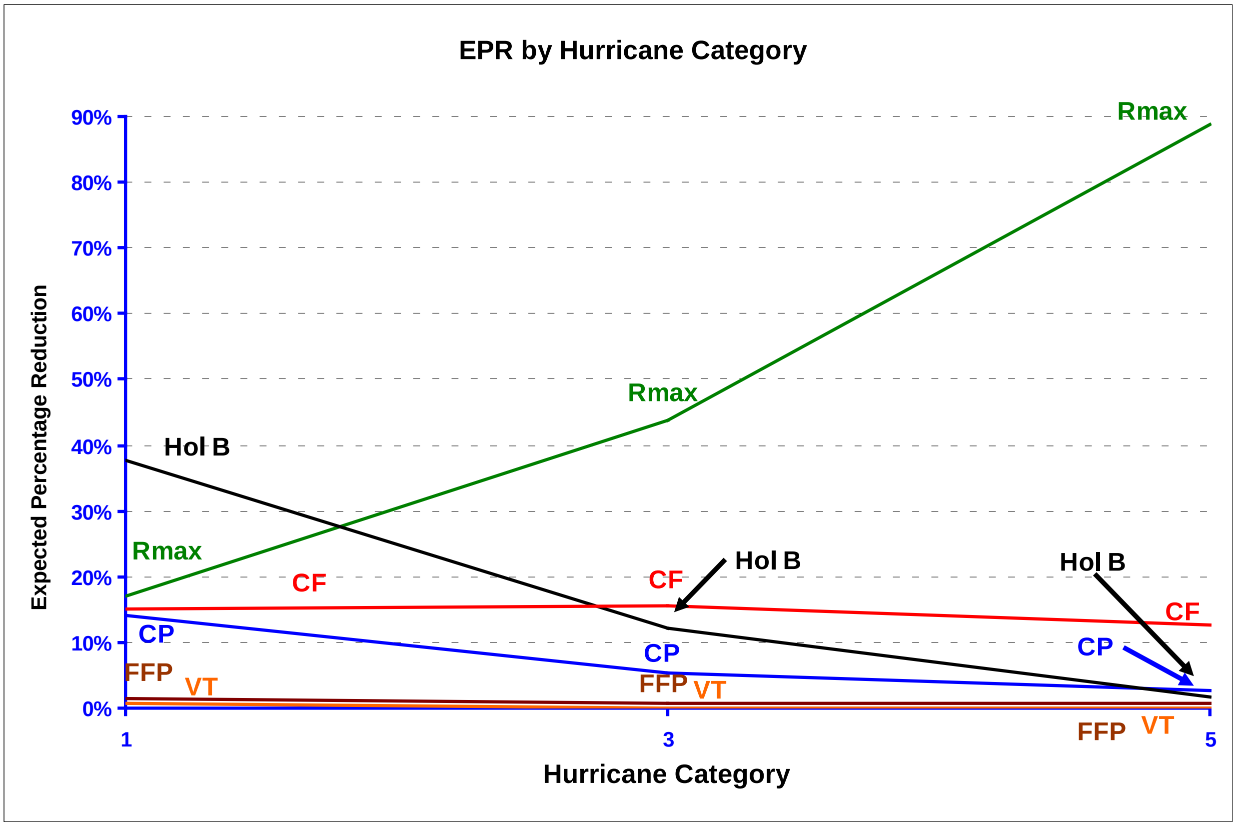
The EPRs for Category 5 in *Figure 13* have the same ordering as for a Category 3 with the exception that Holland B and CP are interchanged in the middle two positions. It is important to note that Holland B dominates the uncertainty in hurricane loss costs for smaller hurricanes and then decreases in influence for larger hurricanes while just the opposite is true for Rmax. CF is in second place for Category 3 and 5 and in third place for Category 1.

Over all hurricane categories, Rmax, CF, and Holland B make the largest contributions to the uncertainty in hurricane loss costs followed in fourth place by CP and then FFP and VT.

The EPRs in the above summary do not necessarily sum to 100% unless the underlying hurricane model is linear. In this case, the sums for Category 1, 3, and 5 are 86%, 78%, and 107%.

Note: Individual modeling organization results may differ significantly from the demonstration results shown here.

Figure 13



EPRs for Expected Hurricane Loss Costs for all Input Variables for all Hurricane Categories

Clarification of Input and Output Files for Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis

A. The Professional Team will need all actual input and output files to verify the modeling organization sensitivity and uncertainty analyses results for hurricane loss costs as specified in Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis. The following explanation is provided to clarify which files the modeling organization must submit. Compliance in submitting these files will eliminate the need for the Professional Team to request these files during the on-site review and to allow verification of the results prior to the on-site review.

Sensitivity Analysis. The first worksheet in the Excel file "~~*FormS6Input17*~~*FormS6Input19.xlsx*" is entitled "SA all Variables." This worksheet contains Latin hypercube samples (LHS) consisting of 100 random combinations of the following seven hurricane model input variables for each of three categories of hurricanes (1, 3, and 5).

1. CP = central pressure (in millibars)
2. Rmax = radius of maximum winds (in statute miles)
3. VT = translational velocity (forward speed in miles per hour)
4. Hurricane model shape parameter such as the Holland B parameter
5. CF = conversion factor for converting the modeled gradient winds to surface winds (or an optional additional input variable if conversion factor is not used)
6. FFP = far field pressure (in millibars)
7. Quantiles for possible additional input variable (use is optional)

B. Modeling organizations might choose to use some variation of these input variables. For example, the modeling organization might choose not to use the "hurricane model shape parameter," but choose to include the "quantile" variable. The actual LHS files used by the modeling organization shall be submitted including the identification of the input parameters that were used.

C. The modeling organization shall also submit the hurricane loss cost output files for the sensitivity analysis portion of Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis.

Uncertainty Analysis. Worksheets 2-8 in the Excel file "~~*FormS6Input17*~~*FormS6Input19.xlsx*" are used for the uncertainty analysis portion of Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis, and are labeled, as follows.

2. UA for CP
3. UA for Rmax
4. UA for VT
5. UA for Shape Parameter
6. UA for CF
7. UA for FFP
8. UA for Quantile

D. The modeling organization shall submit the hurricane loss cost output files for the uncertainty analysis portion of Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis, corresponding to worksheets 2-8.

E. Include the disclosures and displays as noted in the Form S-6, Hypothetical Events for Sensitivity and Uncertainty Analysis, instructions in a submission appendix.

VULNERABILITY STANDARDS

V-1 Derivation of Building Hurricane Vulnerability Functions*

*(*Significant Revision)*

A. Development of the building hurricane vulnerability functions shall be based on at least one of the following: (1) insurance claims data, (2) laboratory or field testing, (3) rational structural analysis, and (4) post-event site investigations. Any development of the building hurricane vulnerability functions based on rational structural analysis, post-event site investigations, and laboratory or field testing shall be supported by historical data.

B. The derivation of the building hurricane vulnerability functions and their associated uncertainties shall be theoretically sound and consistent with fundamental engineering principles.

C. Residential building stock classification shall be representative of Florida construction for personal and commercial residential buildings.

D. Building height/number of stories, primary construction material, year of construction, location, building code, and other construction characteristics, as applicable, shall be used in the derivation and application of building hurricane vulnerability functions.

E. Hurricane vulnerability functions shall be separately derived for commercial residential building structures, personal residential building structures, manufactured homes, and appurtenant structures.

F. The minimum windspeed that generates damage shall be consistent with fundamental engineering principles.

G. Building hurricane vulnerability functions shall include damage as attributable to windspeed and wind pressure, water infiltration, and missile impact associated with hurricanes. Building hurricane vulnerability functions shall not include explicit damage to the building due to flood~~,~~ (including hurricane storm surge~~, or~~ and wave action).

Purpose: Both hurricane and building characteristics affect personal and commercial residential building hurricane vulnerability functions.

The data and methods used to develop building hurricane vulnerability functions, and their associated uncertainties, affect the modeled hurricane loss costs and hurricane probable maximum loss levels. Their development and documentation are essential parts of the hurricane model.

The adoption and enforcement of statewide and county building codes affect the building hurricane vulnerability functions.

The design methods, applicable building codes, and construction practices may differ significantly for commercial residential building structures, personal residential building structures, manufactured homes, and appurtenant structures.

Damage certainly occurs above the hurricane threshold of 74 mph, but can also occur for windspeeds well below this threshold.

Relevant Forms: G-4, Vulnerability Standards Expert Certification
V-1, One Hypothetical Event
A-1, Zero Deductible Personal Residential Hurricane Loss Costs by ZIP Code
A-6, Logical Relationship to Hurricane Risk (Trade Secret Item)

Disclosures

1. Describe any modifications to the building vulnerability component in the hurricane model since the previously-accepted hurricane model.

2. Provide a flowchart documenting the process by which the building hurricane vulnerability functions are derived and implemented.

3. Describe the nature and extent of actual insurance claims data used to develop the building hurricane vulnerability functions. Describe in detail what is included, such as, number of policies, number of insurers, dates of hurricane loss, amount of hurricane loss, and ~~number of units~~ amount of dollar exposure; separated into personal residential, commercial residential, and manufactured homes.

4. Describe any new insurance claims datasets collected since the previously-accepted hurricane model.

~~4~~5. Describe the assumptions, data (including insurance claims data), methods, and processes used for the development of the building hurricane vulnerability functions.

~~5.~~6. Summarize post-event site investigations, including the sources, and provide a brief description of the resulting use of these data in the development or validation of building hurricane vulnerability functions.

~~6.~~7. Describe the categories of the different building hurricane vulnerability functions. Specifically, include descriptions of the building types and characteristics, building height, number of stories, regions within the state of Florida, year of construction, and occupancy types for which a unique building hurricane vulnerability function is used. Provide the total number of building hurricane vulnerability functions available for use in the hurricane model for personal and commercial residential classifications.

~~7.~~8. Describe the process by which local construction practices and statewide and county building code adoption and enforcement are considered in the development of the building hurricane vulnerability functions.

~~8.~~9. Describe the relationship between building structure and appurtenant structure hurricane vulnerability functions and their consistency with insurance claims data.

~~9~~10. Describe the assumptions, data (including insurance claims data), methods, and processes used to develop building hurricane vulnerability functions when:

a. residential construction types are unknown, or
b. one or more primary building characteristics are unknown, or
c. one or more secondary characteristics are known, or
d. building input characteristics are conflicting.

~~10~~11. Identify the one-minute average sustained windspeed and the windspeed reference height at which the hurricane model begins to estimate damage.

~~11~~12. Describe how the duration of windspeeds at a particular location over the life of a hurricane is considered.

~~12~~13. Describe how the hurricane model addresses wind-borne missile impact damage and water infiltration.

~~13~~14. Provide a completed Form V-1, One Hypothetical Event. Provide a link to the location of the form [insert hyperlink here].

Audit

1. Modifications to the building vulnerability component in the hurricane model since the previously-accepted hurricane model will be reviewed in detail, including the rationale for the modifications, the scope of the modifications, the process, the resulting modifications and their impacts on the building vulnerability component. Comparisons with the previously-accepted hurricane model will be reviewed.

2. Historical data in the original form will be reviewed with explanations for any changes made and descriptions of how missing or incorrect data were handled. When historical data ~~is~~ are used to develop building hurricane vulnerability functions, the goodness-of-fit of the data will be reviewed. Complete reports detailing loading conditions and damage states for any laboratory or field testing data used will be reviewed. When rational structural analysis is used to develop building hurricane vulnerability functions, such analyses will be reviewed for a variety of different building construction classes. Laboratory or field tests and original post-event site investigation reports will be reviewed.

3. All papers, reports, and studies used in the continual development of the building hurricane vulnerability functions must be available for review in hard copy or electronic form.

4. Multiple samples of building hurricane vulnerability functions for commercial residential building structures, personal residential building structures, manufactured homes, and

appurtenant structures will be reviewed. The magnitude of logical changes among these items for a given windspeed and validation materials will be reviewed.

5. Justification for the construction classes and characteristics used will be reviewed.

6. Validation of the building hurricane vulnerability functions and associated uncertainties will be reviewed.

7. Documentation and justification for the effects on~~all modifications to~~ the building hurricane vulnerability functions due to local and regional construction practices, and statewide and county building codes and their enforcement will be reviewed. If year of construction ~~and/~~or geographical location of building is used as a surrogate for building code and code enforcement, complete supporting information for the number of year of construction groups used as well as the year-bands~~(s) and/~~ or geographical region(s) of construction that separate~~s~~ particular groups will be reviewed.

8. Validation material for the disclosed minimum windspeed will be reviewed. The computer code showing the inclusion of the minimum windspeed at which damage occurs will be reviewed.

~~9. The effects on building hurricane vulnerability from local and regional construction characteristics and statewide and county building codes will be reviewed including whether current statewide and county building codes are reflected.~~ {Combined with 7 above}

~~10.~~9. How the claim practices of insurance companies are accounted for when claims data for those insurance companies are used to develop or to verify building hurricane vulnerability functions will be reviewed. Examples include the level of damage the insurer considers a loss to be a total loss, claim practices of insurers with respect to concurrent causation, ~~or~~ the impact of public adjusting, or the impact of the legal environment.

~~11.~~10. The percentage of damage at or above which the hurricane model assumes a total structure loss will be reviewed.

11. The treatment of law and ordinance in building hurricane vulnerability functions will be reviewed.

12. A plot comparing building structure and appurtenant structure hurricane vulnerability functions will be reviewed.

13. A plot comparing appurtenant structure hurricane vulnerability functions with insurance claims data will be reviewed.

14. Form V-1, One Hypothetical Event, and the process for completing the form with respect to building damage will be reviewed.

V-2 Derivation of Contents ~~and Time Element~~ Hurricane Vulnerability Functions*

*(*Significant Revision)*

A. Development of the contents ~~and time element~~ hurricane vulnerability functions shall be based on at least one of the following: (1) insurance claims data, (2) tests, (3) rational ~~structural~~ engineering analysis, and (4) post-event site investigations. Any development of the contents ~~and time element~~ hurricane vulnerability functions based on rational ~~structural~~ engineering analysis, post-event site investigations, and tests shall be supported by historical data.

B. The relationship between the hurricane model~~ed~~ building and contents hurricane vulnerability functions shall be consistent with, and supported by, the relationship observed in historical data ~~building and contents hurricane losses shall be reasonable~~.

~~C. Time element hurricane vulnerability function derivations shall consider the estimated time required to repair or replace the property.~~

~~D. The relationship between the hurricane model building, contents, and time element hurricane vulnerability functions and historical building, contents, and time element hurricane losses shall be reasonable.~~

~~E. Time element hurricane vulnerability functions used by the hurricane model shall include time element hurricane losses associated with wind, missile impact, flood, and storm surge damage to the infrastructure caused by a hurricane.~~

Purpose: Contents ~~and time element~~ hurricane vulnerability functions and hurricane losses are affected by various hurricane, building, and contents~~, and building~~ characteristics.

Historical contents ~~and time element~~ hurricane loss data are a reasonable indicator of the appropriateness of contents ~~and time element~~ hurricane vulnerability functions.

The documentation of the development of contents ~~and time element~~ hurricane vulnerability functions with respect to the methods and sources, including any use of insurance claims data ~~(including any adjustments)~~, post-event site investigations, rational ~~structural~~ engineering analysis, and testing data and reports, support the appropriateness of the contents ~~and time element~~ hurricane vulnerability functions.

A reasonable representation of contents ~~and time element~~ hurricane vulnerability is necessary in order to address policies that cover contents ~~and time element~~ hurricane losses.

~~Policies can provide varying types of hurricane time element coverage and insurance policies may pay for hurricane time element claims irrespective of damage to the insured property.~~

Relevant Forms: G-4, Vulnerability Standards Expert Certification
V-1, One Hypothetical Event
A-1, Zero Deductible Personal Residential Hurricane Loss Costs by ZIP Code
A-6, Logical Relationship to Hurricane Risk (Trade Secret Item)

Disclosures

1. Describe any modifications to the contents ~~and time element~~ vulnerability component in the hurricane model since the previously-accepted hurricane model.

2. Provide a flowchart documenting the process by which the contents hurricane vulnerability functions are derived and implemented.

3. Describe the assumptions, data (including insurance claims data), methods, and processes used to develop and validate the contents hurricane vulnerability functions.

4. Provide the total number of contents hurricane vulnerability functions. Describe whether different contents hurricane vulnerability functions are used for personal residential, commercial residential, manufactured homes, unit location for condo owners and apartment renters, and various building classes.

~~5. Provide a flowchart documenting the process by which the time element hurricane vulnerability functions are derived and implemented.~~

~~6. Describe the assumptions, data (including insurance claims data), methods, and processes used to develop and validate the time element hurricane vulnerability functions.~~

~~7. Describe how time element hurricane vulnerability functions take into consideration the damage (including damage due to storm surge, flood, and wind) to local and regional infrastructure.~~

~~8.~~5. Describe the relationship between building structure and contents hurricane vulnerability functions.

~~9. Describe the relationship between building structure and time element hurricane vulnerability functions.~~

~~10. Describe the assumptions, data (including insurance claims data), methods, and processes used to develop contents and time element hurricane vulnerability functions when:~~

~~a. residential construction types are unknown, or~~
~~b. one or more primary characteristics are unknown, or~~
~~c. one or more secondary characteristics are known, or~~
~~d. building input characteristics are conflicting.~~

Audit

1. Modifications to the contents ~~and time element~~ vulnerability component in the hurricane model since the previously-accepted hurricane model will be reviewed in detail, including the rationale for the modifications, the scope of the modifications, the process, the resulting modifications and their impact on the contents ~~and time element~~ vulnerability component. Comparisons with the previously-accepted hurricane model will be reviewed.

2. Multiple samples of contents ~~and time element~~ hurricane vulnerability functions will be reviewed.

3. To the extent that historical data are used to develop mathematical depictions of contents hurricane vulnerability functions, the goodness-of-fit of the data to fitted models will be reviewed.

4. Justification for changes from the previously-accepted hurricane model in the relativities between hurricane vulnerability functions for building and the corresponding hurricane vulnerability functions for contents will be reviewed.

5. Justification and documentation for the dependence of contents hurricane vulnerability functions on construction or occupancy type will be reviewed.

6. Documentation and justification of the ~~following aspects~~method of derivation and underlying data or assumptions related to contents ~~and time element~~ hurricane vulnerability functions will be reviewed~~:~~.

    ~~a. The method of derivation and underlying data,~~
    ~~b. Validation data specifically applicable to time element hurricane vulnerability,~~
    ~~c. Coding of time element by insurers,~~
    ~~d. The effects of demand surge on time element for the 2004 and 2005 hurricane seasons,~~
    ~~e. Variability of time element hurricane vulnerability by building classification and characteristics,~~
    ~~f. Statewide application of time element coverage,~~
    ~~g. Time element vulnerability for various occupancies,~~
    ~~h. The methods used to estimate the time, including uncertainty, required to repair or replace the property, and~~
    ~~i. The methodology and validation for determining the extent of infrastructure damage and their effect on time element hurricane vulnerability.~~

~~7. Justification for changes from the previously-accepted hurricane model in the relativities between hurricane vulnerability functions for building and the corresponding hurricane vulnerability functions for time element will be reviewed.~~

~~8. To the extent that historical data are used to develop mathematical depictions of time element hurricane vulnerability functions, the goodness-of-fit of the data to fitted models will be reviewed.~~

7. Form V-1, One Hypothetical Event, and the process for completing the form with respect to contents damage will be reviewed.

V-3 Derivation of Time Element Hurricane Vulnerability Functions*

*(*Significant Revision)*

A. Development of the time element hurricane vulnerability functions shall be based on at least one of the following: (1) insurance claims data, (2) tests, (3) rational engineering analysis, and (4) post-event site investigations. Any development of the time element hurricane vulnerability functions based on rational engineering analysis, post-event site investigations, and tests shall be supported by historical data.

B. The relationship between the hurricane model building and time element hurricane vulnerability functions shall be consistent with, and supported by, the relationship observed in historical data.

C. Time element hurricane vulnerability function derivations shall consider the estimated time required to repair or replace the property.

D. Time element hurricane vulnerability functions used by the hurricane model shall include time element hurricane losses associated with wind, missile impact, and flood~~,~~ ~~and~~(including hurricane storm surge) and damage to the infrastructure caused by a hurricane.

Purpose: Time element hurricane vulnerability functions and hurricane losses are affected by various hurricane, building, and contents characteristics.

Historical time element hurricane loss data are a reasonable indicator of the appropriateness of time element hurricane vulnerability functions.

The documentation of the development of time element hurricane vulnerability functions with respect to the methods and sources, including any use of insurance claims data, post-event site investigations, rational engineering analysis, and testing data and reports, support the appropriateness of the time element hurricane vulnerability functions.

A reasonable representation of time element hurricane vulnerability is necessary in order to address policies that cover time element hurricane losses.

Policies can provide varying types of hurricane time element coverage and insurance policies may pay for hurricane time element claims irrespective of damage to the insured property.

Relevant Forms: G-4, Vulnerability Standards Expert Certification
V-1, One Hypothetical Event
A-1, Zero Deductible Personal Residential Hurricane Loss Costs by ZIP Code
A-6, Logical Relationship to Hurricane Risk (Trade Secret Item)

Disclosures

1. Describe any modifications to the time element vulnerability component in the hurricane model since the previously-accepted hurricane model.

2. Provide a flowchart documenting the process by which the time element hurricane vulnerability functions are derived and implemented.

3. Describe the assumptions, data, methods, and processes used to develop and validate the time element hurricane vulnerability functions.

4. Describe how time element hurricane vulnerability functions take into consideration the damage (including damage due to ~~storm surge,~~ flood~~,~~ (including hurricane storm surge), and wind) to local and regional infrastructure.

5. Describe the relationship between building structure and time element hurricane vulnerability functions.

Audit

1. Modifications to the time element vulnerability component in the hurricane model since the previously-accepted hurricane model will be reviewed in detail, including the rationale for the modifications, the scope of the modifications, the process, the resulting modifications and their impact on the time element vulnerability component. Comparisons with the previously-accepted hurricane model will be reviewed.

2. Multiple samples of time element hurricane vulnerability functions will be reviewed.

3. Documentation and justification of the method of derivation and underlying data or assumptions related to time element hurricane vulnerability functions will be reviewed.

4. Justification for changes from the previously-accepted hurricane model in the relativities between hurricane vulnerability functions for building and the corresponding hurricane vulnerability functions for time element will be reviewed.

5. To the extent that historical data are used to develop mathematical depictions of time element hurricane vulnerability functions, the goodness-of-fit of the data to fitted models will be reviewed.

6. Form V-1, One Hypothetical Event, and the process for completing the form with respect to time element loss will be reviewed.

V-~~3~~4 Hurricane Mitigation Measures and Secondary Characteristics*

*(*Significant Revision)*

A. Modeling of hurricane mitigation measures to improve a building's hurricane wind resistance, the corresponding effects on hurricane vulnerability, and their associated uncertainties shall be theoretically sound and consistent with fundamental engineering principles. These measures shall include fixtures or construction techniques that affect the performance of the building and the damage to contents and shall consider:

- ***Roof strength***
- ***Roof covering performance***
- ***Roof-to-wall strength***
- ***Wall-to-floor-to-foundation strength***
- ***Opening protection***
- ***Window, door, and skylight strength.***

B. The modeling organization shall justify all hurricane mitigation measures and secondary characteristics considered by the hurricane model.

~~B.~~C. Application of hurricane mitigation measures that affect the performance of the building and the damage to contents shall be justified as to the impact on reducing damage whether done individually or in combination.

~~C.~~D. Treatment of individual and combined secondary characteristics that affect the performance of the building and the damage to contents shall be justified.

Purpose: Hurricane mitigation measures are intended to eliminate or reduce hurricane damage in the modeled hurricane losses as they impact the performance of personal and commercial residential buildings. Florida Statutes require rate filings to include, but not be limited to, the fixtures or construction techniques listed in this standard. Subsequent Florida Office of Insurance Regulation Informational Memorandum 02-0470M refers to a public domain study and further defines the items required.

1. Enhanced roof strength. Example: Braced gable end roof.
2. Enhanced roof covering performance. Example: Roof covering materials that comply with the current Florida Building Code.
3. Enhanced roof-to-wall strength. Example: Hurricane clips or straps, increased size or decreased spacing of nails in roof deck attachment.
4. Enhanced wall-to-floor-to-foundation strength. Example: Stronger anchor bolts or closer spacing of anchors.
5. Opening protection. Example: Shutter products.

6. Window, door (entry doors, garage doors, and sliding glass doors), and skylight strength. Example: Impact resistant glazing, entry doors, garage doors, and sliding glass doors of various strengths.

Secondary characteristics are building characteristics in addition to primary characteristics that might affect building performance in a hurricane event. Secondary characteristics include, but are not limited to:

1. Roof shape – hip roof ~~(sloping ends and sloping sides down to the roof eaves line)~~,
2. Age of roof covering,
3. Wall construction – wood frame, unreinforced or reinforced masonry, and
4. Opening protection for ~~non-glazed openings~~ windows, skylights, doors, and garage doors.

Relevant Forms:
G-4, Vulnerability Standards Expert Certification
V-2, Hurricane Mitigation Measures and Secondary Characteristics, Range of Changes in Damage
V-3, Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item)
V-4, Differences in Hurricane Mitigation Measures and Secondary Characteristics
V-5, Differences in Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item)
A-6, Logical Relationship to Hurricane Risk (Trade Secret Item)

Disclosures

1. Describe any modifications to hurricane mitigation measures and secondary characteristics in the hurricane model since the previously-accepted hurricane model.

2. Describe the procedures used to calculate the impact of hurricane mitigation measures and secondary characteristics, including software, its identification, and current version. Describe whether or not such procedures have been modified since the previously-accepted hurricane model.

~~2.~~3. Provide a completed Form V-2, Hurricane Mitigation Measures and Secondary Characteristics, Range of Changes in Damage. Provide a link to the location of the form [insert hyperlink here].

~~3.~~4. Provide a description of the hurricane mitigation measures and secondary characteristics used by the hurricane model, whether or not they are listed in Form V-2, Hurricane Mitigation Measures and Secondary Characteristics, Range of Changes in Damage.

~~4~~5. Describe how hurricane mitigation measures and secondary characteristics are implemented in the hurricane model. Identify any assumptions.

~~5~~6. Describe how the effects of multiple hurricane mitigation measures and secondary characteristics are combined in the hurricane model and the process used to ensure that multiple hurricane mitigation measures and secondary characteristics are correctly combined.

~~6~~7. Describe how building and contents damage are affected by performance of hurricane mitigation measures and secondary characteristics. Identify any assumptions.

~~7~~8. Describe how hurricane mitigation measures and secondary characteristics affect the uncertainty of the vulnerability. Identify any assumptions.

~~8~~9. Provide a completed Form V-3, Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item), if not considered as Trade Secret. Provide a link to the location of the form [insert hyperlink here].

10. Provide a completed Form V-4, Differences in Hurricane Mitigation Measures and Secondary Characteristics. Provide a link to the location of the form [insert hyperlink here].

11. Provide a completed Form V-5, Differences in Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item), if not considered as Trade Secret. Provide a link to the location of the form [insert hyperlink here].

Audit

1. Modifications to hurricane mitigation measures and secondary characteristics in the hurricane model since the previously-accepted hurricane model will be reviewed in detail, including the rationale for the modifications, the scope of the modifications, the process, the resulting modifications, and their impacts on the vulnerability component. Comparisons with the previously-accepted hurricane model will be reviewed.

2. Procedures, including software, used to calculate the impact of hurricane mitigation measures and secondary characteristics will be reviewed.

~~2.~~3. Form V-2, Hurricane Mitigation Measures and Secondary Characteristics, Range of Changes in Damage; Form V-3, Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item); Form V-4, Differences in Hurricane Mitigation Measures and Secondary Characteristics; and Form V-5, Differences in Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item), will be reviewed.

~~3.~~4. Implementation of individual hurricane mitigation measures and secondary characteristics will be reviewed as well as the effect of individual hurricane mitigation measures and secondary characteristics on damage. Any variation in the change over the range of windspeeds for individual hurricane mitigation measures and secondary characteristics will be reviewed. Historical data, technical literature, analysis or judgment based on fundamental engineering principles used to support the assumptions and implementation of the hurricane mitigation measures and secondary characteristics will be reviewed.

5. The treatment of roof age will be reviewed.

~~4.~~6. Implementation of multiple hurricane mitigation measures and secondary characteristics will be reviewed. The combined effects of these hurricane mitigation measures and secondary characteristics on damage will be reviewed. Any variation in the change over the range of windspeeds for multiple hurricane mitigation measures and secondary characteristics will be reviewed.

~~5~~7. Hurricane mitigation measures and secondary characteristics used by the hurricane model, whether or not referenced in Form V-2, Hurricane Mitigation Measures, Range of Changes in Damage, and Form V-3, Hurricane Mitigation Measures, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item), will be reviewed for theoretical soundness and reasonability.

Form V-1: One Hypothetical Event

Purpose: This form illustrates the general behavior and reasonableness of building hurricane vulnerability functions for hypothetical windspeeds over hypothetical exposure data.

A. Windspeeds for 96 ZIP Codes and sample personal and commercial residential exposure data are provided in the file named "~~FormV1Input17~~*FormV1Input19.xlsx.*" The windspeeds and ZIP Codes represent a hypothetical hurricane track. Model the sample personal and commercial residential exposure data provided in the file against these windspeeds at the specified ZIP Codes, and provide the building and contents damage ratios and time element loss ratios summarized by windspeed (mph) and construction type.

   The windspeeds provided are one-minute sustained 10-meter windspeeds. The sample personal and commercial residential exposure data provided consists of four structures (one of each construction type – wood frame, masonry, manufactured home, and concrete) individually placed at the population centroid of each of the ZIP Codes provided. Each ZIP Code is subjected to a specific windspeed.

   For completing Part A, Estimated Damage for each individual windspeed range is the sum of ground up hurricane loss to all structures in the ZIP Codes subjected to that individual windspeed range, excluding demand surge and flood (including hurricane storm surge). Subject Exposure is all exposures in the ZIP Codes subjected to that individual windspeed range.

   For completing Part B, Estimated Damage is the sum of the ground up hurricane loss to all structures of a specific type (wood frame, masonry, manufactured home, or concrete) in all of the windspeed ranges, excluding demand surge and flood (including hurricane storm surge). Subject Exposure is all exposures of that specific construction type in all of the ZIP Codes.

   One reference structure for each of the construction types shall be placed at the population centroid of the ZIP Codes. Do not include ~~contents,~~ appurtenant structure, contents, or time element coverages in the building damage ratios. Do not include building, appurtenant structure, or time element coverages in the contents damage ratios. Do not include building, appurtenant structure, or contents coverages in the time element loss ratios.

Reference Frame Structure	Reference Masonry Structure
One story Unbraced gable end roof ASTM D3161 Class D or ASTM D7158 Class D shingles ½" plywood deck 6d nails, deck to roof members Toe nail truss to wall anchor Wood framed exterior walls 5/8" diameter anchors at 48" centers for wall-floor-foundation connections No shutters Standard glass windows No door covers No skylight covers Constructed in 1995	One story Unbraced gable end roof ASTM D3161 Class D or ASTM D7158 Class D shingles ½" plywood deck 6d nails, deck to roof members Weak truss to wall connection Masonry exterior walls No vertical wall reinforcing No shutters Standard glass windows No door covers No skylight covers Constructed in 1995
Reference Manufactured Home Structure	**Reference Concrete Structure**
Tie downs Single unit Manufactured in 1980	Twenty story Eight apartment units per story No shutters Standard glass windows Constructed in 1980

B. Confirm that the structures used in completing the form are identical to those in the above table for the reference structures. If additional assumptions are necessary to complete this form (for example, regarding structural characteristics, duration, or surface roughness), provide the reasons why the assumptions were necessary as well as a detailed description of how they were included.

C. Provide ~~a~~ separate plots of the Estimated Damage/Subject Exposure (*y*-axis) versus Windspeed (*x*-axis) for the Building, Contents, and Time Element data in Part A ~~data~~.

D. Include Form V-1, One Hypothetical Event, in a submission appendix.

Form V-1: One Hypothetical Event

Part A

Windspeed (mph, one-minute sustained 10-meter)	Estimated Building Damage/ Subject Building Exposure	Estimated Contents Damage/ Subject Contents Exposure	Estimated Time Element Loss/ Subject Time Element Exposure
41 – 50			
51 – 60			
61 – 70			
71 – 80			
81 – 90			
91 – 100			
101 – 110			
111 – 120			
121 – 130			
131 – 140			
141 – 150			
151 – 160			
161 – 170			

Part B

Construction Type	Estimated Building Damage/ Subject Building Exposure	Estimated Contents Damage/ Subject Contents Exposure	Estimated Time Element Loss/ Subject Time Element Exposure
Wood Frame			
Masonry			
Manufactured Home			
Concrete			

Form V-2: Hurricane Mitigation Measures and Secondary Characteristics, Range of Changes in Damage

Purpose: This form illustrates the measure of impact of hurricane mitigation measures and secondary characteristics when implemented individually or in combination at certain windspeeds.

A. Provide the change in the zero deductible personal residential reference building damage ratio (not hurricane loss cost) for each individual hurricane mitigation measure and secondary characteristic listed in Form V-2, Hurricane Mitigation Measures and Secondary Characteristics, Range of Changes in Damage, as well as for the combination of the four hurricane mitigation measures and secondary characteristics provided for the Mitigated Frame Building and the Mitigated Masonry Building below.

B. If additional assumptions are necessary to complete this form (for example, regarding duration or surface roughness), provide the rationale for the assumptions as well as a detailed description of how they are included.

C. Provide this form in Excel format without truncation. The file name shall include the abbreviated name of the modeling organization, the hurricane standards year, and the form name. Also include Form V-2, Hurricane Mitigation Measures and Secondary Characteristics, Range of Changes in Damage, in a submission appendix.

Reference Frame Building	Reference Masonry Building
One story Unbraced gable end roof ASTM D3161 Class D or ASTM D7158 Class D shingles ½” plywood deck 6d nails deck to roof members Toe nail truss to wall anchor Wood framed exterior walls 5/8” diameter anchors at 48” centers for wall-floor-foundation connections No shutters Standard glass windows No door covers No skylight covers Constructed in 1995	One story Unbraced gable end roof ASTM D3161 Class D or ASTM D7158 Class D shingles ½” plywood deck 6d nails deck to roof members Weak truss to wall connection Masonry exterior walls No vertical wall reinforcing No shutters Standard glass windows No door covers No skylight covers Constructed in 1995
Mitigated Frame Building	**Mitigated Masonry Building**
ASTM D7158 Class H shingles 8d nails deck to roof members Truss straps at roof Structural wood panel shutters	ASTM D7158 Class H shingles 8d nails deck to roof members Truss straps at roof Structural wood panel shutters

Place the reference building at the population centroid for ZIP Code 33921 in Lee County.

Form V-2: Hurricane Mitigation Measures and Secondary Characteristics, Range of Changes in Damage

INDIVIDUAL HURRICANE MITIGATION MEASURES AND SECONDARY CHARACTERISTICS			PERCENTAGE CHANGES IN DAMAGE ((REFERENCE DAMAGE RATIO - MITIGATED DAMAGE RATIO) / REFERENCE DAMAGE RATIO) * 100									
			FRAME BUILDING					MASONRY BUILDING				
			WINDSPEED (MPH)*					WINDSPEED (MPH)*				
			60	85	110	135	160	60	85	110	135	160
	REFERENCE BUILDING		—	—	—	—	—	—	—	—	—	—
ROOF CONFIGURATION	BRACED GABLE ENDS											
	HIP ROOF											
ROOF COVERING	METAL											
	ASTM D7158 CLASS H SHINGLES											
	MEMBRANE											
	NAILING OF DECK	8d										
ROOF-WALL STRENGTH	CLIPS											
	STRAPS											
WALL-FLOOR STRENGTH	TIES OR CLIPS											
	STRAPS											
WALL-FOUNDATION STRENGTH	LARGER ANCHORS OR CLOSER SPACING							—	—	—	—	—
	STRAPS							—	—	—	—	—
	VERTICAL REINFORCING		—	—	—	—	—					
OPENING PROTECTION	WINDOW SHUTTERS	STRUCTURAL WOOD PANEL										
		METAL										
	DOOR AND SKYLIGHT COVERS											
WINDOW, DOOR, SKYLIGHT STRENGTH	WINDOWS	IMPACT RATED										
	ENTRY DOORS	MEETS WIND-BORNE DEBRIS REQUIREMENTS										
	GARAGE DOORS	MEETS WIND-BORNE DEBRIS REQUIREMENTS										
	SLIDING GLASS DOORS	MEETS WIND-BORNE DEBRIS REQUIREMENTS										
	SKYLIGHT	IMPACT RATED										

HURRICANE MITIGATION MEASURES AND SECONDARY CHARACTERISTICS IN COMBINATION	PERCENTAGE CHANGES IN DAMAGE ((REFERENCE DAMAGE RATIO - MITIGATED DAMAGE RATIO) / REFERENCE DAMAGE RATIO) * 100									
	FRAME BUILDING					MASONRY BUILDING				
	WINDSPEED (MPH)*					WINDSPEED (MPH)*				
	60	85	110	135	160	60	85	110	135	160
MITIGATED BUILDING										

**Windspeeds are one-minute sustained 10-meter.*

Form V-3: Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item)

Purpose: This form illustrates the measure of impact of hurricane mitigation measures and secondary characteristics when implemented individually or in combination at certain windspeeds. This form also illustrates the underlying hurricane vulnerability functions and the hurricane loss costs for the reference and mitigated constructions.

A. Provide the mean damage ratio (without including any insurance considerations) to the reference building for each individual hurricane mitigation measure and secondary characteristic listed in Form V-3, Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item), as well as the percent damage for the combination of the four hurricane mitigation measures and secondary characteristics provided for the Mitigated Frame Building and the Mitigated Masonry Building below.

B. Provide the zero deductible personal residential hurricane loss cost rounded to three decimal places, for the reference building and for each individual hurricane mitigation measure and secondary characteristic listed in Form V-3, Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item), as well as the hurricane loss cost for the combination of the four hurricane mitigation measures and secondary characteristics provided for the Mitigated Frame Building and the Mitigated Masonry Building below.

C. If additional assumptions are necessary to complete this form (for example, regarding duration or surface roughness), provide the rationale for the assumptions as well as a detailed description of how they are included.

D. Provide a graphical representation of the hurricane vulnerability curves for the reference building and the fully mitigated building.

E. If not considered as Trade Secret, provide this form in Excel format without truncation. The file name shall include the abbreviated name of the modeling organization, the hurricane standards year, and the form name. Also include Form V-3, Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item), in a submission appendix.

Reference Frame Building	Reference Masonry Building
One story Unbraced gable end roof ASTM D3161 Class D or ASTM D7158 Class D shingles ½" plywood deck 6d nails deck to roof members Toe nail truss to wall anchor Wood framed exterior walls 5/8" diameter anchors at 48" centers for wall-floor-foundation connections No shutters Standard glass windows No door covers No skylight covers Constructed in 1995	One story Unbraced gable end roof ASTM D3161 Class D or ASTM D7158 Class D shingles ½" plywood deck 6d nails deck to roof members Weak truss to wall connection Masonry exterior walls No vertical wall reinforcing No shutters Standard glass windows No door covers No skylight covers Constructed in 1995
Mitigated Frame Building	**Mitigated Masonry Building**
ASTM D7158 Class H shingles 8d nails deck to roof members Truss straps at roof Structural wood panel shutters	ASTM D7158 Class H shingles 8d nails deck to roof members Truss straps at roof Structural wood panel shutters

Place the reference building at the population centroid for ZIP Code 33921 in Lee County.

Form V-3: Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item)

INDIVIDUAL HURRICANE MITIGATION MEASURES AND SECONDARY CHARACTERISTICS			MEAN DAMAGE RATIO										HURRICANE LOSS COSTS	
			FRAME BUILDING					MASONRY BUILDING					FRAME BUILDING	MASONRY BUILDING
			WINDSPEED (MPH)*					WINDSPEED (MPH)*					ACROSS ALL WINDSPEEDS*	
			60	85	110	135	160	60	85	110	135	160		
	REFERENCE BUILDING													
ROOF CONFIGURATION	BRACED GABLE ENDS													
	HIP ROOF													
ROOF COVERING	METAL													
	ASTM D7158 CLASS H SHINGLES													
	MEMBRANE													
	NAILING OF DECK	8d												
ROOF-WALL STRENGTH	CLIPS													
	STRAPS													
WALL-FLOOR STRENGTH	TIES OR CLIPS													
	STRAPS													
WALL-FOUNDATION STRENGTH	LARGER ANCHORS OR CLOSER SPACING							—	—	—	—	—		—
	STRAPS							—	—	—	—	—		—
	VERTICAL REINFORCING		—	—	—	—	—						—	
OPENING PROTECTION	WINDOW SHUTTERS	STRUCTURAL WOOD PANEL												
		METAL												
	DOOR AND SKYLIGHT COVERS													
WINDOW, DOOR, SKYLIGHT STRENGTH	WINDOWS	IMPACT RATED												
	ENTRY DOORS	MEETS WIND-BORNE DEBRIS REQUIREMENTS												
	GARAGE DOORS	MEETS WIND-BORNE DEBRIS REQUIREMENTS												
	SLIDING GLASS DOORS	MEETS WIND-BORNE DEBRIS REQUIREMENTS												
	SKYLIGHT	IMPACT RATED												

HURRICANE MITIGATION MEASURES AND SECONDARY CHARACTERISTICS IN COMBINATION	MEAN DAMAGE RATIO										HURRICANE LOSS COSTS	
	FRAME BUILDING					MASONRY BUILDING					FRAME BUILDING	MASONRY BUILDING
	WINDSPEED (MPH)*					WINDSPEED (MPH)*					ACROSS ALL WINDSPEEDS*	
	60	85	110	135	160	60	85	110	135	160		
MITIGATED BUILDING												

**Windspeeds are one-minute sustained 10-meter.*

Form V-4: Differences in Hurricane Mitigation Measures and Secondary Characteristics

Purpose: This form illustrates the impact of changes in the hurricane model of the hurricane mitigation measures and secondary characteristics from the previously-accepted hurricane model.

A. Provide the differences between the values reported in Form V-2, Hurricane Mitigation Measures and Secondary Characteristics, Range of Changes in Damage, relative to the equivalent data compiled from the previously-accepted hurricane model.

B. Provide a list and describe any assumptions made to complete this form.

C. Provide a summary description of the differences.

D. Provide this form in Excel format without truncation. The file name shall include the abbreviated name of the modeling organization, the hurricane standards year, and the form name. Also include Form V-4, Differences in Hurricane Mitigation Measures and Secondary Characteristics, in a submission appendix.

Form V-4: Differences in Hurricane Mitigation Measures and Secondary Characteristics

INDIVIDUAL HURRICANE MITIGATION MEASURES AND SECONDARY CHARACTERISTICS			DIFFERENCES FROM FORM V-2 RELATIVE TO PREVIOUSLY-ACCEPTED HURRICANE MODEL									
			FRAME BUILDING					MASONRY BUILDING				
			WINDSPEED (MPH)*					WINDSPEED (MPH)*				
			60	85	110	135	160	60	85	110	135	160
	REFERENCE BUILDING		—	—	—	—	—	—	—	—	—	—
ROOF CONFIGURATION	BRACED GABLE ENDS											
	HIP ROOF											
ROOF COVERING	METAL											
	ASTM D7158 CLASS H SHINGLES											
	MEMBRANE											
	NAILING OF DECK	8d										
ROOF-WALL STRENGTH	CLIPS											
	STRAPS											
WALL-FLOOR STRENGTH	TIES OR CLIPS											
	STRAPS											
WALL-FOUNDATION STRENGTH	LARGER ANCHORS OR CLOSER SPACING							—	—	—	—	—
	STRAPS							—	—	—	—	—
	VERTICAL REINFORCING		—	—	—	—	—					
OPENING PROTECTION	WINDOW SHUTTERS	STRUCTURAL WOOD PANEL										
		METAL										
	DOOR AND SKYLIGHT COVERS											
WINDOW, DOOR, SKYLIGHT STRENGTH	WINDOWS	IMPACT RATED										
	ENTRY DOORS	MEETS WIND-BORNE DEBRIS REQUIREMENTS										
	GARAGE DOORS	MEETS WIND-BORNE DEBRIS REQUIREMENTS										
	SLIDING GLASS DOORS	MEETS WIND-BORNE DEBRIS REQUIREMENTS										
	SKYLIGHT	IMPACT RATED										
HURRICANE MITIGATION MEASURES AND SECONDARY CHARACTERISTICS IN COMBINATION			DIFFERENCES FROM FORM V-2 RELATIVE TO PREVIOUSLY-ACCEPTED HURRICANE MODEL									
			FRAME BUILDING					MASONRY BUILDING				
			WINDSPEED (MPH)*					WINDSPEED (MPH)*				
			60	85	110	135	160	60	85	110	135	160
MITIGATED BUILDING												

**Windspeeds are one-minute sustained 10-meter.*

Form V-5: Differences in Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item)

Purpose: This form illustrates the impact of changes in the hurricane model of the hurricane mitigation measures and secondary characteristics and the underlying hurricane loss costs for the reference and mitigated constructions from the previously-accepted hurricane model.

A. Provide the differences between the values reported in Form V-3, Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item), relative to the equivalent data compiled from the previously-accepted hurricane model.

B. Provide a list and describe any assumptions made to complete this form.

C. Provide a summary description of the differences.

D. If not considered as Trade Secret, provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the hurricane standards year, and the form name. Also include Form V-5, Differences in Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item), in a submission appendix.

Form V-5: Differences in Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item)

INDIVIDUAL HURRICANE MITIGATION MEASURES AND SECONDARY CHARACTERISTICS			DIFFERENCES FROM FORM V-3 RELATIVE TO PREVIOUSLY-ACCEPTED HURRICANE MODEL											
			MEAN DAMAGE RATIO										HURRICANE LOSS COSTS	
			FRAME BUILDING					MASONRY BUILDING					FRAME BUILDING	MASONRY BUILDING
			WINDSPEED (MPH)*					WINDSPEED (MPH)*					ACROSS ALL WINDSPEEDS*	
			60	85	110	135	160	60	85	110	135	160		
	REFERENCE BUILDING													
ROOF CONFIGURATION	BRACED GABLE ENDS													
	HIP ROOF													
ROOF COVERING	METAL													
	ASTM D7158 CLASS H SHINGLES													
	MEMBRANE													
	NAILING OF DECK	8d												
ROOF-WALL STRENGTH	CLIPS													
	STRAPS													
WALL-FLOOR STRENGTH	TIES OR CLIPS													
	STRAPS													
WALL-FOUNDATION STRENGTH	LARGER ANCHORS OR CLOSER SPACING							—	—	—	—	—		—
	STRAPS							—	—	—	—	—		—
	VERTICAL REINFORCING		—	—	—	—	—						—	
OPENING PROTECTION	WINDOW SHUTTERS	STRUCTURAL WOOD PANEL												
		METAL												
	DOOR AND SKYLIGHT COVERS													
WINDOW, DOOR, SKYLIGHT STRENGTH	WINDOWS	IMPACT RATED												
	ENTRY DOORS	MEETS WIND-BORNE DEBRIS REQUIREMENTS												
	GARAGE DOORS	MEETS WIND-BORNE DEBRIS REQUIREMENTS												
	SLIDING GLASS DOORS	MEETS WIND-BORNE DEBRIS REQUIREMENTS												
	SKYLIGHT	IMPACT RATED												

HURRICANE MITIGATION MEASURES AND SECONDARY CHARACTERISTICS IN COMBINATION	DIFFERENCES FROM FORM V-3 RELATIVE TO PREVIOUSLY-ACCEPTED HURRICANE MODEL											
	MEAN DAMAGE RATIO										HURRICANE LOSS COSTS	
	FRAME BUILDING					MASONRY BUILDING					FRAME BUILDING	MASONRY BUILDING
	WINDSPEED (MPH)*					WINDSPEED (MPH)*					ACROSS ALL WINDSPEEDS*	
	60	85	110	135	160	60	85	110	135	160		
MITIGATED BUILDING												

Windspeeds are one-minute sustained 10-meter.

A-1 Hurricane Model~~ing~~ Input Data and Output Reports

A. Adjustments, edits, inclusions, or deletions to insurance company or other input data used by the modeling organization shall be based upon generally accepted actuarial, underwriting, and statistical procedures.

B. All modifications, adjustments, assumptions, inputs and input file identification, and defaults necessary to use the hurricane model shall be actuarially sound and shall be included with the hurricane model output report. Treatment of missing values for user inputs required to run the hurricane model shall be actuarially sound and described with the hurricane model output report.

Purpose: Modeled hurricane loss costs and hurricane probable maximum loss levels rely on certain insurer input data assumptions. Implicit assumptions may or may not be appropriate for a given entity using the hurricane model, depending on the circumstances.

Different hurricane modeling approaches may require different input data.

Relevant Form: G-5, Actuarial Standards Expert Certification

Disclosures

1. Identify insurance-to-value assumptions and describe the methods and assumptions used to determine the property value and associated hurricane losses. Provide a sample calculation for determining the property value.

2. Identify depreciation assumptions and describe the methods and assumptions used to reduce insured hurricane losses on account of depreciation. Provide a sample calculation for determining the amount of depreciation and the actual cash value (ACV) hurricane losses.

3. Describe the methods used to distinguish among policy form types (e.g., homeowners, dwelling property, manufactured homes, tenants, condo unit owners).

4. Provide a copy of the input form(s) used by the hurricane model with the hurricane model options available for selection by the user for the Florida hurricane model under review. Describe the process followed by the user to generate the hurricane model output produced from the input form. Include the hurricane model name, ~~and~~ version identification, and platform identification on the input form. All items included in the input form submitted to the Commission ~~should~~ shall be clearly labeled and defined.

5. Disclose, in a hurricane model output report, the specific inputs required to use the hurricane model and the options of the hurricane model selected for use in a residential property insurance rate filing. Include the hurricane model name, ~~and~~ version identification, and platform identification on the hurricane model output report. All items included in the hurricane model output report submitted to the Commission ~~should~~ shall be clearly labeled and defined.

6. Describe actions performed to ensure the validity of insurer or other input data used for hurricane model inputs or for validation/verification.

7. Disclose if changing the order of the hurricane model input exposure data produces different hurricane model output or results.

8. Disclose if removing and adding policies from the hurricane model input file affects the hurricane model output or results for the remaining policies.

Audit

1. Quality assurance procedures, including methods to assure accuracy of insurance or other input data, will be reviewed. Compliance with this standard will be readily demonstrated through documented rules and procedures.

2. All hurricane model inputs and assumptions will be reviewed to determine that the hurricane model output report appropriately discloses all modifications, adjustments, assumptions, and defaults used to produce the hurricane loss costs and hurricane probable maximum loss levels.

A-2 Hurricane Events Resulting in Modeled Hurricane Losses*

~~(*Significant Revision)~~

A. Modeled hurricane loss costs and hurricane probable maximum loss levels shall reflect all insured wind related damages from ~~storms that reach~~ hurricanes ~~strength and~~that produce minimum damaging windspeeds or greater on land in Florida.

B. The modeling organization shall have a documented procedure for distinguishing wind-related hurricane losses from other peril losses.

Purpose: Hurricane loss costs and hurricane probable maximum loss levels should reflect the hurricane losses insurers pay as a result of a hurricane.

Hurricane loss costs and hurricane probable maximum loss levels should only include insured wind-related hurricane losses and time element hurricane losses in Florida resulting from an event modeled as a hurricane consistent with s. 627.4025, F.S. The event should include all such insured wind-related damage caused by a hurricane that makes landfall ~~in~~ on Florida as a hurricane or by-passes Florida as a hurricane and comes close enough to cause damaging winds in Florida.

Relevant Forms: G-5, Actuarial Standards Expert Certification
A-2~~A~~, Base Hurricane Storm Set Statewide Hurricane Losses ~~(2012 FHCF Exposure Data)~~
~~A-2B, Base Hurricane Storm Set Statewide Hurricane Losses (2017 FHCF Exposure Data)~~

Disclosures

1. Describe how damage from hurricane model generated storms (landfalling and by-passing hurricanes) is excluded or included in the calculation of hurricane loss costs and hurricane probable maximum loss levels for Florida.

2. Describe how damage resulting from concurrent or preceding flood (including ~~or~~ hurricane storm surge) is treated in the calculation of hurricane loss costs and hurricane probable maximum loss levels for Florida.

Audit

1. The hurricane model will be reviewed to evaluate whether the determination of hurricane losses in the hurricane model is consistent with this standard.

2. The hurricane model will be reviewed to determine that by-passing hurricanes and their effects are considered in a manner that is consistent with this standard.

3. The hurricane model will be reviewed to determine whether and how the hurricane model takes into account any damage resulting directly and solely from flood (including ~~or~~ hurricane storm surge). ~~Hurricane losses associated with wind damage will be reviewed to determine the treatment of flood and hurricane storm surge.~~

4. The documented procedure for distinguishing wind-related hurricane losses from other peril losses will be reviewed.

A-3 Hurricane Coverages

A. The methods used in the calculation of building hurricane loss costs shall be actuarially sound.

B. The methods used in the calculation of appurtenant structure hurricane loss costs shall be actuarially sound.

C. The methods used in the calculation of contents hurricane loss costs shall be actuarially sound.

D. The methods used in the calculation of time element hurricane loss costs shall be actuarially sound.

Purpose: A reasonable representation of building, appurtenant structure, contents, and time element hurricane losses is necessary in order to address policies that principally cover building, appurtenant structure, contents and time element, such as tenants and condo unit owners policies.

Relevant Form: G-5, Actuarial Standards Expert Certification

Disclosures

1. Describe the methods used in the hurricane model to calculate hurricane loss costs for building coverage associated with personal and commercial residential properties.

2. Describe the methods used in the hurricane model to calculate hurricane loss costs for appurtenant structure coverage associated with personal and commercial residential properties.

3. Describe the methods used in the hurricane model to calculate hurricane loss costs for contents coverage associated with personal and commercial residential properties.

4. Describe the methods used in the hurricane model to calculate hurricane loss costs for time element coverage associated with personal and commercial residential properties.

5. Describe the methods used in the hurricane model to account for law and ordinance coverage associated with personal residential properties.

Audit

1. The methods used to produce building, appurtenant structure, contents and time element hurricane loss costs will be reviewed.

2. The treatment of law and ordinance coverage will be reviewed, including the statutory required 25% and 50% coverage options for personal residential policies. ~~If it is not modeled, justification will be reviewed.~~

3. The treatment of loss assessment coverage for condo unit owners will be reviewed, including the statutory required $2,000 coverage option.

A-4 Modeled Hurricane Loss Cost and Hurricane Probable Maximum Loss Level Considerations

A. Hurricane loss cost projections and hurricane probable maximum loss levels shall not include expenses, risk load, investment income, premium reserves, taxes, assessments, or profit margin.

B. Hurricane loss cost projections and hurricane probable maximum loss levels shall not make a prospective provision for economic inflation.

C. Hurricane loss cost projections and hurricane probable maximum loss levels shall not include any explicit provision for direct flood losses (including those from hurricane storm surge) ~~losses~~.

D. Hurricane loss cost projections and hurricane probable maximum loss levels shall be capable of being calculated from exposures at a geocode (latitude-longitude) level of resolution.

E. Demand surge shall be included in the hurricane model's calculation of hurricane loss costs and hurricane probable maximum loss levels using relevant data and actuarially sound methods and assumptions.

Purpose: The hurricane loss costs and hurricane probable maximum loss levels from the hurricane model should reflect hurricane losses paid by the insurance company as insurance claims resulting from wind damage from an event as defined in Standard A-2, Hurricane Events Resulting in Modeled Hurricane Losses.

Hurricane probable maximum loss levels can be either on an annual aggregate, an annual occurrence, or an event basis. All bases can be useful for understanding the hurricane loss distribution produced by the hurricane model.

Hurricane loss costs represent the expected annual hurricane loss per $1,000 exposure. Other ~~"~~expense and profit loads~~"~~ such as those listed in the standard may be included in rate filings but are outside the scope of the Commission.

Hurricane loss severity may be influenced by supply and demand factors applicable to material and labor costs. This is generally known as demand surge which occurs at the time of a large catastrophic event and is recognized as an important element for hurricane modeling.

Insurance may also be influenced (although perhaps differently from demand surge) by general price inflation. This is a type of economic inflation that is associated with past insured wind loss experience that has been used to develop and validate hurricane loss projection models. The standard does not allow for prospective recognition of future economic inflation or price inflation.

~~Hurricane storm surge can be covered by the National Flood Insurance Program or in some cases by other policies.~~

Relevant Forms: G-5, Actuarial Standards Expert Certification
A-8~~A~~, Hurricane Probable Maximum Loss for Florida ~~(2012 FHCF Exposure Data)~~
~~A-8B, Hurricane Probable Maximum Loss for Florida (2017 FHCF Exposure Data)~~

Disclosures

1. Describe the method(s) used to estimate annual hurricane loss costs and hurricane probable maximum loss levels and their uncertainties. Identify any source documents used and any relevant research results.

2. Identify the highest level of resolution for which hurricane loss costs and hurricane probable maximum loss levels can be provided. Identify all possible resolutions available for the reported hurricane output ranges.

3. Describe how the hurricane model incorporates demand surge in the calculation of hurricane loss costs and hurricane probable maximum loss levels.

4. Provide citations to published papers, if any, or modeling-organization studies that were used to develop how the hurricane model estimates demand surge.

5. Describe how economic inflation has been applied to past insurance experience to develop and validate hurricane loss costs and hurricane probable maximum loss levels.

Audit

1. How the hurricane model handles expenses, risk load, investment income, premium reserves, taxes, assessments, profit margin, economic inflation, and any criteria other than direct property insurance claim payments will be reviewed.

2. The method of determining hurricane probable maximum loss levels will be reviewed.

3. The uncertainty in the estimated annual hurricane loss costs and hurricane probable maximum loss levels will be reviewed.

4. The data and methods used to incorporate individual aspects of demand surge on personal and commercial residential hurricane losses, inclusive of the effects from building material costs, labor costs, contents costs, and repair time will be reviewed.

5. How the hurricane model accounts for economic inflation associated with past insurance experience will be reviewed.

6. The treatment of flood ~~and storm surge~~ losses (including hurricane storm surge) in the determination of modeled hurricane losses will be reviewed.

7. All referenced literature will be reviewed, in hard copy or electronic form, to determine applicability.

A-5 Hurricane Policy Conditions*

(*Significant Revision)

A. The methods used in the development of mathematical distributions to reflect the effects of deductibles and policy limits shall be actuarially sound.

B. The relationship among the modeled deductible hurricane loss costs shall be reasonable.

C. Deductible hurricane loss costs shall be calculated in accordance with s. 627.701(5)(a), F.S.

Purpose: For a given windspeed and building type, hurricane losses may fall below the deductible or above the policy limit. Therefore, the distribution of hurricane losses is important.

The determination of insurance coverage for a commercial residential policy is dependent upon the contractual responsibility of the condo unit owner or condo unit renter and that of the condominium association and the building owner. It is important that these responsibilities be appropriately accounted for in modeling hurricane loss cost projections and commercial residential hurricane probable maximum loss levels.

Relevant Forms: G-5, Actuarial Standards Expert Certification
A-4~~A~~, Hurricane Output Ranges ~~(2012 FHCF Exposure Data)~~
~~A-4B, Hurricane Output Ranges (2017 FHCF Exposure Data)~~
A-6, Logical Relationship to Hurricane Risk (Trade Secret Item)

Disclosures

1. Describe the methods used in the hurricane model to treat deductibles (both flat and percentage), policy limits, and insurance-to-value criteria when projecting hurricane loss costs and hurricane probable maximum loss levels. Discuss data or documentation used to validate the method used by the hurricane model.

2. Describe whether, and if so how, the hurricane model treats policy exclusions and loss settlement provisions.

~~3. Complete the following table using the method implemented in the hurricane model.~~

~~Building Value~~	~~Policy Limit~~	~~Deductible~~	~~Damage Ratio~~	~~Ground Up Hurricane Loss~~	~~Insurance Hurricane Loss~~
~~$100,000~~	~~$90,000~~	~~$500~~	~~2%~~		
~~$100,000~~	~~$90,000~~	~~$500~~	~~50%~~		
~~$100,000~~	~~$90,000~~	~~$500~~	~~92%~~		
~~$100,000~~	~~$90,000~~	~~$500~~	~~100%~~		
~~$100,000~~	~~$100,000~~	~~$500~~	~~92%~~		

~~4~~3. Describe how the hurricane model treats annual deductibles.

Audit

1. The process used to determine the accuracy of the insurance-to-value criteria in data used to develop and validate the hurricane model results will be reviewed.

2. To the extent that insurance claims data are used to develop mathematical depictions of deductibles, policy limits, policy exclusions, and loss settlement provisions, the goodness-of-fit of the data to fitted models will be reviewed.

3. To the extent that insurance claims data are used to validate the hurricane model results, the treatment of the effects of deductibles, policy limits, policy exclusions, loss settlement provisions, and coinsurance in the data will be reviewed.

4. Treatment of annual deductibles will be reviewed.

5. Justification for the changes from the previously-accepted hurricane model in the relativities among corresponding deductible amounts for the same coverage will be reviewed.

A-6 Hurricane Loss Outputs and Logical Relationships to Risk*

(*Significant Revision)

***A.** The methods, data, and assumptions used in the estimation of hurricane loss costs and hurricane probable maximum loss levels shall be actuarially sound.*

***B.** Hurricane loss costs shall not exhibit an illogical relation to risk, nor shall hurricane loss costs exhibit a significant change when the underlying risk does not change significantly.*

***C.** Hurricane loss costs produced by the hurricane model shall be positive and non-zero for all valid Florida ZIP Codes.*

***D.** Hurricane loss costs cannot increase as the quality of construction type, materials, and workmanship increases, all other factors held constant.*

***E.** Hurricane loss costs cannot increase as the presence of fixtures or construction techniques designed for hazard mitigation increases, all other factors held constant.*

***F.** Hurricane loss costs cannot increase as the wind resistant design provisions increase, all other factors held constant.*

***G.** Hurricane loss costs cannot increase as building code enforcement increases, all other factors held constant.*

***H.** Hurricane loss costs shall decrease as deductibles increase, all other factors held constant.*

***I.** The relationship of hurricane loss costs for individual coverages (e.g., building, appurtenant structure, contents, and time element) shall be consistent with the coverages provided.*

***J.** Hurricane output ranges shall be logical for the type of risk being modeled and apparent deviations shall be justified.*

***K.** All other factors held constant, hurricane output ranges produced by the hurricane model shall in general reflect lower hurricane loss costs for:*

1. *masonry construction versus frame construction,*
2. *personal residential risk exposure versus manufactured home risk exposure,*
3. *inland counties versus coastal counties,*
4. *northern counties versus southern counties, and*
5. *newer construction versus older construction.*

A-6 Hurricane Loss Outputs and Logical Relationships to Risk* (Continued) (*Significant Revision)

L. For hurricane loss cost and hurricane probable maximum loss level estimates derived from and validated with historical insured hurricane losses, the assumptions in the derivations concerning (1) construction characteristics, (2) policy provisions, (3) coinsurance, and (4) contractual provisions shall be appropriate based on the type of risk being modeled.

Purpose: Hurricane loss costs and hurricane probable maximum loss levels are to be based on an actuarially sound methodology. The actuarial soundness resulting from compliance with the standard is particularly important to capital markets, insurers, reinsurers, and rating agencies that frequently use hurricane probable maximum loss levels.

Modeled hurricane loss costs should vary according to risk. If the risk of loss due to hurricanes is higher for one area or building type, then the hurricane loss costs should also be higher. Likewise, if there is no difference in risk, there should be no difference in hurricane loss costs. Hurricane loss costs not having these properties do not have a logical relationship to risk.

Revisions to the hurricane model lead to changes in the hurricane output ranges which are to be reasonable. This standard requires that the impacts on the hurricane loss costs are attributable to the revisions.

Relevant Forms:
- G-5, Actuarial Standards Expert Certification
- A-1, Zero Deductible Personal Residential Hurricane Loss Costs by ZIP Code
- A-2~~A~~, Base Hurricane Storm Set Statewide Hurricane Losses ~~(2012 FHCF Exposure Data)~~
- ~~A-2B, Base Hurricane Storm Set Statewide Hurricane Losses (2017 FHCF Exposure Data)~~
- A-3~~A~~, ~~2004~~ Hurricane ~~Season~~ Losses ~~(2012 FHCF Exposure Data)~~
- ~~A-3B, 2004 Hurricane Season Losses (2017 FHCF Exposure Data)~~
- A-4~~A~~, Hurricane Output Ranges ~~(2012 FHCF Exposure Data)~~
- ~~A-4B, Hurricane Output Ranges (2017 FHCF Exposure Data)~~
- A-5, Percentage Change in Hurricane Output Ranges ~~(2012 FHCF Exposure Data)~~
- A-6, Logical Relationship to Hurricane Risk (Trade Secret Item)
- A-7, Percentage Change in Logical Relationship to Hurricane Risk
- A-8~~A~~, Hurricane Probable Maximum Loss for Florida ~~(2012 FHCF Exposure Data)~~
- ~~A-8B, Hurricane Probable Maximum Loss for Florida (2017 FHCF Exposure Data)~~
- S-2~~A~~, Examples of Hurricane Loss Exceedance Estimates ~~(2012 FHCF Exposure Data)~~

~~S-2B, Examples of Hurricane Loss Exceedance Estimates (2017 FHCF Exposure Data)~~

S-5, Average Annual Zero Deductible Statewide Hurricane Loss Costs – Historical versus Modeled

Disclosures

1. Provide a completed Form A-1, Zero Deductible Personal Residential Hurricane Loss Costs by ZIP Code. Provide a link to the location of the form [insert hyperlink here].

2. Provide a completed Form A-2~~A~~, Base Hurricane Storm Set Statewide Hurricane Losses ~~(2012 FHCF Exposure Data)~~. Provide a link to the location of the form [insert hyperlink here].

~~3. Provide a completed Form A-2B, Base Hurricane Storm Set Statewide Hurricane Losses (2017 FHCF Exposure Data). Provide a link to the location of the form [insert hyperlink here].~~

~~4~~3. Provide a completed Form A-3~~A~~, ~~2004~~ Hurricane ~~Season~~ Losses ~~(2012 FHCF Exposure Data)~~. Provide a link to the location of the form [insert hyperlink here].

~~5. Provide a completed Form A-3B, 2004 Hurricane Season Losses (2017 FHCF Exposure Data). Provide a link to the location of the form [insert hyperlink here].~~

~~6~~4. Provide a completed Form A-4~~A~~, Hurricane Output Ranges ~~(2012 FHCF Exposure Data)~~. Provide a link to the location of the form [insert hyperlink here].

~~7. Provide a completed Form A-4B, Hurricane Output Ranges (2017 FHCF Exposure Data). Provide a link to the location of the form [insert hyperlink here].~~

~~8~~5. Provide a completed Form A-5, Percentage Change in Hurricane Output Ranges ~~(2012 FHCF Exposure Data)~~. Provide a link to the location of the form [insert hyperlink here].

6. Provide a completed Form A-6, Logical Relationship to Hurricane Risk (Trade Secret Item), if not considered as Trade Secret. Provide a link to the location of the form [insert hyperlink here].

~~9~~7. Provide a completed Form A-7, Percentage Change in Logical Relationship to Hurricane Risk. Provide a link to the location of the form [insert hyperlink here].

8. Explain any assumptions, deviations, and differences from the prescribed exposure information in Form A-6, Logical Relationship to Hurricane Risk (Trade Secret Item), and Form A-7, Percentage Change in Logical Relationship to Hurricane Risk. In particular, explain how the treatment of unknown is handled in each sensitivity exhibit.

~~10~~9. Provide a completed Form A-8~~A~~, Hurricane Probable Maximum Loss for Florida ~~(2012 FHCF Exposure Data)~~. Provide a link to the location of the form [insert hyperlink here].

~~11. Provide a completed Form A-8B, Hurricane Probable Maximum Loss for Florida (2017 FHCF Exposure Data). Provide a link to the location of the form [insert hyperlink here].~~

~~12~~10. Describe how the hurricane model produces hurricane probable maximum loss levels.

~~13~~11. Provide citations to published papers, if any, or modeling-organization studies that were used to estimate hurricane probable maximum loss levels.

~~14~~12. Describe how the hurricane probable maximum loss levels produced by the hurricane model include the effects of personal and commercial residential insurance coverage.

~~15~~13. Explain any differences between the values provided on Form A-8~~A~~, Hurricane Probable Maximum Loss for Florida~~(2012 FHCF Exposure Data)~~, and those provided on Form S-2~~A~~, Examples of Hurricane Loss Exceedance Estimates~~ (2012 FHCF Exposure Data)~~.

~~16. Explain any differences between the values provided on Form A-8B, Hurricane Probable Maximum Loss for Florida (2017 FHCF Exposure Data), and those provided on Form S-2B, Examples of Hurricane Loss Exceedance Estimates (2017 FHCF Exposure Data).~~

~~17~~14. Provide an explanation for all hurricane loss costs that are not consistent with the requirements of this standard.

~~18~~15. Provide an explanation of the differences in hurricane output ranges between the previously-accepted hurricane model and the current hurricane model~~ based on the 2012 FHCF Exposure Data~~.

~~19~~16. Identify the assumptions used to account for the effects of coinsurance on commercial residential hurricane loss costs.

Audit

1. The data and methods used for hurricane probable maximum loss levels for Form A-8~~A~~, Hurricane Probable Maximum Loss for Florida~~ (2012 FHCF Exposure Data), and Form A-8B, Hurricane Probable Maximum Loss for Florida (2017 FHCF Exposure Data)~~, will be reviewed. The hurricane associated with the Top Events will be reviewed.

2. The frequency distribution and the individual event severity distribution, or information about the formulation of events, underlying Form A-8~~A~~, Hurricane Probable Maximum Loss for Florida~~ (2012 FHCF Exposure Data), and Form A-8B, Hurricane Probable Maximum Loss for Florida (2017 FHCF Exposure Data)~~, will be reviewed.

~~4. The first and second moments of the Annual Aggregate and Annual Occurrence distributions underlying the tables in Form A-8A, Hurricane Probable Maximum Loss for Florida (2012 FHCF Exposure Data), and Form A-8B, Hurricane Probable Maximum Loss for Florida (2017 FHCF Exposure Data), will be reviewed.~~

~~3. The first and second moments of the frequency and severity distributions, or similar information about the event distributions, underlying the hurricane probable maximum loss levels shown in Parts B and C in Form A-8A, Hurricane Probable Maximum Loss for Florida (2012 FHCF Exposure Data), and Form A-8B, Hurricane Probable Maximum Loss for Florida (2017 FHCF Exposure Data), will be reviewed.~~

~~4.~~3. All referenced literature will be reviewed, in hard copy or electronic form, to determine applicability.

~~5.~~4. Graphical representations of hurricane loss costs by ZIP Code and county will be reviewed.

~~6.~~5. Color-coded maps depicting the effects of land friction on hurricane loss costs by ZIP Code will be reviewed.

~~4.~~6. The procedures used by the modeling organization to verify the individual hurricane loss cost relationships will be reviewed. Methods (including any software) used in verifying Standard A-6, Hurricane Loss Outputs and Logical Relationships to Risk, will be reviewed. Forms A-1, Zero Deductible Personal Residential Hurricane Loss Costs by ZIP Code; A-2~~A~~, Base Hurricane Storm Set Statewide Hurricane Losses~~ (2012 FHCF Exposure Data), A-2B, Base Hurricane Storm Set Statewide Hurricane Losses (2017 FHCF Exposure Data)~~; A-3~~A~~, ~~2004~~ Hurricane ~~Season~~ Losses~~ (2012 FHCF Exposure Data), A-3B, 2004 Hurricane Season Losses (2017 FHCF Exposure Data)~~; A-6, Logical Relationship to Hurricane Risk (Trade Secret Item); and A-7, Percentage Change in Logical Relationship to Hurricane Risk, will be reviewed to assess coverage relationships.

~~11.~~7. The hurricane loss cost relationships among deductible, policy form, construction type, coverage, ~~building code/enforcement~~year of construction, building strength, ~~condo unit floor,~~ number of stories, territory, and region will be reviewed.

~~12. The total personal and commercial residential insured hurricane losses provided in Forms A-2A, Base Hurricane Storm Set Statewide Hurricane Losses (2012 FHCF Exposure Data), A-2B, Base Hurricane Storm Set Statewide Hurricane Losses (2017 FHCF Exposure Data), A-3A, 2004 Hurricane Season Losses (2012 FHCF Exposure Data), and A-3B, 2004 Hurricane Season Losses (2017 FHCF Exposure Data), will be reviewed individually for total personal residential and total commercial residential insured hurricane losses.~~

~~13.~~8. Forms A-4~~A~~, Hurricane Output Ranges~~ (2012 FHCF Exposure Data)~~, and A-5, Percentage Change in Hurricane Output Ranges~~ (2012 FHCF Exposure Data), and A-4B, Hurricane Output Ranges (2017 FHCF Exposure Data)~~, will be reviewed, including geographical representations of the data where applicable.

~~14.~~9. Justification for all changes in hurricane loss costs ~~based on the 2012 FHCF Exposure Data~~ from the previously-accepted hurricane model will be reviewed.

~~15.~~10. Form A-4~~A~~, Hurricane Output Ranges~~ (2012 FHCF Exposure Data), and Form A-4B, Hurricane Output Ranges (2017 FHCF Exposure Data)~~, will be reviewed to ensure appropriate relativities among deductibles, coverages, and construction types.

~~16.~~11. Apparent anomalies in the hurricane output ranges and their justification will be reviewed.

Form A-1: Zero Deductible Personal Residential Hurricane Loss Costs by ZIP Code

Purpose: This form and the associated maps illustrate the range and variation by ZIP Code of zero deductible hurricane loss costs across Florida separately for frame owners, masonry owners, and manufactured homes.

A. Provide three maps, color-coded by ZIP Code (with a minimum of six value ranges), displaying zero deductible personal residential hurricane loss costs per $1,000 of exposure for frame owners, masonry owners, and manufactured homes.

B. Create exposure sets for these exhibits by modeling all of the buildings from Notional Set 3 described in the file "~~*NotionalInput17*~~*NotionalInput19.xlsx*" geocoded to each ZIP Code centroid in the state, as provided in the hurricane model. Provide the predominant County name and the Federal Information Processing Standards (FIPS) code associated with each ZIP Code centroid. Refer to the Notional Hurricane Policy Specifications below for additional modeling information. Explain any assumptions, deviations, and differences from the prescribed exposure information.

C. Provide, in the format given in the file named "~~*2017FormA1*~~*2019FormA1.xlsx*" in both Excel and PDF format, the underlying hurricane loss cost data, rounded to three decimal places, used for A. above. The file name shall include the abbreviated name of the modeling organization, the hurricane standards year, and the form name.

Notional Hurricane Policy Specifications

Policy Type	**Assumptions**
Owners	**Coverage A = Building** • Replacement Cost included subject to Coverage A limit • Law and Ordinance ~~not~~ included **Coverage B = Appurtenant Structure** • Replacement Cost included subject to Coverage B limit • Law and Ordinance ~~not~~ included **Coverage C = Contents** • Replacement Cost included subject to Coverage C limit **Coverage D = Time Element** • Time limit = 12 months • Per diem = $150.00/day per policy, if used

✧ Hurricane loss costs per $1,000 shall be related to the Coverage A limit

Policy Type	**Assumptions**
Manufactured Homes	**Coverage A = Building** • Replacement Cost included subject to Coverage A limit **Coverage B = Appurtenant Structure** • Replacement Cost included subject to Coverage B limit **Coverage C = Contents** • Replacement Cost included subject to Coverage C limit **Coverage D = Time Element** • Time limit = 12 months • Per diem = $150.00/day per policy, if used

✧ Hurricane loss costs per $1,000 shall be related to the Coverage A limit

~~Form A-2A: Base Hurricane Storm Set Statewide Hurricane Losses (2012 FHCF Exposure Data)~~

~~Purpose: This form illustrates the modeling organization's ability to replicate reasonably historical hurricane losses for landfalling and by-passing Florida hurricanes.~~

~~A. Provide the total insured hurricane loss and the dollar contribution to the average annual hurricane loss assuming zero deductible policies for individual historical hurricanes using the Florida Hurricane Catastrophe Fund personal and commercial residential zero deductible exposure data provided in the file named "*hlpm2012c.exe.*" The list of hurricanes in this form shall include all Florida and by-passing hurricanes in the modeling organization Base Hurricane Storm Set, as defined in Standard M-1, Base Hurricane Storm Set.~~

~~The table below contains the minimum number of hurricanes from HURDAT2 to be included in the Base Hurricane Storm Set, based on the 117-year period 1900-2016. As defined, a by-passing hurricane (ByP) is a hurricane which does not make landfall, but produces minimum damaging windspeeds or greater on land in Florida. For the by-passing hurricanes included in the table only, the hurricane intensity entered is the maximum windspeed at closest approach to Florida as a hurricane, not the windspeed over Florida. Each hurricane has been assigned an ID number. As defined in Standard M-1, Base Hurricane Storm Set, the Base Hurricane Storm Set for the modeling organization may exclude hurricanes that had zero modeled impact, or it may include additional hurricanes when there is clear justification for the additions. For hurricanes in the table below resulting in zero hurricane loss, the table entry shall be left blank. Additional hurricanes included in the hurricane model Base Hurricane Storm Set shall be added to the table below in order of year and assigned an intermediate ID number as the hurricane falls within the bounding ID numbers.~~

~~B. If additional assumptions are necessary to complete this form, provide the rationale for the assumptions as well as a detailed description of how they are included.~~

~~C. Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the hurricane standards year, and the form name. Also include Form A-2A, Base Hurricane Storm Set Statewide Hurricane Losses (2012 FHCF Exposure Data), in a submission appendix.~~

~~ID~~	~~Hurricane Landfall/ Closest Approach Date~~	~~Year~~	~~Name~~	~~Region as defined in *Figure 3*- Category~~	~~Personal and Commercial Residential Insured Hurricane Losses ($)~~	~~Dollar Contribution~~
~~005~~	~~08/15/1901~~	~~1901~~	~~NoName04-1901~~	~~F-1~~		
~~010~~	~~09/11/1903~~	~~1903~~	~~NoName03-1903~~	~~C-1/A-1~~		
~~015~~	~~10/17/1904~~	~~1904~~	~~NoName04-1904~~	~~C-1~~		
~~020~~	~~06/17/1906~~	~~1906~~	~~NoName02-1906~~	~~B-1/C-1~~		
~~025~~	~~09/27/1906~~	~~1906~~	~~NoName06-1906~~	~~F-2/ByP-2~~		
~~030~~	~~10/18/1906~~	~~1906~~	~~NoName08-1906~~	~~B-3/C-3~~		
~~035~~	~~10/11/1909~~	~~1909~~	~~NoName11-1909~~	~~B-3~~		
~~040~~	~~10/18/1910~~	~~1910~~	~~NoName05-1910~~	~~B-2~~		
~~045~~	~~08/11/1911~~	~~1911~~	~~NoName02-1911~~	~~A-1~~		
~~050~~	~~09/14/1912~~	~~1912~~	~~NoName04-1912~~	~~F-1/ByP-1~~		
~~055~~	~~08/01/1915~~	~~1915~~	~~NoName01-1915~~	~~D-1~~		
~~060~~	~~09/04/1915~~	~~1915~~	~~NoName04-1915~~	~~A-1~~		
~~065~~	~~07/05/1916~~	~~1916~~	~~NoName02-1916~~	~~F-3/ByP-3~~		
~~070~~	~~10/18/1916~~	~~1916~~	~~NoName14-1916~~	~~A-2~~		
~~075~~	~~09/29/1917~~	~~1917~~	~~NoName04-1917~~	~~A-3~~		
~~080~~	~~09/10/1919~~	~~1919~~	~~NoName02-1919~~	~~B-4~~		
~~085~~	~~10/25/1921~~	~~1921~~	~~TampaBay06-1921~~	~~B-3~~		
~~090~~	~~09/15/1924~~	~~1924~~	~~NoName05-1924~~	~~A-1~~		
~~095~~	~~10/21/1924~~	~~1924~~	~~NoName10-1924~~	~~B-1~~		
~~100~~	~~07/28/1926~~	~~1926~~	~~NoName01-1926~~	~~D-2~~		
~~105~~	~~09/18/1926~~	~~1926~~	~~GreatMiami07-1926~~	~~C-4/A-3~~		
~~110~~	~~10/21/1926~~	~~1926~~	~~NoName10-1926~~	~~ByP-3~~		
~~115~~	~~08/08/1928~~	~~1928~~	~~NoName01-1928~~	~~C-2~~		
~~120~~	~~09/17/1928~~	~~1928~~	~~LakeOkeechobee04-1928~~	~~C-4~~		
~~125~~	~~09/28/1929~~	~~1929~~	~~NoName02-1929~~	~~C-3/A-1~~		
~~130~~	~~09/01/1932~~	~~1932~~	~~NoName03-1932~~	~~F-1/ByP-1~~		
~~135~~	~~07/30/1933~~	~~1933~~	~~NoName05-1933~~	~~C-1~~		
~~140~~	~~09/04/1933~~	~~1933~~	~~NoName11-1933~~	~~C-3~~		
~~145~~	~~09/03/1935~~	~~1935~~	~~LaborDay03-1935~~	~~C-5/A-2~~		
~~150~~	~~11/04/1935~~	~~1935~~	~~NoName07-1935~~	~~C-2~~		
~~155~~	~~07/31/1936~~	~~1936~~	~~NoName05-1936~~	~~A-2~~		
~~160~~	~~08/11/1939~~	~~1939~~	~~NoName02-1939~~	~~C-1/A-1~~		
~~165~~	~~10/06/1941~~	~~1941~~	~~NoName05-1941~~	~~C-2/A-1~~		
~~170~~	~~10/19/1944~~	~~1944~~	~~NoName13-1944~~	~~B-3~~		
~~175~~	~~06/24/1945~~	~~1945~~	~~NoName01-1945~~	~~A-1~~		
~~180~~	~~09/15/1945~~	~~1945~~	~~NoName09-1945~~	~~C-4~~		
~~185~~	~~10/08/1946~~	~~1946~~	~~NoName06-1946~~	~~B-2~~		
~~190~~	~~09/17/1947~~	~~1947~~	~~NoName04-1947~~	~~C-4~~		
~~195~~	~~10/12/1947~~	~~1947~~	~~NoName09-1947~~	~~B-1/E-2~~		
~~200~~	~~09/22/1948~~	~~1948~~	~~NoName08-1948~~	~~B-4~~		
~~205~~	~~10/05/1948~~	~~1948~~	~~NoName09-1948~~	~~B-2~~		
~~210~~	~~08/26/1949~~	~~1949~~	~~NoName02-1949~~	~~C-4~~		
~~215~~	~~08/31/1950~~	~~1950~~	~~Baker-1950~~	~~F-1/ByP-1~~		
~~220~~	~~09/05/1950~~	~~1950~~	~~Easy-1950~~	~~A-3~~		
~~225~~	~~10/18/1950~~	~~1950~~	~~King-1950~~	~~C-4~~		
~~230~~	~~09/26/1953~~	~~1953~~	~~Florence-1953~~	~~A-1~~		

~~ID~~	~~Hurricane Landfall/ Closest Approach Date~~	~~Year~~	~~Name~~	~~Region as defined in *Figure 3-* Category~~	~~Personal and Commercial Residential Insured Hurricane Losses ($)~~	~~Dollar Contribution~~
~~235~~	~~10/09/1953~~	~~1953~~	~~Hazel-1953~~	~~B-1~~		
~~240~~	~~09/25/1956~~	~~1956~~	~~Flossy-1956~~	~~A-1~~		
~~245~~	~~09/10/1960~~	~~1960~~	~~Donna-1960~~	~~B-4~~		
~~250~~	~~09/15/1960~~	~~1960~~	~~Ethel-1960~~	~~F-1~~		
~~255~~	~~08/27/1964~~	~~1964~~	~~Cleo-1964~~	~~C-2~~		
~~260~~	~~09/10/1964~~	~~1964~~	~~Dora-1964~~	~~D-2~~		
~~265~~	~~10/14/1964~~	~~1964~~	~~Isbell-1964~~	~~B-3~~		
~~270~~	~~09/08/1965~~	~~1965~~	~~Betsy-1965~~	~~C-3~~		
~~275~~	~~06/09/1966~~	~~1966~~	~~Alma-1966~~	~~A-2~~		
~~280~~	~~10/04/1966~~	~~1966~~	~~Inez-1966~~	~~B-1~~		
~~285~~	~~10/19/1968~~	~~1968~~	~~Gladys-1968~~	~~A-2~~		
~~290~~	~~08/18/1969~~	~~1969~~	~~Camille-1969~~	~~F-5~~		
~~295~~	~~06/19/1972~~	~~1972~~	~~Agnes-1972~~	~~A-1~~		
~~300~~	~~09/23/1975~~	~~1975~~	~~Eloise-1975~~	~~A-3~~		
~~305~~	~~09/04/1979~~	~~1979~~	~~David-1979~~	~~C-2/E-2~~		
~~310~~	~~09/13/1979~~	~~1979~~	~~Frederic-1979~~	~~F-3~~		
~~315~~	~~09/02/1985~~	~~1985~~	~~Elena-1985~~	~~F-3/ByP-3~~		
~~320~~	~~11/21/1985~~	~~1985~~	~~Kate-1985~~	~~A-2~~		
~~325~~	~~10/12/1987~~	~~1987~~	~~Floyd-1987~~	~~B-1~~		
~~330~~	~~08/24/1992~~	~~1992~~	~~Andrew-1992~~	~~C-5~~		
~~335~~	~~08/03/1995~~	~~1995~~	~~Erin-1995~~	~~C-1/A-2~~		
~~340~~	~~10/04/1995~~	~~1995~~	~~Opal-1995~~	~~A-3~~		
~~345~~	~~07/19/1997~~	~~1997~~	~~Danny-1997~~	~~F-1~~		
~~350~~	~~09/03/1998~~	~~1998~~	~~Earl-1998~~	~~A-1~~		
~~355~~	~~09/25/1998~~	~~1998~~	~~Georges-1998~~	~~B-2/F-2~~		
~~360~~	~~10/15/1999~~	~~1999~~	~~Irene-1999~~	~~B-1~~		
~~365~~	~~08/13/2004~~	~~2004~~	~~Charley-2004~~	~~B-4~~		
~~370~~	~~09/05/2004~~	~~2004~~	~~Frances-2004~~	~~C-2~~		
~~375~~	~~09/16/2004~~	~~2004~~	~~Ivan-2004~~	~~F-3/ByP-3~~		
~~380~~	~~09/26/2004~~	~~2004~~	~~Jeanne-2004~~	~~C-3~~		
~~385~~	~~0710/2005~~	~~2005~~	~~Dennis-2005~~	~~A-3~~		
~~390~~	~~08/25/2005~~	~~2005~~	~~Katrina-2005~~	~~C-1~~		
~~395~~	~~09/20/2005~~	~~2005~~	~~Rita-2005~~	~~ByP-2~~		
~~400~~	~~10/24/2005~~	~~2005~~	~~Wilma-2005~~	~~B-3~~		
~~405~~	~~09/02/2016~~	~~2016~~	~~Hermine-2016~~	~~A-1~~		
~~410~~	~~10/07/2016~~	~~2016~~	~~Matthew-2016~~	~~ByP-3~~		
			~~**Total**~~			

~~Note: Total dollar contributions should agree with the total average annual zero deductible statewide hurricane loss costs provided in Form S-5, Average Annual Zero Deductible Statewide Hurricane Loss Costs – Historical versus Modeled, based on the 2012 FHCF Exposure Data.~~

Form A-2~~B~~: Base Hurricane Storm Set Statewide Hurricane Losses ~~(2017 FHCF Exposure Data)~~

Purpose: This form illustrates the modeling organization's ability to replicate reasonably historical hurricane losses for landfalling and by-passing Florida hurricanes.

A. Provide the total insured hurricane loss and the dollar contribution to the average annual hurricane loss assuming zero deductible policies for individual historical hurricanes using the Florida Hurricane Catastrophe Fund personal and commercial residential zero deductible exposure data found in the file named "*hlpm2017c.~~exe~~zip*." The list of hurricanes in this form shall include all Florida and by-passing hurricanes in the modeling organization Base Hurricane Storm Set, as defined in Standard M-1, Base Hurricane Storm Set.

   The table below contains the minimum number of hurricanes from HURDAT2 to be included in the Base Hurricane Storm Set, based on the ~~117~~119-year period 1900-~~2016~~2018. As defined, a by-passing hurricane (ByP) is a hurricane which does not make landfall on Florida, but produces minimum damaging windspeeds or greater on land in Florida. For the by-passing hurricanes included in the table only, the hurricane intensity entered is the maximum windspeed at closest approach to Florida as a hurricane, not the windspeed over Florida. Each hurricane has been assigned an ID number. As defined in Standard M-1, Base Hurricane Storm Set, the Base Hurricane Storm Set for the modeling organization may exclude hurricanes that had zero modeled impact, or it may include additional hurricanes when there is clear justification for the additions. For hurricanes in the table below resulting in zero hurricane loss, the table entry shall be left blank. Additional hurricanes included in the hurricane model Base Hurricane Storm Set shall be added to the table below in order of year and assigned an intermediate ID number as the hurricane falls within the bounding ID numbers.

B. If additional assumptions are necessary to complete this form, provide the rationale for the assumptions as well as a detailed description of how they are included.

C. Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the hurricane standards year, and the form name. Also include Form A-2~~B~~, Base Hurricane Storm Set Statewide Hurricane Losses ~~(2017 FHCF Exposure Data)~~, in a submission appendix.

ID	Hurricane Landfall/ Closest Approach Date	Year	Name	Region as defined in *Figure 3*- Category	Personal and Commercial Residential Insured Hurricane Losses ($)	Dollar Contribution
005	08/15/1901	1901	NoName04-1901	F-1		
010	09/11/1903	1903	NoName03-1903	C-1/A-1		
015	10/17/1904	1904	NoName04-1904	C-1		
020	06/17/1906	1906	NoName02-1906	B-1/C-1		
025	09/27/1906	1906	NoName06-1906	F-2/ByP-2		
030	10/18/1906	1906	NoName08-1906	B-3/C-3		
035	10/11/1909	1909	NoName11-1909	B-3		
040	10/18/1910	1910	NoName05-1910	B-2		
045	08/11/1911	1911	NoName02-1911	A-1		
050	09/14/1912	1912	NoName04-1912	F-1/ByP-1		
055	08/01/1915	1915	NoName01-1915	D-1		
060	09/04/1915	1915	NoName04-1915	A-1		
065	07/05/1916	1916	NoName02-1916	F-3/ByP-3		
070	10/18/1916	1916	NoName14-1916	A-2		
075	09/29/1917	1917	NoName04-1917	A-3		
080	09/10/1919	1919	NoName02-1919	B-4		
085	10/25/1921	1921	TampaBay06-1921	B-3		
090	09/15/1924	1924	NoName05-1924	A-1		
095	10/21/1924	1924	NoName10-1924	B-1		
100	07/28/1926	1926	NoName01-1926	D-2		
105	09/18/1926	1926	GreatMiami07-1926	C-4/A-3		
110	10/21/1926	1926	NoName10-1926	ByP-3		
115	08/08/1928	1928	NoName01-1928	C-2		
120	09/17/1928	1928	LakeOkeechobee04-1928	C-4		
125	09/28/1929	1929	NoName02-1929	C-3/A-1		
130	09/01/1932	1932	NoName03-1932	F-1/ByP-1		
135	07/30/1933	1933	NoName05-1933	C-1		
140	09/04/1933	1933	NoName11-1933	C-3		
145	09/03/1935	1935	LaborDay03-1935	C-5/A-2		
150	11/04/1935	1935	NoName07-1935	C-2		
155	07/31/1936	1936	NoName05-1936	A-2		
160	08/11/1939	1939	NoName02-1939	C-1/A-1		
165	10/06/1941	1941	NoName05-1941	C-2/A-1		
170	10/19/1944	1944	NoName13-1944	B-3		
175	06/24/1945	1945	NoName01-1945	A-1		
180	09/15/1945	1945	NoName09-1945	C-4		
185	10/08/1946	1946	NoName06-1946	B-~~2~~1		
190	09/17/1947	1947	NoName04-1947	C-4		
195	10/12/1947	1947	NoName09-1947	B-1/E-2		
200	09/22/1948	1948	NoName08-1948	B-4		
205	10/05/1948	1948	NoName09-1948	B-2		
210	08/26/1949	1949	NoName02-1949	C-4		
215	08/31/1950	1950	Baker-1950	F-1/ByP-1		
220	09/05/1950	1950	Easy-1950	A-3		
225	10/18/1950	1950	King-1950	C-4		
230	09/26/1953	1953	Florence-1953	A-1		

ID	Hurricane Landfall/ Closest Approach Date	Year	Name	Region as defined in *Figure 3-* Category	Personal and Commercial Residential Insured Hurricane Losses ($)	Dollar Contribution
235	10/09/1953	1953	Hazel-1953	B-1		
240	09/25/1956	1956	Flossy-1956	A-1		
245	09/10/1960	1960	Donna-1960	B-4		
250	09/15/1960	1960	Ethel-1960	F-1		
255	08/27/1964	1964	Cleo-1964	C-2		
260	09/10/1964	1964	Dora-1964	D-2		
265	10/14/1964	1964	Isbell-1964	B-3		
270	09/08/1965	1965	Betsy-1965	C-3		
275	06/09/1966	1966	Alma-1966	A-~~2~~1		
280	10/04/1966	1966	Inez-1966	~~B~~C-1		
285	10/19/1968	1968	Gladys-1968	A-~~2~~1		
290	08/18/1969	1969	Camille-1969	F-5		
295	06/19/1972	1972	Agnes-1972	A-1		
300	09/23/1975	1975	Eloise-1975	A-3		
305	09/04/1979	1979	David-1979	C-2/E-2		
310	09/13/1979	1979	Frederic-1979	F-3		
315	09/02/1985	1985	Elena-1985	F-3/ByP-3		
320	11/21/1985	1985	Kate-1985	A-2		
325	10/12/1987	1987	Floyd-1987	B-1		
330	08/24/1992	1992	Andrew-1992	C-5		
335	08/03/1995	1995	Erin-1995	C-1/A-~~2~~1		
340	10/04/1995	1995	Opal-1995	A-3		
345	07/19/1997	1997	Danny-1997	F-1		
350	09/03/1998	1998	Earl-1998	A-1		
355	09/25/1998	1998	Georges-1998	B-2/F-2		
360	10/15/1999	1999	Irene-1999	B-1		
365	08/13/2004	2004	Charley-2004	B-4		
370	09/05/2004	2004	Frances-2004	C-2		
375	09/16/2004	2004	Ivan-2004	F-3/ByP-3		
380	09/26/2004	2004	Jeanne-2004	C-3		
385	07/10/2005	2005	Dennis-2005	A-3		
390	08/25/2005	2005	Katrina-2005	C-1		
395	09/20/2005	2005	Rita-2005	ByP-2		
400	10/24/2005	2005	Wilma-2005	B-3		
405	09/02/2016	2016	Hermine-2016	A-1		
410	10/07/2016	2016	Matthew-2016	ByP-3		
415	09/10/2017	2017	Irma-2017	B-4		
420	10/08/2017	2017	Nate-2017	F-1		
425	10/10/2018	2018	Michael-2018	A-5		
			Total			

Note: Total dollar contributions should agree with the total average annual zero deductible statewide hurricane loss costs provided in Form S-5, Average Annual Zero Deductible Statewide Hurricane Loss Costs – Historical versus Modeled~~, based on the 2017 FHCF Exposure Data~~.

~~Form A-3A: 2004 Hurricane Season Losses (2012 FHCF Exposure Data)~~

~~Purpose: This form illustrates the modeling organization's ability to replicate reasonably historical hurricane losses for the four Florida landfalling hurricanes in 2004.~~

~~A. Provide the percentage of residential zero deductible hurricane losses, rounded to four decimal places, and the monetary contribution from Hurricane Charley (2004), Hurricane Frances (2004), Hurricane Ivan (2004), and Hurricane Jeanne (2004) for each affected ZIP Code, individually and in total. Include all ZIP Codes where hurricane losses are equal to or greater than $500,000.~~

~~Use the 2012 Florida Hurricane Catastrophe Fund personal and commercial residential zero deductible exposure data provided in the file named "*hlpm2012c.exe.*"~~

~~Rather than using directly a specified published windfield, the winds underlying the hurricane loss cost calculations must be produced by the hurricane model being evaluated and should be the same hurricane parameters as used in completing Form A-2A, Base Hurricane Storm Set Statewide Hurricane Losses (2012 FHCF Exposure Data).~~

~~B. Provide maps color-coded by ZIP Code depicting the percentage of total residential hurricane losses from each hurricane, Hurricane Charley (2004), Hurricane Frances (2004), Hurricane Ivan (2004), and Hurricane Jeanne (2004), and for the cumulative hurricane losses using the following interval coding:~~

~~Red~~	~~Over 5%~~
~~Light Red~~	~~2% to 5%~~
~~Pink~~	~~1% to 2%~~
~~Light Pink~~	~~0.5% to 1%~~
~~Light Blue~~	~~0.2% to 0.5%~~
~~Medium Blue~~	~~0.1% to 0.2%~~
~~Blue~~	~~Below 0.1%~~

~~C. Plot the relevant storm track on each map.~~

~~D. Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the hurricane standards year, and the form name. Also include Form A-3A, 2004 Hurricane Season Losses (2012 FHCF Exposure Data), in a submission appendix.~~

~~Form A-3A: 2004 Hurricane Season Losses~~
~~(2012 FHCF Exposure Data)~~

	~~Hurricane Charley~~		~~Hurricane Frances~~		~~Hurricane Ivan~~		~~Hurricane Jeanne~~		~~Total~~	
~~ZIP Code~~	~~Personal & Commercial Residential Monetary Contribution ($)~~	~~Percent of Losses (%)~~	~~Personal & Commercial Residential Monetary Contribution ($)~~	~~Percent of Losses (%)~~	~~Personal & Commercial Residential Monetary Contribution ($)~~	~~Percent of Losses (%)~~	~~Personal & Commercial Residential Monetary Contribution ($)~~	~~Percent of Losses (%)~~	~~Personal & Commercial Residential Monetary Contribution ($)~~	~~Percent of Losses (%)~~

Form A-3~~B~~: ~~2004~~ Hurricane ~~Season~~ Losses
~~(2017 FHCF Exposure Data)~~

Purpose: This form illustrates the modeling organization's ability to replicate reasonably historical hurricane losses ~~for the four Florida landfalling hurricanes in 2004~~.

A. One or more automated programs or scripts shall be used to generate and arrange the data in Form A-3, Hurricane Losses.

~~A.~~B. Provide the percentage of residential zero deductible hurricane losses, rounded to four decimal places, and the monetary contribution from ~~Hurricane Charley (2004), Hurricane Frances (2004), Hurricane Ivan (2004), and Hurricane Jeanne (2004)~~ Hurricane Hermine (2016), Hurricane Matthew (2016), Hurricane Irma (2017), and Hurricane Michael (2018) for each affected ZIP Code~~, individually and in total~~. Include all ZIP Codes where hurricane losses are equal to or greater than $500,000.

Use the 2017 Florida Hurricane Catastrophe Fund personal and commercial residential zero deductible exposure data provided in the file named "*hlpm2017c.~~exe~~zip*."

Rather than using directly a specified published windfield, the winds underlying the hurricane loss cost calculations must be produced by the hurricane model being evaluated and should be the same hurricane parameters as used in completing Form A-2~~B~~, Base Hurricane Storm Set Statewide Hurricane Losses ~~(2017 FHCF Exposure Data)~~.

~~B~~C. Provide maps color-coded by ZIP Code depicting the percentage of total residential hurricane losses from each hurricane: ~~Hurricane Charley (2004), Hurricane Frances (2004), Hurricane Ivan (2004), and Hurricane Jeanne (2004)~~Hurricane Hermine (2016), Hurricane Matthew (2016), Hurricane Irma (2017), and Hurricane Michael (2018), ~~and for the cumulative hurricane losses~~ using the following interval coding.

Red	Over 5%
Light Red	2% to 5%
Pink	1% to 2%
Light Pink	0.5% to 1%
Light Blue	0.2% to 0.5%
Medium Blue	0.1% to 0.2%
Blue	Below 0.1%

~~C~~D. Plot the relevant storm track on each map.

~~D~~E. Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the hurricane standards year, and the form name. Also include Form A-3~~B~~, ~~2004~~ Hurricane ~~Season~~ Losses ~~(2017 FHCF Exposure Data)~~, in a submission appendix.

Form A-3~~B~~: ~~2004~~ Hurricane ~~Season~~ Losses
~~(2017 FHCF Exposure Data)~~

	Hurricane ~~Charley~~Hermine (2016)		Hurricane ~~Frances~~Matthew (2016)		Hurricane ~~Ivan~~Irma (2017)		Hurricane ~~Jeanne~~Michael (2018)		~~Total~~	
ZIP Code	Personal & Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal & Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal & Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	Personal & Commercial Residential Monetary Contribution ($)	Percent of Losses (%)	~~Personal & Commercial Residential Monetary Contribution ($)~~	~~Percent of Losses (%)~~

~~Form A-4A: Hurricane Output Ranges (2012 FHCF Exposure Data)~~

~~Purpose: This form provides an illustration of the projected personal and commercial residential modeled hurricane loss costs by county and provides a means to review for appropriate differentials among deductibles, coverages, and construction types.~~

~~A. Provide personal and commercial residential hurricane output ranges in the format shown in the file named *"2017FormA4A.xlsx"* by using an automated program or script. Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the hurricane standards year, and the form name. Also include Form A-4A, Hurricane Output Ranges (2012 FHCF Exposure Data), in a submission appendix.~~

~~B. Provide hurricane loss costs, rounded to three decimal places, by county. Within each county, hurricane loss costs shall be shown separately per $1,000 of exposure for frame owners, masonry owners, frame renters, masonry renters, frame condo unit owners, masonry condo unit owners, manufactured homes, and commercial residential. For each of these categories using ZIP Code centroids, the hurricane output range shall show the highest hurricane loss cost, the lowest hurricane loss cost, and the weighted average hurricane loss cost. The aggregate residential exposure data for this form shall be developed from the information in the file named "*hlpm2012c.exe*," except for insured values and deductibles information. Insured values shall be based on the hurricane output range specifications given below. Deductible amounts of 0% and as specified in the hurricane output range specifications given below shall be assumed to be uniformly applied to all risks. When calculating the weighted average hurricane loss costs, weight the hurricane loss costs by the total insured value calculated above. Include the statewide range of hurricane loss costs (i.e., low, high, and weighted average).~~

~~C. If a modeling organization has hurricane loss costs for a ZIP Code for which there is no exposure, give the hurricane loss costs zero weight (i.e., assume the exposure in that ZIP Code is zero). Provide a list in the submission document of those ZIP Codes where this occurs.~~

~~D. If a modeling organization does not have hurricane loss costs for a ZIP Code for which there is some exposure, do not assume such hurricane loss costs are zero, but use only the exposures for which there are hurricane loss costs in calculating the weighted average hurricane loss costs. Provide a list in the submission document of the ZIP Codes where this occurs.~~

~~E. NA shall be used in cells to signify no exposure.~~

~~F. All hurricane loss costs that are not consistent with the requirements of Standard A-6, Hurricane Loss Outputs and Logical Relationships to Risk, and have been explained in Disclosure A-6.17 shall be shaded.~~

~~G. Indicate if per diem is used in producing hurricane loss costs for Coverage D (Time Element) in the personal residential hurricane output ranges. If a per diem rate is used, a rate of $150.00 per day per policy shall be used.~~

Form A-4~~B~~: Hurricane Output Ranges ~~(2017 FHCF Exposure Data)~~

Purpose: This form provides an illustration of the projected personal and commercial residential modeled hurricane loss costs by county and provides a means to review for appropriate differentials among deductibles, coverages, and construction types.

A. One or more automated programs or scripts shall be used to generate the~~Provide~~ personal and commercial residential hurricane output ranges in the format shown in the file named "*~~2017FormA4B~~2019FormA4.xlsx*." ~~by using an automated program or script.~~

B. Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the hurricane standards year, and the form name. Also include Form A-4~~B~~, Hurricane Output Ranges ~~(2017 FHCF Exposure Data)~~, in a submission appendix.

~~B~~C. Provide hurricane loss costs, rounded to three decimal places, by county. Within each county, hurricane loss costs shall be shown separately per $1,000 of exposure for frame owners, masonry owners, frame renters, masonry renters, frame condo unit owners, masonry condo unit owners, manufactured homes, and commercial residential. For each of these categories using ZIP Code centroids, the hurricane output range shall show the highest hurricane loss cost, the lowest hurricane loss cost, and the weighted average hurricane loss cost. The aggregate residential exposure data for this form shall be developed from the information in the file named "*hlpm2017c.~~exe~~zip*," except for insured values and deductibles information. Insured values shall be based on the hurricane output range specifications given below. Deductible amounts of 0% and as specified in the hurricane output range specifications given below shall be assumed to be uniformly applied to all risks. When calculating the weighted average hurricane loss costs, weight the hurricane loss costs by the total insured value calculated above. Include the statewide range of hurricane loss costs (i.e., low, high, and weighted average).

~~C~~D. If a modeling organization has hurricane loss costs for a ZIP Code for which there is no exposure, give the hurricane loss costs zero weight (i.e., assume the exposure in that ZIP Code is zero). Provide a list in the submission document of those ZIP Codes where this occurs.

~~D.~~E. If a modeling organization does not have hurricane loss costs for a ZIP Code for which there is some exposure, do not assume such hurricane loss costs are zero, but use only the exposures for which there are hurricane loss costs in calculating the weighted average hurricane loss costs. Provide a list in the submission document of the ZIP Codes where this occurs.

~~E.~~F. NA shall be used in cells to signify no exposure.

G. ~~F.~~ All hurricane loss costs that are not consistent with the requirements of Standard A-6, Hurricane Loss Outputs and Logical Relationships to Risk, and have been explained in Disclosure A-6.~~17~~ 14 shall be shaded.

~~F.~~H. Indicate if per diem is used in producing hurricane loss costs for Coverage D (Time Element) in the personal residential hurricane output ranges. If a per diem rate is used, a rate of $150.00 per day per policy shall be used.

Hurricane Output Range Specifications

<u>Policy Type</u>	<u>Assumptions</u>

Owners

Coverage A = Building
- Coverage A limit = $100,000
- Replacement Cost included subject to Coverage A limit
- Law and Ordinance ~~not~~ included

Coverage B = Appurtenant Structure
- Coverage B limit = 10% of Coverage A limit
- Replacement Cost included subject to Coverage B limit
- Law and Ordinance ~~not~~ included

Coverage C = Contents
- Coverage C limit = 50% of Coverage A limit
- Replacement Cost included subject to Coverage C limit

Coverage D = Time Element
- Coverage D limit = 20% of Coverage A limit
- Time limit = 12 months
- Per diem = $150.00/day per policy, if used

✧ Dominant Coverage = A
✧ Hurricane loss costs per $1,000 shall be related to the Coverage A limit
✧ Hurricane loss costs for the various specified deductibles shall be determined based on annual deductibles
✧ 2% Deductible of Coverage A
✧ All-other perils deductible = $500

Renters

Coverage C = Contents
- Coverage C limit = ~~$25,000~~$50,000
- Replacement Cost included subject to Coverage C limit

Coverage D = Time Element
- Coverage D limit = 40% of Coverage C limit
- Time limit = 12 months
- Per diem = $150.00/day per policy, if used

✧ Dominate Coverage = C
✧ Hurricane loss costs per $1,000 shall be related to the Coverage C limit
✧

Policy Type Assumptions

- ✧ Hurricane loss costs for the various specified deductibles shall be determined based on annual deductibles
- ✧ 2% Deductible of Coverage C
- ✧ All-other perils deductible = $500

Condo Unit Owners

Coverage A = Building
- Coverage A limit = 10% of Coverage C limit
- Replacement Cost included subject to Coverage A limit

Coverage C = Contents
- Coverage C limit = $50,000
- Replacement Cost included subject to Coverage C limit

Coverage D = Time Element
- Coverage D limit = 40% of Coverage C limit
- Time limit = 12 months
- Per diem = $150.00/day per policy, if used

- ✧ Dominant Coverage = C
- ✧ Hurricane loss costs per $1,000 shall be related to the Coverage C limit
- ✧ Hurricane loss costs for the various specified deductibles shall be determined based on annual deductibles
- ✧ 2% Deductible of Coverage C
- ✧ All-other perils deductible = $500

Manufactured Homes

Coverage A = Building
- Coverage A limit = $50,000
- Replacement Cost included subject to Coverage A limit

Coverage B = Appurtenant Structure
- Coverage B limit = 10% of Coverage A limit
- Replacement Cost included subject to Coverage B limit

Coverage C = Contents
- Coverage C limit = 50% of Coverage A limit
- Replacement Cost included subject to Coverage C limit

Coverage D = Time Element
- Coverage D limit = 20% of Coverage A limit
- Time limit = 12 months
- Per diem = $150.00/day per policy, if used

- ✧ Dominant Coverage = A
- ✧ Hurricane loss costs per $1,000 shall be related to the Coverage A limit

Policy Type **Assumptions**

- ✧ Hurricane loss costs for the various specified deductibles shall be determined based on annual deductibles
- ✧ 2% Deductible of Coverage A
- ✧ All-other perils deductible = $500

Commercial Residential **Coverage A = Building**

- Coverage A limit = ~~$750,000~~$25,000,000
- Replacement Cost included subject to Coverage A limit

Coverage C = Contents

- Coverage C limit = 5% of Coverage A limit
- Replacement Cost included subject to Coverage C limit

Coverage D = Time Element

- Coverage D limit = 20% of Coverage A limit
- Time limit = 12 months
- Per diem = $150.00/day per policy, if used

- ✧ Dominant Coverage = A
- ✧ Hurricane loss costs per $1,000 shall be related to the Coverage A limit
- ✧ Hurricane loss costs for the various specified deductibles shall be determined based on annual deductibles
- ✧ 3% Deductible of Coverage A
- ✧ All-other perils deductible = ~~$500~~$5,000

Form A-5: Percentage Change in Hurricane Output Ranges ~~(2012 FHCF Exposure Data)~~

Purpose: This form illustrates the impact of changes in the hurricane model on the hurricane loss cost output ranges from the previously-accepted hurricane model.

A. One or more automated programs or scripts shall be used to generate and arrange the data in Form A-5, Percentage Change in Hurricane Output Ranges.

B. Provide summaries of the percentage change in average hurricane loss cost output range data compiled in Form A-4~~A~~, Hurricane Output Ranges ~~(2012 FHCF Exposure Data)~~, relative to the equivalent data compiled from the previously-accepted hurricane model in the format shown in the file named *"~~2017FormA5~~2019FormA5.xlsx."*

For the change in hurricane output range exhibit, provide the summary by:

- Statewide (overall percentage change),
- By region, as defined in *Figure 14* – North, Central and South, and
- By county, as defined in *Figure 15* – Coastal and Inland.

~~B~~C. Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the hurricane standards year, and the form name. Also include all tables in Form A-5, Percentage Change in Hurricane Output Ranges ~~(2012 FHCF Exposure Data)~~, in a submission appendix.

~~C~~D. Provide color-coded maps by county reflecting the percentage changes in the average hurricane loss costs ~~based on the 2012 FHCF Exposure Data~~ with specified deductibles for frame owners, masonry owners, frame renters, masonry renters, frame condo unit owners, masonry condo unit owners, manufactured homes, and commercial residential from the hurricane output ranges from the previously-accepted hurricane model.

Counties with a negative percentage change (reduction in hurricane loss costs) shall be indicated with shades of blue, counties with a positive percentage change (increase in hurricane loss costs) shall be indicated with shades of red, and counties with no percentage change shall be white. The larger the percentage change in the county, the more intense the color-shade.

Figure 14

State of Florida by North/Central/South Regions

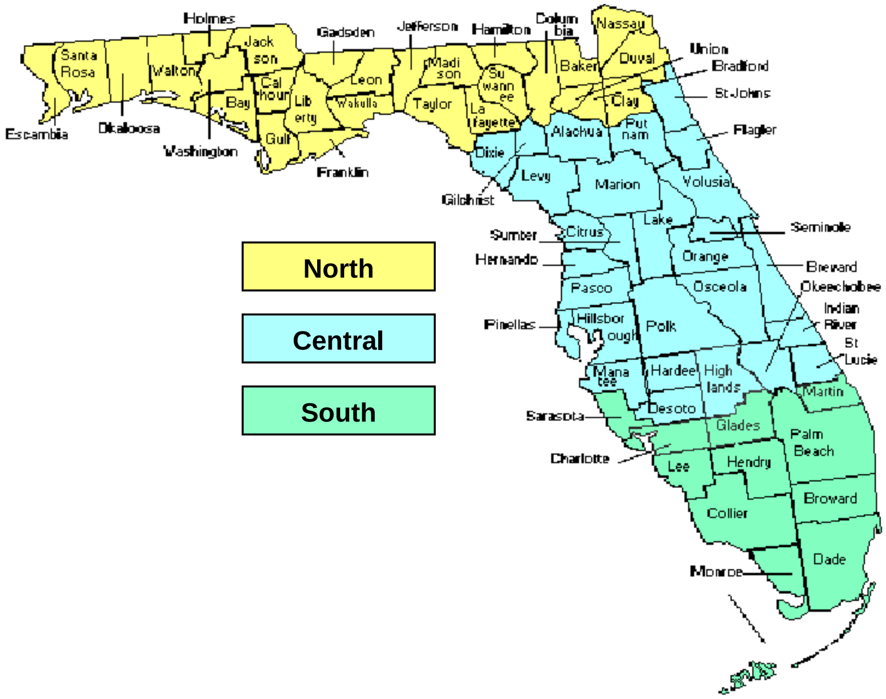
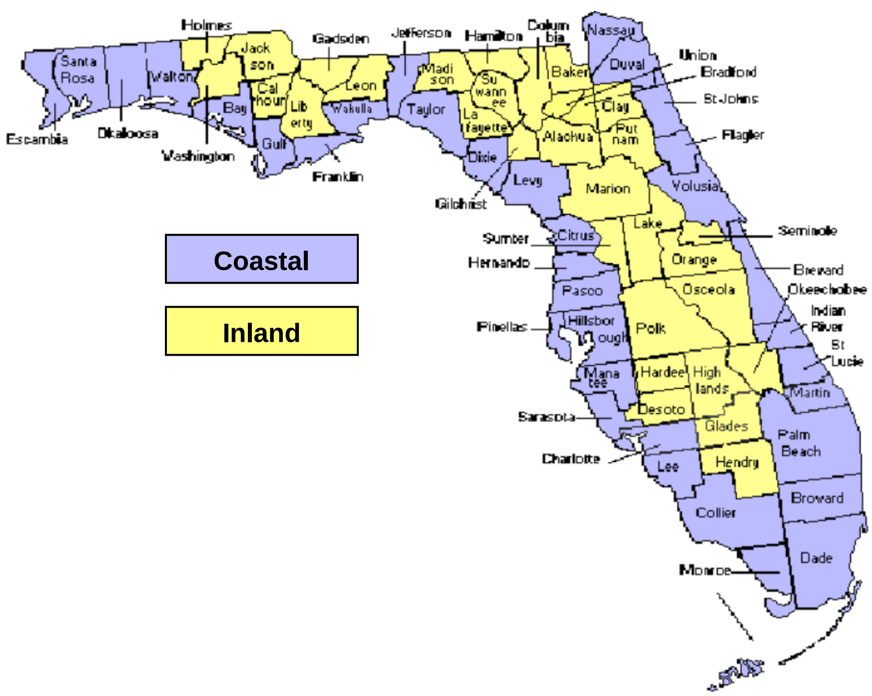


Figure 15

State of Florida by Coastal/Inland Counties



Form A-6: Logical Relationship to Hurricane Risk (Trade Secret Item)

Purpose: This form provides an illustration of the hurricane loss cost relationships among deductible, policy form, construction type, coverage, year of construction, building strength, ~~condo unit floor,~~ and number of stories.

A. One or more automated programs or scripts shall be used to generate the exhibits in Form A-6, Logical Relationship to Hurricane Risk (Trade Secret Item).

~~A.~~B. Provide the logical relationship to hurricane risk exhibits in the format shown in the file named *"~~2017FormA6~~2019FormA6.xlsx."*

~~B~~C. Create exposure sets for each exhibit by modeling all of the coverages from the appropriate Notional Set listed below at each of the locations in ~~"~~Location Grid A~~"~~ as described in the file *"~~NotionalInput17~~NotionalInput19.xlsx."* Refer to the Notional Hurricane Policy Specifications below for additional modeling information.

~~C. Explain any assumptions, deviations, and differences from the prescribed exposure information. In particular, explain how the treatment of unknown is handled in each sensitivity.~~

Exhibit	Notional Set
Deductible Sensitivity	Set 1
Policy Form Sensitivity	Set 2
~~Policy Form/~~Construction Sensitivity	Set 3
Coverage Sensitivity	Set 4
~~Building Code/Enforcement (~~Year Built~~)~~ Sensitivity	Set 5
Building Strength Sensitivity	Set 6
~~Condo Unit Floor Sensitivity~~	~~Set 7~~
Number of Stories Sensitivity	Set ~~8~~7

D. Hurricane models shall treat points in ~~"~~Location Grid A~~"~~ as coordinates that would result from a geocoding process. Hurricane models shall treat points by simulating hurricane loss at exact location or by using the nearest modeled parcel/street/cell in the hurricane model. Report results for each of the points in ~~"~~Location Grid A~~"~~ individually, unless specified. Hurricane loss costs per $1,000 of exposure shall be rounded to three decimal places.

E. All hurricane loss costs that are not consistent with the requirements of Standard A-6, Hurricane Loss Outputs and Logical Relationships to Risk, and have been explained in Disclosure A-6.~~17~~ 14 shall be shaded.

F. Provide graphical summaries to demonstrate the sensitivities for each Notional Set.

~~F~~G. Create an exposure set and report hurricane loss costs results for strong owners frame buildings (Notional Set 6) for each of the points in ~~"~~Location Grid B~~"~~ as described in the file *"~~NotionalInput17~~NotionalInput19.xlsx."* Provide a color-coded contour map of the hurricane loss costs. Provide a scatter plot of the hurricane loss costs (*y*-axis) against distance to closest coast (*x*-axis).

Notional Hurricane Policy Specifications

Policy Type	**Assumptions**
Owners	**Coverage A = Building** • Replacement Cost included subject to Coverage A limit • Law and Ordinance ~~not~~ included **Coverage B = Appurtenant Structure** • Replacement Cost included subject to Coverage B limit • Law and Ordinance ~~not~~ included **Coverage C = Contents** • Replacement Cost included subject to Coverage C limit **Coverage D = Time Element** • Time limit = 12 months • Per diem = $150.00/day per policy, if used

- ✧ Hurricane loss costs per $1,000 shall be related to the Coverage A limit
- ✧ Hurricane loss costs for the various specified deductibles shall be determined based on annual deductibles
- ✧ All-other perils deductible = $500

Renters	**Coverage C = Contents** • Replacement Cost included subject to Coverage C limit **Coverage D = Time Element** • Time limit = 12 months • Per diem = $150.00/day per policy, if used

- ✧ Hurricane loss costs per $1,000 shall be related to the Coverage C limit
- ✧ Hurricane loss costs for the various specified deductibles shall be determined based on annual deductibles
- ✧ All-other perils deductible = $500

Policy Type	Assumptions
Condo Unit Owners	**Coverage A = Building** • Replacement Cost included subject to Coverage A limit **Coverage C = Contents** • Replacement Cost included subject to Coverage C limit **Coverage D = Time Element** • Time limit = 12 months • Per diem = $150.00/day per policy, if used

- ✧ Hurricane loss costs per $1,000 shall be related to the Coverage C limit
- ✧ Hurricane loss costs for the various specified deductibles shall be determined based on annual deductibles
- ✧ All-other perils deductible = $500

Manufactured Homes	**Coverage A = Building** • Replacement Cost included subject to Coverage A limit **Coverage B = Appurtenant Structure** • Replacement Cost included subject to Coverage B limit **Coverage C = Contents** • Replacement Cost included subject to Coverage C limit **Coverage D = Time Element** • Time limit = 12 months • Per diem = $150.00/day per policy, if used

- ✧ Hurricane loss costs per $1,000 shall be related to the Coverage A limit
- ✧ Hurricane loss costs for the various specified deductibles shall be determined based on annual deductibles
- ✧ All-other perils deductible = $500

Commercial Residential	**Coverage A = Building** • Replacement Cost included subject to Coverage A limit **Coverage C = Contents** • Replacement Cost included subject to Coverage C limit **Coverage D = Time Element** • Time limit = 12 months • Per diem = $150.00/day per policy, if used

- ✧ Hurricane loss costs per $1,000 shall be related to the Coverage A limit

- Hurricane loss costs for the various specified deductibles shall be determined based on annual deductibles
- All-other perils deductible = ~~$500~~$5,000

Form A-7: Percentage Change in Logical Relationship to Hurricane Risk

Purpose: This form illustrates the impact of changes in the hurricane model on the logical relationship to hurricane risk exhibits from the previously-accepted hurricane model.

A. One or more automated programs or scripts shall be used to generate the exhibits in Form A-7, Percentage Change in Logical Relationship to Hurricane Risk.

~~A.~~B. Provide summaries of the percentage change in logical relationship to hurricane risk exhibits from the previously-accepted hurricane model in the format shown in the file named "~~*2017FormA7*~~*2019FormA7.xlsx.*"

~~B~~C. Create exposure sets for each exhibit by modeling all of the coverages from the appropriate Notional Set listed below at each of the locations in ~~"~~Location Grid B~~"~~ as described in the file "~~*NotionalInput17*~~*NotionalInput19.xlsx.*" Refer to the Notional Hurricane Policy Specifications provided in Form A-6, Logical Relationship to Hurricane Risk (Trade Secret Item), for additional modeling information.

~~C. Explain any assumptions, deviations, and differences from the prescribed exposure information. In particular, explain how the treatment of unknown is handled in each sensitivity.~~

Exhibit	Notional Set
Deductible Sensitivity	Set 1
Policy Form Sensitivity	Set 2
~~Policy Form/~~Construction Sensitivity	Set 3
Coverage Sensitivity	Set 4
~~Building Code/Enforcement (~~Year Built~~)~~ Sensitivity	Set 5
Building Strength Sensitivity	Set 6
~~Condo Unit Floor Sensitivity~~	~~Set 7~~
Number of Stories Sensitivity	Set ~~8~~7

D. Hurricane models shall treat points in ~~"~~Location Grid B~~"~~ as coordinates that would result from a geocoding process. Hurricane models shall treat points by simulating hurricane loss at exact location or by using the nearest modeled parcel/street/cell in the hurricane model. Provide the results statewide (overall percentage change) and by the regions defined in Form A-5, Percentage Change in Hurricane Output Ranges~~ (2012 FHCF Exposure Data)~~.

E. Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the hurricane standards year, and the form name. Also include all ~~tables~~ exhibits in Form A-7, Percentage Change in Logical Relationship to Hurricane Risk, in a submission appendix.

~~Form A-8A: Hurricane Probable Maximum Loss for Florida (2012 FHCF Exposure Data)~~

~~Purpose: This form provides an illustration of the distribution of hurricane losses. The form also illustrates that appropriate calculations were used to produce both expected annual hurricane losses and hurricane probable maximum loss levels.~~

~~A. Provide a detailed explanation of how the Expected Annual Hurricane Losses and Return Periods are calculated.~~

~~B. Complete Part A showing the personal and commercial residential hurricane probable maximum loss for Florida. For the Expected Annual Hurricane Losses column, provide personal and commercial residential, zero deductible statewide hurricane loss costs based on the 2012 Florida Hurricane Catastrophe Fund personal and commercial residential zero deductible exposure data found in the file named "*hlpm2012c.exe*."~~

~~In the column, Return Period (Years), provide the return period associated with the average hurricane loss within the ranges indicated on a cumulative basis.~~

~~For example, if the average hurricane loss is $4,705 million for the range $4,501 million to $5,000 million, provide the return period associated with a hurricane loss that is $4,705 million or greater.~~

~~For each hurricane loss range in millions ($1,001-$1,500, $1,501-$2,000, $2,001-$2,500) the average hurricane loss within that range should be identified and then the return period associated with that hurricane loss calculated. The return period is then the reciprocal of the probability of the hurricane loss equaling or exceeding this average hurricane loss size.~~

~~The probability of equaling or exceeding the average of each range should be smaller as the ranges increase (and the average hurricane losses within the ranges increase). Therefore, the return period associated with each range and average hurricane loss within that range should be larger as the ranges increase. Return periods shall be based on cumulative probabilities.~~

~~A return period for an average hurricane loss of $4,705 million within the $4,501-$5,000 million range should be lower than the return period for an average hurricane loss of $5,455 million associated with a $5,001- $6,000 million range.~~

~~C. Provide a graphical comparison of the current hurricane model Residential Return Periods hurricane loss curve to the previously-accepted hurricane model Residential Return Periods hurricane loss curve. Residential Return Period (Years) shall be shown on the *y*-axis on a log-10 scale with Hurricane Losses in Billions shown on the *x*-axis. The legend shall indicate the corresponding hurricane model with a solid line representing the current year and a dotted line representing the previously-accepted hurricane model.~~

~~D. Provide the estimated hurricane loss and uncertainty interval for each of the Personal and Commercial Residential Return Periods given in Part B, Annual Aggregate, and Part C, Annual Occurrence. Describe how the uncertainty intervals are derived. Also, provide in Parts B and C, the Conditional Tail Expectation, the expected value of hurricane losses greater than the Estimated Hurricane Loss Level.~~

~~E. Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the hurricane standards year, and the form name. Also include Form A-8A, Hurricane Probable Maximum Loss for Florida (2012 FHCF Exposure Data), in a submission appendix.~~

~~Part A – Personal and Commercial Residential Hurricane Probable Maximum Loss for Florida~~

~~HURRICANE LOSS RANGE (MILLIONS)~~			~~TOTAL HURRICANE LOSS~~	~~AVERAGE HURRICANE LOSS (MILLIONS)~~	~~NUMBER OF HURRICANES~~	~~EXPECTED ANNUAL HURRICANE LOSSES*~~	~~RETURN PERIOD (YEARS)~~
~~$ -~~	~~to~~	~~$ 500~~					
~~$ 501~~	~~to~~	~~$ 1,000~~					
~~$ 1,001~~	~~to~~	~~$ 1,500~~					
~~$ 1,501~~	~~to~~	~~$ 2,000~~					
~~$ 2,001~~	~~to~~	~~$ 2,500~~					
~~$ 2,501~~	~~to~~	~~$ 3,000~~					
~~$ 3,001~~	~~to~~	~~$ 3,500~~					
~~$ 3,501~~	~~to~~	~~$ 4,000~~					
~~$ 4,001~~	~~to~~	~~$ 4,500~~					
~~$ 4,501~~	~~to~~	~~$ 5,000~~					
~~$ 5,001~~	~~to~~	~~$ 6,000~~					
~~$ 6,001~~	~~to~~	~~$ 7,000~~					
~~$ 7,001~~	~~to~~	~~$ 8,000~~					
~~$ 8,001~~	~~to~~	~~$ 9,000~~					
~~$ 9,001~~	~~to~~	~~$ 10,000~~					
~~$ 10,001~~	~~to~~	~~$ 11,000~~					
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~~$ 40,001~~	~~to~~	~~$ 45,000~~					
~~$ 45,001~~	~~to~~	~~$ 50,000~~					
~~$ 50,001~~	~~to~~	~~$ 55,000~~					
~~$ 55,001~~	~~to~~	~~$ 60,000~~					
~~$ 60,001~~	~~to~~	~~$ 65,000~~					
~~$ 65,001~~	~~to~~	~~$ 70,000~~					
~~$ 70,001~~	~~to~~	~~$ 75,000~~					
~~$ 75,001~~	~~to~~	~~$ 80,000~~					
~~$ 80,001~~	~~to~~	~~$ 90,000~~					
~~$ 90,001~~	~~to~~	~~$ 100,000~~					
~~$ 100,001~~	~~to~~	~~$ Maximum~~					
~~Total~~							

~~*Personal and commercial residential zero deductible statewide hurricane loss using 2012 FHCF personal and commercial residential zero deductible exposure data (file name: *hlpm2012c.exe*).~~

~~Part B – Personal and Commercial Residential Hurricane Probable Maximum Loss for Florida (Annual Aggregate)~~

~~Return Period (Years)~~	~~Estimated Hurricane Loss Level~~	~~Uncertainty Interval~~	~~Conditional Tail Expectation~~
~~Top Event~~			~~---~~
~~1,000~~			
~~500~~			
~~250~~			
~~100~~			
~~50~~			
~~20~~			
~~10~~			
~~5~~			

~~Part C – Personal and Commercial Residential Hurricane Probable Maximum Loss for Florida (Annual Occurrence)~~

~~Return Period (Years)~~	~~Estimated Hurricane Loss Level~~	~~Uncertainty Interval~~	~~Conditional Tail Expectation~~
~~Top Event~~			~~---~~
~~1,000~~			
~~500~~			
~~250~~			
~~100~~			
~~50~~			
~~20~~			
~~10~~			
~~5~~			

Form A-8~~B~~: Hurricane Probable Maximum Loss for Florida
~~(2017 FHCF Exposure Data)~~

Purpose: This form provides an illustration of the distribution of hurricane losses. The form also illustrates that appropriate calculations were used to produce both expected annual hurricane losses and hurricane probable maximum loss levels.

A. One or more automated programs or scripts shall be used to generate and arrange the data in Form A-8, Hurricane Probable Maximum Loss for Florida.

~~A.~~B. Provide a detailed explanation of how the Expected Annual Hurricane Losses and Return Periods are calculated.

~~B.~~C. Complete Part A showing the personal and commercial residential hurricane probable maximum loss for Florida. For the Expected Annual Hurricane Losses column, provide personal and commercial residential, zero deductible statewide hurricane loss costs based on the 2017 Florida Hurricane Catastrophe Fund personal and commercial residential zero deductible exposure data found in the file named "*hlpm2017c.~~exe~~zip*."

In the column, Return Period (Years), provide the return period associated with the average hurricane loss within the ranges indicated on a cumulative basis.

For example, if the average hurricane loss is \$4,705 million for the range \$4,501 ~~million to~~ - \$5,000 million, provide the return period associated with a hurricane loss that is \$4,705 million or greater.

For each hurricane loss range in millions (\$1,001-\$1,500, \$1,501-\$2,000, \$2,001-\$2,500) the average hurricane loss within that range should be identified and then the return period associated with that hurricane loss calculated. The return period is then the reciprocal of the probability of the hurricane loss equaling or exceeding this average hurricane loss size.

The probability of equaling or exceeding the average of each range should be smaller as the ranges increase (and the average hurricane losses within the ranges increase). Therefore, the return period associated with each range and average hurricane loss within that range should be larger as the ranges increase. Return periods shall be based on cumulative probabilities.

A return period for an average hurricane loss of \$4,705 million within the \$4,501-\$5,000 million range should be lower than the return period for an average hurricane loss of \$5,455 million associated with a \$5,001-\$6,000 million range.

~~C~~D. Provide a graphical comparison of the current hurricane model Residential Return Periods hurricane loss curve to the previously-accepted hurricane model Residential Return Periods hurricane loss curve. Residential Return Period (Years) shall be shown on the *y*-axis on a log-10 scale with Hurricane Losses in Billions shown on the *x*-axis. The legend shall indicate the corresponding hurricane model with a solid line representing the current year and a dotted line representing the previously-accepted hurricane model.

~~D~~E. Provide the estimated hurricane loss and uncertainty interval for each of the Personal and Commercial Residential Return Periods given in Part B, Annual Aggregate, and Part C, Annual Occurrence. Describe how the uncertainty intervals are derived. Also, provide in Parts B and C, the Conditional Tail Expectation, the expected value of hurricane losses greater than the Estimated Hurricane Loss Level.

~~E~~F. Provide this form in Excel format. The file name shall include the abbreviated name of the modeling organization, the hurricane standards year, and the form name. Also include Form A-8~~B~~, Hurricane Probable Maximum Loss for Florida~~ (2017 FHCF Exposure Data)~~, in a submission appendix.

Part A – Personal and Commercial Residential Hurricane Probable Maximum Loss for Florida

HURRICANE LOSS RANGE (MILLIONS)				TOTAL HURRICANE LOSS	AVERAGE HURRICANE LOSS (MILLIONS)	NUMBER OF HURRICANES	EXPECTED ANNUAL HURRICANE LOSSES*	RETURN PERIOD (YEARS)
~~$~~ >0	to	$	500					
$ 501	to	$	1,000					
$ 1,001	to	$	1,500					
$ 1,501	to	$	2,000					
$ 2,001	to	$	2,500					
$ 2,501	to	$	3,000					
$ 3,001	to	$	3,500					
$ 3,501	to	$	4,000					
$ 4,001	to	$	4,500					
$ 4,501	to	$	5,000					
$ 5,001	to	$	6,000					
$ 6,001	to	$	7,000					
$ 7,001	to	$	8,000					
$ 8,001	to	$	9,000					
$ 9,001	to	$	10,000					
$ 10,001	to	$	11,000					
$ 11,001	to	$	12,000					
$ 12,001	to	$	13,000					
$ 13,001	to	$	14,000					
$ 14,001	to	$	15,000					
$ 15,001	to	$	16,000					
$ 16,001	to	$	17,000					
$ 17,001	to	$	18,000					
$ 18,001	to	$	19,000					
$ 19,001	to	$	20,000					
$ 20,001	to	$	21,000					
$ 21,001	to	$	22,000					
$ 22,001	to	$	23,000					
$ 23,001	to	$	24,000					
$ 24,001	to	$	25,000					
$ 25,001	to	$	26,000					
$ 26,001	to	$	27,000					
$ 27,001	to	$	28,000					
$ 28,001	to	$	29,000					
$ 29,001	to	$	30,000					
$ 30,001	to	$	35,000					
$ 35,001	to	$	40,000					
$ 40,001	to	$	45,000					
$ 45,001	to	$	50,000					
$ 50,001	to	$	55,000					
$ 55,001	to	$	60,000					
$ 60,001	to	$	65,000					
$ 65,001	to	$	70,000					
$ 70,001	to	$	75,000					
$ 75,001	to	$	80,000					
$ 80,001	to	$	90,000					
$ 90,001	to	$	100,000					
$ 100,001	to	$	Maximum					
Total								

*Personal and commercial residential zero deductible statewide hurricane loss using the 2017 Florida Hurricane Catastrophe Fund personal and commercial residential zero deductible exposure data ~~(~~found in the file named~~:~~ *hlpm2017c.~~exe~~zip*~~)~~.

Part B – Personal and Commercial Residential Hurricane Probable Maximum Loss for Florida - ~~(~~Annual Aggregate~~)~~

Return Period (Years)	Estimated Hurricane Loss Level	Uncertainty Interval	Conditional Tail Expectation
Top Event			---
1,000			
500			
250			
100			
50			
20			
10			
5			

Part C – Personal and Commercial Residential Hurricane Probable Maximum Loss for Florida - ~~(~~Annual Occurrence~~)~~

Return Period (Years)	Estimated Hurricane Loss Level	Uncertainty Interval	Conditional Tail Expectation
Top Event			---
1,000			
500			
250			
100			
50			
20			
10			
5			

CI-1 Hurricane Model Documentation*

~~(*Significant Revision)~~

A. Hurricane model functionality and technical descriptions shall be documented formally in an archival format separate from the use of letters, slides, and unformatted text files.

B. ~~The modeling organization shall maintain a~~A primary document repository shall be maintained, containing or referencing a complete set of documentation specifying the hurricane model structure, detailed software description, and functionality. Documentation shall be indicative of current model development and software engineering practices.

C. All computer software (i.e., user interface, scientific, engineering, actuarial, data preparation, and validation) relevant to the hurricane model shall be consistently documented and dated.

D. The ~~modeling organization~~following shall be maintained: (1) a table of all changes in the hurricane model from the previously-accepted hurricane model to the initial submission this year, and (2) a table of all substantive changes since this year's initial submission.

E. Documentation shall be created separately from the source code.

F. ~~The modeling organization shall maintain a~~A list of all externally acquired, currently used, hurricane model-specific software and data assets shall be maintained. The list shall include (1) asset name, (2) asset version number, (3) asset acquisition date, (4) asset acquisition source, (5) asset acquisition mode (e.g., lease, purchase, open source), and (6) length of time asset has been in use by the modeling organization.

Purpose: To capture all aspects of *documenting* the hurricane model. Documentation enables the modeling organization personnel to create a shared, formal hurricane model organizational structure of all information specifically related to the hurricane model. This structure (1) may include many forms of media such as printed documentation, diagrams, and time-based media such as animations, and (2) may be implemented on one or more platforms.

Relevant Form: G-6, Computer/Information Standards Expert Certification

Audit

1. The primary document repository, in either electronic or physical form, and its maintenance process will be reviewed. The repository should contain or reference full documentation of the software.

2. All documentation should be easily accessible from a central location in order to be reviewed.

3. Complete user documentation, including all recent updates, will be reviewed.

4. Modeling organization personnel, or their designated proxies, responsible for each aspect of the software (i.e., user interface, quality assurance, engineering, actuarial, verification) should be present when the Computer/Information Standards are being reviewed. Internal users of the software will be interviewed.

5. Verification that documentation is created separately from, and is maintained consistently with, the source code will be reviewed.

6. The list of all externally acquired hurricane model-specific software and data assets will be reviewed.

7. The tables specified in CI-1.D that contain the items listed in Standard G-1, Scope of the Hurricane Model and Its Implementation, Disclosure ~~5~~ 7 will be reviewed. The tables should contain the item number in the first column. The remaining five columns should contain specific document or file references for affected components or data relating to the following Computer/Information Standards: CI-2, Hurricane Model Requirements; CI-3, Hurricane Model ~~Architecture~~ Organization and Component Design; CI-4, Hurricane Model Implementation; CI-5, Hurricane Model Verification; and CI-6, Hurricane Model Maintenance and Revision.

8. Tracing of the hurricane model changes specified in Standard G-1, Scope of the Hurricane Model and Its Implementation, Disclosure ~~5~~ 7 and Audit ~~5~~ 6 through all Computer/Information Standards will be reviewed.

CI-2 Hurricane Model Requirements

~~The modeling organization shall maintain a~~A complete set of requirements for each software component, as well as for each database or data file accessed by a component, shall be maintained. Requirements shall be updated whenever changes are made to the hurricane model.

Purpose: To define an initial stage of hurricane model development. Software development begins with a thorough *specification of requirements* for each component, database, or data file accessed by a component. These requirements are frequently documented informally in natural language, with the addition of illustrations that aid both users and software engineers in specifying components, databases, or data files accessed by a component for the software product and process. Requirements drive the subsequent design (CI-3, Hurricane Model ~~Architecture~~ Organization and Component Design), implementation (CI-4, Hurricane Model Implementation), and verification (CI-5, Hurricane Model Verification) of the hurricane model.

A typical division of requirements into categories would include:

1. ***Interface:*** For example, use the web browser Internet Explorer, with ActiveX technology, to show county and ZIP Code maps of Florida. Allow text search commands for browsing and locating counties.

2. ***Human Factors:*** For example, ZIP Code boundaries and contents, can be scaled to the extent that the average user can visually identify residential home exposures marked with small circles.

3. ***Functionality:*** For example, make the software design at the topmost level a data flowchart containing the following components: HURRICANE~~S~~, WINDFIELD, DAMAGE, and HURRICANE LOSS COSTS. Write the low-level code in Java.

4. ***Network Organization:*** For example, the use of multiple platforms, client-server layout, and cloud services.

5. ***Documentation:*** For example, use Acrobat PDF for the layout language, and add PDF hyperlinks in documents to connect the sub-documents.

~~5~~6. ***Data:*** For example, store the hurricane vulnerability data in an Excel spreadsheet using a different sheet for each construction type.

~~6~~7. ***Human Resources:*** For example, task individuals for the six-month coding of the windfield simulation. Ask others to design the user-interface by working with the Quality Assurance team.

~~7~~8. ***System Models***: For example, models with representations of software, data, and associated human collaboration~~,~~ will use Business Process Model and Notation (BPMN), Unified Modeling Language (UML), or Systems Modeling Language (SysML).

~~8~~9. ***Security:*** For example, store tapes off-site, with incremental daily backups. Password-protect all source files.

~~9~~10. ***Quality Assurance:*** For example, filter insurance claims data against norms and extremes created for the last project.

Relevant Form: G-6, Computer/Information Standards Expert Certification

Disclosure

1. Provide a description of the hurricane model and platform(s) documentation for interface, human factors, functionality, system documentation, data, human and material resources, security, and quality assurance.

Audit

1. Maintenance and documentation of a complete set of requirements for each software component, database, and data file accessed by a component will be reviewed.

CI-3 Hurricane Model ~~Architecture~~ Organization and Component Design~~*~~

~~(*Significant Revision)~~

A. The ~~modeling organization~~following shall be maintained and documented: (1) detailed control and data flowcharts and interface specifications for each software component, (2) schema definitions for each database and data file, (3) flowcharts illustrating hurricane model-related flow of information and its processing by modeling organization personnel or consultants, ~~and~~ (4) network organization, and (5) system model representations associated with (1)-(~~3~~4) above. Documentation shall be to the level of components that make significant contributions to the hurricane model output.

B. All flowcharts (e.g., software, data, and system models) shall be based on (1) a referenced industry standard (e.g., Unified Modeling Language (UML), Business Process Model and Notation (BPMN), Systems Modeling Language (SysML)), or (2) a comparable internally-developed standard which is separately documented.

Purpose: To *design* the hurricane model once requirements (CI-2, Hurricane Model Requirements) have been specified. The software system (comprised of code and data) and the business process (composed of people and information flows) are designed as a collection of interconnected components. Hurricane models are designed to function over networks and sometimes are embedded in more than one platform. Networks include component nodes such as router, client, server, and cloud.

~~These~~ Hurricane model components are frequently specified in hierarchical flowcharts and diagrams. Example components might include HURRICANE~~S~~, WINDFIELD, DAMAGE, and HURRICANE LOSS COSTS, and the major sub-components of each. The purpose of each example component is, as follows:

1. HURRICANE~~S~~ accepts historical hurricane sets and generates historical and stochastic storm trajectories;

2. WINDFIELD accepts the output from HURRICANE~~S~~ and produces site-specific winds;

3. DAMAGE accepts the output from WINDFIELD and generates damage to building;

4. HURRICANE LOSS COSTS accepts the output from DAMAGE and generates hurricane loss costs.

Relevant Form: G-6, Computer/Information Standards Expert Certification

Audit

1. The following will be reviewed:

    a. Detailed control and data flowcharts, completely and sufficiently labeled for each component,
    b. Interface specifications for all components in the hurricane model,
    c. Documentation for schemas for all data files, along with field type definitions,
    d. Each network flowchart including components, sub-component flowcharts, arcs, and labels, ~~and~~
    e. Flowcharts illustrating hurricane model-related information flow among modeling organization personnel or consultants (e.g., BPMN, UML, SysML, or equivalent technique including a modeling organization internal standard)~~.~~, and
    f. If the hurricane model is implemented on more than one platform, the detailed control and data flowcharts, component interface specifications, schema documentation for all data files, and detailed network flowcharts for each platform.

2. A hurricane model component custodian, or designated proxy, should be available for the review of each component.

3. The flowchart reference guide or industry standard reference will be reviewed.

CI-4 Hurricane Model Implementation*

(*Significant Revision)

A. ~~The modeling organization shall maintain a~~A complete procedure of coding guidelines consistent with accepted software engineering practices shall be maintained.

B. Network organization documentation shall be maintained.

C. ~~The modeling organization shall maintain a~~A complete procedure used in creating, deriving, or procuring and verifying databases or data files accessed by components shall be maintained.

~~C~~D. All components shall be traceable, through explicit component identification in the hurricane model representations (e.g., flowcharts) down to the code level.

~~D~~E. ~~The modeling organization shall maintain a~~A table of all software components affecting hurricane loss costs and hurricane probable maximum loss levels shall be maintained with the following table columns: (1) component name, (2) number of lines of code, minus blank and comment lines, and (3) number of explanatory comment lines.

~~E~~F. Each component shall be sufficiently and consistently commented so that a software engineer unfamiliar with the code shall be able to comprehend the component logic at a reasonable level of abstraction.

~~F~~G. ~~The modeling organization shall maintain t~~The following documentation shall be maintained for all components or data modified by items identified in Standard G-1, Scope of the Hurricane Model and Its Implementation, Disclosure ~~5~~ 7 and Audit ~~5~~6:

1. A list of all equations and formulas used in documentation of the hurricane model with definitions of all terms and variables~~.~~, and

2. A cross-referenced list of implementation source code terms and variable names corresponding to items within ~~F~~G.1 above.

Purpose: To *implement* the hurricane model based on requirements (CI-2, Hurricane Model Requirements) and design (CI-3, Hurricane Model ~~Architecture~~ Organization and Component Design). The hurricane model implementation is created using computer software (i.e., code) and data. Elements formed in the design stage should be fully traceable to components of the implementation. The design stage serves as an abstract, and often visual, representation of the underlying implementation comprised of code and data.

Relevant Form: G-6, Computer/Information Standards Expert Certification

Disclosure

1. Specify the hardware, operating system, and ~~other~~ essential software~~, and all computer languages~~ required to use the hurricane model on a given platform.

Audit

1. The interfaces and the coupling assumptions will be reviewed.

2. The documented coding guidelines, including procedures for ensuring readable identifiers for variables, constants, and components, and confirmation that these guidelines are uniformly implemented will be reviewed.

3. The procedure used in creating, deriving, or procuring and verifying databases or data files accessed by components will be reviewed.

4. The traceability among components at all levels of representation will be reviewed.

5. The following information will be reviewed for each component, either in a header comment block, source control database, or the documentation:

    a. Component name,
    b. Date created,
    c. Dates modified, modification rationale, and by whom,
    d. Purpose or function of the component, and
    e. Input and output parameter definitions.

6. The table of all software components as specified in CI-4.~~D~~ E will be reviewed.

7. Hurricane model components and the method of mapping to elements in the computer program will be reviewed.

8. Comments within components will be reviewed for sufficiency, consistency, and explanatory quality.

9. Unique aspects within various platforms with regard to the use of hardware, operating system, and essential software will be reviewed.

10. Network organization implementation will be reviewed.

CI-5 Hurricane Model Verification

A. General

For each component, ~~the modeling organization shall maintain~~ procedures shall be maintained for verification, such as code inspections, reviews, calculation crosschecks, and walkthroughs, sufficient to demonstrate code correctness. Verification procedures shall include tests performed by modeling organization personnel other than the original component developers.

B. Component Testing

1. ***~~The modeling organization shall use t~~Testing software shall be used to assist in documenting and analyzing all components.***
2. ***Unit tests shall be performed and documented for each component.***
3. ***Regression tests shall be performed and documented on incremental builds.***
4. ***~~Aggregation~~ Integration tests shall be performed and documented to ensure the correctness of all hurricane model components. Sufficient testing shall be performed to ensure that all components have been executed at least once.***

C. Data Testing

1. ***~~The modeling organization shall use t~~Testing software shall be used to assist in documenting and analyzing all databases and data files accessed by components.***
2. ***~~The modeling organization shall perform and document i~~Integrity, consistency, and correctness checks shall be performed and documented on all databases and data files accessed by the components.***

Purpose: To ensure a correct mapping from executing the implementation (CI-4, Hurricane Model Implementation) to previously-specified requirements (CI-2, Hurricane Model Requirements), and design (CI-3, Hurricane Model ~~Architecture~~ Organization and Component Design). *Verification* requires tests to be run by varying component inputs to ensure correct output.

Relevant Form: G-6, Computer/Information Standards Expert Certification

Disclosures

1. State whether any two executions of the hurricane model with no changes in input data, parameters, code, and seeds of random number generators produce the same hurricane loss costs and hurricane probable maximum loss levels.

2. Provide an overview of the component testing procedures.

3. Provide a description of verification approaches used for externally acquired data, software, and models.

Audit

1. The components will be reviewed for containment of sufficient logical assertions, exception-handling mechanisms, and flag-triggered output statements to test the correct values for key variables that might be subject to modification.

2. The testing software used by the modeling organization will be reviewed.

3. The component (unit, regression, ~~aggregation~~integration) and data test processes and documentation will be reviewed including compliance with independence of the verification procedures.

4. Fully time-stamped, documented cross-checking procedures and results for verifying equations, including tester identification, will be reviewed. Examples include mathematical calculations versus source code implementation or the use of multiple implementations using different languages.

5. Flowcharts defining the processes used for manual and automatic verification will be reviewed.

6. Verification approaches used for externally acquired data, software, and models will be reviewed.

CI-6 Hurricane Model Maintenance and Revision

A. ***~~The modeling organization shall maintain a~~ A clearly written policy shall be implemented for ~~hurricane model~~ review, maintenance, and revision of the hurricane model and network organization, including verification and validation of revised components, databases, and data files.***

B. ***A revision to any portion of the hurricane model that results in a change in any Florida residential hurricane loss cost or hurricane probable maximum loss level shall result in a new hurricane model version identification.***

C. ***~~The modeling organization shall use t~~Tracking software shall be used to identify and describe all errors, as well as modifications to code, data, and documentation.***

D. ***~~The modeling organization shall maintain a~~A list of all hurricane model versions since the initial submission for this year shall be maintained. Each hurricane model description shall have a unique version identification and a list of additions, deletions, and changes that define that version.***

Purpose: To create a formal procedure for identifying, organizing and *maintaining hurricane model versions*. Hurricane model software, data, and documentation are stored in an online system that tracks all editing changes by author and change date.

Relevant Form: G-6, Computer/Information Standards Expert Certification

Disclosures

1. Identify procedures used to review and maintain code, data, and documentation.

2. Describe the rules underlying the hurricane model and code revision identification systems.

Audit

1. All policies and procedures used to review and maintain the code, data, and documentation will be reviewed. For each component in the system decomposition, the installation date under configuration control, the current version identification, and the date of the most recent change(s) will be reviewed.

2. The policy for hurricane model revision and management will be reviewed.

3. Portions of the code, not necessarily related to recent changes in the hurricane model, will be reviewed.

4. The tracking software will be reviewed and checked for the ability to track date and time.
5. The list of all hurricane model revisions as specified in CI-6.D will be reviewed.

CI-7 Hurricane Model Security

~~The modeling organization shall have implemented and fully documented~~ ~~s~~Security procedures shall be implemented and fully documented for (1) secure access to individual computers where the software components or data can be created or modified, (2) secure operation of the hurricane model by clients, if relevant, to ensure that the correct software operation cannot be compromised, (3) anti-virus software installation for all machines where all components and data are being accessed, and (4) secure access to documentation, software, and data in the event of a catastrophe.

Purpose: To ensure that the hurricane model is *secured* against unauthorized access. Security procedures are necessary to maintain an adequate, secure, and correct base for code, data, and documentation of the hurricane model and platforms. The modeling organization is expected to have a secure location supporting all code, data, and documentation development and maintenance. Necessary measures include, but are not limited to, (1) virus protection, (2) limited access protocols for software, hardware, and networks, and (3) backup and redundancy procedures.

Relevant Form: G-6, Computer/Information Standards Expert Certification

Disclosure

1. Describe methods used to ensure the security and integrity of the code, data, and documentation. These methods include the security aspects of each platform and its associated hardware, software, and firmware.

Audit

1. The written policy for all security procedures and methods used to ensure the security of code, data, and documentation will be reviewed.

2. Documented security procedures for access, client hurricane model use, anti-virus software installation, and off-site procedures in the event of a catastrophe will be reviewed.

3. Security aspects of each platform will be reviewed.

4. Network security documentation and network integrity assurance procedures will be reviewed.

WORKING DEFINITIONS OF TERMS USED IN THE *HURRICANE STANDARDS REPORT OF ACTIVITIES* AND IN THE *FLOOD STANDARDS REPORT OF ACTIVITIES*

Working Definitions of Terms
Used in the *Hurricane Standards Report of Activities*
And in the *Flood Standards Report of Activities*

(These terms are applicable to the *Hurricane Standards Report of Activities*, the *Flood Standards Report of Activities*, or both.)

Actual Cash Value (ACV):

Cost of replacing damaged or destroyed property with comparable new property minus depreciation.

Actuary:

A highly specialized professional with mathematical and statistical sophistication trained in the risk aspects of property insurance, whose functions include the calculations involved in determining proper insurance rates, evaluating reserves, and various aspects of insurance research; a member of the Casualty Actuarial Society or Society of Actuaries with requisite experience and compliance with U.S. Qualification Standards of the American Academy of Actuaries as applicable to property catastrophe modeling.

Acyclic Graph:

A graph containing no cycles.

Additional Living Expense (ALE):

If a home becomes uninhabitable due to a covered loss, ALE coverage pays for the extra costs of housing, dining expenses, etc. up to the limits for ALE in the policy.

Aggregate Data:

Summarized datasets or data summarized by using different variables. For example, data summarizing the exposure amounts by line of business by ZIP Code is one set of aggregated data.

~~Aggregation Test:~~

~~A test to ensure the correctness of all components when operating as a whole.~~

Annual Aggregate Loss Distribution:

For Commission purposes, the probability distribution of the sum of all losses that are expected to occur for all modeled hurricane events in each year or for all modeled flood events in each year.

Annual Exceedance Probability:

Probability of an annual loss outcome greater than a specified value. Reciprocal of the return period.

Annual Occurrence Loss Distribution:

For Commission purposes, the probability distribution of the largest loss that is expected to occur for all modeled hurricane or flood events in each year.

Appurtenant Structures:

Detached buildings and other structures located on the same property as the principal insured building (e.g., detached garage, fences, swimming pools, patios). For standard flood policies, contracts, and endorsements, appurtenant structures include detached garage only, and for other flood policies, contracts, and endorsements, appurtenant structures may include detached garage and may include other detached structures.

Assertion:

A logical expression specifying a program state that must exist or a set of conditions that program variables must satisfy at a particular point during program execution. Types include input assertion, loop assertion, output assertion. Assertions may be handled specifically by the programming language (i.e., with an "assert" statement) or through a condition (i.e., "if") statement.

Astronomical Tide:

The periodic variation in sea surface that results from gravitational attraction of the sun and moon without any atmospheric influence.

Atlantic Basin:

The area including the entire North Atlantic Ocean, the Caribbean Sea, and the Gulf of Mexico.

Average:

Arithmetic average or arithmetic mean.

Average Annual Loss (AAL):

The ~~AAL is the~~ expected value of the annual aggregate loss distribution.

Base Hurricane Storm Set:

The historical storm set used to calibrate and validate simulated ~~modeled~~ hurricanes ~~frequency~~ impacting Florida and adjacent states, ~~against historical hurricanes~~ as defined in Standard M-1, Base Hurricane Storm Set.

Bathymetry:

Spatial variation of ocean depth relative to mean sea level.

Business Process Model and Notation (BPMN):

A graphical representation for specifying business processes in a business process model.

By-Passing Hurricane:

A hurricane which does not make landfall on Florida, but produces minimum damaging windspeeds or greater on land in Florida.

Calibration:

Process of adjusting values of model input parameters in an attempt to fit appropriate target datasets.

Catastrophe:

A natural or man-made event that causes more than $25 million in insured losses as defined by Property Claims Services.

Center:

The point inside the eye of a hurricane where the wind is calm and about which the vortex winds rotate.

Characteristics (Output):

For Commission purposes, resulting values or datasets which are generated by the model through a process of analyzing, evaluating, interpreting, or performing calculations on parameters (input).

Civil Engineer:

Licensed professional engineer whose practice covers the design, analysis, evaluation, and construction of building foundations and structures.

Code:

In software engineering, computer instructions and data definitions expressed in a programming language or in a form output by an assembler, compiler, or other translator. *Synonym*: **Program**.

Code Refactoring:

Reviewing computer source code to improve nonfunctional attributes of the software through a continuous and sustained code improvement effort. Refactoring involves methods to reduce code complexity, improve readability and extensibility, including unit testing.

Coding Guidelines:

Organization, format, and style directives in the development of programs and the associated documentation.

Coinsurance:

A specific provision used in a property insurance policy in which an insurer assumes liability only for a proportion of a loss.

Commercial Residential Property Insurance:

The type of coverage provided by condominium association, cooperative association, apartment building, and similar policies, including covering the common elements of a homeowners' association; see s. 627.4025, F.S.

Component:

One of the parts that make up a system. A component may be subdivided into other components. The terms "module," "component," and "unit" are often used interchangeably or defined to be sub-elements of one another in different ways depending on the context. For non-object oriented software, a component is defined as the main program, a subprogram, or a subroutine. For object-oriented software, a component is defined as a class characterized by its attributes and component methods.

Component Tree:

An acyclic graph depicting the hierarchical decomposition of a software system or model. *See also*: **System Decomposition**.

Components and Cladding:

Elements of the building envelope that do not qualify as part of the main wind-force resisting system.

Conditional Tail Expectation:

Expected value of the loss above a given loss level.

Condominium Owners Policy:

The coverage provided to the condominium unit owner in a building against damage to the interior of the unit.

Control Flow:

The sequence in which operations are performed during the execution of a computer program. *Contrast with*: **Data Flow**.

Conversion Factor:

~~Either~~ (1) ~~t~~The ratio of the one-minute 10-meter wind to a reference wind (e.g., another level, gradient wind, or boundary layer depth-average).~~, or~~ (2) ~~a~~ A constant used to convert one unit of measure to another (as in 1 knot = 1.15 mph).

Correctness:

(1) The degree to which a system or component is free from faults in its specification, design, and implementation. (2) The degree to which software, documentation, or other items comply with specified requirements.

Current State-of-the-Science:

A technique, methodology, process, or data that clearly advances or improves the science and may or may not be of a proprietary nature. Such advancement or improvement should be agreed upon and acceptable to the Commission. Includes current scientific and technical literature.

Current Scientific and Technical Literature:

A refereed or peer-reviewed publication specific to the academic discipline involved and recognized by the academic community as an advancement or significant contribution to the literature which has not been superseded or replaced by more recent literature.

Damage:

(1) Physical harm caused to something in such a way as to impair its value, usefulness, or normal function. (2) The Commission recognizes that the question, "What is the damage to the house?" may be answered in a number of ways. In constructing their models, the modeling organizations assess "losses" in more than one way, depending on the use to which the information is to be put in the model. A structural engineer might determine that a house is 55% damaged and consider it still structurally sound. A claims adjuster might look at the same house and determine that 55% damage translates into a total loss because the house will be uninhabitable for some time, and further, because of a local ordinance relating to damage exceeding 50%, will have to be completely rebuilt according to updated building requirements. Since the Commission is reviewing hurricane models for purposes of residential rate filings in Florida and flood models for purposes of personal residential rate filings in Florida, loss costs must be a function of insurance damage rather than engineering damage.

Damage Ratio:

Percentage of a property damaged by an event relative to the total cost to rebuild or replace the property of like kind and quality.

Damaging Wave Action:

Waves with sufficient energy to cause structural damage to a personal residential structure.

Data Flow:

The sequence in which data transfer, use, and transformation are performed during the execution of a computer program. *Contrast with*: **Control Flow**.

Data Validation:

Techniques to assure the needed accuracy, required consistency, and sufficient completeness of data values used in model development and revision.

Datum, Horizontal & Vertical:

The reference specifications of a measurement system, usually a system of coordinate positions on a surface (horizontal datum) or heights above or below a surface (vertical datum). A datum provides a base line reference for numerical values associated with location or height. Common datums used in the U.S. include North American Datum, NAD27 and NAD83 (horizontal) and National Geodetic Vertical Datum, NGVD29 and National American Vertical Datum, NAVD88 (vertical).

Decay Rate:

The rate at which surface windspeeds decrease and central pressure increases in a tropical cyclone. Tropical cyclones weaken or decay as central pressure rises. Once tropical cyclones move over land, their rate of decay is affected not only because of the removal of their warm water energy source, but also because of surface roughness. The surface roughness contribution to filling is expected to vary spatially. *See also*: **Weakening**.

Demand Surge:

A sudden and generally temporary increase in ~~the cost of claims due to amplified payments following a hurricane or a series of hurricane events~~material and labor costs which occurs following a catastrophic event.

Depreciation:

The decrease in the value of property over time.

Discharge:

The volume of water moving through a specifically defined location or two-dimensional area over a quantity of time, usually quantified in cubic feet per second (cf/s).

Dry Floodproofing:

Measures that result in a building being watertight, with walls and exterior surfaces substantially impermeable to the passage of floodwater, and with structural components having the capacity to resist flood loads.

Economic Inflation:

With regards to insurance, the trended long-term increase in the costs of coverages brought about by the increase in costs for the materials and services.

Elevation:

Vertical distance above or below a specific vertical datum.

Erosion (Flood Induced):

The wearing away, collapse, undermining or subsidence of land during a flood~~, due to waves or currents exceeding their cyclical levels~~.

Event:

For purposes of modeling hurricane losses, an event is any hurricane that makes landfall in Florida as a hurricane or by-passes Florida as a hurricane but comes close enough to cause damaging winds in Florida.

Exception:

A state or condition that either prevents the continuation of program execution or initiates, on its detection, a pre-defined response through the provision of exception-handling capabilities.

Exposure:

The unit of measure of the amount of risk assumed. Rates and loss costs are expressed as dollars per exposure. Sometimes the number of houses is used in homeowner's insurance as a loose equivalent.

Far-Field Pressure:

~~Baseline~~ The background environmental surface pressure ~~in the~~of a tropical cyclone ~~environment that may be used to relate maximum wind to~~far from the tropical cyclone's center. The difference between the far-field and minimum central pressure is related to the tropical cyclone maximum wind.

Filling Rate:

Synonym: **Decay Rate**.

Flag-Triggered Output Statements:

Statements that cause intermediate results (output) to be produced based on a Boolean-valued flag. This is a common technique for program testing.

Flood:

A general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties, at least one of which is the policyholder's property, from:

1. Overflow of inland or tidal waters,
2. Unusual and rapid accumulation or runoff of surface waters from any source,
3. Mudflow, or
4. Collapse or subsidence of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels that result in a flood as defined above.

See s. 627.715(1)(a)5.(b), F.S.

Flood Barriers:

A structural component attached to or constructed around a building or building opening, preceding a flood event, to prevent flood waters from entering a building or area by creating a watertight barrier. Flood barriers can include permanent but movable components, such as watertight doors and seals, or temporary (removable) components, such as floodwall panels.

Flood-borne Debris:

Objects carried or moved by floodwaters into a personal residential structure and capable of causing damage to that structure.

Flood, Coastal:

Flood resulting from astronomical tides or storm surge.

Flood Conditions:

Physical characteristics associated with flooding such as extent and elevation or depth, flow, velocity, waves, duration, erosion, salinity, or contamination.

Flood Depth:

(1) For flood hazard purposes, flood depth equals flood elevation minus ground elevation. (2) For building vulnerability calculations, flood depth equals flood elevation minus lowest floor elevation. For coastal floods, flood depth is measured from the wave crest elevation or from the water surface including wave runup.

Flood Duration:

The length of time in which an area or building is inundated by floodwaters.

Flood Elevation:

Elevation of the water surface relative to a vertical datum, including coastal wave effects where present. For coastal floods, the flood elevation includes wave setup (wave radiation stress) and is taken at the wave crest elevation or the water surface including wave runup.

Flood Extent:

The horizontal limits of a given flood event, occurring where the ground elevation equals the flood elevation.

Flood Frequency:

The probability, in percentage, that a flood of a specific level will occur or be exceeded in any given year. For example, a flood with a 1% flood frequency (i.e., 1% annual chance) is a flood that has a 1% chance of being equaled or exceeded in any year. This same flood frequency can also be written as a decimal (i.e., 0.01 annual exceedance probability) or a return period, which is the inverse of the decimal (i.e., 100-year return period).

Flood, Inland:

Flood not of coastal origin. Inland floods typically are due to rainfall, runoff, ponding, and include riverine floods, lacustrine floods, and surface water flooding.

Flood Inundation:

The rising of a body or source of water and its overflowing onto normally dry land.

Flood, Lacustrine:

A type of inland flooding usually associated with a generally non-moving water source (e.g., lake, pond) caused by water levels rising and inundating adjacent areas with standing water.

Flood Life Cycle:

The full progression of flooding conditions, beginning with the initial flood inundation, continuing through the rise, peak, and fall of floodwaters, and ending when floodwaters have receded below the threshold set in the definition of flood.

Flood Mitigation Measure:

Any measure which permanently reduces flood damage to a building by (1) preventing flood waters from inundating the building (e.g., elevating a building above the estimated flood elevation), or (2) decreasing the damage which flood inundation would cause to a building (e.g., elevating electrical and other flood-susceptible components of the building above the flood elevation and retrofitting the portions of the building which would be inundated with flood-resistant materials).

Flood Policies, Contracts and Endorsements:

Various ways flood coverage can be offered; see s. 627.715, F.S.

Flood, Riverine:

A type of inland flooding usually associated with a watercourse (e.g., river, stream) which results in water overflowing the banks of the watercourse and inundating adjacent areas with moving water. The velocity of the floodwater can be a major factor in the resulting damage and injuries associated with the flood.

Flood, Surface Water:

Flooding caused by the accumulation of above-ground water which is not associated with a specific watercourse or water body. Surface water flooding excludes water from increased ground water levels.

Floodplain:

Any land area susceptible to being inundated by floodwaters from any source.

Floodwater:

The water that inundates an area during a flood, usually containing debris and possible contaminants.

Flowchart:

A diagram that visually depicts information moving through a system identified by iconic representations of components. Components are interconnected by pathways frequently represented by arrows. Examples of flowcharts are flow of data and control, and flow of information in a system comprised of people and machines.

Flow Velocity:

The velocity of water as it moves within a channel or over land, usually quantified in feet per second (ft/s).

Forward Speed:

The forward speed at which a tropical cyclone is moving along the earth's surface. This is not the speed at which winds are circulating around the tropical cyclone. A forward speed of 3 mph is slow; a forward speed of 10-15 mph is average; a forward speed of 20-30 mph is fast.

Frequency Distribution:

Division of a sample of observations into a number of classes together with the number of observations in each class.

Function:

(1) In programming languages, a subprogram, usually with formal parameters, that produces a data value that it returns to the place of the invocation. A function may also produce other changes through the use of parameters. (2) A specific purpose of an entity or its characteristic action.

Functionality:

The degree to which the intended function of an entity is realized. *See also*: **Function**.

Fundamental Engineering Principles:

The basic engineering tools, physical laws, rules, or assumptions from which other engineering tools can be derived.

Geocoding:

Assignment of a location to geographic coordinates.

Geographic Grid:

An array of cells used to define geographic space. Each cell stores a numeric value that represents a geographic attribute (e.g., elevation) for that unit of space. Data from the grid cells can be compiled into a set of contours or used to create a three-dimensional surface. When the grid is drawn as a map, cells are often assigned colors according to their numeric value. Each grid cell is referenced by its *x,y* coordinate location.

Geographic Information System (GIS):

An integrated collection of computer software and data used to review and manage information about geographic places, analyze spatial relationships, and model spatial processes. A GIS provides a framework for gathering and organizing spatial data and related information so that it can be displayed and analyzed.

Geographic Location Data:

Information related to the geocoding process within the model software.

Ground Up Loss:

Loss to a structure or location prior to the application of a deductible, policy limit, coinsurance penalty, depreciation, exclusion, or other policy provision.

Guaranteed Replacement Cost:

A policy provision in which the insurer agrees to pay losses on a replacement cost basis even if in excess of the policy limit.

Gust Factor:

Maximum ~~R~~ratio of the ~~strongest~~ windspeed ~~within a specified~~averaged over a short interval of time (such as 3~~-second~~ or 10~~-~~ seconds) to the mean windspeed.

Homeowner Insurance Policy (HO):

A package policy for the homeowner that typically combines protection on the structure and contents, additional living expense protection, and personal liability insurance. Homeowner’s policies were first developed in the 1950’s. Prior to that time, homeowners wishing coverage for fire, theft, and liability had to purchase three separate policies. Homeowner’s policies do not cover earthquake or flood. These are sold separately.

Human Factors:

Study of the interrelationships between humans, the tools they use, and the environment in which they live and work. *See also*: **User Interface**.

Hurricane:

A tropical cyclone in which the maximum one-minute average windspeed at 10-meters height is 74 miles per hour or greater.

Hurricane Characteristic:

An output of the hurricane model. Examples are modeled windspeed at a particular location, track, and intensity variation.

Hurricane Mitigation Measure:

A factor or function that improves a structure’s ~~wind~~ resistance to wind, water infiltration, or missile impact.

Hurricane Parameter:

An input (generally stochastic) to the hurricane model. Examples are radius of maximum wind, maximum wind, profile factor, and instantaneous speed and direction of motion.

Implementation:

The process of transforming a design specification into a system realization with components in hardware, software and “humanware.” *See also*: **Code**.

Incremental Build:

A system development strategy that begins with a subset of required capabilities and progressively adds functionality through a cyclical build and test approach.

Independent:

An independent characteristic or event is one which is unaffected by the existence of another characteristic or by whether or not another event occurs.

Inflow Angle:

The angle that near-surface hurricane wind vectors make with respect to the azimuthal direction about the storm center. The angle is measured inward toward the storm center. It is a parameter used to transform assumed circular hurricane winds appropriate for the free troposphere to inward directed winds appropriate for the near-surface.

Initial Soil Conditions:

Conditions (generally related to moisture content) of a soil preceding a precipitation or flood event, which affect the soil infiltration rate and maximum infiltration volume. The initial conditions of soil can have a large impact on rainfall runoff, due to the ability (or inability) of the soil to absorb water. Initial moisture conditions of a soil can be affected by groundwater levels or recent rainfall events.

Insurance Policy:

A contractual document which defines the amount and scope of insurance provided by the insurer resulting in a transfer of risk.

Insurance to Value:

The relationship of the amount of insurance to replacement cost. 100% insurance to value means that the amount of insurance equals the replacement cost.

Insured Loss:

The cost to repair/restore property after an insured event, including ALE, payable by the insurance company after the application of policy terms and limits.

Insured Primary Damage:

Damage that is not excess of or secondary to another policy, contract, or endorsement.

~~Aggregation~~ Integration Test:

A test to ensure the correctness of all components when operating as a whole.

Intensity:

The maximum one-minute sustained surface (i.e., 10-meter) winds measured near the center of a tropical ~~storm~~cyclone.

Interface Specification:

An unambiguous and complete description of the meaning, type, and format of data exchanges among system components (software, hardware, and ~~"~~humanware~~"~~). *See also*: **User Interface**.

Invariant:

A logical expression that remains true within the context of a code segment.

Isotach:

A line of constant windspeed.

Landfall:

A landfall has occurred when the center of tropical cyclone circulation crosses the coastline from sea to land.

Landfall Frequency Distribution:

Frequency distribution of hurricanes whose centers have crossed the coastline from water (Atlantic Ocean or Gulf of Mexico) to land. For hurricane paths that, for example, roughly parallel the coastline with multiple crossings, a single count of the initial crossing should be used in the frequency distribution.

Law and Ordinance Coverage:

Coverage for loss to the undamaged portion of the building if municipal ordinance or code may require that a partially damaged building be demolished; the cost of demolition of the undamaged portions of the building, if it is mandated by the building, zoning, or land use ordinance or law; any increased expenses incurred to upgrade, repair, or replace the building with one conforming to the current building laws or ordinances.

Licensed Professional Engineer:

Professional engineer who has met specific qualification standards in education, work experience, and examinations and has been licensed by a state licensure board.

Loss Adjustment Expenses (LAE):

The expenses incurred by an insurer to adjust a claim by a policyholder. These expenses are divided into allocated loss adjustment expenses (ALAE) and unallocated loss adjustment expenses (ULAE). Allocated loss adjustment expenses are specific amounts attributable to individual claims such as attorney's fees and court costs. Unallocated loss adjustment expenses are all other types of LAE.

Loss Costs:

The portion of the insurance premium applicable to the payment of insured losses only, exclusive of insurance company expenses and profits, per unit of insured exposure. Loss costs are generally stated per thousand dollars of exposure.

Loss Exceedance Estimate:

The loss amount which would be exceeded at a given level of probability based on a specific exposure dataset.

Lowest Floor:

The lowest floor of the lowest enclosed area, including basement, but excluding any unfinished or flood-resistant enclosure, usable solely for vehicle parking, building access, or limited storage, provided that such enclosure is not built so as to render the structure in violation of building code and floodplain management requirements.

Major Flood Control Measure:

Measure undertaken on a large scale, to reduce the presence, depth, or energy of flow or waves in areas that receive flood protection from the measure. Major flood control measures include dams, levees, and floodwalls whose failure could affect hundreds of personal residential properties or more.

Manning *n*:

An empirically-determined coefficient, also known as the Manning's Roughness Coefficient, describing the roughness of a ground and ground-cover combination.

Manufactured Home:

Type of ***Mobile Home***, fabricated in a plant on or after June 15, 1976, in compliance with the federal Manufactured Home Construction and Safety Standard Act, and according to standards promulgated by the U.S. Department of Housing and Urban Development (HUD). Manufactured homes are transportable in one or more sections, eight feet or more in width and built on an integral chassis. They are designed to be used as a dwelling when set in place and connected to the required utilities and includes the plumbing, heating, air-conditioning, and electrical systems contained therein. Persons licensed by the Florida Department of Highway Safety and Motor Vehicles must perform installation. The structures are typically covered by mobile/manufactured home insurance policies (MH).

Mapping of ZIP Codes:

Either a point estimate or a physical geographic area.

Maximum Windspeed:

The peak one-minute, 10-meter winds in a hurricane. Depending on context, maximum windspeed may also refer to the strongest gradient wind.

Mean Windspeed:

The time average surface (10 ~~-~~meter) windspeed at a location. ~~The averaging period should not be less than one minute.~~One minute is used to define the Saffir-Simpson Hurricane Wind Scale.

Miles Per Hour (mph):

Standard unit of windspeed measurement.

Millibar (mb):

Unit of air pressure. *See also*: **Minimum Central Pressure**.

Minimum Central Pressure:

The minimum surface pressure at the center of a tropical cyclone. The atmosphere exerts a pressure force measured in millibars. Average sea level pressure is 1013.25 millibars. Tropical cyclones have low pressure at the center of the cyclone. For a tropical cyclone of a given radius, lower central pressure corresponds to stronger surface windspeeds and storm surge height. The lowest pressure ever measured in a hurricane in the Atlantic basin was 882 mb in Hurricane Wilma (2005).

Mobile Home:

Common term used to describe ***Manufactured Home*** (see above). Technically, mobile homes were fabricated prior to June 15, 1976. These structures are covered by mobile/ manufactured home insurance policies (MH).

Model:

A comprehensive set of formal structures, data, and components used to capture processes associated with the effects of hurricanes or floods and their impacts on personal residential and commercial properties leading to insured losses. These processes include the following:

1. Scientific and engineering representations such as equations, pseudo-codes, flowcharts, and source code,
2. All data necessary for producing such losses, and
3. System representations, involving human collaboration and communication, relating to 1. and 2.

Model Component Custodian:

The individual who can explain the functional behavior of the component and is responsible for changes (revisions in code, documentation, or data) to that component.

Model Management:

The processes associated with the model lifecycle, including design, creation, implementation, verification, validation, maintenance, and documentation of the model.

Model ~~Architecture~~Organization:

The structure of components in a program/system, their interrelationships, and the principles and guidelines governing their design and evolution over time.

Modeling Organization:

The entity(s) encompassing the requisite qualifications and experience (as found in Standard G-2, Qualifications of Modeling Organization Personnel and Consultants Engaged in Development of the Hurricane Model and Standard GF-2, Qualifications of Modeling Organization Personnel and Consultants Engaged in Development of the Flood Model) that organize resources to develop and maintain any models that have the potential for improving the accuracy or reliability of the hurricane loss projections used in residential rate filings or flood loss projections used in personal residential rate filings.

Model Revision:

The process of changing a model to correct discovered faults, add functional capability, respond to technology advances, or prevent invalid results or unwarranted uses. *See also*: **Regression Test**.

Model Validation:

A comparison between model behavior and empirical (i.e., physical) behavior.

Model Verification:

Assuring that the series of transformations, initiating with requirements and concluding with an implementation, follow the prescribed software development process.

Modification Factor:

A scalar adjustment to a vulnerability function that may increase or decrease the amount of change.

Modification Function:

Adjusts a vulnerability function and may vary over its range.

Modular Home:

Dwelling, manufactured off-site and erected/assembled on-site in accordance with Florida Building Code requirements. All site related work (erection, assembly, and other construction at the site, including all foundation work, utility connection, etc.) is subject to local permitting and inspections. Modular homes are typically covered by homeowner insurance policies (i.e., HO-3).

National Flood Insurance Program (NFIP):

The program of flood insurance coverage and floodplain management administered under the National Flood Insurance Act of 1968 (and any amendments to it), and applicable Federal regulations promulgated in Title 44 of the Code of Federal Regulations, Subchapter B.

National Geodetic Vertical Datum of 1929 (NGVD29):

A vertical datum, established in 1929 and renamed in 1973, derived from observed mean sea level at 26 tide gauges in the United States and Canada, and a series of benchmarks established across the United States from those tide gauges.

Network Organization:

A configuration of computer-based nodes and communication links which connect nodes.

Non-Tropical Storm:

A storm that has none or only some of the meteorological characteristics of a tropical cyclone. It is driven in part or full by energy sources other than the heat content of seawater. Such storms include but are not limited to extra-tropical cyclones, sub-tropical cyclones, post-tropical cyclones, and remnant lows that may have had tropical origin, as well as mid-latitude cyclones and frontal systems that did not have tropical origins.

North American Vertical Datum of 1988 (NAVD88):

A vertical datum, established in 1991, derived from measurements taken in the United States, Canada, and Mexico to address changes in land surface and the resulting elevation distortions due to the motion of the earth’s crust, postglacial rebound, and ground subsidence.

NWS:

The National Weather Service, a division of NOAA.

Parameters (Input):

For Commission purposes, values entered into the model which are used, singularly or in combination, to calculate a characteristic (output).

Parcel:

Official land boundary defining the legal extent of a property.

Peak Gust:

Highest surface (i.e., 10-meter) wind recorded, generally in a 2- to 3-second interval.

Peak Hurricane Intensity:

The peak intensity over the lifetime of a hurricane estimated as the maximum one-minute sustained surface (i.e., 10-meter) winds near the center of the hurricane. *See also*: **Intensity**.

Percolation:

The slow movement of water through the pores in soil or permeable rock, usually occurring under mostly saturated conditions.

Personal Residential Property Insurance:

The type of coverage provided by homeowner's, manufactured home owner's, dwelling, tenant's, condominium unit owner's, cooperative unit owner's, and similar policies; see s. 627.4025, F.S.

Planetary Boundary Layer (PBL) Models:

Mathematical and statistical representations of the planetary boundary layer (PBL). The PBL is the bottom layer of the atmosphere that is in contact with the surface of the earth. Its properties are highly influenced by frictional contact with the surface. The PBL is often turbulent and ranges in depth from tens of meters to several kilometers depending on time of day and surface geography.

Platform:

The unique combination of hardware, operating system, and essential software required as a base for the model implementation.

Position:

The position of a hurricane is the latitude and longitude of its center.

Premium:

The consideration paid or to be paid to an insurer for the issuance and delivery of any binder or policy of insurance; see s. ~~626.014~~627.041(2), F.S. Premium is the amount charged to the policyholder and includes all taxes and commissions.

Pressure Field:

The spatial distribution of sea level pressure associated with a storm. Typically, the sea level pressure increases radially from a minimum at the storm center until it is indistinguishable from the environmental background pressure.

Previously-Accepted Model:

The original model determined acceptable under the 2017 standards.

Probable Maximum Loss (PML):

Given an annual probability, the loss that is likely to be exceeded on a particular portfolio of residential exposures in Florida. Modeling organizations can determine the PML on various bases depending on the needs of the user.

Professional Engineer:

A person engaged in the professional practice of rendering service or creative work requiring education, training, and experience in engineering sciences and the application of special knowledge of the mathematical, physical, and engineering sciences in such professional or creative work as consultation, investigation, evaluation, planning or design of public or private utilities, structures, machines, processes, circuits, buildings, equipment or projects, and supervision of construction for the purpose of securing compliance with specifications and design for any such work (National Society of Professional Engineers).

Profile Factor:

A hurricane parameter input to the hurricane model that controls the radial structure of the tropical cyclone winds independently of Rmax and Vmax.

Program:

See: **Code**.

Projection, Horizontal & Vertical:

A method by which the curved surface of the earth is portrayed on a flat surface. This generally requires a mathematical transformation of the earth's latitude and longitude, and projections vary by the portion of the earth being depicted. All projections distort distance, area, shape, direction, or some combination thereof. A common horizontal projection system used in Florida is State Plane Coordinates, divided into three zones: north, east, and west. Vertical components are added to a horizontal projection (x,y coordinates) to create a projected coordinate system (x,y,z coordinates).

Property Insurance:

Insurance on real or personal property of every kind, whether the property is located on land, on water, or in the air, against loss or damage from any and all perils (hazards or causes); see s. 624.604, F.S.

Quality Assurance:

The responsibility and consequent procedures for achieving the targeted levels of quality in the model and the continual improvement of the model development process.

Radius of Maximum Winds (Rmax):

Distance from the center of a hurricane to the strongest winds.

Rate:

The amount by which the exposure is multiplied to determine the premium; see s. 627.041(1), F.S. Rate times exposure equals premium.

Recurvature:

A change in the track of a storm that causes the storm to move continuously from west to east (rather than from east to west as in the tropics), usually also increasing in forward speed. Recurvature happens when the storm moves into the subtropical westerlies.

Regression Test:

A procedure that attempts to identify new faults that might be introduced in the changes to remove existing deficiencies (correct faults, add functionality, or prevent user errors). A regression test is a test applied to a new version or release to verify that it performs the intended functions without introducing new faults or deficiencies. This procedure is not to be confused with ordinary least squares as used in statistics. *See also*: **Model Revision**.

Reinsurance:

An arrangement by which one insurer (the ceding insurer) transfers all or a portion of its risk under a policy or group of policies to another insurer (the reinsurer). Thus reinsurance is insurance purchased by an insurance company from another insurer, to reduce risk for the ceding insurer.

Replacement Cost:

The cost to replace damaged property with a new item of like kind and quality.

Residential Property Insurance:

See s. 627.4025, F.S. *See also:* **Commercial Residential Property Insurance** and **Personal Residential Property Insurance**.

Requirements Specification:

A document that specifies the requirements for a system or component. Typically included are functional requirements, performance requirements, interface requirements, design requirements, quality requirements, and development standards.

Return Period:

The reciprocal of an annual exceedance probability of a given loss or ~~set of~~ event~~s~~.

Roughness:

Surface characteristics capable of disrupting airflow. Roughness elements may be natural (e.g., mountains, trees, grasslands) or man-made (e.g., buildings, bridges).

Saffir-Simpson Hurricane Wind Scale:

A scale ranging from one-to-five based on a hurricane's sustained windspeed. This scale estimates potential property damage from hurricane winds. *Reference:* Saffir-Simpson Hurricane Wind Scale provided in Standard M-3, Hurricane Probabilities.

Salinity:

The dissolved salt content of water, often expressed as a mass fraction. Typical salinity of seawater is 35 parts per thousand, but values vary due to river input, precipitation, evaporation, and other factors.

Schema:

(1) A complete description of the structure of a database pertaining to a specific level of consideration. (2) The set of statements, expressed in a data definition language, that completely describes the structure of a database.

Sea-Surface Drag Coefficient:

The ratio of the wind stress on the sea surface to the 10-meter wind kinetic energy. It is used to relate the near-surface windspeed to the sea surface wind stress required for storm surge modeling. The coefficient is estimated semi-empirically and is observed to be a function of windspeed.

Sensitivity:

The effect that a change in the value of an input variable will have on the output of the model.

Sensitivity Analysis:

Determination of the magnitude of the change in response of a model to changes in model inputs and specifications.

Significant Revision:

Those revisions to the standards or any revisions to the model that result in changes to loss costs or probable maximum loss levels, or have potential for changes to the loss costs or probable maximum loss levels. The Commission determines whether a revision to a standard is significant.

Site-Built Home:

Dwelling that is constructed on the building site in accordance with the Florida Building Code. All site related work (foundation, building, and other construction at the site, utility connection, etc.) is subject to local permitting and inspections. Site-built homes are typically covered by homeowner insurance policies (i.e., HO-3).

SLOSH:

Sea, Lake and Overland Surges from Hurricanes (SLOSH) is a NWS computer model developed to estimate storm surge heights resulting from historical, hypothetical, or predicted hurricanes by taking into account the atmospheric pressure (difference between central pressure and ambient pressure far from the storm), radius of maximum winds, and track data (forward speed and direction).

Software Engineering:

The application of a systematic, disciplined, and quantifiable approach to the design, development, operation, and maintenance of software; that is, the application of engineering to software.

Soil Infiltration:

The downward entry of water into the soil or rock surface.

Soil Infiltration Rate:

The rate at which a soil under specified conditions absorbs falling rain, melting snow, or surface water, expressed in depth of water per unit of time (e.g., inches/hour). Infiltration rate usually has a rapid decline with time from the beginning of infiltration and reaches a steady state as the soil eventually becomes saturated. At this stage, the infiltration rate would be approximately equal to the percolation rate.

Special Loss Settlement:

Loss provision used by the National Flood Insurance Program (NFIP) for manufactured homes equal to the minimum of the following three quantities: replacement cost, 1.5 times actual cash value, and policy limit.

Standard Flood Insurance:

Insurance that must cover only losses from the peril of flood equivalent to that provided under a standard flood insurance policy under the National Flood Insurance Program (NFIP). Standard flood insurance issued in Florida must provide the same coverage, including deductible and adjustment of losses, as that provided under a standard flood insurance policy under the NFIP; see s. 627.715, F.S.

Statistical Terms:

Definitions of statistical terms are available in: A Dictionary of Statistical Terms, Fifth Edition, F.H.C. Marriott, John Wiley & Sons, 1990.

Stillwater Elevation:

The elevation of the water surface (relative to a vertical datum) resulting from freshwater inputs, and where present, astronomical tides and storm surge. For coastal floods, the stillwater elevation may include wave setup (wave radiation stress) but excludes coastal wave forms (wave height, wave runup) that fluctuate above and below the stillwater elevation.

Storm Heading:

The direction towards which a storm is moving. Angle is measured clockwise from north (0°) so that east is 90°, etc.

Storm Surge:

An abnormal rise in sea level accompanying a storm, and whose height is the difference between the observed level of the sea surface and the level that would have occurred in the absence of the storm. Storm surge is usually estimated by subtracting the normal or astronomical tide from the observed storm tide.

Storm Tide:

The level of the sea surface including the effects of both the storm and the astronomical tide.

Storm Track:

The trajectory of~~path along that~~ a tropical cyclone ~~has already moved~~center.

Stormwater:

Water from precipitation events which typically runs off impervious (e.g., paved) areas and is then conveyed via roadways and other impervious areas into systems of swales, ditches, pipes, channels, and ponds. Stormwater usually contains contaminants from impervious areas (e.g., oil, chemicals) and can accumulate to cause flooding during larger precipitation events.

Sub-Component:

A component that is encapsulated within another component. *See also*: **Component Tree.**

System Decomposition:

The hierarchical division of a system into components. *See also*: **Component Tree**.

Systems Modeling Language (SysML):

A general-purpose modeling language for systems engineering applications that supports the specification, analysis, design, verification, and validation of a broad range of systems and systems-of-systems.

Temporary Flood Protection Measures:

Any measure temporarily installed preceding a flood event to protect a building or area from inundation by floodwaters, which is then removed after the flood event.

Terrain:

Terrain or terrain roughness for structures or a site is determined by the surface area surrounding the site including other structures (height and density) and topographic features such as ground elevation, vegetation or trees, and bodies of water.

Test:

A phase in the software (model) development process that focuses on the examination and dynamic analysis of execution behavior. Test plans, test specifications, test procedures, and test results are the artifacts typically produced in completing this phase.

Testing:

Software testing involves executing an implementation of the software with test data and examining the outputs of the software and its operational behavior to check that it is performing as required. Testing is a dynamic technique of verification and validation because it works with an executable representation of the system. Typical testing approaches include unit, aggregation, regression, and functional testing.

Time Element Coverage:

Insurance for a covered incident resulting in loss of use of property for a period of time. The loss is considered to be time lost, not actual property damage. Examples of time element coverage include business interruption, extra expense, rent and rental value, additional living expense, and leasehold interest coverage.

Topography:

A detailed graphic description or representation of the natural and artificial surface features of an area of land, in a way to show relative positions and elevations, and usually not including portions of land which are always or normally submerged. *See also:* **Bathymetry**.

Tropical Cyclone:

A generic term for a non-frontal synoptic-scale cyclone originating over tropical or subtropical waters with organized convection and definite cyclonic surface wind circulation.

Tropical Storm:

A tropical cyclone in which the maximum one-minute average windspeed at 10-meters height ranges from 39 to 73 miles per hour inclusive.

Uncertainty Analysis:

Determination of the variation or imprecision in model output resulting from the collective variation in the model inputs.

Underwriting:

The process of identifying and classifying the potential degree of risk represented by a proposed exposure unit. Potential insureds that satisfy an insurer's underwriting standards are offered insurance or are offered a renewal while others are declined or non-renewed.

Unified Modeling Language (UML):

A standardized modeling language in software engineering using graphic notation to create visual models of software systems. This language is designed to enable software developers to specify, visualize, construct, and document artifacts in object-oriented software development.

Unit:

Synonym: **Component**.

Unit Test:

Each component is tested on its own, isolated from the other components in the system.

User:

A person who uses a computer to execute code, to provide the code with input through a user interface, or to obtain textual or visual output.

User Documentation:

Documentation describing a way in which a system or component is to be used to obtain desired results. *See also*: **User Manual**.

User Interface:

An interface that enables information to be passed between a human user and hardware or software components of a computer system. *See also*: **Interface Specification**.

User Manual:

A document that presents the information necessary to employ a system or component to obtain desired results. Typically described are system or component capabilities, limitations, options, permitted inputs, expected outputs, possible error messages, and special instructions.

Vmax (or maximum wind):

The peak one-minute, 10-meter winds in a hurricane. Depending upon the context, Vmax may also refer to the strongest gradient wind.

Validation:

The process of determining the degree to which a model or simulation is an accurate representation of the real-world from the perspective of the intended uses of the model or simulation.

Verification:

The process of determining that a model representation accurately represents the developer's conceptual description, specification, and requirements. Verification also evaluates the extent to which the model development process is based on sound and established software engineering techniques. Testing, inspections, reviews, calculation crosschecks and walkthroughs, applied to design and code, are examples of verification techniques. *See also*: **Walkthrough**.

Version:

(1) An initial release or re-release of a computer software configuration item, associated with a complete compilation or recompilation of the computer software configuration item. (2) An initial release or complete re-release of a document, as opposed to a revision resulting from issuing change pages to a previous release. (3) An initial release or re-release of a database or file.

Vertical Wind Profile:

The continuous variation of hurricane windspeed with height.

Visualization:

A two- or three-dimensional graphical display, chart, or plot meant to augment or replace a numerical table.

Vortex:

The circularly-symmetric rotating wind and pressure fields of the hurricane.

Vulnerability Assessment:

A determination as to how likely a particular insured structure is to be damaged by a hurricane or flood and an estimate of the loss potential.

Vulnerability Function:

The curve that represents the damage ratios expected at various windspeeds or at various flood elevations or depths.

Walkthrough:

A static analysis technique in which a designer or programmer leads members of the development team and other interested parties through a segment of the documentation or code, and the participants ask questions and make comments about possible errors, violation of development standards, and other problems.

Water Infiltration:

Rain entering a building during a tropical cyclone, not including water intrusion caused by flood.

Water Intrusion:

Penetration of water from outside the structure into the structure, by means not included in the definition of flood. Water intrusion does not include water infiltration during a tropical cyclone, or during other rain events.

Wave Crest Elevation:

Elevation (relative to vertical datum) of the top (crest) of a coastal wave. The wave crest elevation must be above the stillwater elevation.

Wave Height:

The vertical distance between the crest and the preceding trough of a wave.

Wave Proxy:

A characterization that accounts for the presence of waves without modeling waves explicitly.

Wave Runup:

The rush of water up a slope or structure face. Wave runup occurs as waves break and run up above the stillwater elevation.

Wave Runup Elevation:

Elevation (relative to vertical datum) that a wave runs up a slope or structure face. The wave runup elevation must be above the stillwater elevation.

Wave Setup (Wave Radiation Stress):

Super-elevation of the water surface over normal storm surge elevation due to onshore mass transport of water by wave action alone.

Weakening:

A reduction in the maximum one-minute sustained 10-meter winds. *See also*: **Decay Rate**.

Wet Floodproofing:

Measures that allow floodwaters to enter a building while preventing or providing resistance to flood damage to the building and its contents.

Windfield:

The area of winds associated with a tropical cyclone. Winds are typically asymmetric in a moving tropical cyclone with winds in the right front quadrant, relative to motion, being strongest.

ZIP Code Centroid:

Two types of centroids:

Geographic Centroid:

The geographic center of a ZIP Code.

Population Weighted Centroid:

The center determined by weighting the distribution of population over the ZIP Code.

REFERENCES USED IN THE *HURRICANE STANDARDS REPORT OF ACTIVITIES* AND IN THE *FLOOD STANDARDS REPORT OF ACTIVITIES*

References
Used in the *Hurricane Standards Report of Activities* And in the *Flood Standards Report of Activities*

(These references are applicable to the *Hurricane Standards Report of Activities*, the *Flood Standards Report of Activities*, or both.)

For the purposes of the hurricane and flood standards for hurricane and flood model specification adopted in the *Hurricane Standards Report of Activities* or in the *Flood Standards Report of Activities*, the following references or published datasets are listed. Subsequent revisions to these documents and datasets shall supersede the versions listed below.

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~~VIII.~~ INQUIRIES OR INVESTIGATIONS

INQUIRIES OR INVESTIGATIONS

The Commission finds that since its activities are ongoing, it is appropriate to set out, as it did at the end of its previous year of inquiry and investigation, a list of matters which the Commission determines are subjects for further inquiry and investigation. These matters may be discussed during any Commission or ~~c~~Committee meeting. This list is not intended to be all-inclusive. The Commission anticipates that other matters will be added as they are identified. The Commission also notes that these matters as set out below imply no particular order of importance and no particular order regarding timing.

The Professional Team provides a report on the inquiries or investigations to the Commission prior to the ~~c~~Committee meetings.

~~Impact of Legal and Claims Environment~~

> ~~Investigate the impact of the legal and claims environment (e.g., assignment of benefits, attorney fees, increased litigation) on modeled hurricane loss costs and hurricane probable maximum loss levels. Is the impact of the legal and claims environment evident in the claims data provided to the modeling organizations for validation of the modeled hurricane loss costs and hurricane probable maximum loss levels? Should the impact of the legal and claims environment be incorporated in the hurricane model results, and if so, how? Should the impact of the legal and claims environment be incorporated into the hurricane standards?~~

There are no active inquiries at this time.

Previous Inquiries or Investigations

Acceptability Process and Standards for Future Consideration
(Note: Report was provided to the Commission July 2009, and is available at ~~*www.*~~*sbafla.com/method/portals/methodology/CommissionInquiries/200907_InquiriesReportJuly2009.pdf*.)

The Commission incorporated in the *Report of Activities as of November 1, 2008*, a section entitled *"Acceptability Process and Standards for Future Consideration."* The section contained potential new standards, public disclosures, audit requirements, forms, and procedures that were discussed during the Committee meetings on August 12 & 13, 2008. The Commission sought public comments on the contents of the section in order to fully understand the implications of the various proposed changes.

The Commission incorporated the potential new standards, public disclosures, audit requirements, forms, and procedures deemed appropriate in the *Report of Activities as of November 1, 2009*.

Adverse Loss Development
(Note: Report was provided to the Commission July 2013, and is available at ~~*www.*~~*sbafla.com/method/portals/methodology/CommissionInquiries/20130710_InquiriesReport.pdf*.)

Is the impact of reopened claims evident in the claims data provided to the modeling organizations for validation of the hurricane loss projections generated by the hurricane model? Should the impact of adverse loss development be incorporated in the hurricane model loss results, and if so, how? Should adverse loss development be a consideration to be incorporated into the hurricane standards or as a separate hurricane standard?

The Commission determined that adverse loss development should not be incorporated into the existing hurricane standards.

ALE/Storm Surge/Infrastructure
(Note: Report was provided to the Commission July 2005, and is available at ~~*www.*~~*sbafla.com/method/portals/methodology/CommissionInquiries/PTIssuesReportJuly2005.pdf*.)

The Commission ~~has studied~~investigated how ALE claim payments are affected by storm surge damage to the infrastructure.

The Commission determined that ALE loss costs produced by a hurricane model should appropriately consider ALE claims as a result of damage to the infrastructure.

Claims Data Contamination of Flood and Wind Losses
(Note: Report was provided to the Commission September 2017, and is available at ~~www.~~*sbafla.com/Method/Portals/Methodology/CommissionInquiries/20170928_PT_Inquiry%20 Report.pdf.*)

The Commission ~~has~~ investigated how contamination of claims data (flood loss counted as wind loss) impacts validation and hurricane model output.

The Commission recognizes that this issue is ongoing and efforts to evaluate claims data are to be continually audited.

Commercial Residential Property
(Note: Reports were provided to the Commission July 2002, available at ~~www.~~*sbafla.com/ method/portals/methodology/CommissionInquiries/200207commercialresidential.pdf;* July 2005, available at ~~www.~~*sbafla.com/method/portals/methodology/CommissionInquiries/PTIssuesReport July2005.pdf;* July 2006, available at ~~www~~*.sbafla.com/method/portals/methodology/Commission Inquiries/PTIssuesReportJuly2006.pdf;* and July 2009, available at ~~www.~~*sbafla.com/method/ portals/methodology/Commission Inquiries/200907_InquiriesReportJuly2009.pdf.*)

The Commission ~~has~~ studied commercial residential to determine (1) if the Commission should expand its scope to include commercial residential property in the hurricane modeling process, (2) if sufficient data are available for validation purposes, (3) if the acceptability process would include personal residential and commercial residential as a whole or separately, (4) what changes would be involved in the meteorology and vulnerability hurricane standards, and (5) if separate hurricane standards should be created for commercial residential.

The Commission determined that after the 2004 and 2005 hurricane seasons there was information on which reasonable commercial residential hurricane loss costs could be modeled and validated, and that commercial residential hurricane standards would be adopted.

Condo-Unit Floor Location
(Note: Report was provided to the Commission September 2017, and is available at ~~www~~*.sbafla.com/Method/Portals/Methodology/CommissionInquiries/20170928_PT_Inquiry%20 Report.pdf.*)

The Commission ~~has~~ investigated the condo-unit floor location impact on hurricane loss costs and how the lack of floor location is treated.

The Commission determined that the absence of floor location loss data for condominiums precludes the inclusion of this effect into a hurricane model.

Demand Surge
(Note: Report was provided to the Commission July 2003, and is available at ~~www.~~*sbafla.com/method/portals/methodology/CommissionInquiries/ProTeamWhitePaper.pdf*.)

The Commission ~~has~~ studied demand surge to determine (1) if there is information on which reasonable demand surge estimations can be made, (2) how demand surge is incorporated in hurricane model calculations, (3) what the scientific basis is for those calculations, and (4) whether it is appropriate for demand surge to be included or excluded.

The Commission determined that after the 2004 and 2005 hurricane seasons there was sufficient information on which reasonable demand surge estimations could be made and to incorporate demand surge into the hurricane standards.

HURDAT Data Revisions
(Note: Reports were provided to the Commission July 2003, available at ~~www.~~*sbafla.com/method/portals/methodology/CommissionInquiries/ProTeamWhitePaper.pdf* and July 2005, available at ~~www.~~*sbafla.com/method/portals/methodology/CommissionInquiries/PTIssuesReportJuly2005.pdf*.)

The Commission has assessed adopting HURDAT as the Base Hurricane Storm Set and determined that all models should be based upon the complete HURDAT with the June 1, 2008 release.

The Commission provided a multiple-year buffer for the transition between the existing Base Hurricane Storm Set and the complete North Atlantic HURDAT.

Hurricane Force Winds
(Note: Reports were provided to the Commission July 2005, available at ~~www.~~*sbafla.com/method/portals/methodology/CommissionInquiries/PTIssuesReportJuly2005.pdf* and July 2006, available at ~~www.~~*sbafla.com/method/portals/methodology/CommissionInquiries/PTIssuesReportJuly2006.pdf.*)

The Commission ~~has~~ assessed the extent to which modeled hurricanes match the observed radius of hurricane force winds.

The Commission recognizes the importance of the spatial distribution of winds, but is sensitive to the inadequacies associated with radius of hurricane force winds data.

Hurricane Season Impact
(Note: Report was provided to the Commission July 2006, and is available at ~~www.~~*sbafla.com/method/portals/methodology/CommissionInquiries/PTIssuesReportJuly2006.pdf.*)

The Commission ~~has assessed~~investigated if any potential bias is entered into the hurricane model results by the inclusion or exclusion of a year's hurricane season, whether the season be active or inactive.

The Commission determined it is prudent to maintain the requirement to update the hurricane frequency annually to reduce any potential bias entered in the hurricane model results by the inclusion or exclusion of a year's hurricane season.

Impact of Legal and Claims Environment
(Note: Report was provided to the Commission September 2019, and is available at *sbafla.com/Method/Portals/Methodology/CommissionInquiries/201909_PT_InquiryReportClaimsEnvironment.pdf.*)

The Commission ~~Investigate~~investigated the impact of the legal and claims environment (e.g., assignment of benefits, attorney fees, increased litigation) on modeled hurricane loss costs and hurricane probable maximum loss levels, including if~~. Is~~ the impact of the legal and claims environment is evident in the claims data provided to the modeling organizations for validation of the modeled hurricane loss costs and hurricane probable maximum loss levels; ~~? Should~~ if the impact of the legal and claims environment should be incorporated in the hurricane model results, and if so, how; ~~? Should~~ and if the impact of the legal and claims environment should be incorporated into the hurricane standards~~?~~.

The Commission determined that the impact of the legal and claims environment should not be incorporated into the existing hurricane standards at this time.

Impact on Modeling Organizations
(Note: Report was provided to the Commission July 2003, and is available at ~~*www.*~~*sbafla.com/method/portals/methodology/CommissionInquiries/ProTeamWhitePaper.pdf.)*

The Commission ~~has~~ investigated the cost factor involved with meeting the standards and the acceptability process, the impact changes have on this cost, and ideas for ~~cutting~~ reducing the cost to modeling organizations.

The Commission considers the costs and benefits associated with the review process and continually monitors its impact on modeling organizations.

Inland versus Coastal Exposures
(Note: Report was provided to the Commission September 2017, and is available at ~~*www.*~~*sbafla.com/Method/Portals/Methodology/CommissionInquiries/20170928_PT_Inquiry%20 Report.pdf*).

The Commission ~~has~~ investigated how the treatment of inland versus coastal exposures has an effect on the spatial evaluation of hurricane vulnerability functions.

The Commission ~~recognizes~~ determined this issue is covered under the existing standards and audit requirements as the approaches used are deemed proprietary.

Interactions of Hurricanes
(Note: Report was provided to the Commission July 2005, and is available at ~~*www.*~~*sbafla.com/method/portals/methodology/CommissionInquiries/PTIssuesReportJuly2005.pdf.*)

The Commission ~~has~~ investigated the assumptions used by the hurricane models regarding whether the damage caused by multiple hurricanes impacting the same exposure during a season is independent and how it impacts hurricane loss costs.

The Commission determined that hurricane models should calculate deductible hurricane loss costs on an annual deductible basis.

Hurricane Mitigation Impact

(Note: Report was provided to the Commission July 2013, and is available at ~~*www.*~~*sbafla.com/method/portals/methodology/CommissionInquiries/20130710_InquiriesReport.pdf*.)

The Commission considered the development of new forms to examine the impact of mitigation schemes, individually and in combination, on the mean damage ratio for a portfolio similar to the one used in Form V-1, One Hypothetical Event, for frame and masonry constructions and an actuarial form similar to Form V-3, Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item), providing hurricane loss costs rather than mean damage ratio.

The Commission ~~made~~ adopted revisions to the reference structures in the existing hurricane vulnerability forms and determined the reporting of hurricane loss costs in Form V-3, Hurricane Mitigation Measures and Secondary Characteristics, Mean Damage Ratios and Hurricane Loss Costs (Trade Secret Item), for the reference building, for each individual hurricane mitigation measure, and for the combination of the four hurricane mitigation measures was adequate.

Multi-Decadal Variability and Its Impact on Expected Hurricane Loss

(Note: Reports were provided to the Commission July 2006, and are available at ~~*www.*~~*sbafla.com/method/portals/methodology/CommissionInquiries/PTIssuesReportJuly2006.pdf* and ~~*www.*~~*sbafla.com/method/portals/methodology/CommissionInquiries/MultidecadalReportJuly2006.pdf*, and July 2009, available at ~~*www.*~~*sbafla.com/method/portals/methodology/CommissionInquiries/200907_InquiriesReportJuly2009.pdf.)*

A body of literature has accumulated since 1990 that focuses on multi-decadal variability of hurricanes. The hypothesis is that we are in an enhanced period of activity that can be expected to last for a total duration of 20-30 years and then decrease to activity levels like the low frequency and hurricane landfall times of the 1980s. The Commission ~~has~~ assessed if the hurricane models should take this into account.

The Commission determined that its procedures are sufficient to review a hurricane model submitted to account for multi-decadal variability.

Retrofit or Remodeled Structures

(Note: Report was provided to the Commission July 2009, and is available at ~~*www.*~~*sbafla.com/method/portals/methodology/CommissionInquiries/200907_InquiriesReportJuly2009.pdf.*)

The Commission investigated how retrofit or remodeled buildings are treated in a hurricane model and what information is reflected in year built data provided by insurance companies.

The Commission ~~recognizes~~ determined that the current methods used by hurricane models to incorporate year built data is satisfactory and is sensitive to the inadequacies associated with the exposure data.

Risk Location

(Note: Report was provided to the Commission July 2006, and is available at ~~www.~~*sbafla.com/method/portals/methodology/CommissionInquiries/PTIssuesReportJuly2006.pdf*.)

The Commission ~~has~~ investigated the use of latitude/longitude based exposure datasets rather than ZIP Code based where the exposure is placed at the population centroid and how this would impact hurricane loss costs.

The Commission determined that ZIP Code based exposure data is appropriate.

Software Engineering

(Note: Report was provided to the Commission July 2013, and is available at ~~www.~~*sbafla.com/method/portals/methodology/CommissionInquiries/20130710_InquiriesReport.pdf*.)

The Commission investigated the software engineering techniques, such as code refactoring, used by the modeling organizations to improve the readability, efficiency, maintainability, and structure of software without changing its functionality.

The Commission determined the software engineering techniques and the availability of tools for use by the modeling organization to improve the readability, efficiency, maintainability, and structure of the software without changing its functionality should be assessed before additional requirements are imposed in the Computer/Information Standards.

Specific or Unique Hurricane Modeling Issues

(Note: Report was provided to the Commission July 2013, and is available at ~~www.~~*sbafla.com/method/portals/methodology/CommissionInquiries/20130710_InquiriesReport.pdf*.)

The Commission investigated specific or unique hurricane modeling issues.

The Commission determined ~~A~~anomalies related to specific counties or unique circumstances that may impact hurricane modeling results shall be identified, and these issues shall be evaluated and discussed by the Commission.

Storm Surge

(Note: Reports were provided to the Commission July 2009, available at ~~www.~~*sbafla.com/method/portals/methodology/CommissionInquiries/200907_InquiriesReportJuly2009.pdf* and July 2013, available at ~~www.~~*sbafla.com/method/portals/methodology/CommissionInquiries/20130710_InquiriesReport.pdf*.)

The Commission investigated how modeling organizations model storm surge during the development of the 2017 Flood Standards including the following:

1. Storm surge calculation,
2. Underlying formulation of the storm surge calculation (e.g., dynamical or statistical, underlying equations or functional/distributional form), including whether it includes wave action,
3. Source and resolution of the bathymetry and coastal topography used in the storm surge calculation at the risk location level,
4. Hurricane parameters and characteristics used in the storm surge calculation,
5. Inputs used in the storm surge calculation that have not already been described,

6. Storm surge initialization in an individual storm surge calculation,
7. Storm surge development related to storm track out to sea,
8. Comparison of the storm surge calculated in the flood model with historical storm surge (e.g., five locations from a different coastal county),
9. Comparison of storm surge calculated in the flood model worst case for the same five locations compared with other datasets or models,
10. Flood model capability to determine losses due to storm surge explicitly, and
11. Development of the building flood vulnerability functions for storm surge.

The Commission sought input and feedback on the development of the flood standards from the modeling organizations and the public. In addition to monthly flood standards committee meetings over the course of a year, on-site visits to modeling organizations were conducted for additional feedback purposes. The Commission published Discussion Flood Standards as of December 1, 2015 for review of coastal and inland flood modeling.

The Commission adopted flood standards, ~~public~~ disclosures, audit requirements, forms, and procedures deemed appropriate in the *Flood Standards Report of Activities as of November 1, 2017.*

Transition of Hurricanes

(Note: Report was provided to the Commission July 2005, and is available at ~~www.~~*sbafla.com/method/portals/methodology/CommissionInquiries/PTIssuesReportJuly2005.pdf.*)

The Commission ~~has~~ assessed the need to account for the transition of hurricanes from over-water to over-land using currently-acceptable meteorological science.

The Commission determined that the current methods used by hurricane models are adequate to capture the transition effects of hurricane weakening and friction and that the hurricane models should be validated using published wind observations as substantial data for hurricane windfields over-land are being collected and published in the atmospheric science and engineering literature.

Uncertainty Reduction

(Note: Report was provided to the Commission September 2017, and is available at ~~www.~~*sbafla.com/Method/Portals/Methodology/CommissionInquiries/20170928_PT_Inquiry%20 Report.pdf*).

The Commission ~~has~~ investigated aspects of the hurricane model and inputs that could lead to the greatest reduction in the uncertainty in hurricane model outputs (e.g., hurricane frequency, damage functions, incorrect data input, granularity of exposure location (ZIP Code centroid versus street address) data input).

The Commission identified several aspects of ~~the~~ hurricane models that drive the inherent uncertainties.

Vulnerability Hurricane Model Development for Hurricane Mitigation Features

(Note: Report was provided to the Commission July 2013, and is available at ~~*www.*~~*sbafla.com/ method/portals/methodology/CommissionInquiries/20130710_InquiriesReport.pdf*.)

The Commission explored the use of a physical/engineering based approach to vulnerability hurricane model development for application of hurricane mitigation features.

The Commission recognizes there are challenges in applying a physical/engineering based approach including the large number of input variables to support this type of hurricane vulnerability function development, converting physical loss to financial loss, and the claims analysis relative to the impact of hurricane mitigation factors. The Commission determined that the current methods used by hurricane models are adequate for the application of hurricane mitigation features.

~~IX.~~ APPENDICES

Acronyms
Used in the *Hurricane Standards Report of Activities*
And in the *Flood Standards Report of Activities*

(These acronyms are applicable to the *Hurricane Standards Report of Activities*, the *Flood Standards Report of Activities*, or both.)

AAL	Average Annual Loss
ACV	Actual Cash Value
AIR	AIR Worldwide Corporation
ALAE	Allocated Loss Adjustment Expense
ALE	Additional Living Expense
ARA	Applied Research Associates, Inc.
ASTM	American Society for Testing and Materials
BCEGS	Building Code Effectiveness Grading Schedule
BPMN	Business Process Model and Notation
ByP	By-Passing
CDF	Cumulative Distribution Function
CF	Conversion Factor
Commission	Florida Commission on Hurricane Loss Projection Methodology
COR	CoreLogic, Inc.
cf/s	Cubic Feet per Second
CP	Central Pressure
CS	Committee Substitute
EPR	Expected Percentage Reduction
EQE	EQECAT, Inc. (now CoreLogic, Inc.)
FCHLPM	Florida Commission on Hurricane Loss Projection Methodology
FFP	Far Field Pressure
FHCF	Florida Hurricane Catastrophe Fund
FIPS	Federal Information Processing Standards
FPM	Florida Public Hurricane Loss Model
F.S.	Florida Statutes
ft/s	Feet per Second
FWMD	Florida Water Management District
GIS	Geographic Information System
HB	House Bill
HO	Homeowner Insurance Policy
HUD	U.S. Department of Housing and Urban Development
HURDAT2	Hurricane Data 2nd Generation
KCC	Karen Clark & Company
LAE	Loss Adjustment Expense
LHS	Latin Hypercube Sampling
LULC	Land Use Land Cover
mb	Millibar
MH	Manufactured Home Insurance Policy
mph	Miles per Hour
MRLC	Multi-Resolution Land Characteristics
n	Gauckler-Manning Roughness Coefficient

NA	Not Applicable
NAD	North American Datum
NAVD	North American Vertical Datum
NFIP	National Flood Insurance Program
NGVD	National Geodetic Vertical Datum
NLCD	National Land Cover Database
NOAA	National Oceanic & Atmospheric Administration
NWS	National Weather Service
OIR	Office of Insurance Regulation
PBL	Planetary Boundary Layer
PML	Probable Maximum Loss
r	Radius
Rmax	Radius of Maximum Winds
RMS	Risk Management Solutions, Inc.
ROA	Report of Activities
s	Section of Florida Statutes
SA	Sensitivity Analysis
SB	Senate Bill
SBA	State Board of Administration
SLOSH	Sea, Lake, and Overland Surges from Hurricanes
SRC	Standardized Regression Coefficient
SysML	Systems Modeling Language
UA	Uncertainty Analysis
ULAE	Unallocated Loss Adjustment Expense
UML	Unified Modeling Language
USGS	United States Geological Survey
Vmax	Velocity Maximum
VT	Translational Velocity
WGS	World Geodetic System
ZIP	Zone Improvement Plan

627.0628 Florida Commission on Hurricane Loss Projection Methodology; public records exemption; public meetings exemption.–

(1) LEGISLATIVE FINDINGS AND INTENT.–

(a) Reliable projections of hurricane losses are necessary in order to assure that rates for residential property insurance meet the statutory requirement that rates be neither excessive nor inadequate. The ability to accurately project hurricane losses has been enhanced greatly in recent years through the use of computer modeling. It is the public policy of this state to encourage the use of the most sophisticated actuarial methods to assure that consumers are charged lawful rates for residential property insurance coverage.

(b) The Legislature recognizes the need for expert evaluation of computer models and other recently developed or improved actuarial methodologies for projecting hurricane losses, in order to resolve conflicts among actuarial professionals, and in order to provide both immediate and continuing improvement in the sophistication of actuarial methods used to set rates charged to consumers.

(c) It is the intent of the Legislature to create the Florida Commission on Hurricane Loss Projection Methodology as a panel of experts to provide the most actuarially sophisticated guidelines and standards for projection of hurricane losses possible, given the current state of actuarial science. It is the further intent of the Legislature that such standards and guidelines must be used by the State Board of Administration in developing reimbursement premium rates for the Florida Hurricane Catastrophe Fund, and, subject to paragraph (3)(d), must be used by insurers in rate filings under s. 627.062 unless the way in which such standards and guidelines were applied by the insurer was erroneous, as shown by a preponderance of the evidence.

(d) It is the intent of the Legislature that such standards and guidelines be employed as soon as possible, and that they be subject to continuing review thereafter.

(e) The Legislature finds that the authority to take final agency action with respect to insurance ratemaking is vested in the Office of Insurance Regulation and the Financial Services Commission, and that the processes, standards, and guidelines of the Florida Commission on Hurricane Loss Projection Methodology do not constitute final agency action or statements of general applicability that implement, interpret, or prescribe law or policy; accordingly, chapter 120 does not apply to the processes, standards, and guidelines of the Florida Commission on Hurricane Loss Projection Methodology.

(2) COMMISSION CREATED.–

(a) There is created the Florida Commission on Hurricane Loss Projection Methodology, which is assigned to the State Board of Administration. For the purposes of this section, the term "commission" means the Florida Commission on Hurricane Loss Projection Methodology. The commission shall be administratively housed within the State Board of Administration, but it shall independently exercise the powers and duties specified in this section.

(b) The commission shall consist of the following 12 members:

1. The insurance consumer advocate.
2. The senior employee of the State Board of Administration responsible for operations of the Florida Hurricane Catastrophe Fund.
3. The Executive Director of the Citizens Property Insurance Corporation.
4. The Director of the Division of Emergency Management.
5. The actuary member of the Florida Hurricane Catastrophe Fund Advisory Council.
6. An employee of the office who is an actuary responsible for property insurance rate filings and who is appointed by the director of the office.
7. Five members appointed by the Chief Financial Officer, as follows:
    a. An actuary who is employed full time by a property and casualty insurer that was responsible for at least 1 percent of the aggregate statewide direct written premium for homeowner insurance in the calendar year preceding the member's appointment to the commission.
    b. An expert in insurance finance who is a full-time member of the faculty of the State University System and who has a background in actuarial science.
    c. An expert in statistics who is a full-time member of the faculty of the State University System and who has a background in insurance.
    d. An expert in computer system design who is a full-time member of the faculty of the State University System.
    e. An expert in meteorology who is a full-time member of the faculty of the State University System and who specializes in hurricanes.
8. A licensed professional structural engineer who is a full-time faculty member in the State University System and who has expertise in wind mitigation techniques. This appointment shall be made by the Governor.

(c) Members designated under subparagraphs (b)1.-5. shall serve on the commission as long as they maintain the respective offices designated in subparagraphs (b)1.-5. The member appointed by the director of the office under subparagraph (b)6. shall serve on the commission until the end of the term of office of the director who appointed him or her, unless removed earlier by the director for cause. Members appointed by the Chief Financial Officer under subparagraph (b)7. shall serve on the commission until the end of the term of office of the Chief Financial Officer who appointed them, unless earlier removed by the Chief Financial Officer for cause. Vacancies on the commission shall be filled in the same manner as the original appointment.

(d) The State Board of Administration shall annually appoint one of the members of the commission to serve as chair.

(e) Members of the commission shall serve without compensation, but shall be reimbursed for per diem and travel expenses pursuant to s. 112.061.

(f) The State Board of Administration shall, as a cost of administration of the Florida Hurricane Catastrophe Fund, provide for travel, expenses, and staff support for the commission.

(g) There shall be no liability on the part of, and no cause of action of any nature shall arise against, any member of the commission, any member of the State Board of Administration, or any employee of the State Board of Administration for any action taken in the performance of their duties under this section. In addition, the commission may, in writing, waive any potential cause of action for negligence of a consultant, contractor, or contract employee engaged to assist the commission.

(3) ADOPTION AND EFFECT OF STANDARDS AND GUIDELINES.–

(a) The commission shall consider any actuarial methods, principles, standards, models, or output ranges that have the potential for improving the accuracy of or reliability of the hurricane loss projections used in residential property insurance rate filings and flood loss projections used in rate filings for personal lines residential flood insurance coverage. The commission shall, from time to time, adopt findings as to the accuracy or reliability of particular methods, principles, standards, models, or output ranges.

(b) The commission shall consider any actuarial methods, principles, standards, or models that have the potential for improving the accuracy of or reliability of projecting probable maximum loss levels. The commission shall adopt findings as to the accuracy or reliability of particular methods, principles, standards, or models related to probable maximum loss calculations.

(c) In establishing reimbursement premiums for the Florida Hurricane Catastrophe Fund, the State Board of Administration must, to the extent feasible, employ actuarial methods, principles, standards, models, or output ranges found by the commission to be accurate or reliable.

(d) With respect to a rate filing under s. 627.062, an insurer shall employ and may not modify or adjust actuarial methods, principles, standards, models, or output ranges found by the commission to be accurate or reliable in determining hurricane loss factors and probable maximum loss levels for use in a rate filing under s. 627.062. An insurer may employ a model in a rate filing until 120 days after the expiration of the commission's acceptance of that model and may not modify or adjust models found by the commission to be accurate or reliable in determining probable maximum loss levels. This paragraph does not prohibit an insurer from using a straight average of model results or output ranges for the purposes of a rate filing for personal lines residential flood insurance coverage under s. 627.062.

(e) The commission shall adopt actuarial methods, principles, standards, models, or output ranges for personal lines residential flood loss no later than July 1, 2017.

(f) The commission shall revise previously adopted actuarial methods, principles, standards, models, or output ranges every odd-numbered year for hurricane loss projections. The commission shall revise previously adopted actuarial methods, principles, standards, models, or output ranges no less than every 4 years for flood loss projections.

(g) 1. A trade secret, as defined in s. 688.002, which is used in designing and constructing a hurricane or flood loss model and which is provided pursuant to this section, by a private company, to the commission, office, or consumer advocate appointed pursuant to s. 627.0613 is confidential and exempt from s. 119.07(1) and s. 24(a), Art. 1 of the State Constitution.

2. a. That portion of a meeting of the commission or of a rate proceeding on an insurer's rate filing at which a trade secret made confidential and exempt by this paragraph is discussed is exempt from s. 286.011 and s. 24(b), Art. 1 of the State Constitution. The closed meeting must be recorded, and no portion of the closed meeting may be off the record.

b. The recording of a closed portion of a meeting is exempt from s. 119.07(1) and s. 24(a), Art. 1 of the State Constitution.

~~c. This paragraph is subject to the Open Government Sunset Review Act in accordance with s. 119.15, and shall stand repealed on October 2, 2019, unless reviewed and saved from repeal through reenactment by the Legislature.~~

History.–s. 6, ch. 95-276; s. 6, ch. 96-194; s. 3, ch. 97-55; s. 4, ch. 2000-333; s. 1066, ch. 2003-261; s. 79, ch. 2004-390; s. 4, ch. 2005-111; s. 3, ch. 2005-264; s. 12, ch. 2006-12; s. 145, ch. 2008-4; s. 11, ch. 2008-66; s. 83, ch. 2009-21; s. 10, ch. 2009-70; s. 16, ch. 2009-87; s. 1, ch. 2010-89; s. 431, ch. 2011-142; s. 76, ch. 2012-5; s. 5, ch.2013-60; s. 2, ch. 2014-80; s.1, ch. 2014-98; s. 2, ch. 2015-135; s. 1, ch. 2017-142; s. 1, ch. 2019-35.

627.4025 Residential coverage and hurricane coverage defined.–

(1) Residential coverage includes both personal lines residential coverage, which consists of the type of coverage provided by homeowner, mobile home owner, dwelling, tenant, condominium unit owner, cooperative unit owner, and similar policies, and commercial lines residential coverage, which consists of the type of coverage provided by condominium association, cooperative association, apartment building, and similar policies, including policies covering the common elements of a homeowners association. Residential coverage for personal lines and commercial lines as set forth in this section includes policies that provide coverage for particular perils such as windstorm and hurricane or coverage for insurer insolvency or deductibles.

(2) As used in policies providing residential coverage:

(a) "Hurricane coverage" is coverage for loss or damage caused by the peril of windstorm during a hurricane. The term includes ensuing damage to the interior of a building, or to property inside a building, caused by rain, snow, sleet, hail, sand, or dust if the direct force of the windstorm first damages the building, causing an opening through which rain, snow, sleet, hail, sand, or dust enters and causes damage.

(b) "Windstorm" for purposes of paragraph (a) means wind, wind gusts, hail, rain, tornadoes, or cyclones caused by or resulting from a hurricane which results in direct physical loss or damage to property.

(c) "Hurricane" for purposes of paragraphs (a) and (b) means a storm system that has been declared to be a hurricane by the National Hurricane Center of the National Weather Service. The duration of the hurricane includes the time period, in Florida:

1. Beginning at the time a hurricane watch or hurricane warning is issued for any part of Florida by the National Hurricane Center of the National Weather Service;
2. Continuing for the time period during which the hurricane conditions exist anywhere in Florida; and
3. Ending 72 hours following the termination of the last hurricane watch or hurricane warning issued for any part of Florida by the National Hurricane Center of the National Weather Service.

History.–s. 8, ch. 95-276; s. 11, ch. 96-194; s. 10, ch. 97-55.

627.701(5)-(9) Liability of insureds; coinsurance; deductibles. –

(5) (a) The hurricane deductible of any personal lines residential property insurance policy issued or renewed on or after May 1, 2005, shall be applied as follows:

1. The hurricane deductible shall apply on an annual basis to all covered hurricane losses that occur during the calendar year for losses that are covered under one or more policies issued by the same insurer or an insurer in the same insurer group.
2. If a hurricane deductible applies separately to each of one or more structures insured under a single policy, the requirements of this paragraph apply with respect to the deductible for each structure.
3. If there was a hurricane loss for a prior hurricane or hurricanes during the calendar year, the insurer may apply a deductible to a subsequent hurricane which is the greater of the remaining amount of the hurricane deductible or the amount of the deductible that applies to perils other than a hurricane. Insurers may require policyholders to report hurricane losses that are below the hurricane deductible or to maintain receipts or other records of such hurricane losses in order to apply such losses to subsequent hurricane claims.
4. If there are hurricane losses in a calendar year on more than one policy issued by the same insurer or an insurer in the same insurer group, the hurricane deductible shall be the highest amount stated in any one of the policies. If a policyholder who had a hurricane loss under the prior policy is provided or offered a lower hurricane deductible under the new or renewal policy, the insurer must notify the policyholder, in writing, at the time the lower hurricane deductible is provided or offered, that the lower hurricane deductible will not apply until January 1 of the following calendar year.

(b) For commercial residential property insurance policies issued or renewed on or after January 1, 2006, the insurer must offer the policyholder the following alternative hurricane deductibles:

1. A hurricane deductible that applies on an annual basis as provided in paragraph (a); and
2. A hurricane deductible that applies to each hurricane.

(6) (a) It is the intent of the Legislature to encourage the use of higher hurricane deductibles as a means of increasing the effective capacity of the hurricane insurance market in this state and as a means of limiting the impact of rapidly changing hurricane insurance premiums. The Legislature finds that the hurricane deductibles specified in this subsection are reasonable when a property owner has made adequate provision for restoration of the property to its full value after a catastrophic loss.

(c) A personal lines residential insurance policy providing hurricane coverage may, at the mutual option of the insured and insurer, include a secured hurricane deductible as described in paragraph (c) if the applicant presents the insurer a certificate of security as described in paragraph (d). An insurer may not directly or indirectly require a secured deductible under this subsection as a condition of issuing or renewing a policy. A certificate of security is not required with respect to an applicant who owns a 100 percent equity interest in the property.

(d) A secured hurricane deductible must include the substance of the following:
   1. The first $500 of any claim, regardless of the peril causing the loss, is fully deductible.
   2. With respect to hurricane losses only, the next $5,000 in losses are fully insured, subject only to a copayment requirement of 10 percent.
   3. With respect to hurricane losses only, the remainder of the claim is subject to a deductible equal to a specified percentage of the policy dwelling limits in excess of the deductible allowed under former paragraph (3)(a) but no higher than 10 percent of the policy dwelling limits.
   4. The insurer agrees to renew the coverage on a guaranteed basis for a period of years after initial issuance of the secured deductible equal to at least 1 year for each 2 percentage points of deductible specified in subparagraph 3. unless the policy is canceled for nonpayment of premium or the insured fails to maintain the certificate of security. Such renewal shall be at the same premium as the initial policy except for premium changes attributable to changes in the value of the property.

(e) The office shall draft and formally propose as a rule the form for the certificate of security. The certificate of security may be issued in any of the following circumstances:
   1. A mortgage lender or other financial institution may issue a certificate of security after granting the applicant a line of credit, secured by equity in real property or other reasonable security, which line of credit may be drawn on only to pay for the deductible portion of insured construction or reconstruction after a hurricane loss. In the sole discretion of the mortgage lender or other financial institution, the line of credit may be issued to an applicant on an unsecured basis.
   2. A licensed insurance agent may issue a certificate of security after obtaining for an applicant a line of credit, secured by equity in real property or other reasonable security, which line of credit may be drawn on only to pay for the deductible portion of insured construction or reconstruction after a hurricane loss. The Florida Hurricane Catastrophe Fund shall negotiate agreements creating a financing consortium to serve as an additional source of lines of credit to secure deductibles. Any licensed insurance agent may act as the agent of such consortium.
   3. Any person qualified to act as a trustee for any purpose may issue a certificate of security secured by a pledge of assets, with the restriction that the assets may be drawn on only to pay for the deductible portion of insured construction or reconstruction after a hurricane loss.
   4. Any insurer, including any admitted insurer or any surplus lines insurer, may issue a certificate of security after issuing the applicant a policy of supplemental insurance that will pay for 100 percent of the deductible portion of insured construction or reconstruction after a hurricane loss.
   5. Any other method approved by the office upon finding that such other method provides a similar level of security as the methods specified in this paragraph and that such other method has no negative impact on residential property insurance catastrophic capacity. The legislative intent of this subparagraph is to provide the flexibility needed to achieve the public policy of expanding property insurance capacity while improving the affordability of property insurance.

(e) An issuer of a certificate of security may terminate the certificate for failure to honor any of the terms of the underlying financial arrangement. The issuer must provide notice of termination to the insurer within 10 working days after termination. Unless the policyholder obtains a replacement certificate of security within an additional 20 working days after such notice, the deductible provision in the policy must revert to a lower deductible otherwise offered by the insurer and the policyholder is responsible for any additional premium required for a policy with such deductible.

(7) Prior to issuing a personal lines residential property insurance policy on or after April 1, 1997, or prior to the first renewal of a residential property insurance policy on or after April 1, 1997, the insurer must offer a deductible equal to $500 applicable to losses from perils other than hurricane. The insurer must provide the policyholder with notice of the availability of the deductible specified in this subsection in a form approved by the office at least once every 3 years. The failure to provide such notice constitutes a violation of this code but does not affect the coverage provided under the policy. An insurer may require a higher deductible only as part of a deductible program lawfully in effect on June 1, 1996, or as part of a similar deductible program.

(8) Notwithstanding the other provisions of this section or of other law, but only as to hurricane coverage as defined in s. 627.4025 for commercial lines residential coverages, an insurer may offer a deductible in an amount not exceeding 10 percent of the insured value if, at the time of such offer and at each renewal, the insurer also offers to the policyholder a deductible in the amount of 3 percent of the insured value. Nothing in this subsection prohibits any deductible otherwise authorized by this section. All forms by which the offers authorized in this subsection are made or required to be made shall be on forms that are adopted or approved by the commission or office.

(9) With respect to hurricane coverage provided in a policy of residential coverage, when the policyholder has taken appropriate hurricane mitigation measures regarding the residence covered under the policy, the insurer shall provide the insured the option of selecting an appropriate reduction in the policy’s hurricane deductible or selecting the appropriate discount credit or other rate differential as provided in s. 627.0629. The insurer must provide the policyholder with notice of the options available under this subsection on a form approved by the office.

History.–s. 605, ch. 59-205; s. 3, ch. 76-168; s. 1, ch. 77-457; ss. 2, 3, ch. 81-318; ss. 538, 541, 809(2nd), ch. 82-243; s. 79, ch. 82-386; s. 114, ch. 92-318; s. 16, ch. 93-410; s. 13, ch. 95-276; s. 12, ch. 96-194; s. 11, ch. 97-55; s. 26, ch. 97-93; s. 1736, ch. 97-102; s. 1183, ch. 2003-261; s. 4, ch. 2004-480; ss. 12, 13, ch. 2005-111; s. 45, ch. 2006-12; s. 28, ch. 2007-1; s. 17, ch. 2007-90; s. 151, ch. 2008-4.

627.7011 Homeowners' policies; offer of replacement cost coverage and law and ordinance coverage.–

(1) Prior to issuing a homeowner's insurance policy, the insurer must offer each of the following:

(a) A policy or endorsement providing that any loss that is repaired or replaced will be adjusted on the basis of replacement costs to the dwelling not exceeding policy limits, rather than actual cash value, but not including costs necessary to meet applicable laws and ordinances regulating the construction, use, or repair of any property or requiring the tearing down of any property, including the costs of removing debris.

(b) A policy or endorsement providing that, subject to other policy provisions, any loss that is repaired or replaced at any location will be adjusted on the basis of replacement costs to the dwelling not exceeding policy limits, rather than actual cash value, and also including costs necessary to meet applicable laws and ordinances regulating the construction, use, or repair of any property or requiring the tearing down of any property, including the costs of removing debris. However, additional costs necessary to meet applicable laws and ordinances may be limited to 25 percent or 50 percent of the dwelling limit, as selected by the policyholder, and such coverage applies only to repairs of the damaged portion of the structure unless the total damage to the structure exceeds 50 percent of the replacement cost of the structure.

An insurer is not required to make the offers required by this subsection with respect to the issuance or renewal of a homeowner's policy that contains the provisions specified in paragraph (b) for law and ordinance coverage limited to 25 percent of the dwelling limit, except that the insurer must offer the law and ordinance coverage limited to 50 percent of the dwelling limit. This subsection does not prohibit the offer of a guaranteed replacement cost policy.

(2) Unless the insurer obtains the policyholder's written refusal of the policies or endorsements specified in subsection (1), any policy covering the dwelling is deemed to include the law and ordinance coverage limited to 25 percent of the dwelling limit. The rejection or selection of alternative coverage shall be made on a form approved by the office. The form must fully advise the applicant of the nature of the coverage being rejected. If this form is signed by a named insured, it is conclusively presumed that there was an informed, knowing rejection of the coverage or election of the alternative coverage on behalf of all insureds. Unless the policyholder requests in writing the coverage specified in this section, it need not be provided in or supplemental to any other policy that renews, insures, extends, changes, supersedes, or replaces an existing policy if the policyholder has rejected the coverage specified in this section or has selected alternative coverage. The insurer must provide the policyholder with notice of the availability of such coverage in a form approved by the office at least once every 3 years. The failure to provide such notice constitutes a violation of this code, but does not affect the coverage provided under the policy.

(3) In the event of a loss for which a dwelling or personal property is insured on the basis of replacement costs:

(a) For a dwelling, the insurer must initially pay at least the actual cash value of the insured loss, less any applicable deductible. The insurer shall pay any remaining amounts necessary to perform such repairs as work is performed and expenses are incurred. If a total loss of a dwelling occurs, the insurer shall pay the replacement cost coverage without reservation or holdback of any deprecation in value, pursuant to s. 627.702.

(b) For personal property:

1. The insurer must offer coverage under which the insurer is obligated to pay the replacement cost without reservation or holdback for any depreciation in value, whether or not the insured replaces the property.
2. The insurer may also offer coverage under which the insurer may limit the initial payment to the actual cash value of the personal property to be replaced, require the insured to provide receipts for the purchase of the property financed by the initial payment, use such receipts to make the next payment requested by the insured for the replacement of insured property, and continue this process until the insured remits all receipts up to the policy limits for replacement costs. The insurer must provide clear notice of this process before the policy is bound. A policyholder must be provided an actuarially reasonable premium credit or discount for this coverage. The insurer may not require the policyholder to advance payment for the replaced property.

(4) (a) An insurer that issues a homeowner's insurance policy must include with the policy documents at initial issuance and every renewal, in bold type no smaller than 18 points, the following statement:

"LAW AND ORDINANCE: LAW AND ORDINANCE COVERAGE IS AN IMPORTANT COVERAGE THAT YOU MAY WISH TO PURCHASE. PLEASE DISCUSS WITH YOUR INSURANCE AGENT."

(b) An insurer that issues a homeowner's insurance policy that does not provide flood insurance coverage must include with the policy documents at initial issuance and every renewal, in bold type no smaller than 18 points, the following statement:

"FLOOD INSURANCE: YOU MAY ALSO NEED TO CONSIDER THE PURCHASE OF FLOOD INSURANCE. YOUR HOMEOWNER'S INSURANCE POLICY DOES NOT INCLUDE COVERAGE FOR DAMAGE RESULTING FROM FLOOD EVEN IF HURRICANE WINDS AND RAIN CAUSED THE FLOOD TO OCCUR. WITHOUT SEPARATE FLOOD INSURANCE COVERAGE, YOU MAY HAVE UNCOVERED LOSSES CAUSED BY FLOOD. PLEASE DISCUSS THE NEED TO PURCHASE SEPARATE FLOOD INSURANCE COVERAGE WITH YOUR INSURANCE AGENT."

(c) The intent of this subsection is to encourage policyholders to purchase sufficient coverage to protect them in case events excluded from the standard homeowners policy, such as law and ordinance enforcement and flood, combine with covered events to produce damage or loss to the insured property. The intent is also to encourage policyholders to discuss these issues with their insurance agent.

(5) This section does not:

(a) Apply to policies not considered to be “homeowners’ policies,” as that term is commonly understood in the insurance industry.

(b) Apply to mobile home policies.

(c) Limit the ability of an insurer to reject or nonrenew any insured or applicant on the grounds that the structure does not meet underwriting criteria applicable to replacement cost or law and ordinance policies or for other lawful reasons.

(d) Prohibit an insurer from limiting its liability under a policy or endorsement providing that loss will be adjusted on the basis of replacement costs to the lesser of:

1. The limit of liability shown on the policy declarations page;
2. The reasonable and necessary cost to repair the damaged, destroyed, or stolen covered property; or
3. The reasonable and necessary cost to replace the damaged, destroyed, or stolen covered property.

(e) Prohibit an insurer from exercising its right to repair damaged property in compliance with its policy and s. 627.702(7).

History.–s. 17, ch. 93-410; s. 1184, ch. 2003-261; s. 14, ch. 2005-111; s. 23, ch. 2006-12; s. 4, ch. 2009-87; s. 19, ch. 2011-39; s. 1, ch. 2018-63; s. 1, ch. 2019-82.

627.714 Residential condominium unit owner coverage; loss assessment coverage required.–

(1) For policies issued or renewed on or after July 1, 2010, coverage under a unit owner's residential property policy must include at least $2,000 in property loss assessment coverage for all assessments made as a result of the same direct loss to the property, regardless of the number of assessments, owned by all members of the association collectively if such loss is of the type of loss covered by the unit owner's residential property insurance policy, to which a deductible of no more than $250 per direct property loss applies. If a deductible was or will be applied to other property loss sustained by the unit owner resulting from the same direct loss to the property, no deductible applies to the loss assessment coverage.

(2) The maximum amount of any unit owner's loss assessment coverage that can be assessed for any loss shall be an amount equal to that unit owner's loss assessment coverage limit in effect 1 day before the date of the occurrence. Any changes to the limits of a unit owner's coverage for loss assessments made on or after the day before the date of the occurrence are not applicable to such loss.

(3) Regardless of the number of assessments, an insurer providing loss assessment coverage to a unit owner is not required to pay more than an amount equal to that unit owner's loss assessment coverage limit as a result of the same direct loss to property.

(4) Every individual unit owner's residential property policy must contain a provision stating that the coverage afforded by such policy is excess coverage over the amount recoverable under any other policy covering the same property.

History.–s. 5, ch. 2010-174.

Florida Office of Insurance Regulation Informational Memoranda

INFORMATIONAL MEMORANDUM 02-0470M
June 6, 2002
Florida Department of Insurance
Tom Gallagher
Treasurer, Insurance Commissioner and Fire Marshal

All Property and Casualty Insurers Authorized to Write Residential Property Insurance in the State of Florida

Implementation of Revision to Section 627.0629(1), F.S. Concerning Residential Property Insurance Rate Filings - Delayed Effective Date Pursuant to HB 1307

The purpose of this memorandum is to advise insurers that the substantive changes to the captioned statute have been postponed from a February 28, 2002 effective date to a June 1, 2002 effective date. Rate filings received by the Department on or after June 1, 2002 must include actuarially reasonable differentials for fixtures or construction techniques demonstrated to reduce the amount of loss in a windstorm. Types of fixtures or techniques that must be included are specified in the statute. In addition, credits for fixtures and techniques that meet the minimum requirements of the Florida Building Code must be included in the rate filing. All insurers must make a rate filing which includes actuarially reasonable differentials by February 28, 2003. This date has not changed.

A public domain study providing data and information on estimated loss reduction for wind resistive building features in single-family residences in Florida is available. The complete text of that study, Development of Loss Relativities for Wind Resistive Features of Residential Structures, may be downloaded from the website of the Florida Department of Community Affairs at http://www.dca.state.fl.us/fbcdJprograms/rcmp/index.htm. The Florida Department of Insurance recognizes that study as a basis for deriving actuarially reasonable differentials to reflect techniques that have been demonstrated to reduce the amount of loss in a windstorm. Insurers may rely upon other fully documented studies as long as filings include comparable documentation for the differentials (or lack of same) requested.

Compliance with this statute requires each filing to include appropriate treatment for existing construction (retrofit) as well as for new construction (built to meet the requirements of the new Florida Building Code). Provisions should be considered for construction features that exceed building code requirements for the location of the structure and that have been demonstrated to reduce windstorm losses. Each filer must specify how the construction features it proposes to use in rating will be verified and must precisely define the fixtures and techniques within its rate manual. At this time, filers will not be permitted to offset hypothetical loss of premium revenue as a result of compliance with this statute. Partly in order to minimize the effect of the lack of offset, the Department is currently suggesting a modification to the relativities contained in the above study (see below). Once the actual distribution of insureds is available for a company's combination of fixtures and techniques recognized, differentials for each, and verification procedures, the company may submit a complete rate filing that adjusts base rates accordingly. This rate filing should also completely implement the discounts, credits, or other rate differentials indicated in the fully documented study relied upon by the insurer, to the extent they are actuarially credible.

The statute requires inclusion of at least the following fixtures or construction techniques:

1. Enhanced roof strength. Example: Roof covering materials that comply with the Florida Building Code 2001 or the 1994 South Florida Building Code ("110 mph" rated shingle)
2. Enhanced roof covering performance. Example: Secondary water resistance in case of roof covering failure (application of self-adhering modified bitumen tape to plywood joints or foamed polyurethane structural adhesive covering joints between all plywood sheets)
3. Enhanced roof to wall strength. Example: Hurricane Clips or Wraps, increased size or decreased spacing of nails in roof deck attachment
4. Enhanced wall-to-floor-to-foundation strength. Example: House may not rely solely on gravity and friction for resistance to uplift and lateral loads
5. Opening protection. Example: Shutter products
6. Window, door, and skylight strength. Example: Impact resistant glazing

The examples cited in this list have been demonstrated to reduce windstorm losses in the above referenced study. Filings that omit consideration of any of these items must contain actuarially sound and documented demonstrations that the item(s) omitted do not reduce windstorm losses. Filings must also include rate differentials for all other techniques that meet the minimum requirements of the Florida Building Code.

The following fixtures or construction techniques have also been demonstrated to reduce windstorm losses in the above referenced study:

1. Roof Shape - Hip roof with sloping ends and sloping sides down to the roof eaves line
2. Wall Construction - Masonry or reinforced masonry
3. Opening protection for non-glazed openings - Doors and garage doors
4. Gable End Bracing for roof shapes other than hip roof

Such fixtures or techniques should be considered in each filing.

There are other fixtures and techniques that were not considered in the above referenced study. Filers wishing to include such items must provide appropriately documented actuarially reasonable bases for their inclusion and the differentials requested.

Rate relativities may be based on Tables 6-1, 6-2, 6-4, 6-5, 6-6, and 6-7 of the above referenced study, appropriately modified. Filers must modify those tables if their rate relativities are to apply to more than the hurricane portion of the rate since the tables are predicated solely on reduction in hurricane loss costs. Filers must also modify those tables to treat the expense portion of the rate properly. To the extent that relativities will apply to that part of the rate that is not proportional to loss costs (for example general and other acquisition expense components) the tables must be modified. Finally, filers are required to apply sound actuarial judgment in using the loss cost relativities shown in those tables. In view of the large rate changes which might otherwise be induced, the approximations needed to produce practical results (such as the specifications of the houses used for modeling and the number of rating factors used), and the potential for differences in results using different hurricane models, the Department currently suggests the following modification:

$\mathbf{R = (R_t - 1.0).50 + 1.0}$ where

R_t is the rate relativity based on the Table, modified for the prior two considerations and R is the rate relativity to be used. As filers become able to measure the effects of implementation accurately, this modification must be curtailed.

The Department of Insurance recognizes that, in many cases, verification of fixtures and techniques will involve professional inspection of properties. The cost of such inspections may be included as an expense by insurers within their rate filings as specified by Section 627.062(2)(b)2, Florida Statutes or any necessary certificate of inspection may be provided by the insured at the expense of the insured. Where some elements of an insurer's compliance plan are reasonably subject to self-certification by the insured or to exterior photographic documentation, insureds must be permitted to take advantage of such elements without incurring inspection expenses. Acceptable inspector qualifications should be documented in insurer manuals to permit insureds a choice of qualified inspectors.

Questions regarding this memorandum may be directed to Howard Eagelfeld, Actuary, Bureau of Property and Casualty Forms and Rates, at (850) 413-5319 or eagelfeldh@doi.state.fl.us.

INFORMATIONAL MEMORANDUM

OIR-03-001M
ISSUED
January 23, 2003
Office of Insurance Regulation
Kevin M. McCarty
Director

All Property and Casualty Insurers Authorized to Write Residential Property Insurance in the State of Florida

Implementation of Revision to Section 627.0629(1), F.S. Concerning Residential Property Insurance Rate Filings, Effective June 1, 2002

Supplement to INFORMATIONAL MEMORANDUM 02-0470M issued on June 6, 2002

The purpose of this memorandum is to assist insurers with the filing requirements for this referenced statutory revision. The Department has analyzed the study, Development of Loss Relativities for Wind Resistive Features of Residential Structures commissioned by the Florida Department of Community Affairs, and created suggested sets of credits for new and existing construction. These suggested credits are available on the Department's website and are intended to facilitate filing preparation and review as well as simplify administration and application of such credits.

For existing construction, the Department's analysis combined Tables 6-1, 6-2, and 6-4 from the above-referenced study. For purposes of determining credits, all of the relativities were divided by the existing construction relativity for the non-FBC equivalent roof cover, roof deck attachment A, roof-wall toe nails connection, and no opening protection for Terrain B and C, respectively. This approach was confirmed as appropriate with the firm that conducted this study. Credits were then determined and tempered by 50%. This tempering was applied in view of the large rate changes which might otherwise be induced, the approximations needed to produce practical results (such as the specifications of the houses used for modeling and the number of rating factors used), and the potential for differences in results using different hurricane models. As filers become able to measure the effects of implementation accurately, this tempering must be curtailed. An examination of the resultant credits indicated that the differences between the credits for certain fixtures/techniques were minimal. The suggested credits, therefore, combined the credits for the following fixtures/techniques:

1. Roof Deck Attachment D and Roof Deck Attachment C.
2. Hurricane Opening Protection for All Openings and Windows Only.
3. Basic Opening Protection for All Openings and Windows Only.
4. Braced Gable Roof Shape and Unbraced Gable Roof Shape.

The suggested additional credits for Masonry and Reinforced Masonry Construction were eliminated recognizing the fact that insurers currently use construction type in the rating of their policies and will continue to do so.

For new construction, the Department's analysis combined Tables 6-6 and 6-7 from the above-referenced study. For purposes of determining credits, all of the relativities were divided by the existing construction relativity for the non-FBC equivalent roof cover, roof deck attachment A, roof-wall toe nails connection, and no opening protection for Terrain B and C, respectively (the Terrain C relativity was used for the High Velocity Hurricane Zone). This approach was confirmed as appropriate with the firm that conducted this study. Credits were then determined and tempered by 50%. This tempering was applied in view of the large rate changes which might otherwise be induced, the approximations needed to produce practical results (such as the specifications of the houses used for modeling and the number of rating factors used), and the potential for differences in results using different hurricane models. As filers become able to measure the effects of implementation accurately, this tempering must be curtailed. An examination of the resultant credits indicated that the differences between the credits for certain fixtures/techniques were minimal. The suggested credits, therefore, combined the credits for the following fixtures/ techniques:

1 Dimensional Lumber Deck and Other Roof Deck.
2 Terrain B and Terrain C - Wind Speed ≥ 120, Wind Borne Debris Region.
3 High Velocity Hurricane Zone and Terrain C.
4 Terrain B FBC Wind Speed = 100, all Wind Speeds of Design.
5 Terrain B FBC Wind Speed = 110, all Wind Speeds of Design.
6 Enclosed and Partially Enclosed Structures.
7 Opening Protection – All Openings and Windows Only.

The suggested additional credits for Masonry and Reinforced Masonry Construction were eliminated recognizing the fact that insurers currently use construction type in the rating of their policies and will continue to do so.

These suggested sets of credits contemplate the elimination of insurers' current windstorm protective devices (i.e. shutter) credits. Insureds who currently qualify for a windstorm protective devices credit should at least qualify for a Basic Opening Protection credit.

Insurers should continue to give Building Code Effectiveness Grading Schedule (BCEGS) credits to those insureds that qualify for such credits. The Department suggests tempering these credits by 25% to eliminate any overlap between these credits and the suggested windstorm loss reduction credits.

The Department is willing to consider the reduction or elimination of new home discounts on wind premiums for homes that qualify for new construction credits.

Questions regarding this memorandum may be directed to Ken Ritzenthaler. He can be contacted at (850) 413-5314 or ritzenthalerk@dfs.state.fl.us.

Meeting Schedule and Topics of Discussion

1995

July 14	Commission Organizational Meeting
August 10	Discussion of the Problem
August 24	Discussion on Mission, Goals, and Objectives
September 7	Meeting with Modeling Organizations
September 21	Development of Work Plan
October 5	Canceled Due to Hurricane Opal
October 19	Development of Descriptive Criteria and Tests of the Hurricane Model
November 2	The Evaluation Process
November 16	Meeting with Modeling Organizations to provide input for the Evaluation Process
November 30	Adoption of Initial Hurricane Standards and Guidelines

1996

January 8	Review of Modeling Organization Responses for Modules 1 and 2
January 29	Comparison of Hurricane Models
February 12	Tests and Evaluations
February 26	Tests and Evaluations
April 1	Professional Team Report
April 15	Module 3 Phase 2 Test Results
April 19	AIR Presentation
April 20	EQE Presentation
April 26	Tillinghast Presentation
April 27	RMS Presentation
May 6	Committee Meetings B Session 1 Adopting Hurricane Standards
May 20	Committee Meetings B Session 2 Adopting Hurricane Standards
June 3	Adopting a Specification of Acceptable Computer Hurricane Models or Hurricane Output Ranges
August 26	Planning and Update as to Modeling Organization Progress
November 13	Vulnerability Standards Committee Meeting
December 11	Actuarial Standards Committee Meeting

1997

February 7	Review of Hurricane Standards and Procedures; Vulnerability Standards Committee Meeting
April 11	Review of AIR Hurricane Model
May 6	Meteorology Standards Committee Meeting

May 7	General Standards Committee Meeting
May 16	Review of AIR Hurricane Model (Continued); Computer Standards Committee Meeting
May 22	Vulnerability Standards Committee Conference Call Meeting
May 29	Review of AIR Hurricane Model (Continued); Adoption of 1997 Hurricane Standards
September 29	Planning for Calendar Year and Review of Hurricane Models
October 23	Vulnerability Committee Meeting
October 24	Review of AIR Hurricane Model
December 11 & 12	Review of EQE Hurricane Model
December 16	Review of RMS Hurricane Model

1998

April 23	Committee Meetings
April 24	Committee Meetings; Adoption of 1998 Hurricane Standards
May 21	Modules and Acceptability Process Adopted
November 17 & 18	Review of Tillinghast Hurricane Model
November 19 & 20	Review of E.W. Blanch Hurricane Model
December 8	Review of RMS Hurricane Model
December 9	Review of EQE Hurricane Model
December 10	Review of AIR Hurricane Model

1999

March 19	Commission Workshop; New Timeframe for Hurricane Model Review
July 15 & 16	Committee Meetings
July 28	Meteorology Standards Committee Meeting
August 17	Adoption of 1999 Hurricane Standards and *Hurricane Standards Report of Activities*

2000

March 15	Discussion of Hurricane Model Submissions and Determination of On-Site Reviews
May 9	Review of AIR Hurricane Model – Suspended Consideration; E.W. Blanch and RMS Hurricane Models Determined Acceptable under the 1999 Hurricane Standards
May 10	EQE Hurricane Model Determined Acceptable under the 1999 Hurricane Standards; Review of Risk Engineering Hurricane Model
May 11	Review of Risk Engineering Hurricane Model (Continued) – Suspended Consideration
May 12	Review of AIR Hurricane Model (Continued) – Postponement Approved
July 25 & 26	ARA Hurricane Model Determined Acceptable under the 1999 Hurricane Standards

July 27	Committee Meetings
July 28	Committee Meetings; AIR Hurricane Model Determined Acceptable under the 1999 Hurricane Standards
September 14 & 15	Adoption of 2000 Hurricane Standards and *Hurricane Standards Report of Activities*

2001

March 27	Discussion of Hurricane Model Submissions and Determination of On-Site Reviews
May 10	EQE and E.W. Blanch Hurricane Models Determined Acceptable under the 2000 Hurricane Standards
May 11	AIR and ARA Hurricane Models Determined Acceptable under the 2000 Hurricane Standards
July 30	RMS Hurricane Model Determined Acceptable under the 2000 Hurricane Standards; Committee Meetings
July 31	Committee Meetings
September 18	Canceled due to World Trade Center Bombings
September 19	Adoption of 2001 Hurricane Standards and *Hurricane Standards Report of Activities*
October 15	Adoption of 2001 Hurricane Standards and *Hurricane Standards Report of Activities* (Continued)

2002

March 27	Discussion of Hurricane Model Submissions and Determination of On-Site Reviews
May 29	RMS Hurricane Model Determined Acceptable under the 2001 Hurricane Standards
May 30	EQE and AIR Hurricane Models Determined Acceptable under the 2001 Hurricane Standards
May 31	ARA Hurricane Model Determined Acceptable under the 2001 Hurricane Standards
July 23 & 24	Committee Meetings
September 18 & 19	Adoption of 2002 Hurricane Standards and *Hurricane Standards Report of Activities*

2003

February 20	Continuing Education and Training Workshop – Overview of Methodologies used in Catastrophe Computer Simulation Models
April 1	Discussion of Hurricane Model Submissions and Determination of On-Site Reviews
May 29	AIR and ARA Hurricane Models Determined Acceptable under the 2002 Hurricane Standards
May 30	EQE and RMS Hurricane Models Determined Acceptable under the 2002 Hurricane Standards
July 22 & 23	Committee Meetings

	August 21 & 22	Adoption of 2003 Hurricane Standards and *Hurricane Standards Report of Activities*
2004		
	March 18	Discussion of Hurricane Model Submissions and Determination of On-Site Reviews
	May 12	RMS and ARA Hurricane Models Determined Acceptable under the 2003 Hurricane Standards
	May 13	AIR and EQE Hurricane Models Determined Acceptable under the 2003 Hurricane Standards
	July 27 & 28	Committee Meetings
	September 15 & 16	Canceled due to Hurricane Ivan
	October 6 & 7	Adoption of 2004 Hurricane Standards and *Hurricane Standards Report of Activities*
2005		
	March 10 & 11	Discussion of Hurricane Model Submissions and Determination of On-Site Reviews
	June 1	Review of RMS Hurricane Model
	June 2	RMS, AIR, and EQE Hurricane Models Determined Acceptable under the 2004 Hurricane Standards
	June 3	ARA Hurricane Model Determined Acceptable under the 2004 Hurricane Standards
	July 15	Acceptability Process Committee Meeting
	July 26 - 28	Committee Meetings
	August 10	Actuarial Standards and Acceptability Process Committee Meetings
	September 14 & 15	Adoption of 2005 Hurricane Standards and *Hurricane Standards Report of Activities*
2006		
	January 25 & 26	Workshop to Discuss Modeling Commercial Residential Exposure, Simplification of the Commission's Review Process, and to Review the Study "*An Assessment of Computer Generated Loss Costs in Florida*"
	March 16	Discussion of Hurricane Model Submissions and Determination of On-Site Reviews
	May 16	AIR Hurricane Model Determined Acceptable under the 2005 Hurricane Standards; Review of RMS Hurricane Model
	May 17	RMS and ARA Hurricane Models Determined Acceptable under the 2005 Hurricane Standards
	May 18	EQE Hurricane Model Determined Acceptable under the 2005 Hurricane Standards
	June 30	Promulgating Rules Conference Call Meeting
	July 26 & 27	Committee Meetings and Rule Workshop

	August 17 & 18	Adoption of 2006 Hurricane Standards and *Hurricane Standards Report of Activities*; Approval to file Notice of Proposed Rulemaking for Rule 19-16.001, Florida Commission on Hurricane Loss Projection Methodology
	September 26	Discussion of Rule Hearing comments received on Rule 19-16.001, Florida Commission on Hurricane Loss Projection Methodology
	October 23	Withdrawal of Rule 19-16.001, Florida Commission on Hurricane Loss Projection Methodology
2007		
	March 13	Discussion of Hurricane Model Submissions and Determination of On-Site Reviews
	May 8	ARA Hurricane Model Determined Acceptable under the 2006 Hurricane Standards
	May 9	EQE and AIR Hurricane Models Determined Acceptable under the 2006 Hurricane Standards
	June 21	RMS Hurricane Model Determined Acceptable under the 2006 Hurricane Standards
	August 15 & 16	Committee Meetings
	August 17	FPM Determined Acceptable under the 2006 Hurricane Standards
	September 20 & 21	Adoption of 2007 Hurricane Standards and *Hurricane Standards Report of Activities*
	November 5	Approval of Report to the Florida House of Representatives, Comparison of Hurricane Loss Projection Models
	December 18	Adoption of an addendum to the *Hurricane Standards Report of Activities as of November 1, 2007*
2008		
	March 12	Discussion of Hurricane Model Submissions and Determination of On-Site Reviews
	March 21	Discussion of RMS Hurricane Model Submission and Determination of On-Site Review
	May 20	AIR and RMS Hurricane Models Determined Acceptable under the 2007 Hurricane Standards
	May 21	ARA Hurricane Model Determined Acceptable under the 2007 Hurricane Standards
	June 23	EQE and FPM Determined Acceptable under the 2007 Hurricane Standards
	July 28	Public Testimony and Discussion of CS/CS/SB 2860 passed during the 2007 Legislative Session
	August 12 & 13	Committee Meetings
	September 17 & 18	Adoption of 2008 Hurricane Standards and *Hurricane Standards Report of Activities*
2009		
	January 29 & 30	Workshop to Discuss Modeling of Commercial Residential Exposure and Short Term Frequency

March 19	Discussion of Hurricane Model Submissions and Determination of On-Site Reviews
May 19	AIR Hurricane Model Determined Acceptable under the 2008 Hurricane Standards
June 2	ARA and FPM Determined Acceptable under the 2008 Hurricane Standards
June 3	EQE Hurricane Model Determined Acceptable under the 2008 Hurricane Standards; RMS Hurricane Model Not Determined Acceptable under the 2008 Hurricane Standards
July 23 & 24	Workshop to Discuss Modeling of Commercial Residential Exposure, Short Term Frequency, and Storm Surge; Discussion of RMS Request to Reconsider Denial of the RMS Hurricane Model under the 2008 Hurricane Standards; Adoption of an Addendum to the ~~2008~~ *Hurricane Standards Report of Activities as of November 1, 2008*; RMS Hurricane Model Determined Acceptable under the 2008 Hurricane Standards
August 11	Committee Meetings
August 12	Windstorm Mitigation Committee Meeting
August 13	Committee Meetings
September 15 & 16	Adoption of 2009 Hurricane Standards and *Hurricane Standards Report of Activities*
September 17	Windstorm Mitigation Committee Meeting
October 29	Windstorm Mitigation Committee Meeting
December 4	Discussion of AIR Request to Submit a Hurricane Model for Review Outside of the Every Other Year Review Cycle Adopted in the ~~2009~~ *Hurricane Standards Report of Activities as of November 1, 2009*; Adoption of an Addendum to the ~~2009~~ *Hurricane Standards Report of Activities as of November 1, 2009*
December 18	Windstorm Mitigation Committee Meeting

2010

January 15	Discussion on Windstorm Mitigation Discounts Report
January 25	Approval of Windstorm Mitigation Discounts Report to the Governor, the Cabinet, the President of the Senate, and the Speaker of the House of Representatives
April 15	Discussion of AIR Hurricane Model Submission and Determination of On-Site Review
June 8	AIR Hurricane Model Determined Acceptable under the 2009 Hurricane Standards
October 26	Discussion of AIR Hurricane Model Software Implementation Issue; Acceptability of AIR Hurricane Model under the 2009 Hurricane Standards Temporarily Suspended
November 8	Corrected AIR Hurricane Model Determined Acceptable under the 2009 Hurricane Standards

	December 14	Discussion of Hurricane Model Submissions and Determination of On-Site Reviews
2011		
	June 2	ARA and RMS Hurricane Models Determined Acceptable under the 2009 Hurricane Standards
	June 16	EQE Hurricane Model Determined Acceptable under the 2009 Hurricane Standards; FPM Not Determined Acceptable under the 2009 Hurricane Standards
	August 17 & 18	Reconsideration of the FPM; FPM Determined Acceptable under the 2009 Hurricane Standards; Committee Meetings
	September 21 & 22	Corrected RMS Hurricane Model Determined Acceptable under the 2009 Hurricane Standards; Committee Meetings
	October 19 & 20	Adoption of 2011 Hurricane Standards and *Hurricane Standards Report of Activities*
	November 16	Adoption of 2011 Hurricane Standards and *Hurricane Standards Report of Activities* (Continued); Discussion of AIR Request for Consideration of Different Software Versions Acceptable under the 2009 Hurricane Standards; Review and Action Delegated to Commission Chair with Input of Professional Team
2012		
	December 17	Discussion of Hurricane Model Submissions and Determination of On-Site Reviews; Discussion of RMS Notification of Error in Previous Hurricane Model
2013		
	March 7	Discussion of RMS Error in Previous Hurricane Model; Acceptability of RMS Hurricane Model under the 2009 Hurricane Standards Rescinded; Corrected RMS Hurricane Model Determined Acceptable under the 2009 Hurricane Standards
	June 18	Workshop to Discuss New Software Platforms, Modeling Storm Surge, Recent Revisions to HURDAT, Recap of Hurricane Model Review Process; ARA Hurricane Model Determined Acceptable under the 2011 Hurricane Standards
	June 19	AIR and RMS Hurricane Models Determined Acceptable under the 2011 Hurricane Standards
	June 20	EQE Hurricane Model Determined Acceptable under the 2011 Hurricane Standards; Executive Committee Meeting
	August 13	FPM Determined Acceptable under the 2011 Hurricane Standards; Discussion of AIR Request for Consideration of New Software Platform Acceptable under the 2011 Hurricane Standards and Approval of Professional Team to Review On-Site; Approval of Executive Committee Recommendations; Committee Meetings
	August 14 & 15	Committee Meetings (Continued)
	September 24 & 25	Adoption of 2013 Hurricane Standards and *Hurricane Standards Report of Activities*

2014

September 30	Acceptability Process Committee Meeting to discuss the process and timeline for developing flood standards
October 30	Flood Standards Development Committee Meeting
November 14	Flood Standards Development Committee Meeting
December 16	Discussion of Hurricane Model Submissions and Determination of On-Site Reviews; Flood Standards Development Committee Meeting

2015

January 29	Flood Standards Development Committee Meeting
February 19	Discussion of AIR Notification of Issue in Previous Hurricane Model; Discussion of ARA Notification of Error in Previous Hurricane Model; Acceptability of ARA Hurricane Model under the 2011 Hurricane Standards Temporarily Suspended; Flood Standards Development Committee Meeting
March 31	Flood Standards Development Committee Meeting
April 22	Corrected ARA Hurricane Model Determined Acceptable under the 2011 Hurricane Standards; Flood Standards Development Committee Meeting
June 2	FPM and EQE Hurricane Models Determined Acceptable under the 2013 Hurricane Standards
June 3	ARA and AIR Hurricane Models Determined Acceptable under the 2013 Hurricane Standards
June 4	Flood Standards Development Committee Meeting
June 30	RMS Hurricane Model Determined Acceptable under the 2013 Hurricane Standards; Flood Standards Development Committee Meeting
July 1	Flood Standards Development Committee Meeting
August 11	Executive Committee Meeting; Approval of Executive Committee Recommendations; Flood Standards Development Committee Meeting
September 22 & 23	Hurricane Standards Committee Meetings
September 24	Flood Standards Development Committee Meeting
October 8	Flood Standards Development Committee Meeting
October 13 & 14	Adoption of 2015 Hurricane Standards and *Hurricane Standards Report of Activities*
November 17	Commission Meeting to Consider Publication of Discussion Flood Standards

2016

December 13	Corrected ARA Hurricane Model Determined Acceptable under the 2013 Hurricane Standards; Discussion of Hurricane Model Submissions and Determination of On-Site Reviews

2017

May 10	AIR ~~Hurricane Model~~ and FPM Hurricane Models Determined Acceptable under the 2015 Hurricane Standards

May 11	ARA and COR Hurricane Models Determined Acceptable under the 2015 Hurricane Standards
May 12	RMS Hurricane Model Determined Acceptable under the 2015 Hurricane Standards
May 22 & 23	Flood Standards Committee Meetings
June 15 & 16	Adoption of 2017 Flood Standards, Principles, and Acceptability Process
September 27 & 28	Hurricane Standards Committee Meetings
October 25	Adoption of 2017 Hurricane Standards, *Hurricane Standards Report of Activities*, and *Flood Standards Report of Activities*

2019

January 7	Discussion of Hurricane Model Submissions and Determination of On-Site Reviews
June 11	AIR and KCC Hurricane Models Determined Acceptable under the 2017 Hurricane Standards
June 12	ARA and FPM Hurricane Models Determined Acceptable under the 2017 Hurricane Standards
June 13	COR and RMS Hurricane Models Determined Acceptable under the 2017 Hurricane Standards
September 18 & 19	Hurricane Standards Committee Meetings
October 29	Adoption of 2019 Hurricane Standards and *Hurricane Standards Report of Activities*; Adoption of an amendment to the 2017 Flood Standards Model Review Schedule in the *Flood Standards Report of Activities as of November 1, 2017*

Transcript Information

All public meetings of the Florida Commission on Hurricane Loss Projection Methodology are transcribed by a Court Reporter. If you would like to purchase copies of any transcript, contact the Court Reporter for the date of the meeting.

July 14, 1995	Amy Gonter, Habershaw Reporting Service, 850-385-9426
August 10, 1995	Amy Gonter, Habershaw Reporting Service, 850-385-9426
August 24, 1995	Sue Habershaw, Habershaw Reporting Service, 850-385-9426
September 7, 1995	Sue Habershaw, Habershaw Reporting Service, 850-385-9426
September 21, 1995	Nancy Vetterick, Accurate Stenotype Reporters, Inc., 850-878-2221
October 19, 1995	Christine Wheeler, Habershaw Reporting Service, 850-385-9426
November 2, 1995	Cathy Webster, C & N Reporters, 850-926-2020
November 16, 1995	Cathy Webster, C & N Reporters, 850-926-2020
November 30, 1995	Lori Dezell, Kirkland & Associates, 850-222-8390
January 8, 1996	Cathy Webster, C & N Reporters, 850-926-2020
January 29, 1996	Cathy Webster, C & N Reporters, 850-926-2020
February 12, 1996	Cathy Webster, C & N Reporters, 850-926-2020
February 26, 1996	Cathy Webster, C & N Reporters, 850-926-2020
April 1, 1996	Cathy Webster, C & N Reporters, 850-926-2020
April 15, 1996	Cathy Webster, C & N Reporters, 850-926-2020
April 19 & 20, 1996	Cathy Webster, C & N Reporters, 850-926-2020
April 26 & 27, 1996	Cathy Webster, C & N Reporters, 850-926-2020
May 6, 1996	Cathy Webster, C & N Reporters, 850-926-2020
May 20, 1996	Cathy Webster, C & N Reporters, 850-926-2020
June 3, 1996	Nancy Metzke, C & N Reporters, 850-926-2020
August 26, 1996	Cathy Webster, C & N Reporters, 850-926-2020
November 13, 1996	Cathy Webster, C & N Reporters, 850-926-2020
December 11, 1996	Cathy Webster, C & N Reporters, 850-926-2020
February 7, 1997	Cathy Webster, C & N Reporters, 850-926-2020
April 11, 1997	Cathy Webster, C & N Reporters, 850-926-2020
May 6, 1997	Nancy Metzke, C & N Reporters, 850-926-2020
May 7, 1997	Lisa G. Eslinger, C & N Reporters, 850-926-2020
May 16, 1997	Cathy Webster, C & N Reporters, 850-926-2020
May 22, 1997	Cathy Webster, C & N Reporters, 850-926-2020
May 29, 1997	Nancy Metzke, C & N Reporters, 850-926-2020
September 29, 1997	Lisa Girod Jones, Registered Merit Reporter, 850-894-2277

October 23 & 24, 1997	Cathy Webster, C & N Reporters, 850-926-2020
December 11 & 12, 1997	Nancy Metzke, C & N Reporters, 850-926-2020
December 16, 1997	Nancy Metzke, C & N Reporters, 850-926-2020
April 23 & 24, 1998	Nancy Metzke, C & N Reporters, 850-926-2020
May 21, 1998	Cathy Webster, C & N Reporters, 850-926-2020
November 17 - 20, 1998	Cathy Webster, C & N Reporters, 850-926-2020
December 8, 1998	Cathy Webster, C & N Reporters, 850-926-2020
December 9, 1998	Nancy Metzke, C & N Reporters, 850-697-8314
December 10, 1998	Cathy Webster, C & N Reporters, 850-926-2020
March 19, 1999	Cathy Webster, C & N Reporters, 850-926-2020
July 15 & 16, 1999	Nancy Metzke, C & N Reporters, 850-697-8314
July 28, 1999	Nancy Metzke, C & N Reporters, 850-697-8314
August 17, 1999	Debra Krick, Premier Reporting, 850-894-0828
March 15, 2000	Nancy Metzke, C & N Reporters, 850-697-8314
May 9 - 12, 2000	Nancy Metzke, C & N Reporters, 850-697-8314
July 25 - 28, 2000	Nancy Metzke, C & N Reporters, 850-697-8314
September 14 & 15, 2000	Nancy Metzke, C & N Reporters, 850-697-8314
March 27, 2001	Nancy Metzke, C & N Reporters, 850-697-8314
May 10 & 11, 2001	Nancy Metzke, C & N Reporters, 850-697-8314
July 30 & 31, 2001	Nancy Metzke, C & N Reporters, 850-697-8314
September 19, 2001	Nancy Metzke, C & N Reporters, 850-697-8314
October 15, 2001	Mindy Martin, Catherine Wilkinson & Associates, 850-224-0127
March 27, 2002	Mindy Martin, Catherine Wilkinson & Associates, 850-224-0127
May 29 - 31, 2002	Catherine Wilkinson, Catherine Wilkinson & Associates, 850-224-0127
July 23 & 24, 2002	Catherine Wilkinson, Catherine Wilkinson & Associates, 850-224-0127
September 18, 2002	Christine Wheeler, Accurate Stenotype Reporters, Inc., 850-878-2221
September 19, 2002	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
April 1, 2003	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
May 29 & 30, 2003	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
July 22 & 23, 2003	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
August 21 & 22, 2003	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
March 18, 2004	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
May 12 & 13, 2004	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
July 27 & 28, 2004	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
October 6 & 7, 2004	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221

March 10 & 11, 2005	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
June 1 - 3, 2005	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
July 15, 2005	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
July 26 - 28, 2005	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
August 10, 2005	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
September 14 & 15, 2005	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
March 16, 2006	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
May 16 - 18, 2006	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
June 30, 2006	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
July 26 & 27, 2006	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
August 17, 2006	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
August 18, 2006	Danielle Freeze, Accurate Stenotype Reporters, Inc., 850-878-2221
September 26, 2006	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
October 23, 2006	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
March 13, 2007	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
May 8 & 9, 2007	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
June 21, 2007	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
August 15 - 17, 2007	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
September 20 & 21, 2007	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
November 5, 2007	Jo Langston, Accurate Stenotype Reporters, Inc., 850-878-2221
December 18, 2007	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
March 12, 2008	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
March 21, 2008	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
May 20 & 21, 2008	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
June 23, 2008	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
July 28, 2008	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
August 12 & 13, 2008	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
September 17 & 18, 2008	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
January 29 & 30, 2009	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
March 19, 2009	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
May 19, 2009	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
June 2 & 3, 2009	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
July 23 & 24, 2009	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
August 11 - 13, 2009	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
September 15 - 17, 2009	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221

October 29, 2009	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
December 4, 2009	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
December 18, 2009	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
January 15, 2010	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
January 25, 2010	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
April 15, 2010	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
June 8, 2010	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
October 26, 2010	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
November 8, 2010	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
December 14, 2010	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
June 2, 2011	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
June 16, 2011	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
August 17, 2011	Tracy Brown, Accurate Stenotype Reporters, Inc., 850-878-2221
August 18, 2011	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
September 21, 2011	Tracy Brown, Accurate Stenotype Reporters, Inc., 850-878-2221
September 22, 2011	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
October 19, 2011	Sarah Gilroy, Accurate Stenotype Reporters, Inc., 850-878-2221
October 20, 2011	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
November 16, 2011	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
December 17, 2012	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
March 7, 2013	Tracy Brown, Accurate Stenotype Reporters, Inc., 850-878-2221
June 18 - 20, 2013	Tracy Brown, Accurate Stenotype Reporters, Inc., 850-878-2221
August 13 - 15, 2013	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
September 24 & 25, 2013	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
September 30, 2014	Tracy Brown, Accurate Stenotype Reporters, Inc., 850-878-2221
October 30, 2014	Mary Kay Kline, Accurate Stenotype Reporters, Inc., 850-878-2221
November 14, 2014	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
December 16, 2014	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
January 29, 2015	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
February 19, 2015	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
March 31, 2015	Tracy Brown, Accurate Stenotype Reporters, Inc., 850-878-2221
April 22, 2015	Tracy Brown, Accurate Stenotype Reporters, Inc., 850-878-2221
June 2 - 4, 2015	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
June 30, 2015	Tracy Brown, Accurate Stenotype Reporters, Inc., 850-878-2221
July 1, 2015	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221

August 11, 2015	Lori Dezell, 850-251-1482
September 22 - 24, 2015	Lori Dezell, 850-251-1482
October 8, 2015	Lori Dezell, 850-251-1482
October 13 & 14, 2015	Lori Dezell, 850-251-1482
November 17, 2015	Carolyn Rankine, Premier Reporting, 850-894-0828
December 13, 2016	Jo Langston, Accurate Stenotype Reporters, Inc., 850-878-2221
May 10-12, 2017	Lori Dezell, 850-251-1482
May 22 & 23, 2017	Lori Dezell, 850-251-1482
June 15 & 16, 2017	Lori Dezell, 850-251-1482
September 27 & 28, 2017	Lori Dezell, 850-251-1482
October 25, 2017	Lori Dezell, 850-251-1482
January 7, 2019	Lori Dezell, 850-251-1482
June 11-13, 2019	Lori Dezell, 850-251-1482
September 18 & 19, 2019	Lori Dezell, 850-251-1482
October 29, 2019	Lori Dezell, 850-251-1482

Commission Documentation

The State Board of Administration, in its responsibility as administrator for the Commission, maintains documentation for all meetings of the Commission. This information may be obtained by writing to:

Donna Sirmons
Florida Commission on Hurricane Loss Projection Methodology
c/o State Board of Administration
P. O. Box 13300
Tallahassee, Florida 32317-3300

or by emailing to donna.sirmons@sbafla.com.

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