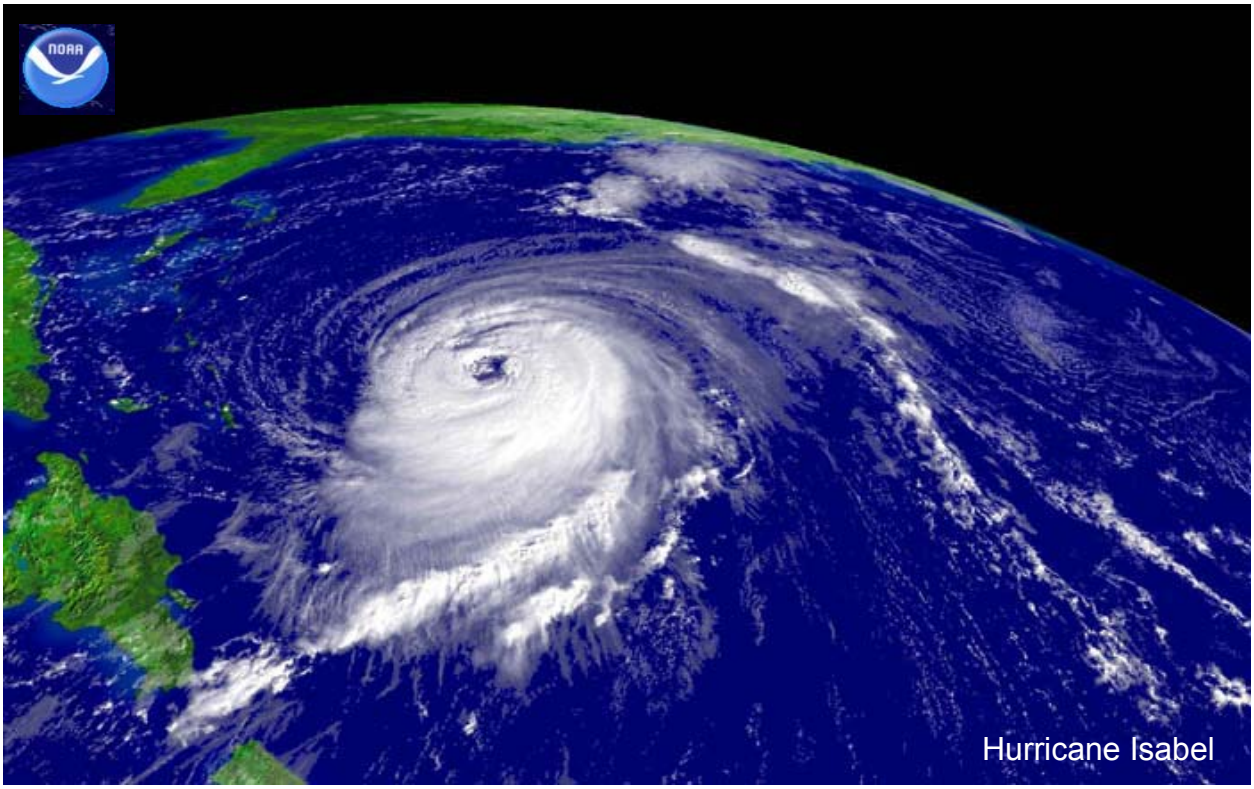
Report of Activities as of November 1, 2003



Florida Commission on Hurricane Loss Projection Methodology

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OF FLORIDA

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Dear Trustees:

As Chair of the Florida Commission on Hurricane Loss Projection Methodology, I am pleased to present to you the "Report of Activities" as of November 1, 2003. This report documents the eighth 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 at least annually." 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 (305) 348-2065.

Sincerely,

Sneh Gulati
Chair, Florida Commission on Hurricane Loss Projection Methodology

cc: Johnnie Byrd, House Speaker
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I. INTRODUCTION

INTRODUCTION

Legislative Findings and Intent

The Florida Commission on Hurricane Loss Projection Methodology was established during the 1995 Legislative session. CS/HB 2619, passed on May 8, 1995, and signed by the Governor on June 14, 1995, created Section 627.0628, Florida Statutes. The Legislature specifically determined, in Section 627.0628(1), Florida Statutes, 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 assure that consumers are charged lawful rates for residential property insurance coverage," Section 627.0628(1)(a), Florida Statutes. The Legislature clearly supports and encourages the use of computer modeling as part of the ratemaking process.

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 (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.

The Florida Hurricane Catastrophe Fund (FHCF) must use the Commission's findings, to the extent feasible, in establishing reimbursement premium rates. Section 627.0628(3)(b), Florida Statutes, states that "to the extent feasible," the SBA must "employ actuarial methods, principals, Standards, models, or output ranges found by the Commission to be accurate or reliable" in formulating reimbursement premiums for the FHCF. Individual insurers are not required to use the Commission's findings, but may choose to do so in order to support or justify a rate filing. Section 627.0628(3)(c), Florida Statutes, provides that "an insurer may employ actuarial methods, principles, Standards, models, or output ranges found by the Commission to be accurate or reliable to determine hurricane loss factors for use in a rate filing" with the Office of Insurance Regulation (OIR), Department of Financial Services. If the insurer chooses to utilize the Commission's findings, such findings are deemed "admissible and relevant in consideration of a rate filing by the OIR or in any arbitration or administrative or judicial review."

The Commission's rejection of a particular method or model has no binding effect on insurers or the OIR. The OIR may still accept a method or model if an insurer decides to use it in a rate filing. It is important to note that the OIR reviews and approves rates based on the Standards and requirements of Section 627.062, Florida Statutes -- not on particular methodologies. The methodology appropriate for one insurer in leading to sound rates may be inappropriate for another insurer. The OIR has complete authority to review and determine the resolution of a rate filing. The Commission's charge is limited to adopting findings regarding methods or models it reviews. The Commission's findings are not binding on either the SBA as regards to the FHCF or on the OIR. Insurers are not required to use the Commission's findings, but may choose to do so in order to support or justify a rate filing.

The Work of the Commission

The Commission, a panel of experts, was created to evaluate computer models and other recently developed or improved actuarial methodologies for projecting hurricane losses 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…," Section 627.0628(1)(b), Florida Statutes. Section 627.0628(3)(a), Florida Statutes, defines 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. 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 statutory language is clear in that those methods or models that have the potential for improving the accuracy or reliability of hurricane loss projections 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)(d), Florida Statutes, 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 in the following ways: (1) by referral after having been rejected by the OIR; (2) by being submitted directly to the Commission; or (3) by 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:

   Module 1 – Description of the Model
   Module 2 – Background and Professional Credentials of the Modeling Company
   Module 3 – Tests of the Model
   Module 4 – Professional Team On-Site Review
   Module 5 – Modeler 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 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 area called On-Site Review, and Module 5 was moved to the Acceptability Process. The Standards were realigned to facilitate the Commission voting process.

At least annually, the Commission adopts revisions to actuarial methods, principals, Standards, models, and/or output ranges, Section 627.0628(3)(d), Florida Statutes. The Commission adopted Standards for the specifications of a computer model in June 1996. Those Standards were subsequently revised in May 1997, May 1998, August 1999, September 2000, October 2001, September 2002, and again in August 2003.

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, and can be found in the Principles section of this Report.

Overview

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

Modeling Company	**Standards**
AIR Worldwide Corporation	1996, 1997, 1998, 1999, 2000, 2001, 2002
Applied Research Associates, Inc.	1999, 2000, 2001, 2002
E.W. Blanch Co.	1998, 1999, 2000
EQECAT, Inc.	1997, 1998, 1999, 2000, 2001, 2002
Risk Management Solutions, Inc.	1997, 1998, 1999, 2000, 2001, 2002
Tillinghast–Towers Perrin	1998

II. PRINCIPLES

PRINCIPLES

1. 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. *History-New 11/30/95, rev. 8/22/03*

2. 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 resulting from hurricanes and to adopt findings regarding the accuracy or reliability of these methodologies for use in residential rate filings. *History-New 9/21/95, rev. 11/30/95*

3. The proprietary nature of the computer simulation model being reviewed should be respected; however, the Commission must have sufficient information and access to information and data to make a determination of a model's acceptability. *History-New 11/30/95, rev. 5/20/96*

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

5. No model or method will 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*

6. 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 will attempt to accommodate routine updating of acceptable models or methods. *History-New 11/30/95, rev. 5/20/96*

7. The Commission's process for determination of acceptability of models should, as far as possible, not restrict competition in the catastrophe modeling industry or thwart innovation in that industry. *History-New 11/30/95, rev. 5/20/96*

8. All models or methods should be theoretically sound. *History-New 9-21-95*

9. The output of a computer simulation model should be reasonable and the modeler should demonstrate its reasonableness. *History-New 9-21-95, rev. 8/22/03*

10. Insurers should not improperly manipulate or control computer simulation model results. *History-New 9-21-95*

11. Models or methods should not be biased to overstate or understate results. *History-New 9-21-95*

12. All sensitive components of the computer simulation model should be identified. *History-New 9-21-95*

III. COMMISSION STRUCTURE

COMMISSION STRUCTURE

Oversight

The Commission was created, pursuant to Section 627.0628, Florida Statutes, "to **independently** exercise the powers and duties specified" in that statute. The Commission is administratively housed within the State Board of Administration (SBA), and as a cost of administration of 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), Florida Statutes, requires that the Commission consist of eleven 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 of the Department of Community Affairs;
5. The actuary member of the Florida Hurricane Catastrophe Fund Advisory Council;
6. Six members appointed by the Chief Financial Officer, as follows:
    a. An employee of the Florida Department of Financial Services – Office of Insurance Regulation who is an actuary responsible for property insurance rate filings;
    b. 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;
    c. 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;
    d. 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;
    e. An expert in computer system design who is a full time member of the faculty of the State University System;
    f. An expert in meteorology who is a full time member of the faculty of the State University System and who specializes in hurricanes.

Terms of Members

The Insurance Consumer Advocate, Senior FHCF Officer, Executive Director of Citizens Property Insurance Corporation, Director of the Division of Emergency Management of the

Department of Community Affairs, 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 six 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 (Section 627.0628(2)(c), Florida Statutes).

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 (Section 627.0628(2)(d), Florida Statutes). 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;
    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.

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. This work is extremely technical and requires specialized expertise. Therefore, the Legislature, in Section 627.0628, Florida Statutes, 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 and Committee meeting;
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 this law is outlined below;

5. Give notice of special conflicts of interest. 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 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;
6. Commission members are expected to meet the highest Standards of ethical behavior. 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 Section 112.3143, Florida Statutes, and the conflicts which would preclude a Commission member from voting on an issue are only those conflicts which are "special" in that the member, the member's relative or a business associate of the member stands to reap a direct financial benefit 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).

New Member Orientation and Continuing Education of Existing Members

As part of the FHCF's administrative support of the Commission, the FHCF staff will be responsible for new member orientation. The FHCF 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***.

Commission Meetings

Quorum: A majority of the eleven Commission members, i.e. six 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 conflict of interest, 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 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 14 days prior to the date scheduled.

Public Access: Any member of the public shall have access to all Commission meetings.

Agendas: Agendas listing topics planned for discussion shall be furnished to each member prior to the meeting. However, 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 FHCF staff shall be responsible for ensuring that all meetings are recorded. The transcribed record shall be maintained by FHCF staff.

Voting Requirement: Except in the case of a "special" conflict of interest, 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 (Section 286.012, Florida Statutes).

Designation of an Acting Chair: Depending on the circumstances, the 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.

Committee Meetings

Committee meetings are for the purpose of discussing issues, developing Standards, and completing the necessary groundwork so that when the Commission meets later to formally adopt the Standards, most of the issues can be easily resolved with less detail and finalizing work required. Members of the public are encouraged to participate in Committee meetings. 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.

The philosophy behind Committee meetings is to create a workshop environment where Commission members, Professional Team members, SBA staff, modelers, insurers, regulators, and the general public have an opportunity to discuss Standards and the Commission's process and procedures. Therefore, all interested parties are invited to participate and provide their input. The objective is to reach a consensus among all those present as to the resolution of issues, the wording of particular Standards, and the details of the Acceptability Process so that most of the preliminary work can be completed prior to the Commission meeting to adopt Standards.

The role of the Chair of a Committee is to present the draft of proposed Standards and other relevant documents with the aide of the Professional Team and SBA staff. The role of the other Committee members is to review the proposed draft and provide input and ideas at the Committee meetings. The role of the other Commission members is to participate, at their option, in all or various Committee meetings. In this manner the difficult work will be spread among Commission members and specific expertise will be utilized when reviewing and revising

Standards. It is beneficial for each Commission member to be fully prepared to participate as an active Committee member and provide quality input and discussion at the Committee stage.

It should be noted that Committee meetings are not Commission meetings. Due to quorum requirements, no formal voting shall take place at Committee meetings. The Committee 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 Committee to meet with one Commission member (the Chair of the Committee) and other interested parties (non-Commission members). The Committee meeting idea works best when Commission members guide the Committee meetings and there is broad participation by the public, modelers, regulators, or other interested parties. Although 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 Chairs should regularly call upon and solicit input from any and all interested parties present.

In conjunction with the Committee meetings the Commission may decide to highlight in depth one component of the model. The modelers will be given an opportunity to provide additional information in order to facilitate the Commission members' understanding of the models, so that an in-depth review of the related Standards can be undertaken. The model components to be reviewed are as follows:

1. General aspects of the model
2. Meteorological aspects of the model
3. Vulnerability aspects of the model
4. Actuarial aspects of the model
5. Computer aspects of the model
6. Statistical aspects of the model

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 will consist of a proposal, an estimated cost, and a time frame for completion. The Commission will 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 model submissions or any fiscal impact that changes to the Acceptability Process or the 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, Florida Statutes, a/k/a "The Sunshine Law" or "open meeting law" applies to the Commission.

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

Any communication, whether in person, by telephone, computer, 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.

Basic Requirements: All "meetings" subject to the Sunshine Law must be –

- Open to the Public;
- Noticed;
- Minutes must be taken and preserved. The official minutes of the Commission will consist on a verbatim transcript unless special circumstances arise. In addition, 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 FHCF staff ensures that all scheduled meetings of the Commission are filed for public notice in the Florida Administrative Weekly and a transcript is taken and preserved.

IV. FINDINGS OF THE COMMISSION

FINDINGS OF THE COMMISSION

Concerning Model Accuracy and Reliability

Background

Section 627.0628(3)(a), Florida Statutes, instructs the Commission to adopt findings from time to time as to the accuracy or reliability of Standards and models, among other things. 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.

The Commission finds that the computer simulation models that it has reviewed are stochastic forecasting models. This means that future hurricane events are stochastically generated and the associated loss costs are accumulated. By generating a sufficient body of future events, the sampling uncertainty in the output ranges owing to the random variate generation process becomes negligible. The Commission finds that the accepted models produce accurate or reliable loss costs for the entire state of Florida which are based on statistically sound and theoretically appropriate techniques given the data and research currently available.

Accurate and Reliable - Defined

The Commission finds that the computer simulation 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 model construction are reflected in the six sections of Standards established and refined since June of 1996:

- General Standards reflecting the professional status of the model designers and testers and generic aspects of the model;
- Meteorological Standards covering all aspects of this infrequent weather phenomenon;
- Vulnerability Standards assessing the impact of the storm on residential property;
- Actuarial Standards assessing the damage impact in insurance terms;
- Computer Standards providing the overall design, construction, and execution of the model; and
- Statistical Standards addressing the statistical foundation of the model and the sensitivity and uncertainty assessment of model outputs as a function of model inputs.

The Commission finds and recognizes that the scientific fields underlying loss projection models continue to evolve providing further insights into property damage and insurance implications. As a direct consequence, the Commission annually reviews and revises the Standards comprising its yearly *Report of Activities*. The Commission finds that the Standards adopted each year represent the current state-of-the-art in computer simulation modeling for purposes of producing

loss costs for residential property in Florida that are accurate and reliable.

The words “accurate” and “reliable” are used in Section 627.0628, Florida Statutes, but are not defined therein. In the context of computer simulation modeling, “accurate” means that the models have been designed and constructed in a careful, sensible, and scientifically acceptable manner such that they correctly describe the critical aspects needed to project loss costs. “Reliable” is defined for computer simulation models as meaning that they consistently produce dependable results and that there is no inherent or known bias which would cause the model or technique to overstate or understate results.

FINDINGS OF THE COMMISSION

Concerning Proprietary Information

The Commission finds the following with respect to Principle #3, that:

(1) each of the companies that own a computer simulation model reviewed by the Commission has proprietary information regarding the design and construction of that model,

(2) the modeling companies are unwilling to reveal that proprietary information 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 a copy of the publicly available transcript of the meeting, and

(3) the modeling companies are willing to reveal all of their proprietary information if that information can remain confidential. Since that information would become publicly available in the context of a meeting in the sunshine, the Commission has authorized the assembling of the Professional Team to review the models on-site on behalf of the Commission.

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

PROCESS FOR DETERMINING THE ACCEPTABILITY OF A COMPUTER SIMULATION MODEL

This section sets out the Commission's process for the determination of acceptability of a computer simulation model. Although the Commission's charge is to review *any* method or model that has the potential for improving the accuracy or reliability of hurricane loss projections for purposes of residential property ratemaking in Florida, the Commission's focus has been computer simulation models (model). When the Commission undertakes the review of other methods, the acceptability process will be revised accordingly.

The Commission has determined that prior to November 1 of each year, it will adopt new Standards, revise existing Standards, and, if necessary, revise this process. The effective date of new or revised Standards will be November 1 unless otherwise specified by the Commission.

The Commission has determined that significant changes are those changes to the Standards or any changes to the model that result in changes to loss costs or have potential for changes to the loss costs. Any minor revisions, changes to the Standards, or any changes to the model by the modeler that do not result in changes to loss costs are not considered significant. The Commission may determine in its judgment whether a change is significant.

The Commission has determined that any modeling company that wishes to be reviewed for compliance with the Standards adopted by the Commission shall notify the Commission in accordance with the requirements set out below by February 28 following the adoption of each year's Standards. Any modeling company that fails to notify the Commission by February 28 for consideration under the most recently adopted Standards or fails to be found acceptable in accordance with those Standards shall not be considered for review until the Standards are again revised or reviewed.

The Commission has further determined that the period between November 1, the effective date of new and revised Standards, and February 28, the deadline for notification by the modeler, is a reasonable amount of time for any modeler to comply with the Standards adopted by the Commission. If the Commission determines that four months is not sufficient, based on the nature of the changes 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 modeler, the Chair shall have the authority to grant a reasonable extension should the Chair determine that an emergency or unusual situation exists that warrants an extension and is determined to be beyond the control of the modeler.

I. Notification Requirements for New and Existing Modeling Companies

A. Notification

For purposes of this section, a "new" modeling company is defined as a company who is making a submission to the Commission for the first time or whose model was not submitted to or was not accepted by the Commission under the previous year's Standards. An "existing" company is defined as a company whose model was accepted by the Commission under the previous year's Standards.

1. **Notification of Readiness for Review.** By February 28 of each year, any modeling company wishing to have its model reviewed for acceptability by the Commission shall notify the Chair of the Commission in writing that the company 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; (3) all required Disclosure and Form information; (4) a general description of the information to be presented to the Professional Team and to the Commission; and (5) a completed Model Submission Checklist.

Notification to the Commission shall include:

a. A reference to the signed Expert Certification (Form G-1) and a statement that professionals having credentials and/or experience in the areas of meteorology, engineering, actuarial science, statistics, and computer science have reviewed the model for compliance with the Standards and that the model is ready to be reviewed by the Professional Team. Any caveats to this certification will be noted in the letter and accompanied by a complete explanation.

b. A summary statement of compliance with each Standard and the data and analyses required in the Disclosures and Forms. For existing modeling companies, the material must be updated as appropriate to reflect compliance with the new or revised Standards even though the modeling company submitted this material as part of a determination of acceptability under the previous year's Standards.

c. A list of any non-proprietary information and documentation that the modeler anticipates presenting to the Commission.

d. A general description of any proprietary information that the modeler intends to present to the Professional Team.

e. Twenty-five (25) bound copies and twenty-five (25) CD-ROM copies of all documentation and subsequent revisions shall be provided to the Commission. The electronic copies of the submission must be provided in the following manner:

1. Form V-2, Form A-1, Form A-2, Form S-1A, Form S-1B, Form S-2, Form S-7, Form S-8, and Form S-9 shall be provided on CD-ROM in both Excel and PDF format;

2. For new modeling companies, which have not previously provided this analysis to the Commission, Form S-12 shall be provided on CD-ROM in ASCII and PDF format;

3. The remaining portions of the submission shall be provided on CD-ROM in PDF format;

4. All data file names shall include the abbreviated name of the modeler, the Standards year, and the Form name (when applicable);

5. All revised data files submitted shall include the revision date, the abbreviated name of the modeler, the Standards year, and the Form name (when applicable) in the file name.

6. The PDF submission files shall be highlightable and bookmarked.

f. Format of the Submission:

1. Table of Contents shall be included;

2. 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;

3. All tables, graphs, and other non-text items shall be specifically listed in the Table of Contents and clearly labeled with abbreviations defined;

4. State the Standard, Disclosure, or Form in italics and give the response in non-italics. **The Purpose and Audit portion should not be restated.** The modeler response should include a statement in support of compliance following each Standard. The modeler shall indicate whether proprietary information will be provided to the Professional Team relative to the Standard, Disclosure, or Form relating to this specific item.

5. Graphs should be accompanied by legends and labels for all elements.

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

b. For data indexed by latitude and longitude, by county or by ZIP Code, a continuous color map with superimposed county and ZIP Code boundaries shall be produced.

c. Maps will use three colors – blue, white, and red, along with shades of blue, white, and red, with dark blue and dark red designating the lowest and highest quantities, respectively. The color legend and associated map shall be comprised of an appropriate number of intervals to provide readability.

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

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

2. **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, then the modeling company will notify the Commission in writing that there have been no significant changes to the model previously determined acceptable. The Commission will then meet and review the letter and any other documentation provided and determine whether the model will be considered acceptable for an additional year, whether an on-site review by the Professional Team is warranted, and whether a meeting with the Commission is warranted.

3. **Revisions to the Standards or the Model – Significant.** If the Commission makes significant changes to any existing Standards and/or adopts new Standards so that a model already determined to be acceptable is still in compliance with some, but not necessarily all, the Standards, then the modeling company will inform the Commission in writing as to whether it believes it is still in compliance with the Standards that have been substantially revised or are new. If an existing modeling company makes significant changes to the version of the model previously accepted by the Commission, then at the time it notifies the Commission that it is ready to have its model reviewed for acceptability, the modeling company must notify the Commission in writing of the change(s) and describe the magnitude of the change(s). The Commission will then meet and review the modeling company's notification and any other documentation provided and determine whether the model is acceptable for an additional year or whether an on-site review by the Professional Team is warranted or whether an on-site review is not necessary but that additional documentation must be provided which will then be reviewed at a Commission meeting. The Commission will not review changes made to a previously approved version of a model at any time other than after the next February 28 notification date.

4. The modeler must notify the Chair of the Commission in writing, as soon as possible, of any unusual situations that may impact the model submission.

B. Review of the Readiness Notification

The Chair will notify the Commission members of a projected time frame for an on-site review by the Professional Team and for the Commission meeting to review a model for acceptability. During the meeting to determine the readiness of the modeling company to be reviewed by the Professional Team on-site, the Commission may create a list of issues related to the model submission. The Chair may request that the modeling company (in person or by conference call) meet with the Commission and explain any issues concerning compliance with the Standards, Disclosures, or Forms. The Commission or the Chair may request additional information if deemed necessary to clarify the submission. If the Commission determines that the submission is incomplete, unclear, or non-responsive, the Commission may specify a time frame for correcting any deficiencies. The Professional Team will review and verify the explanation of each deficiency. The modeler shall provide the Commission with a written response explaining each deficiency correction prior to the Commission's review of the model. Failure of the modeler to correct the deficiency within the time frame specified will result in the termination of the review process. The prior year's acceptance of the model will expire at that time, and the modeling company will be notified as such in writing. Upon termination of the review process, the modeling company shall be required to wait until after the next revision or review of the Standards before requesting the Commission to review its model.

C. Professional Team On-Site Review

1. **Telephone Conference Call.** After the Commission has received a complete submission from the modeling company and prior to the on-site review, at the request of the Commission or the modeler, the SBA staff will arrange a telephone conference call between the modeling company and the Professional Team or a subset of the Professional Team. Prior to the conference call, the Professional Team will provide to the SBA a detailed pre-visit letter (to be sent to the modeler) outlining specific issues to be addressed by each modeler unique to the model submission. The purpose of this call is to review the pre-visit letter, materials, data files, and personnel that will 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 Professional Team will not make a determination regarding the modeling company's readiness for review, but the conference call will allow the modeling company and the Professional Team the opportunity to clarify any concerns or ask any questions regarding the upcoming on-site review. This conference call will be the only scheduled opportunity for modelers to clarify any questions directly with the Professional Team prior to their on-site review.

2. **On-Site Review.** If a determination has been made that a new modeling company is ready for an on-site review or that an on-site review is necessary for an existing modeling company, the SBA staff will schedule the on-site review of the Professional Team to: (a) audit for compliance with the most recently adopted Standards, and (b) review the information provided in the Disclosures and Forms. The SBA staff will handle all arrangements for the on-site review. The on-site review will be scheduled at a mutually agreeable time. On-site, the Professional Team will assist the Commission in identifying issues for the Commission's consideration, including the development of new Standards, verifying that each Standard has been met, and that the data and analyses required in the Disclosures and Forms are acceptable. All material that the modeler intends to present to the Commission shall be presented to the Professional Team during the on-site review.

   There are two possible outcomes of the on-site review regarding auditing for compliance with the Standards, Disclosures, and Forms:

   a. The Professional Team determines that, in its opinion, the model complies with the Standards, Disclosures, and Forms, and so reports to the Commission.

   b. The Professional Team determines that, in its opinion, the model has not been demonstrated to comply with the requirements in the Disclosures and Forms or with one or more Standards.

   The Professional Team is free to react to possible corrections proposed by the modeling company but will not tell the modeling company 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. The Professional Team will provide a draft report to the modeler while on-site to allow the modeler the opportunity to screen for proprietary material.

   If the problems cannot be corrected while the Professional Team is on-site, then the modeling company will have seven days from the final day of the initial on-site review to notify the Chair in writing that it will be ready for an additional review within 30 days of this notification. The Chair will assemble the Professional Team or an appropriate subset of the Professional Team for only one additional review to ensure that the corrections have been incorporated into the current, running version of the model. The Professional Team will make no more than one additional on-site review to address problems noted by the Professional Team.

   If the modeling company disagrees with the Professional Team as to compliance, then the company has two options: (1) it can proceed to the scheduled Commission meeting and present its arguments to the Commission to determine acceptability; or (2) it can withdraw its request for review. Such

a withdrawal will result in a new modeling company waiting until the next revision or review of the Standards before requesting the Commission review its model, and will result in the expiration of an existing modeling company's acceptability under the previous year's Standards and cause the existing modeling company to wait until after the next revision or review of the Standards before requesting the Commission review its model. An existing modeling company will be notified in writing of the termination of its acceptability under the previous year's Standards.

D. Professional Team Report

After a model has been reviewed on-site and prior to the meeting at which the model will be reviewed for acceptability, the Professional Team will provide the Commission with a written report. The Professional Team report shall include a section that summarizes its review of the information submitted in the Disclosures and Forms, as well as a general overview of the model, citing any pertinent issues for the Commission's consideration. As to each Standard, the Professional Team will state whether it verified the Standard was met or not met, and also provide an explanation and appropriate support for the Professional Team's conclusion. For both new and existing models, as to each Standard, the report will indicate whether or not the Professional Team reviewed proprietary information or documentation and, if so, include a general description of this proprietary information or documentation. Any disparate opinions among Professional Team members concerning compliance with the Standards, Disclosures, and Forms will be noted and explained.

II. Review by the Commission

A. General Review of a Modeling Company

For any modeling company seeking the Commission's determination of acceptability, the Commission may request a meeting with the modeling company prior to the Commission's review of the modeler's compliance with the Standards. The meeting may provide a general discussion about the model or its readiness for review and will also give the Commission and the modeler an opportunity to address any other issues. This meeting may be conducted concurrently with the meeting to determine acceptability.

B. Meeting to Determine Acceptability

The Commission will meet at a properly noticed public meeting to determine the acceptability of a new or existing model once the modeling company has provided all required material and the Professional Team has concluded its on-site review or any rescheduled reviews.

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 will be resolved by the Commission and the Commission will determine which Standard will prevail. If at the meeting a unique or unusual situation arises, the Commission will determine the appropriate course of action to handle that situation, using its sound discretion and adhering to the legislative findings and intent as expressed in Section 627.0628(1), Florida Statutes. Each company's model will be reviewed independently of any other companys' models previously approved or presently applying for review.

C. Modeler Presentation

All modelers shall make a presentation to the Commission with respect to the model as used for residential rate making purposes in Florida.

A new modeler is expected to give a detailed overview presentation to the Commission explaining how the model is designed to be theoretically sound and meets the criteria of being accurate and reliable. In addition, the modeler is expected to review and elaborate as to how the model meets each Standard including details and issues related to the Disclosures and Forms.

An existing modeler is expected to present a general overview of the model (10-15 minutes). This presentation should concentrate on the theoretical basis for the model and highlight the measures taken to ensure the model is accurate and reliable. The presentation should focus on changes, including output ranges, from the previously accepted model and the effect those changes have on loss costs. The presentation should provide a verification of each Standard and address issues raised in the Disclosures and Forms.

The modeler presentation should serve to enlighten the Commission regarding various issues that have arisen throughout the entire evaluation process. The 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.
4. Other related aspects dealing with accuracy or reliability.

The modeler presentation shall include an explanation of corrections made for deficiencies noted by the Commission or the Professional Team.

The modeler presentation is for the purpose of helping the Commission understand outstanding issues as well as how the modeler has resolved various issues and to explain the basis as to how the model meets the Standards. Additionally, the modeler presentation is for the purpose of clarifying information provided in the Disclosures and Forms.

All presentation materials shall be presented using a medium that is readable by all members of the Commission. All materials presented to the Commission at the meeting to determine acceptability shall be provided to SBA staff in electronic format.

D. Voting at the Meeting to Determine Acceptability

At its public meeting to determine the acceptability of a new or existing model, once a quorum is present, either in person or by telecommunications, all votes will be by a roll call vote based on the majority vote of those present. No Commissioner, who is present at any Commission meeting at which an official decision or act is to be taken or adopted by the Commission, may abstain from voting except when a conflict of interest exists (Section 286.012, Florida Statutes, Section 112.3143, Florida Statutes). For those circumstances in which a Standard does not apply to a particular model, the Commission will vote affirmatively that the Standard does not apply and such a vote will constitute a determination by the Commission that the Standard is not applicable.

To be determined acceptable, the model must 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 will not be found to be acceptable.

The Standards will be categorized under six groupings as follows: (1) General Standards, (2) Meteorological Standards, (3) Vulnerability Standards, (4) Actuarial Standards, (5) Statistical Standards, and (6) Computer Standards. The minimum number of vote tallies taken to determine the acceptability of a model would be one for each group of Standards. If the Commission determines that the model meets all Standards in a grouping, the model is found acceptable with respect to each individual Standard in the grouping. Standards with subparts denoted by a notation of A, B, C, etc. are considered one Standard. At the request of any Commission member, one or more Standards in a grouping may be set aside from the remaining 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 model as may be appropriate due to the unique aspects of the model.

Once a motion is made and seconded and the discussion has concluded, a roll call vote will be taken as outlined in this section. The Commission will have completed its determination of the acceptability of the model when it has completed voting on all Standards. This does not preclude the Commission from revisiting a previous vote or revising the voting procedure as noted above.

E. Notification of Acceptability

Once the Commission has determined that a model is acceptable in accordance with the procedures in this process and that all required information has been provided to the Commission, the Chair of the Commission will provide the modeling company with a letter confirming the Commission's action. The letter shall be in the following format:

> (Name and Address of Modeler)
>
> Re: Florida Commission on Hurricane Loss Projection Methodology
>
> Dear _____:
>
> This will confirm the finding of the Florida Commission on Hurricane Loss Projection Methodology on (date), that the (name of company) computer model has been determined acceptable for projecting hurricane loss costs for personal residential rate filings.
>
> The Commission has determined that the (name and version of model) complies with the Standards adopted by the Commission on (date of adoption), and concludes that the (name and version of the model) is sufficiently accurate and reliable for projecting hurricane loss costs for residential property in Florida.
>
> In accordance with the Commission's procedures, this determination of acceptability expires on February 28, 2005, unless the modeler has complied with the latest adopted procedures described in the "Process for the determination of acceptability of a computer simulation model" in order to maintain its acceptability.
>
> On behalf of the Commission, I congratulate you and your colleagues. We appreciate your participation and input in this process.
>
> Sincerely,
> (Name), Chair

F. Notification of Expiration

A model's acceptability expires when a model that had been determined acceptable under the prior year's Standards is determined not acceptable as to the following year's Standards. A model's acceptability will also expire under the previous year's Standards on February 28 following the November 1 effective date of new and revised Standards unless the modeling company has notified the Commission of its compliance with the new and revised Standards by February 28. In that case, the previous year's determination of acceptability will remain effective until the conclusion of the determination of acceptability process for the then current Standards.

Upon the expiration of a model's acceptability the Chair of the Commission shall send a letter to the modeling company informing the company that its acceptability has expired.

The letter shall be in the following format if the model fails to be found acceptable in accordance with the most recently adopted Standards:

(Name and Address of Modeler)

Re: Florida Commission on Hurricane Loss Projection Methodology

Dear _____:

This will confirm the finding of the Florida Commission on Hurricane Loss Projection Methodology on (date), that the Commission's determination of acceptability for the (name of company) computer model under the Standards effective (date) has expired as of (date).

The Commission appreciates your participation in this process.

Sincerely,
(Name), Chair

The letter shall be in the following format if the modeling company fails to notify the Commission by February 28 for consideration under the most recently adopted Standards:

(Name and Address of Modeler)

Re: Florida Commission on Hurricane Loss Projection Methodology

Dear _____:

This will confirm that the Florida Commission on Hurricane Loss Projection Methodology's determination of acceptability for the (name of company) computer model under the Standards effective (date) has expired as of February 28, (year).

The Commission appreciates your past participation in this process.

Sincerely,
(Name), Chair

G. Discovery of Errors and/or Changes to a Model after the Model has been Determined to be Acceptable by the Commission

If a modeler discovers that material errors have been made in the model or the submission, the modeler shall immediately notify the Chair of the Commission in writing. The notification shall detail the nature of the error or change to the model, why it occurred, what is needed or has been done to correct the problem, the time frame needed for making the correction, and any other relevant documentation necessary to describe both the error/change and the correction. The Chair shall (1) review the notification and inform the Commission members as soon as possible; (2) determine the need for a special meeting or whether the issue can be addressed at the next regularly scheduled meeting of the Commission; and (3) assess, with at least two members of the Professional Team, the severity of the error and determine whether the error warrants a temporary suspension of the acceptability of the model until the Commission has had an opportunity to review the matter.

The Chair shall send a letter to the modeling company as soon as practical notifying the company of the receipt of the error/change to the model notification and any decisions of the Chair pending review of the Commission.

If a modeler intentionally fails to notify or unreasonably delays the notification of the Commission of any errors or changes to a model, which has been previously found acceptable by the Commission, the Commission shall review and investigate the circumstances and determine the appropriate course of action.

A copy of all letters relating to the acceptability of a model will be provided to the Director of the Office of Insurance Regulation.

Model Submission Checklist

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

Yes	No	Item
		1. Letter to the Commission
		a. Refers to the Expert Certification Form and states that professionals having credentials and/or experience in the areas of meteorology, engineering, actuarial science, statistics, and computer 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 complete explanation
		2. Summary statement of compliance with each individual Standard and the data and analyses required in the Disclosures and Forms
		3. List of any non-proprietary information and documentation the modeler anticipates presenting to the Commission
		4. General description of any proprietary information the modeler intends to present to the Professional Team
		5. Model Identification
		6. 25 Bound Copies
		7. 25 CD ROMs containing:
		a. Submission text in PDF format – includes all Standards, Disclosures, and Forms not listed separately in d. below
		b. PDF file bookmarked and highlightable
		c. Data file names include abbreviated name of modeler, Standards year, and Form name (when applicable)
		d. Forms V-2, A-1, A-2, S-1A, S-1B, S-2, S-7, S-8, S-9, and S-12 (for new modeling companies which have not previously provided the Commission with this analysis) in PDF format
		e. Forms V-2, A-1, A-2, S-1A, S-1B, S-2, S-7, S-8, and S-9 in Excel format
		f. Form S-12 (for new modeling companies which have not previously provided the Commission with this analysis) in ASCII format
		8. Table of Contents
		9. Materials consecutively numbered from beginning to end starting with the first page (including cover) using a single numbering system
		10. All tables, graphs, and other non-text items specifically listed in Table of Contents
		11. All tables, graphs, and other non-text items clearly labeled with abbreviations defined
		12. Standards, Disclosures, and Forms in *italics*, modeler responses in non-italics
		13. Graphs accompanied by legends and labels for all elements

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

_____

_____

_____

_____

Model Name	Modeler Signature	Date

VI. ON-SITE REVIEW

On-Site Review

I. On-Site Review by Professional Team

A. General Purpose

The purpose of the On-Site Review is to evaluate the compliance of the model with the Standards, Disclosures, and Forms. The On-Site Review is conducted in conjunction with the Process for Determining the Acceptability of a Computer Simulation Model. It is not intended to provide a preliminary peer review of the model. The goal of the Professional Team's efforts is to provide the Commission a clear and thorough report of the 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 requested by the Commission in the submission should be disclosed and will be reviewed.

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

The On-Site Review by the Professional Team will involve the following:

1. Due diligence review of information submitted by the modeler. For existing modelers, the due diligence review will concentrate on any changes in the Disclosures and Forms as noted in the notification of readiness letter.

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

3. Verification that information provided by the modeler in the Disclosures and Forms is valid and is an accurate and fairly complete description of the model.

4. Audit for compliance with the Standards. The Professional Team will attempt to consider each grouping of Standards as a unit.

Feedback regarding compliance of the model with the Standards, Disclosures, and Forms will be provided to the modeling company throughout the review process.

B. Preparation for On-Site Review

1. The Professional Team will assist the Commission and the SBA staff in determining if a modeling company is ready for an On-Site Review.

2. The Professional Team will assist the modeler in preparing for the On-Site Review, by providing to the SBA a detailed pre-visit letter (to be sent to the modeler) outlining specific issues to be addressed by each modeler unique to the model submission. During the scheduled pre-visit telephone conference call, the Professional Team will respond to requests for clarifications of the due diligence,

audit requirements, and any materials, data files, and personnel that the Professional Team has stated should be available during the review, according to the Audit section of the Standards and the pre-visit letter.

3. The SBA staff is responsible for scheduling On-Site Review dates. Each modeler 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 modeler and the depth of the inquiry needed for the Professional Team to obtain an understanding of the model. The Commission expects new modeling companies to be well-prepared for a review by the Professional Team. In particular, it is suggested that a modeler conduct a detailed self-audit to assure that it is ready for the formal audit.

4. The modeler should have all necessary materials and data on-site for review. All material referenced in the submission as "will be shown to the Professional Team" and all material that the modeler intends to present to the Commission should be presented to the Professional Team during the On-Site Review.

5. All materials, charts, graphs, and maps used in support of the model should be presented in a manner that is readable by all members of the Professional Team.

C. Professional Team Report

1. After completing its review of the Standards, Disclosures, and Forms, the Professional Team will conduct an exit briefing with the modeling company. During this briefing, the Professional Team will provide a preliminary draft of the report to be provided to the Commission. This offers the modeler an opportunity to check for any factual errors and to expunge any confidential or proprietary information. The Professional Team will accede to modeling company suggestions for changes in its draft to only correct factual errors and remove any confidential or proprietary information. The report will include:

    - a list of participants
    - a summary of significant changes to the model from the previous year
    - any corrections to be made in the submission prior to the Commission meeting to review the model
    - a verification of any deficiencies noted by the Commission
    - a copy of the pre-visit letter
    - a verification of compliance with the Standards, Disclosures, and Forms
    - a description of material reviewed in support of compliance with the Standards, Disclosures, and Forms
    - any modeler comments provided in response to Commission inquiries and investigations.

2. After leaving the modeling company premises, the Professional Team, in coordination with SBA staff, will finalize its report and provide it to all Commission members in advance of the meeting scheduled for the Commission's review of the model.

D. Additional Verification Review

It is possible that a subset of the Standards or changes made to the Disclosures and Forms may require further review by the Professional Team or a subset of the Professional Team. In such cases, the SBA staff will arrange a follow-up On-Site Review, in accordance with the Acceptability Process, to ascertain compliance to those Standards, Disclosures, and/or Forms.

II. Composition and Selection of the Professional Team

A team of professional individuals, known as the Professional Team, will conduct On-Site Reviews of modeling companies seeking a determination of acceptability by the Commission. The Professional Team will consist of individuals having professional credentials in the following disciplines (each area will be represented by one or more individuals): Actuarial Science, Statistics, Meteorology, Computer Science, and Engineering.

The SBA staff will select the Professional Team members, and the SBA will enter into contracts with each individual selected.

Selection of the Professional Team members will be 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 deadline(s). Consideration will be given to the following factors:

- Professional credentials and experience
- Reasonableness of fees
- Availability
- References

III. Responsibilities of the Professional Team

A. Team Leader

The SBA staff will designate one member of the Professional Team as the team leader. The team leader will be responsible for coordinating the activities of the Professional Team and overseeing the development of reports to the Commission.

B. Responsibilities of the Team Members

1. Participate in preparations and discussions with the Commission and the 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 modelers.

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

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

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

6. Discuss the model with the modeler's professional staff to gain a clear understanding and confidence in the operation of the 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.

IV. Responsibilities of the SBA Staff

The Professional Team will report to designated SBA staff. SBA staff will supervise the Professional Team and coordinate their pre-on-site planning activities, On-Site Reviews and activities, and post-on-site activities.

These responsibilities include:

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

B. Coordinating and scheduling On-Site Reviews.

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

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

E. Working with the modeler to determine which professionals at the modeling company will work with corresponding Professional Team members while on-site.

F. Briefing and de-briefing the Professional Team members prior to, during, and after the On-Site Review.

G. Coordinating the preparation of written reports and presentations to the Commission.

V. Confidential and Proprietary Information

While on-site, the Professional Team members are expected to have access to confidential and proprietary data and information.

It is the responsibility of the modeling company to identify to all Professional Team members what is considered proprietary or confidential and is not to be made public. Upon arrival of the Professional Team on-site, the modeler shall provide a written list of all items they intend the Professional Team to review. The modeler shall mark any item proprietary, as appropriate. This does not preclude the Professional Team from requesting any additional information.

All written documentation provided by the modeling company to the Commission will be considered a public document. As such, it will be available for public scrutiny. The modeling company should 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 company indicates are proprietary or confidential that are viewed by Professional Team members will not be considered public documents and are to be left on-site. Any notes made by Professional Team members are not considered public documents and are to be kept confidential with respect to proprietary information or trade secrets learned on-site.

Any notes made by a Professional Team member relating to confidential information or data that would compromise the proprietary nature of a model or reveal trade secrets are not to be made available to Commission members.
Proprietary information or trade secrets of the modeler learned by a Professional Team member will not be discussed with Commission members.

Professional Team members will agree to respect the proprietary nature of the model and not use confidential information in any way detrimental to the interest of the modeling company.

Care will be taken by the Professional Team members not to discuss other models being evaluated while they are on-site reviewing a particular model.

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 model or a component part of a model.

VI. Refer to the Process for Determining the Acceptability of a Computer Simulation Model for additional information regarding the On-Site Review.

VII. 2003 STANDARDS, DISCLOSURES, AND FORMS

Florida Commission on
Hurricane Loss Projection Methodology

Model Identification

Name of Model and Version: _____

Name of Modeling Company: _____

Street Address: _____

City, State, Zip: _____

Mailing Address, if different from above:_____

_____

Contact Person:_____

Phone Number: _____ **Fax Number:**_____

E-mail Address: _____

Date: _____

Submission Data

The following input data have been provided to the modeler on the enclosed CD-ROM.

Input Data

Name	Description
hlpm1998.exe	1998 FHCF exposure data for loss cost comparison (S-6.3) 1998 FHCF exposure data for output ranges (Form S-1A) 1998 FHCF exposure data for average annual zero deductible statewide loss costs (Form S-5)
hlpm2002.exe	2002 FHCF exposure data for loss cost comparison (S-6.4) 2002 FHCF exposure data for output ranges (Form S-1B) 2002 FHCF exposure data for average annual zero deductible statewide loss costs (Form S-5) 2002 FHCF exposure data for expected annual hurricane losses (Form S-9)
99FHCFWts.xls	1998 weights for output ranges (Form S-1A)
02FHCFWts.xls	2002 weights for output ranges (Form S-1B)
FormA1Input03.xls	Description of the events for Form A-1 – 30 Hypothetical Events
FormA2Input03.xls	Construction type and ZIP Codes for Form A-2 – Loss Costs
FormV1Input03.xls	Wind speeds for 336 ZIP Codes for Form V-1 – One Hypothetical Event
2003FormS1A.xls	Output ranges format for Form S-1A – Output Ranges (1998 FHCF exposure)
2003FormS1B.xls	Output ranges format for Form S-1B – Output Ranges (2002 FHCF exposure)
FormS12Input03.xls	Input values for Form S-12 – Hypothetical Events for Sensitivity and Uncertainty Analysis (requirement for new modeling companies which have not previously provided the Commission with this analysis)

Modelers shall provide output in specified output files as listed below. XXX denotes the abbreviated name of the modeler.

Output Data

Name	Description
XXX03FormA1.xls	Output data from Form A-1 – 30 Hypothetical Events
XXX03FormA2.xls	Output data from Form A-2 – Loss Costs
XXX03FormS1A.xls	Output data from Form S-1A – Output Ranges
XXX03FormS1B.xls	Output data from Form S-1B – Output Ranges
XXX03FormS2.xls	Output data from Form S-2 – Percentage Change in Output Ranges
XXX03FormS7.xls	Output data from Form S-7 – Official Storm Set Average Annual Zero Deductible Statewide Loss Costs
XXX03FormS8.xls	Output data from Form S-8 – Hurricane Andrew Loss Costs
XXX03FormS121SA.dat	Wind speed output from Form S-12 – Sensitivity Analysis all variables, category 1 storm (requirement for new modeling companies which have not previously provided the Commission with this analysis)
XXX03FormS121UACP.dat	Wind speed output from Form S-12 – Uncertainty Analysis CP, category 1 storm (requirement for new modeling companies which have not previously provided the Commission with this analysis)

Name	Description
XXX03FormS121UARmax.dat	Wind speed output from Form S-12 – Uncertainty Analysis Rmax, category 1 storm (requirement for new modeling companies which have not previously provided the Commission with this analysis)
XXX03FormS121UAVT.dat	Wind speed output from Form S-12 – Uncertainty Analysis VT, category 1 storm (requirement for new modeling companies which have not previously provided the Commission with this analysis)
XXX03FormS121UAQuantile.dat	Wind speed output from Form S-12 – Uncertainty Analysis Quantile, category 1 storm (requirement for new modeling companies which have not previously provided the Commission with this analysis)
XXX03FormS123SA.dat	Wind speed output from Form S-12 – Sensitivity Analysis all variables, category 3 storm (requirement for new modeling companies which have not previously provided the Commission with this analysis)
XXX03FormS123UACP.dat	Wind speed output from Form S-12 – Uncertainty Analysis CP, category 3 storm (requirement for new modeling companies which have not previously provided the Commission with this analysis)
XXX03FormS123UARmax.dat	Wind speed output from Form S-12 – Uncertainty Analysis Rmax, category 3 storm (requirement for new modeling companies which have not previously provided the Commission with this analysis)
XXX03FormS123UAVT.dat	Wind speed output from Form S-12 – Uncertainty Analysis VT, category 3 storm (requirement for new modeling companies which have not previously provided the Commission with this analysis)
XXX03FormS123UAQuantile.dat	Wind speed output from Form S-12 – Uncertainty Analysis Quantile, category 3 storm (requirement for new modeling companies which have not previously provided the Commission with this analysis)
XXX03FormS125SA.dat	Wind speed output from Form S-12 – Sensitivity Analysis all variables, category 5 storm (requirement for new modeling companies which have not previously provided the Commission with this analysis)
XXX03FormS125UACP.dat	Wind speed output from Form S-12 – Uncertainty Analysis CP, category 5 storm (requirement for new modeling companies which have not previously provided the Commission with this analysis)
XXX03FormS125UARmax.dat	Wind speed output from Form S-12 – Uncertainty Analysis Rmax, category 5 storm (requirement for new modeling companies which have not previously provided the Commission with this analysis)
XXX03FormS125UAVT.dat	Wind speed output from Form S-12 – Uncertainty Analysis VT, category 5 storm (requirement for new modeling companies which have not previously provided the Commission with this analysis)
XXX03FormS125UAQuantile.dat	Wind speed output from Form S-12 – Uncertainty Analysis Quantile, category 5 storm (requirement for new modeling companies which have not previously provided the Commission with this analysis)
XXX03FormV2.xls	Output data from Form V-2 – Mitigation Measures – Range of Changes in Damage

The modeler shall run various scenario hurricane events through the model on the input exposure data. The referenced output Forms shall be completed and specified loss files provided on CD-ROM in both Excel and PDF format. The file names should include the abbreviated name of the modeler, the Standards year, and the Form name.

"FormA2Input03.xls" data set consists of one $100,000 building for each construction type for each ZIP Code in Florida. The data set contains 4,437 records. The following table is a description of the fields in the data set.

No.	Field Name	Description
1.	County Code	Federal Information Processing Standards (FIPS) County Code - see ***Figure 1***
2.	ZIP Code	5-digit ZIP Code
3.	Construction Type	The following codes will be used: 1 = Wood Frame, 2 = Masonry, 3 = Mobile Home
4.	Deductible	1% policy deductible for all records
5.	Total Insured Value - Building	$100,000 for all records
6.	Total Insured Value - Appurtenant Structures	$10,000 for all records
7.	Total Insured Value - Contents	$50,000 for all records
8.	Total Insured Value - Additional Living Expense	$20,000 for all records

The modeler is directed to make the following assumptions with the analysis:

- Each structure is insured 100% to value
- Per Diem = $150.00/day per policy, if used
- Number of stories = 1
- Occupancy type = Single Family Dwelling
- Year of Construction = 1980
- Tide at landfall is 0 meters
- If the model assumes different construction types other than those provided with the data, map the codes the Commission has provided to the appropriate codes. Provide a copy of this mapping and proper documentation describing the reason for the mapping.
- Verify that only population weighted centroids were used for the location of risks within the ZIP Code, where more specific locations were not available.

All other assumptions that the modeler must make with the analysis shall be reviewed with SBA staff. The intent is to keep all assumptions consistent among the modelers.

Figure 1

Florida County Codes

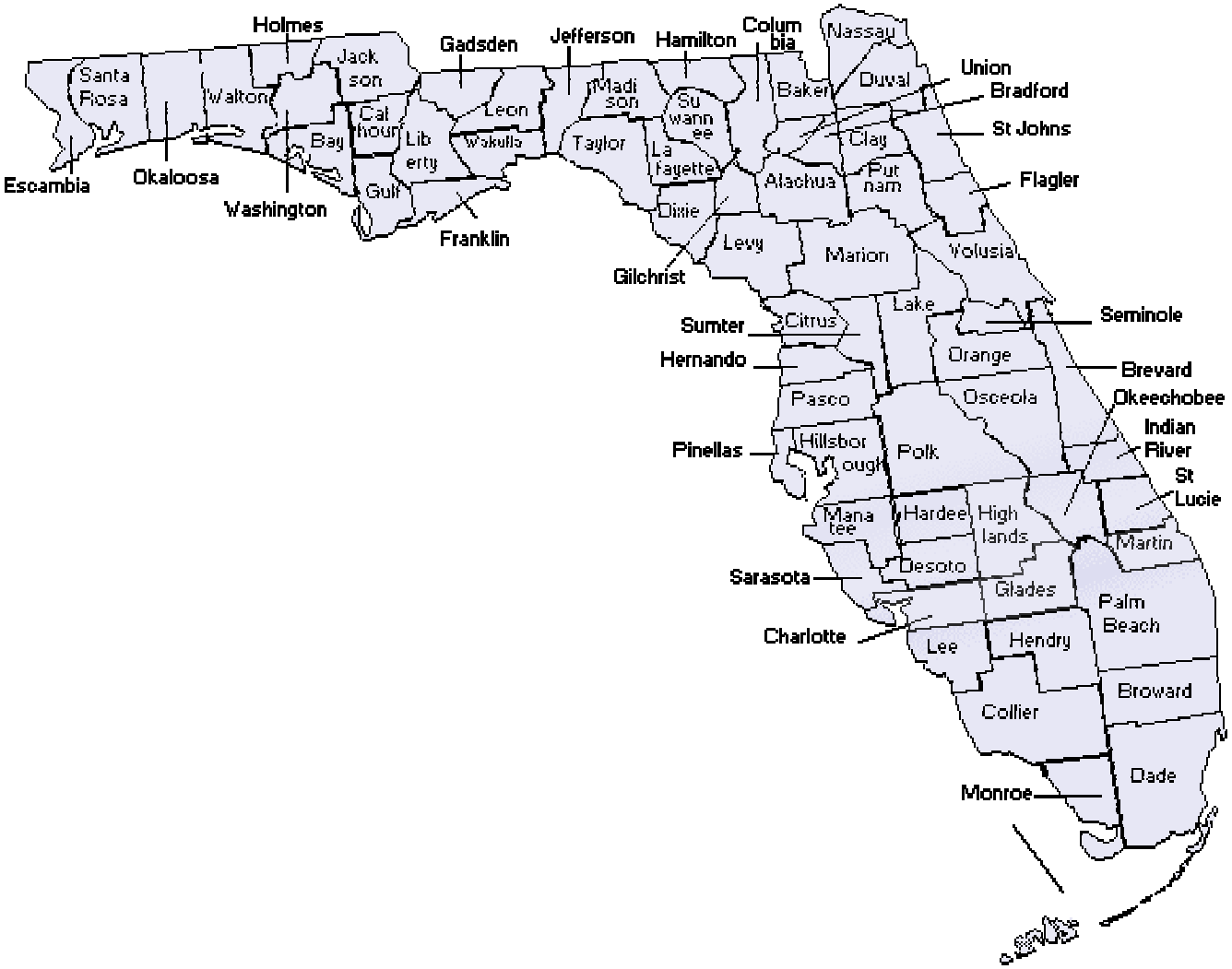
County Code	County Name	County Code	County Name	County Code	County Name
001	Alachua	**047**	Hamilton	**091**	Okaloosa
003	Baker	**049**	Hardee	**093**	Okeechobee
005	Bay	**051**	Hendry	**095**	Orange
007	Bradford	**053**	Hernando	**097**	Osceola
009	Brevard	**055**	Highlands	**099**	Palm Beach
011	Broward	**057**	Hillsborough	**101**	Pasco
013	Calhoun	**059**	Holmes	**103**	Pinellas
015	Charlotte	**061**	Indian River	**105**	Polk
017	Citrus	**063**	Jackson	**107**	Putnam
019	Clay	**065**	Jefferson	**109**	St. Johns
021	Collier	**067**	Lafayette	**111**	St. Lucie
023	Columbia	**069**	Lake	**113**	Santa Rosa
025*	Dade	**071**	Lee	**115**	Sarasota
027	De Soto	**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		

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

*The FIPS code and description for Dade County was changed to 086, Miami-Dade. The 1998 Florida Hurricane Catastrophe Fund (FHCF) exposure data file provided to the modelers does not reflect this change, and Dade County is identified as 025. Modelers should map to the old County Code 025 and if necessary, re-identify 086 to 025 for Forms using the 1998 FHCF exposure data. The 2002 FHCF exposure data file reflects the county code change to 086, Miami-Dade. Forms using the 2002 FHCF exposure data should map to the new County Code 086.

Figure 2

State of Florida
By County



GENERAL STANDARDS

G-1 Scope of the Computer Model and Its Implementation

The computer model shall project loss costs for personal lines residential property from hurricane events.

Purpose: This Standard gives a high level view of the scope of the model to be reviewed, namely projecting loss costs for personal lines residential property from hurricane events.

Disclosures

1. Specify the model and program version number reflecting the release date.

2. Provide a concise description of the model. Describe the theoretical basis of the model and include a brief description of the methodology, particularly the wind components, the damage components, and the insured loss components used in the model. Provide precise citations to representative or primary technical papers that describe the underlying model theory.

3. Provide a flow diagram that illustrates interactions among major model components.

Audit

The main intent of the audit is to determine the capabilities of the model and to assess its implementation for purposes of Florida estimated loss costs. Copies of all representative or primary technical papers that describe the underlying model theory shall be made available.

G-2 Qualifications of Modeler Personnel and Independent Experts

A. Model construction, testing, and evaluation shall be performed by modeler personnel or independent experts who possess the necessary skills, formal education, or experience to develop hurricane loss projection methodologies.

B. The model or any modifications to an accepted model shall be reviewed by modeler personnel or independent experts in the following professional disciplines, if relevant: structural/wind engineering (licensed Professional Engineer (PE)), statistics (advanced degree), actuarial science (Associate or Fellow of Casualty Actuarial Society), meteorology (advanced degree), and computer/information science (advanced degree). These individuals shall abide by the standards of professional conduct if adopted by their profession.

Purpose: Professional disciplines implicitly represented in Commission Standards (structural/wind engineering, statistics, actuarial science, meteorology, computer/information science) should be represented among modeler staff and consultants.

Disclosures

1. Company Background

   A. Describe the ownership structure of the modeling company. Describe affiliations with other companies and the nature of the relationship, if any. Indicate if your company has changed its name and explain the circumstances.

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

   C. If the model is developed by an entity other than a modeling company, describe the funding source for the model.

   D. Describe the modeler's services and the percentage of the company's annual income derived from each.

   E. Indicate how long the model has been used for analyzing insurance company exposures or other such uses. Describe these uses.

F. Indicate if the modeling company has ever been involved in litigation or challenged by a statutory authority where the credibility of one of its U. S. hurricane model versions was disputed. Describe the nature of the case and the conclusion.

G. Provide the number of the company's clients in the following categories: ratemaking, reinsurance and capital markets, government.

2. Professional Credentials

A. Provide the highest degree obtained (discipline and University), employment or consultant status and tenure, and relevant experience of individuals involved in the primary development of or revisions to the following aspects of the model:

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

B. Identify any new employees or consultants (since the previous submission) working on the model.

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

D. Provide the names, positions, credentials, and their role in the development of the model of any individuals who are not full-time employees of the modeler. Indicate specifically whether such individuals are associated with the insurance industry, consumer advocacy group, or a government entity as well as their involvement with consulting activities.

3. Independent Expert Review

A. Provide dates of independent peer reviews that have been performed on the following aspects of the model:

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

B. Provide documentation of independent peer reviews of the Standards or Disclosures. Identify any unresolved or outstanding issues as a result of these reviews.

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

D. Describe any review by an independent organization, such as Standard and Poor's, Moody's, etc.

4. Provide a completed Form G-1, Expert Certification.

Audit

The Professional Team will review the professional vitae of modeler personnel and independent experts responsible for the current model and information on their predecessors, if different than current personnel. Background information on individuals providing testimonial letters in the submission shall be provided.

The Professional Team will review Form G-1 and all independent peer reviews of the model.

Discuss any incidents where model personnel have failed to abide by the standards of professional conduct adopted by their profession.

G-3 Risk Location

A. ZIP Codes used in the model shall be updated at least every 24 months using information originating from the United States Postal Service. The United States Postal Service issue date of the updated information shall be reasonable.

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

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

Purpose: The 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 basic assessments of loss costs.

Disclosures

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

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

Audit

Provide geographic displays for selected ZIP Codes. The Professional Team will review the location of specific centroids.

G-4 Units of Measurement

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

B. All model outputs of length, wind speed, and pressure shall be in units of statute miles, statute miles per hour, and millibars, respectively.

C. Wind inputs to the damage function shall be in units consistent with currently used wind measurement units and/or shall be converted using standard meteorological/engineering conversion factors.

Purpose: The Commission requires uniformity of measurements with regard to model outputs in the units given in the Standard. Therefore, the specific units of measurement and all conversion factors should be provided.

Disclosures

1. All conversion factors or techniques shall be disclosed.

Audit

The Professional Team will review the model to assess the appropriateness and accuracy of the measurements, conversion factors, and techniques.

G-5 Independence of Model Components

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

Purpose: This Standard requires that each of the three primary components be individually sound and operate independently of each other. For example, the model should not allow adjustments to the vulnerability components to compensate for apparent meteorological deficiencies (e.g., inflating damage to counteract for a deflated wind field). In addition to each component of the model meeting its respective Standards, the interrelationship of the model components as a whole must be reasonable.

Audit

Demonstrate that the model components adequately portray hurricane phenomena and effects (damage and loss costs). Attention will be paid to an assessment of (1) the theoretical soundness of each component and (2) the basis of their integration. For example, a model would not meet this Standard if an artificial calibration adjustment had been made to improve the match of historical and model results for a specific storm.

Describe all changes in the model since the previous submission that might impact the independence of the model components.

Form G-1: Expert Certification

In accordance with I.A. of the Process for Determining the Acceptability of a Computer Simulation Model, the following credentialed experts in the areas of the discipline indicated below do hereby certify that they have reviewed the model for compliance with the Standards and, according to their professional standards and code of ethical conduct, do hereby certify that the model complies with the 2003 Standards adopted by the Florida Commission on Hurricane Loss Projection Methodology and is ready to be reviewed by the Professional Team.

NOTE: A facsimile or any properly reproduced signature on the same or identical forms will be acceptable to meet this requirement. Updated signatures are required following modifications to the model.

METEOROLOGY:

_____
Print Name, Title, and Degree or Credentials

_____ _____
Signature Date

ENGINEERING:

_____
Print Name, Title, and Degree or Credentials

_____ _____
Signature Date

ACTUARIAL SCIENCE:

_____
Print Name, Title, and Degree or Credentials

_____ _____
Signature Date

STATISTICS:

_____
Print Name, Title, and Degree or Credentials

_____ _____
Signature Date

COMPUTER SCIENCE:

_____
Print Name, Title, and Degree or Credentials

_____ _____
Signature Date

METEOROLOGICAL STANDARDS

M-1 Official Hurricane Set*

*(*Significant Revision)*

For landfall frequency analyses, the modeler shall use the latest updated Official Storm Set. Updates to HURDAT approved by the Tropical Prediction Center/National Hurricane Center are acceptable modifications to the storm set.

Purpose: The Official Storm Set is a baseline. This set covers the period 1900-2002. A primary use of this baseline storm set is in checking modeled versus historical storms impacting Florida. The Standard does not preclude the use of other hurricane or tropical storm events if they provide relevant information in hurricane modeling.

Disclosures

1. Describe any deviation from the Official Storm Set.

Audit

The modeler will provide the storm set used. Failure to update the storm set, as specified in the Standard, is not acceptable.

M-2 Hurricane Characteristics*

*(*Significant Revision)*

Methods for depicting all modeled hurricane characteristics, including but not limited to wind speed, radial distributions of wind and pressure, minimum central pressure, radius of maximum winds, strike probabilities, tracks, and the time variant wind fields, shall be based on information documented by currently accepted scientific literature or modeler information accepted by the Commission.

Purpose: This Standard requires that the modeler use only scientifically sound information for determining hurricane characteristics. The stochastic storm set should depict realistic hurricane characteristics.

Disclosures

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

2. Describe the dependencies among variables in the wind field component and how they are represented in the model.

3. Describe the process for converting gradient winds to surface winds including the treatment of the associated uncertainties. Explain how the wind speeds generated in the wind field model were converted from sustained to gust and identify the averaging time.

4. Describe how the asymmetric nature of hurricanes is considered in the model.

5. Describe the stochastic hurricane tracks and discuss their appropriateness. Describe the historical data used as the basis for the model's hurricane tracks.

6. Describe how the coastline is segmented (or partitioned) in determining the parameters for hurricane frequency used in the model. Provide the hurricane frequency distribution by intensity for each segment.

7. For hurricane characteristics modeled as random variables, describe the probability distributions.

Audit

Prepare graphical depictions (e.g., histograms overlaid with fitted density functions) of storm characteristics as used in the model. Describe:

- the data set basis for the fitted distributions,
- the assessments of correlated characteristics (e.g., central pressure and radius of maximum winds),
- the fitting methods used and any smoothing techniques employed, and defend the choices of distributions used,
- the spatial distribution of hurricane force winds associated with both modeled and historical events.

The goodness-of-fit of distributions to historical data will be reviewed.

The modeler will present time-based contour animations (capable of being paused) of wind and pressure fields to demonstrate scientifically reasonable wind field characteristics.

The Professional Team will compare the treatment of uncertainties associated with the conversion of gradient winds to surface winds with currently accepted literature.

Map the location of the peak hurricane intensity compared to the western most point of a random selection of recurving storm tracks for hurricanes effecting Florida.

M-3 Landfall Intensity

Models shall use maximum one-minute sustained 10-meter wind speed when defining hurricane landfall intensity. This applies both to the Official Storm Set used to develop landfall strike probabilities 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 wind speed shall be within the range of wind speeds (in statute miles per hour) categorized by the Saffir-Simpson scale.

Saffir-Simpson Hurricane Scale (for displayed parameters):

Category	Winds (mph)	Central Pressure (mb)	Damage
1	74 - 95	$\geq$ 980	Minimal
2	96 - 110	965 - 979	Moderate
3	111 - 130	945 - 964	Extensive
4	131 - 155	920 - 944	Extreme
5	Over 155	< 920	Catastrophic

Purpose: This Standard provides a consistent measure of hurricane wind speed and a consistent measure of hurricane intensity.

Disclosures

1. Define an "event" in the model. Describe how the model handles events with multiple landfalls and by-passing hurricanes.

2. Provide the upper limit of wind speeds (maximum one-minute average wind at 10-meters height) per hurricane category (defined by the Saffir-Simpson scale wind speed) that the model produces.

Audit

Demonstrate the goodness-of-fit of the frequency distributions of category 3-5 hurricanes.

Demonstrate that the hurricane intensity at landfall is consistent with the Saffir-Simpson wind range for the stochastic storm set.

M-4 Hurricane Probabilities

A. Modeled probability distributions for hurricane intensity, eye diameter, forward speed, radii for maximum winds, and radii for hurricane force winds shall be consistent with historical hurricanes in the Atlantic basin.

B. Modeled hurricane probabilities shall reasonably reflect the historical record through 2002 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).

Purpose: This Standard requires that the modeled probabilities of hurricane characteristics are consistent with those documented in currently accepted scientific literature. Consistent means spatial distributions of modeled hurricane probabilities accurately depicting those of vulnerable coastlines in Florida.

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

Disclosures

1. Describe the source documents and any additional research that was performed to develop the model's variable functions or databases. Describe all such information, including a description of the historical database(s), for the model's hurricane wind speeds and hurricane frequencies.

2. List any assumptions used in creating any of these databases.

3. Provide vertical bar graphs depicting distributions of hurricane frequencies by category by region (Figure 3).

4. Provide a completed Form M-1, Annual Occurrence Rates.

Audit

Probabilities are compared with observed hurricane frequency using methods documented in currently accepted scientific literature. The Professional Team will review the goodness-of-fit of modeled to historical hurricane frequencies for the four regions of Florida and overall as provided in Form M-1.

Demonstrate that the quality of fit extends beyond the Florida border by showing results for appropriate coastal segments in Alabama, Georgia, and Mississippi.
Describe and support the method of selecting stochastic storm tracks and angles of landfall.

Describe and support the method of selecting storm track strike intervals. If strike locations are on a discrete set, show the landfall points for major metropolitan areas in Florida.

Demonstrate the goodness-of-fit of parametric distributions to historical hurricane characteristics.

M-5 Land Friction and Weakening*

A. *The magnitude of land friction coefficients shall be consistent with currently accepted scientific literature, consistent with geographic surface roughness, and implemented with appropriate geographic information system data.
*(*Significant Revision)*

B. The hurricane overland weakening rate methodology used by the model shall be reasonable in comparison to historical records.

Purpose: This Standard ensures that the required weakening of hurricanes over land and the transition of winds from ocean to land is consistent with currently accepted scientific literature depicting appropriate building/land coefficients. The land use and land cover database used by the model should be consistent with the current data for Florida. The transition of winds from over water to over land within the model should be consistent with wind field boundary layer dynamics.

Disclosures

1. Describe the decay rates or hurricane degradation assumptions used by the model after the hurricane makes landfall. Describe how far inland hurricane force winds are estimated for different category events (as defined by wind speed in the Saffir-Simpson scale). Describe any variations in the decay rate.

2. Identify other variables that affect the wind speed estimation (e.g., surface roughness, topography, etc.).

3. Provide the collection and publication dates of the land use and land cover data used in the model.

4. Provide a graphic representation of the modeled degradation rates for Florida storms over time compared to the Kaplan-DeMaria decay rate. Include curves for +/- 20% of the Kaplan-DeMaria values.

Audit

Justify the collection and publication dates of the land use and land cover data used in the model.

Maps depicting land friction effects are required. Describe the representation of land friction effects in the model.

Comparisons of the model's weakening rates to historical Florida storms and to weakening rates will be reviewed.

Transition of winds from over water to over land (i.e. landfall) will be reviewed.

M-6 Logical Relationships of Hurricane Characteristics

A. The radius of maximum winds shall reflect historical hurricane characteristics.

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

C. The wind speed shall decrease with increasing surface roughness (friction), all other factors held constant.

Purpose: This Standard requires the modeler to demonstrate physical consistency of the model wind field.

Disclosures

1. Provide a completed Form M-2, Radius of Maximum Winds.

2. Provide a completed Form M-3, Maps of Maximum Winds.

Audit

Forms M-2, M-3, and the modeler's sensitivity analyses provide the information used in auditing this Standard.

Form M-1: Annual Occurrence Rates

Provide annual occurrence rates for landfall from the data set that the model generates by hurricane category (defined by wind speed in the Saffir-Simpson scale) for the entire state of Florida and selected regions as defined in ***Figure 3.*** List the annual occurrence rate (probability of an event in a given year) per hurricane category. The historical frequencies below have been derived from the Commission's Official Storm Set. If hurricanes are used in addition to the Official Storm Set as specified in Standard M-1, then the historical frequencies should be modified.

Modeled Annual Occurrence Rates

	Entire State		Region A – NW Florida		Region B – SW Florida	
Category	**Historical**	**Modeled**	**Historical**	**Modeled**	**Historical**	**Modeled**
1	.24		.11		.08	
2	.12		.04		.02	
3	.14		.02		.04	
4	.03		0		.01	
5	.02		0		.01	

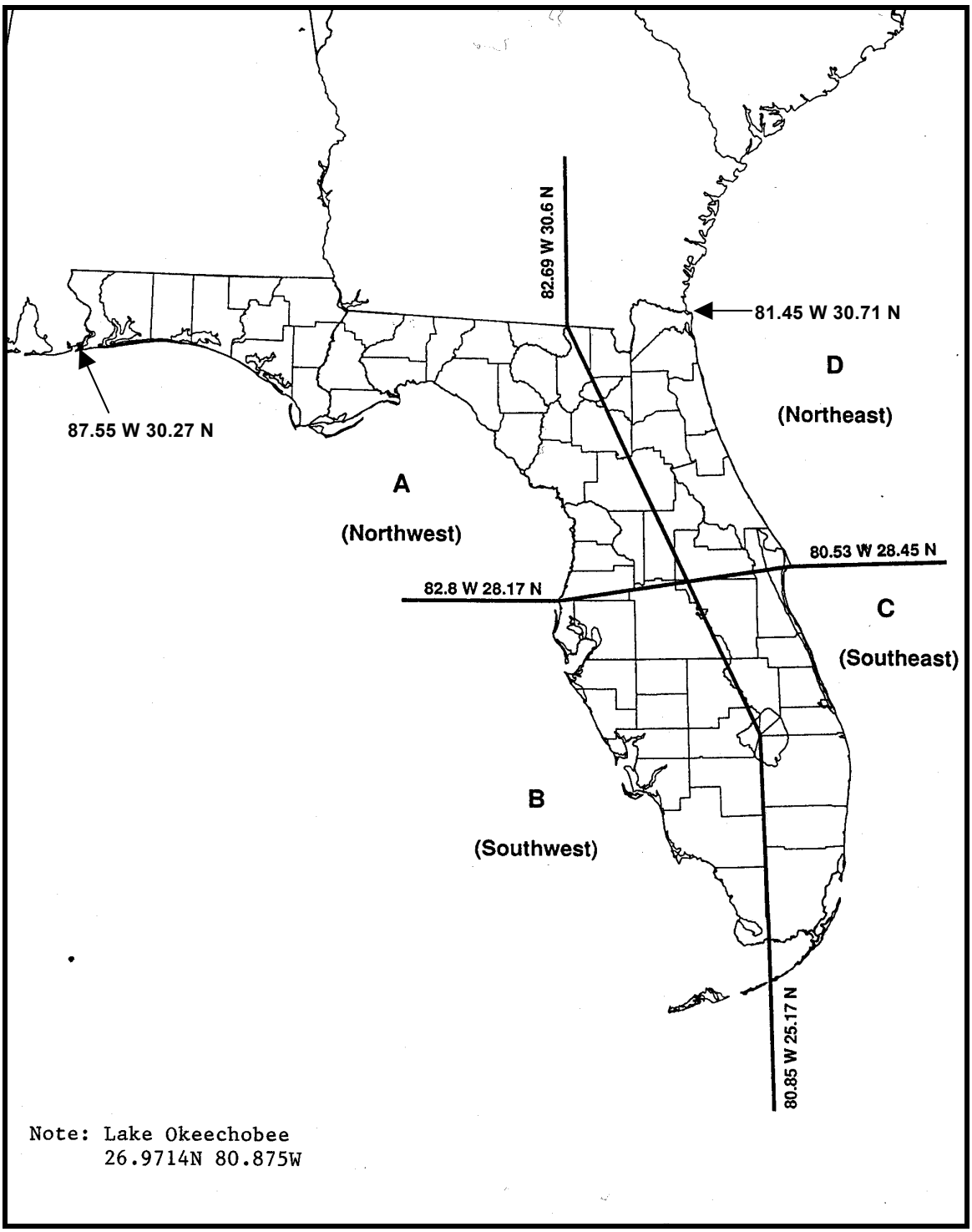
	Region C – SE Florida		Region D – NE Florida		By-Passing Storms	
Category	**Historical**	**Modeled**	**Historical**	**Modeled**	**Historical**	**Modeled**
1	.06		0		.01	
2	.05		.01		.02	
3	.08		0		.01	
4	.02		0		.01	
5	.01		0		0	

**Round to 2 decimal places*

Note: Number of Hurricanes does not include By-Passing Storms

Figure 3

State of Florida
By Region



Form M-2: Radius of Maximum Winds

Provide ranges for radius of maximum winds used by the model (viz., the stochastic storm set) for the central pressures provided in the table below.

Provide a graphical representation of the Rmax (*x*-axis) versus Central Pressure (*y*-axis).

Central Pressure (mb)	Range of Rmax (mi)
900	
910	
920	
930	
940	
950	
955	
960	
965	
970	
975	
980	
985	
990	

Form M-3: Maps of Maximum Winds

Provide a color map of the maximum winds at the ZIP Code level for the modeled version of the Official Storm Set.

Provide a color map of the maximum winds at the ZIP Code level for a 100-year return period from the stochastic storm set.

Maximum winds in these maps are defined as the maximum one-minute sustained winds as recorded at each location.

OFFICIAL STORM SET

			Landfall Code				Landfall Code			
			A				B			
11/1/2003 Standards			Enter/	Central	Wind		Enter/	Central	Wind	
Name	Year	Landfall Code	Exit	Pressure	Speed	Category	Exit	Pressure	Speed	Category
NONAME 3	1903	HRCFL2AFL1	Enter	980	75	1				
NONAME 2	1906	HRCFL1								
NONAME 8	1906	HRCFL2					Enter	967	125	3
NONAME 9	1909	By-Passing								
NONAME 4	1910	HRBFL3					Enter	941	121	3
NONAME 1	1911	HRAFL1 AL1	Enter	990	81	1				
NONAME 4	1915	HRAFL1	Enter	982	92	1				
NONAME 13	1916	HR AL2AFL2	Enter	974	115	2				
NONAME 14	1916	HRBFL1					Enter	990	81	1
NONAME 3	1917	HRAFL3	Enter	964	104	2				
NONAME 2	1919	By-Passing								
NONAME 6	1921	HRBFL3DFL2					Enter	952	104	2
NONAME 4	1924	HRAFL1	Enter	994	75	1				
NONAME 7	1924	HRBFL1					Enter	972	93	1
NONAME 2	1925	HRBFL1					Enter	994	75	1
NONAME 1	1926	HRDFL2								
NONAME 6	1926	HRCFL4BFL3AFL3 AL3	Enter	950	121	3	Exit	950	121	3
NONAME 10	1926	By-Passing								
NONAME 1	1928	HRCFL2								
NONAME 4	1928	HRCFL4DFL2 GA1 SC1								
NONAME 2	1929	HRCFL3AFL2	Enter	980	75	1				
NONAME 5	1933	HRATX2CFL1								
NONAME 12	1933	HRCFL3								
NONAME 2	1935	HRBFL5AFL2	Enter	985	86	1	Enter	892	173	5
NONAME 6	1935	HRCFL2					Exit	973	75	1
NONAME 5	1936	HRAFL3	Enter	973	90	1				
NONAME 2	1939	HRCFL1AFL1	Exit	990	80	1				
NONAME 5	1941	HRCFL2BFL2AFL2	Enter	990	75	1	Exit	960	109	2
NONAME 11	1944	HRBFL3DFL2					Enter	949	117	3
NONAME 1	1945	HRAFL1	Enter	982	92	1				
NONAME 9	1945	HRCFL3								
NONAME 5	1946	HRBFL1					Enter	993	75	1
NONAME 4	1947	HRCFL4 LA3 MS3BFL2					Exit	978	97	2
NONAME 8	1947	HR GA2 SC2CFL1					Enter	975	80	1
NONAME 7	1948	HRBFL3CFL2					Enter	963	115	3
NONAME 8	1948	HRCFL2								
NONAME 2	1949	HRCFL3								
EASY	1950	HRAFL3	Enter	958	102	2				
KING	1950	HRCFL3								
FLORENCE	1953	HRAFL1	Enter	982	92	1				
FLOSSY	1956	HR LA2AFL1	Enter	974	92	1				
DONNA	1960	HRBFL4 NC3 NY3DFL2 CT2 RI2 MA1 NH1 ME1					Enter	930	132	4
CLEO	1964	HRCFL2								
DORA	1964	HRDFL2								
ISBELL	1964	HRBFL2CFL2					Enter	964	107	2
BETSY	1965	HRCFL3 LA3								
ALMA	1966	HRAFL2	Enter	970	98	2				
INEZ	1966	HRBFL1					Enter	977	76	1
GLADYS	1968	HRAFL2DFL1	Enter	977	86	1				
AGNES	1972	HRAFL1 NY1 CT1	Enter	978	85	1				
ELOISE	1975	HRAFL3	Enter	955	119	3				
DAVID	1979	HRCFL2DFL2 GA2 SC2								
ELENA	1985	By-Passing								
KATE	1985	HRAFL2	Enter	967	92	1				
FLOYD	1987	HRBFL1					Enter	993	75	1
ANDREW	1992	HRCFL5BFL3 LA3					Exit	950	126	3
ERIN	1995	HRCFL1AFL2	Enter	974	98	2				
OPAL	1995	HRAFL2	Enter	942	113	3				
EARL	1998	HRAFL1	Enter	987	81	1				
GEORGES	1998	By-Passing								
IRENE	1999	HRBFL1CFL1					Enter	987	80	1
The Codes:		AFL = Northwest Florida								
		BFL = Southwest Florida								
		CFL = Southeast Florida								
		DFL = Northeast Florida								
		Total By Landfall Code				24				21
NOTE: Category defined by wind speed										
HURDAT Landfall Code defined by central pressure										

		Landfall Code C				Landfall Code D				Landfall Code By-Pass			
		Enter/	Central	Wind		Enter/	Central	Wind		Region	Central	Wind	
Name	Year	Exit	Pressure	Speed	Category	Exit	Pressure	Speed	Category	Affected	Pressure	Speed	Category
NONAME 3	1903	Enter	977	98	2								
NONAME 2	1906	Enter	979	86	1								
NONAME 8	1906	Exit	967	81	1								
NONAME 9	1909									C	978	98	2
NONAME 4	1910												
NONAME 1	1911												
NONAME 4	1915												
NONAME 13	1916												
NONAME 14	1916												
NONAME 3	1917												
NONAME 2	1919									B	929	132	4
NONAME 6	1921					Exit	980	92	1				
NONAME 4	1924												
NONAME 7	1924												
NONAME 2	1925												
NONAME 1	1926	Enter	960	109	2								
NONAME 6	1926	Enter	931	134	4								
NONAME 10	1926									C	968	110	2
NONAME 1	1928	Enter	977	98	2								
NONAME 4	1928	Enter	935	128	3								
NONAME 2	1929	Enter	948	114	3								
NONAME 5	1933	Enter	990	81	1								
NONAME 12	1933	Enter	948	132	4								
NONAME 2	1935												
NONAME 6	1935	Enter	973	75	1								
NONAME 5	1936												
NONAME 2	1939	Enter	990	81	1								
NONAME 5	1941	Enter	954	121	3								
NONAME 11	1944												
NONAME 1	1945												
NONAME 9	1945	Enter	951	116	3								
NONAME 5	1946												
NONAME 4	1947	Enter	947	125	3								
NONAME 8	1947	Exit	993	85	1								
NONAME 7	1948	Exit	964	92	1								
NONAME 8	1948	Enter	963	86	1								
NONAME 2	1949	Enter	954	116	3								
EASY	1950												
KING	1950	Enter	955	112	3								
FLORENCE	1953												
FLOSSY	1956												
DONNA	1960					Exit	969	110	2				
CLEO	1964	Enter	967	99	2								
DORA	1964					Enter	961	99	2				
ISBELL	1964	Exit	968	105	2								
BETSY	1965	Enter	952	115	3								
ALMA	1966												
INEZ	1966												
GLADYS	1968					Exit	966	86	1				
AGNES	1972												
ELOISE	1975												
DAVID	1979	Enter	968	98	2	Exit	971	98	2				
ELENA	1985									A	959	115	3
KATE	1985												
FLOYD	1987												
ANDREW	1992	Enter	922	165	5								
ERIN	1995	Enter	984	86	1								
OPAL	1995												
EARL	1998												
GEORGES	1998									B	981	104	1
IRENE	1999	Exit	984	75	1								
					27				5				5

VULNERABILITY STANDARDS

V-1 Derivation of Vulnerability Functions*

A. Development of the vulnerability functions is to be based on a combination of the following: (1) historical data, (2) tests, (3) structural calculations, (4) expert opinion, or (5) site inspections. Any development of the vulnerability functions based on structural calculations or expert opinion shall be supported by tests, site inspections, or historical data.

B. The method of derivation of the vulnerability functions shall be theoretically sound.

C. Any modification factors/functions to the vulnerability functions or structural characteristics and their corresponding effects shall be clearly defined and be theoretically sound.

D. Construction type and construction characteristics shall be used in the derivation and application of vulnerability functions.

E. In the derivation and application of vulnerability functions, assumptions concerning building code revisions and building code enforcement shall be reasonable and be theoretically sound.
*(*Significant Revision)*

F. Vulnerability functions shall be separately derived for building structures, mobile homes, appurtenant structures, contents, and additional living expense.

G. The minimum wind speed that generates damage shall be reasonable.

Purpose: The development of vulnerability functions should not be based exclusively on structural calculations or expert opinion. Use of structural calculations or expert opinion should be supported by site inspections, tests, and historical data to the extent such data are available, and their use should be appropriate.

The development of vulnerability functions should be documented with respect to the sources, including data and calculations derived from site inspections and engineering judgment.

The effects of building codes and their enforcement that affect the vulnerability functions should be considered and be reasonably represented in the model.

Separate vulnerability functions are required for building structures, mobile homes, appurtenant structures, contents, and additional living expense.

Hurricane damage certainly occurs above the threshold of 74 mph, but can also occur for wind speeds well below this threshold.

Disclosures

1. Provide a flow chart documenting the process by which the vulnerability functions are derived and implemented.

2. Describe the nature and extent of actual insurance claims data used to develop the model's vulnerability functions. Describe in detail what is included, such as, number of policies, number of insurers, and number of units of dollar exposure, separated into personal lines, commercial, and mobile home.

3. Summarize site inspections, including the source, and a brief description of the resulting use of these data in development, validation, or verification of vulnerability functions.

4. List the primary documents or the research results used in the development of the model's vulnerability functions.

5. Describe the number of categories of the different vulnerability functions. Specifically, include descriptions of the structure types, lines of business, and coverages in which a unique vulnerability function is used.

6. Identify the one-minute average sustained wind speed at which the model begins to estimate damage.

7. Describe how the duration of wind speeds at a particular location over the life of a hurricane is considered.

8. Provide a completed Form V-1, One Hypothetical Event.

Audit

Historical data should be available in the original form with explanations for any changes made and descriptions of how missing or incorrect data were handled. To the extent that historical data are used to develop vulnerability functions, demonstrate the goodness-of-fit of the data to fitted models. Complete reports detailing loading conditions and damage suffered are required for any test data used. Complete structural calculations shall be presented so that a variety of different building types and construction characteristics may be selected for review. The basis for expert opinion and original site inspection reports should be available for review.

Copies of any papers, reports, and studies used in the development of the vulnerability functions should be available for review. Copies of all public record documents used may be requested for review.

Multiple samples of vulnerability functions for building structures, mobile homes, appurtenant structures, contents, and additional living expense should be available. The magnitude of logical changes among these items for a given wind speed shall be explained and validation materials should be available.

Justify the construction types and characteristics used, and provide validation of the range and direction of the variations in damage.

Document and justify all modifications to the vulnerability functions due to building codes and their enforcement.

Provide validation material for the disclosed minimum wind speed. Provide the computer code showing the inclusion of the minimum wind speed at which damage occurs.

Describe how the duration of wind speeds at a particular location over the life of a hurricane is considered.

Form V-1 will be reviewed.

V-2 Mitigation Measures*

*(*Significant Revision due to Form V-2)*

A. Modeling of mitigation measures to improve a building's wind resistance and the corresponding effects on vulnerability shall be theoretically sound. These measures shall include fixtures or construction techniques that enhance:

- ***Roof strength***
- ***Roof covering performance***
- ***Roof-to-wall strength***
- ***Wall-to-floor-to-foundation strength***
- ***Opening protection***
- ***Window, door, and skylight strength.***

B. Application of mitigation measures shall be reasonable both individually and in combination.

Purpose: State 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" refers to a public domain study and further defines the items required:

1. Enhanced roof strength. Example: Roof covering materials that comply with the 2001 Florida Building Code 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.

Also listed are items that should be considered:

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.

It is necessary to account for the total impact that the use of multiple mitigation measures will have on damage. When multiple mitigation measures are used, the effect on damage may not be the sum of the effects of the individual measures. For example, if the use of shutters reduces damages by 25% and truss anchors reduce damages by 15%, the use of both measures may not reduce damages by 40% and has to be at least as great as the larger reduction.

The comprehensive and detailed listing of items that are required or should be considered ensures consistency and completeness among all modelers in presenting the necessary Disclosures and demonstrations of theoretical soundness.

Disclosures

1. Provide a completed Form V-2, Mitigation Measures – Range of Changes in Damage.

Audit

Form V-2 provides the information used in auditing this Standard.

Total effect on damage due to use of multiple mitigation measures will be reviewed and shown to be reasonable. Any variation in the change over the range of wind speeds for individual and multiple mitigation measures will be reviewed and shown to be reasonable.

Mitigation measures used by the model that are not listed as required in this Standard will be disclosed and shown to be theoretically sound and reasonable.

Form V-1: One Hypothetical Event

Wind speeds for 336 ZIP Codes are provided in the file named **"FormV1Input03.xls."** The wind speeds and ZIP Codes represent a hypothetical hurricane track. The modeler is instructed to model the sample exposure data provided in the file named **"FormA2Input03.xls"** against these wind speeds at the specified ZIP Codes and provide the damage ratios summarized by wind speed (mph) and construction type.

The wind speeds provided are one-minute sustained 10-meter wind speeds. The sample exposure data provided consists of three structures (one of each construction type – wood frame, masonry, and mobile home) individually placed at the population centroid of each of the ZIP Codes provided. Each ZIP Code is subjected to a specific wind speed. For completing Part A, Estimated Damage for each individual wind speed range is the sum of loss to all buildings in the ZIP Codes subjected to that individual wind speed range. Subject Exposure is all exposures in the ZIP Codes subjected to that individual wind speed range. For completing Part B, Estimated Damage is the sum of the loss to all buildings of a specific type (wood frame, masonry, or mobile home) in all of the wind speed ranges. Subject Exposure is all exposures of that specific type in all of the ZIP Codes.

One base structure for each of the construction types should be placed at the population center of the ZIP Codes.

Base Frame Structure:	**Base Masonry Structure:**
One story Unbraced gable end roof Normal shingles (55mph) ½" plywood deck 6d nails, deck to roof members Toe nail truss to wall anchor Wood framed exterior walls Nails for wall/floor/foundation connections No shutters Standard glass windows No door covers No skylight covers Constructed in 1980	One story Unbraced gable end roof Normal shingles (55mph) ½" plywood deck 6d nails, deck to roof members Toe nail truss to wall anchor Masonry exterior walls No vertical wall reinforcing No shutters Standard glass windows No door covers No skylight covers Constructed in 1980
Base Mobile Home Structure: Tie downs Single unit	

If additional assumptions are necessary to complete this Form (for example, regarding duration), the modeler should provide the reasons why the assumptions were necessary as well as a detailed description of how they were included.

Provide a plot of the Form V-1 Part A data.

Form V-1: One Hypothetical Event

Part A

Wind Speed (mph)	Estimated Damage/ Subject Exposure
20 – 30	_____
31 – 40	_____
41 – 50	_____
51 – 60	_____
61 – 70	_____
71 – 80	_____
81 – 90	_____
91 – 100	_____
101 – 110	_____
111 – 120	_____
121 – 130	_____
131 – 140	_____
141 – 150	_____

Part B

Construction Type	Estimated Damage/ Subject Exposure
Wood Frame	_____
Masonry	_____
Mobile Home	_____

Form V-2: Mitigation Measures – Range of Changes in Damage

Provide the percentage change in the zero deductible personal residential non-mitigated damage due to each mitigation measure listed in Form V-2. These mitigation measures are the minimum required to be documented. Adding measures to this list is encouraged.

If additional assumptions are necessary to complete this Form (for example, regarding duration), the modeler should provide the reasons why the assumptions were necessary as well as a detailed description of how they were included.

Provide this Form on CD-ROM in both Excel and PDF format. The file name should include the abbreviated name of the modeler, the Standards year, and the Form name.

Base structures for frame and masonry are as defined in Form V-1.

Base structures are $100,000 fully insured structures with a zero deductible policy.

Required ZIP Codes:

32226, Duval County	(50 – 150 mph wind range)
32308, Leon County	(50 – 125 mph wind range)
32617, Marion County	(50 – 125 mph wind range)
33140, Miami-Dade County	(50 – 175 mph wind range)
34110, Collier County	(50 – 150 mph wind range)

Place the base structure at the population centroid for the five required ZIP Codes. Wind speeds (one-minute sustained 10-meter) start at 50 mph and vary at intervals of 25 mph or less up to the maximum wind speed indicated in the range above. Individual mitigation measures should be added one at a time to each base structure.

The change to the damage for each mitigation measure should be determined as a percentage with the maximum and minimum value from the required ZIP Codes.

Form V-2: Mitigation Measures – Range of Changes in Damage

MITIGATION MEASURES			OWNERS				RENTERS				CONDO UNIT OWNERS			
			FRAME		MASONRY		FRAME		MASONRY		FRAME		MASONRY	
			LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH	LOW	HIGH
ROOF STRENGTH	UNBRACED GABLE ENDS		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	BRACED GABLE ENDS													
	HIP ROOF													
ROOF COVERING	NORMAL SHINGLE (55 mph)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	RATED SHINGLE (110 mph)													
	MEMBRANE													
	NAILING OF DECK	6d	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		8d												
ROOF-TO-WALL STRENGTH	TOE NAILS		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	CLIPS													
	STRAPS													
WALL-FLOOR-FOUNDATION STRENGT	NAILS		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	TIES/CLIPS													
	STRAPS													
OPENING PROTECTION	SHUTTERS	NONE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		PLYWOOD												
		STEEL												
		ENGINEERED												
WINDOW, DOOR, & SKYLIGHT STRENGTH	WINDOWS	STD GLASS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		LAMINATED												
		IMPACT GLASS												
	NO DOOR COVER		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	DOOR COVER													
	NO SKYLIGHT COVER		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	SKYLIGHT COVER													

ACTUARIAL STANDARDS

A-1 Underwriting Assumptions

A. When used in the modeling process or for verification purposes, adjustments, edits, inclusions, or deletions to insurance company input data used by the modeler shall be based upon accepted actuarial, underwriting, and statistical procedures.

B. For loss cost estimates derived from or validated with historical insured hurricane losses, the assumptions in the derivations concerning (1) construction characteristics, (2) policy provisions, (3) claim payment practices, and (4) relevant underwriting practices underlying those losses, as well as any actuarial modifications, shall be reasonable and appropriate.

Purpose: Insurance company data used in model development should include appropriate insurer or modeler adjustments that do not diminish the usefulness of the data.

Loss costs may be significantly impacted by the way in which insurers pay claims following a hurricane event. To appropriately use historical insurer claims data to verify modeled loss costs it is important that insurer claim practices are understood and that the effects of insurer claim practices on the loss costs are explained.

Disclosures

1. Describe how the model treats the definition of an event from an insurance policy perspective.

2. Identify the assumptions used to develop loss costs for unknown residential construction types.

3. Describe how the modeled loss costs take into consideration storm surge and flood damage to the infrastructure.

4. Describe the assumptions included in model development and validation concerning insurance company claim payment practices.

5. Identify depreciation assumptions and describe the methods and assumptions used to reduce insured losses on account of depreciation. Provide a sample calculation for determining the amount of depreciation and the actual cash value (ACV) losses.

6. Identify property value assumptions and describe the methods and assumptions used to determine the true property value and associated losses. Provide a sample calculation for determining the property value and guaranteed replacement cost losses.

7. Describe how loss adjustment expenses are considered within the loss cost estimates.

Audit

Quality assurance procedures should include methods to assure accuracy of input insurance data prior to code execution. Compliance with this Standard will be readily demonstrated through rules and documented procedures.

Demonstrate how the claim practices of insurance companies are accounted for when claims data for those insurance companies are used to develop or to verify model calculations. For example, the level of damage the insurer considers a loss to be a "total loss." Provide the methods used to delineate among the insurer claim practices in the use of historical claims data to verify model outputs.

A-2 Loss Cost Projections

A. Loss cost projections produced by hurricane loss projection models shall not include expenses, risk load, investment income, premium reserves, taxes, assessments, or profit margin.

B. Loss cost projections shall not make a prospective provision for economic inflation.

C. Loss cost projections shall not explicitly include demand surge.

Purpose: The Commission has determined that at present its scope is limited to personal residential loss costs. Loss costs represent the expected annual loss per $1000 exposure. Other "expense and profit loads" such as those listed in the Standard are included in rate filings and are calculated by actuaries rather than by a computer model.

Loss severity is influenced by general economic inflation applicable to material and labor. Amounts of insurance may also be influenced (although perhaps differently) by economic inflation. Economic inflation is an element of past insurance experience that has been used to construct and validate hurricane loss projection models. Prospective changes in economic inflation applicable after construction of the model are found to be outside the scope of the Commission's work.

Significant demand surge was observed in Hurricane Andrew, but has not been documented in smaller U.S. hurricanes. The circumstances necessary for a recurrence of demand surge, as well as its potential magnitude, do not appear to be well understood and quantified. Furthermore, governmental intervention is possible in future demand surge situations. Demand surge, if it exists for smaller storms, will be implicitly reflected in insurance industry experience. Models should not place over-emphasis on Hurricane Andrew experience because this may result in the prediction that demand surge will recur for all storms both large and small.

Disclosures

1. Describe the method or methods used to estimate annual loss costs needed for ratemaking. Identify any source documents used and research performed.

2. Explain how the model treats the issue of demand surge.

3. Identify the highest level of resolution for which loss costs can be provided. Identify the resolution used for the reported output ranges.

Audit

Demonstrate how the presence of demand surge has been considered in any analysis where Hurricane Andrew losses are used for development or verification of the model or its output. Demonstrate how demand surge is incorporated in any other data used in the development or verification of the model.

Describe how the model handles expenses, risk load, investment income, premium reserves, taxes, assessments, profit margin, and economic inflation.

A-3 User Inputs

All modifications, adjustments, assumptions, defaults, and treatments of missing values used in the model shall be actuarially sound and included with the model output.

Purpose: Hurricane loss projection models may rely on certain insurer assumptions. Implicit assumptions may or may not be appropriate for use by a given insurer, depending on the circumstances.

Disclosures

1. Describe the methods used to distinguish among policy form types (e.g., homeowners, dwelling property, mobile home, renters, condo unit owners).

2. Disclose, in a model output report, the specific type of input that is required to use the model or model output in a personal residential property insurance rate filing. Such input includes, but is not limited to, optional features of the model, type of data to be supplied by the model user and needed to derive loss estimates from the model, and any variables that a model user is authorized to set in implementing the model. Include the model name and version number on the model output report.

3. Provide a copy of the input form used by a model user to provide input criteria to be used in the model. The modeler should demonstrate that the input form relates directly to the model output. Include the model name and version number on the input form.

   All items included in the input and output forms submitted to the Commission should be clearly labeled and clearly defined.

4. Describe actions performed to ensure the validity of insurer data used for model inputs or validation/verification.

Audit

All insurer inputs and assumptions will be reviewed.

A-4 Logical Relationship to Risk

A. Loss costs shall not exhibit an illogical relation to risk, nor shall loss costs exhibit a significant change when the underlying risk does not change significantly.

B. Loss costs produced by the model shall be positive and non-zero for all valid Florida ZIP Codes.

C. Loss costs cannot increase as friction or roughness increase, all other factors held constant.

D. Loss costs cannot increase as the quality of construction type, materials and workmanship increases, all other factors held constant.

E. Loss costs cannot increase as the presence of fixtures or construction techniques designed for hazard mitigation increases, all other factors held constant.

F. Loss costs cannot increase as the quality of building codes and enforcement increases, all other factors held constant.

G. Loss costs shall decrease as deductibles increase, all other factors held constant.

H. The relationship of loss costs for individual coverages (A, B, C, D) shall be consistent with the coverages provided.

Purpose: Modeled loss costs should vary according to risk. If the risk of loss due to hurricanes is higher for one area or structure type, then the loss costs should also be higher. Likewise, if there is no difference in risk there should be no difference in loss costs. Loss costs not having these properties have an illogical relation to risk.

Disclosures

1. State whether the model produces the same loss costs if it runs the same information more than once (i.e., not changing the seed of the random number generator).

2. Demonstrate that loss cost relationships by type of coverage (buildings, appurtenant structures, contents, additional living expenses) are consistent with actual insurance data.

3. Demonstrate that loss cost relationships by construction type or vulnerability function (frame, masonry, and mobile home) are consistent with actual insurance data.

4. Demonstrate that loss cost relationships among coverages, territories, and regions are consistent and reasonable.

5. Explain any anomalies or special circumstances that might preclude any of the above conditions from occurring.

6. Provide a completed Form A-1, 30 Hypothetical Events.

7. Provide a completed Form A-2, Loss Costs.

Audit

Graphic representations of loss costs by ZIP Code and county will be reviewed.

Color-coded maps depicting the effects of land friction on loss costs by ZIP Code will be reviewed.

Individual loss cost relationships will be reviewed. Forms A-1 and A-2 will be used to assess coverage relationships.

A-5 Deductibles and Policy Limits

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 loss costs shall be reasonable. Differences in these relationships from those previously found acceptable shall be reasonable.

Purpose: For a given wind speed and structure type, there is a range of possible results. Some losses may fall completely below the deductible. The distribution of losses is therefore important to the determination of the effects of deductibles and policy limits.

Disclosures

1. Describe the methods used in the model to treat deductibles (both flat and percentage), policy limits, replacement costs, and insurance-to-value when estimating loss costs.

2. Provide an example of how insurer loss (loss net of deductibles) is calculated. Discuss data or documentation used to confirm or validate the method used by the model.

   Example:

(A) Building Value	Policy Limit	(B) Deductible	(C) Damage Ratio	(D)=(A)*(C) Zero Deductible Loss	(E)=(D)-(B) Loss Net of Deductible
100,000	90,000	500	2%	2,000	1,500

Audit

The modeler actuary may be asked to attest to the actuarial soundness of the procedure for handling deductibles and policy limits. To the extent that historical data are used to develop mathematical depictions of deductibles and policy limit functions, demonstrate the goodness-of-fit of the data to fitted models. Justify changes from the prior submission in the relativities among corresponding deductible amounts for the same coverage.

A-6 Contents

A. The methods used in the development of contents loss costs shall be actuarially sound.

B. The relationship between the modeled building and contents loss costs shall be reasonable, based on the relationship between historical building and contents losses. Differences in the relationship of building and contents loss costs from those previously found acceptable shall be reasonable.

Purpose: A reasonable representation of contents losses is necessary in order to address policies that principally cover contents, such as tenants and condo unit owners policies.

Disclosures

1. Describe the methods used in the model to calculate loss costs for contents coverage.

2. Demonstrate that loss cost relationships between building and contents coverages are reasonable.

Audit

The modeler actuary may be asked to attest to the actuarial soundness of the procedure for calculating loss costs for contents coverage. To the extent that historical data are used to develop mathematical depictions of contents functions, demonstrate the goodness-of-fit of the data to fitted models. Justify changes from the prior submission in the relativities between loss costs for buildings and the corresponding loss costs for contents.

A-7 Additional Living Expenses (ALE)

A. The methods used in the development of Additional Living Expense (ALE) loss costs shall be actuarially sound.

B. ALE loss cost derivations shall consider the estimated time required to repair or replace the property.

C. The relationship between the modeled building and ALE loss costs shall be reasonable, based on the relationship between historical building and ALE losses. Differences in the relationship of building and ALE loss costs from those previously found acceptable shall be reasonable.

Purpose: Policies can cover varying levels of additional living expense. The time factor to repair/reconstruct the property should include variation due to abnormal working conditions or damage to the infrastructure.

Disclosures

1. Describe the methods used to develop loss cost for additional living expense coverage. State whether the model considers both direct and indirect loss to the building. For example, direct loss is for expenses paid to house policyholders in an apartment while their home is being repaired. Indirect loss is for expenses incurred for loss of power (e.g., food spoilage).

2. State the minimum threshold at which ALE loss is calculated (e.g., loss is estimated for building damage greater than 20% or only for category 3, 4, 5 events). Provide documentation of validation test results to verify the approach used.

Audit

The modeler actuary may be asked to attest to the actuarial soundness of the procedure for calculating loss costs for ALE coverage. Documentation and justification of the following will be reviewed:

A. The method of derivation and data on which the ALE vulnerability function is based;

B. Validation data specifically applicable to ALE;

C. Assumptions regarding the coding of ALE losses by insurers;

D. The effects of demand surge on ALE for Hurricane Andrew;

E. Assumptions regarding the variability of ALE by size of property;

F. Statewide application of ALE assumptions;

G. Assumptions regarding ALE for mobile homes, tenants, and condo unit owners exposure;

H. The methods used to incorporate the estimated time required to repair or replace the property;

I. The methodology and available validation for determining the extent of infrastructure damage and its effect on ALE costs.

To the extent that historical data are used to develop mathematical depictions of ALE functions, demonstrate the goodness-of-fit of the data to fitted models.

Form A-1: 30 Hypothetical Events

Thirty hypothetical events have been specified by the Commission consisting of five hurricanes, one for each hurricane category 1-5, at six different landfall locations; Jacksonville, Ft. Pierce, Miami, Ft. Myers, Tampa/St. Petersburg, and Panama City. Provide the maximum estimated one-minute sustained 10-meter wind speed over land associated with the events as well as the estimated loss by coverage type. Modeled estimated one-minute average wind speeds should be consistent with central pressure inputs.

A description of the events is contained in the file named **"FormA1Input03.xls"**. Provide this information on CD-ROM in both an Excel and a PDF format. The file name should include the abbreviated name of the modeler, the Standards year, and the Form name. Complete ***Form A-1*** using the specified file layout:

Estimated losses are requested in total and by coverage type for the 30 hypothetical events.

No.	Field Name	Description
INPUT		
1.	Event ID	Event identification 1-30
2.	Category	Saffir-Simpson Hurricane Category 1-5
3.	Central Pressure	Measured in millibars
4.	Radius of Maximum Winds	Measured in statute miles
5.	Forward Speed	Measured in miles per hour
6.	Landfall	Latitude and longitude of event at landfall location
7.	Location	General area of landfall
8.	Direction	Measured in degrees, assuming 0 degrees is north
9.	Radius of Hurricane Force Winds	Measured in statute miles
OUTPUT		
10.	Maximum Estimated Wind Speed	Maximum estimated one minute average wind speed over land for this event
11.	Total Estimated Loss	Total estimated loss summarized for building, appurtenant structures, contents and additional living expense
12.	Estimated Building Loss	Total estimated loss for building
13.	Estimated App. Structure Loss	Total estimated loss for appurtenant structures
14.	Estimated Contents Loss	Total estimated loss for contents
15.	Estimated ALE Loss	Total estimated loss for additional living expense

Form A-2: Loss Costs

Provide loss costs for each construction type for each ZIP Code in the sample data set named **"FormA2Input03.xls."** The following is a description of the requested file layout. Follow the instructions on ***Form A-2*** below. Note that fields 1-9 are the exposure fields from the sample data set. Fields 10-13 are for the loss costs (net of deductibles).

Provide the expected annual loss costs by construction type and coverage for each ZIP Code in the sample data. There are 1,479 ZIP Codes and 3 construction types; therefore, the completed file should have 4,437 records in total. If there are ZIP Codes in the sample data set that the model does not recognize as "valid," provide a list of such ZIP Codes and either a) the new ZIP Code to which the original one was mapped, or b) an indication that the insured values from this ZIP Code were not modeled. Loss cost data should be provided for all ZIP Codes given in the sample data set. That is, if no losses were modeled, the record should still be included in the completed file with loss cost of zero, and, if a ZIP Code was mapped to a new one, the resulting loss costs should be reported with the original ZIP Code. Provide the results on CD-ROM in both Excel and PDF format using the following file layout. The file name should include the abbreviated name of the modeler, the Standards year, and the Form name.

No.	Field Name	Description
Exposure Fields from Sample Data Set		
1	Analysis Date	Date of Analysis – YYYY/MM/DD
2	County Code	FIPS County Code
3	ZIP Code	5-digit ZIP Code
4	Construction Type	Use the following: 1 = Wood Frame, 2 = Masonry, 3 = Mobile Home
5	Deductible	1% (of the Building Value) policy deductible for each record (i.e., 0.01*$100,000)
6	Building Value	$100,000 for each record
7	Appurtenant Structures Value	$10,000 for each record
8	Contents Value	$50,000 for each record
9	Additional Living Expense Value	$20,000 for each record
Loss Costs (net of deductibles)		
10	Building Loss Cost*	Estimated expected annual loss cost for building divided by the building value modeled for each record ($100,000)
11	Appurtenant Structures Loss Cost*	Estimated expected annual loss cost for appurtenant structures divided by the appurtenant structures value modeled for each record ($10,000)
12	Contents Loss Cost*	Estimated expected annual loss cost for contents divided by the contents value modeled for each record ($50,000)
13	Additional Living Expense Loss Cost*	Estimated expected annual loss cost for additional living expense divided by the additional living expense value modeled for each record ($20,000)

**Round all loss costs to 6 decimal places*

All deductibles are a percentage of the Building Value and are policy-level deductibles; however, for reporting purposes, the policy deductible should be pro-rated to the individual coverage losses in proportion to the loss.

Example

Assume that a model analyzing Wood Frame properties in ZIP Code 33102 (Miami-Dade County) estimated the following:

Field Name	Value
Analysis Date	1999/11/15
County Code	Miami-Dade County = 86
ZIP Code	33102
Construction Type	Wood Frame = 1
Deductible	1% = 0.01*$100,000 = $1,000
Building Value	$100,000
Appurtenant Structures Value	$10,000
Contents Value	$50,000
Additional Living Expense Value	$20,000
Building Loss*	$10,000
Appurtenant Structures Loss*	$1,000
Contents Loss*	$2,500
Additional Living Expense Loss*	$500

**Represents 1st dollar losses (i.e., prior to application of deductibles)*

The $1,000 policy deductible would be applied as follows:

Deductible	1% = 0.01*$100,000=$1,000
Building Loss	$10,000-[($10,000÷$14,000)x$1,000]=$9,285.71
Appurtenant Structures Loss	$1,000-[($1,000÷$14,000)x$1,000]=$928.57
Contents Loss	$2,500-[($2,500÷$14,000)x$1,000]=$2,321.43
Additional Living Expense Loss	$500-[($500÷$14,000)x$1,000]=$464.29

The reported ***Form A-2*** data are shown below:

Field Name	Value
Analysis Date	1999/11/15
County Code	Miami-Dade County = 86
ZIP Code	33102
Construction Type	Wood Frame = 1
Deductible	1% = 0.01
Building Value	$100,000
Appurtenant Structures Value	$10,000
Contents Value	$50,000
Additional Living Expense Value	$20,000
Building Loss Cost	$9,285.71÷$100,000 = 0.092857
Appurtenant Structures Loss Cost	$928.57÷$10,000 = 0.092857
Contents Loss Cost	$2,321.43÷$50,000 = 0.046429
Additional Living Expense Loss Cost	$464.29÷$20,000 = 0.023214

Based on the above information, the data should be reported in the following format:

1999/11/15,86,33102,1,0.01,100000,10000,50000,20000,0.092857,0.092857,0.046429,0.023214

STATISTICAL STANDARDS

S-1 Use of Historical Data

A. The use of historical data in developing the model shall be supported by rigorous methods published in currently accepted scientific literature.

B. Modeled and historical results shall reflect agreement using currently accepted scientific and statistical methods.

Purpose: Many aspects of model development and implementation involve fitting a probability distribution to historical data for use in generating stochastic storms. Such fitted models should be checked to ensure that the distributions are reasonable. The chi-square goodness-of-fit test may not be a rigorous methodology for demonstrating the reasonableness of models of historical data.

This Standard explicitly requires the modelers to have the results of data fitting with probability distributions available for the model assessments. Also, this Standard requires the production of graphical and numerical statistical summaries by the modeler in advance of an audit (which could have the desirable effect in a self-audit of identifying potential problem areas).

Disclosures

1. Identify the form of the probability distributions used for each function or variable, if applicable. Identify statistical techniques used for the estimates and the specific goodness-of-fit tests applied. Describe whether the p-values associated with the fitted distributions provide a reasonable agreement with the historical data.

2. Provide the source and the number of years of the historical data set used to develop probability distributions for specific hurricane characteristics. If any modifications have been made to the data set, describe them in detail and their appropriateness.

3. Describe the nature and results of the tests performed to validate the wind speeds generated.

4. Provide the date of loss of the insurance company data available for validation and verification of the model.

5. Provide an assessment of uncertainty using confidence intervals or other accepted scientific characterizations of uncertainty.

6. Provide a completed Form S-10, Probability of Hurricanes per Year.

7. Provide a completed Form S-11, Probable Maximum Loss.

Audit

Graphical comparisons of modeled and historical data and goodness-of-fit tests will be reviewed. Examples include hurricane frequencies, tracks, intensities, and physical damage. Forms S-10 and S-11 will be reviewed.

The modeler's characterization of uncertainty for wind speed, damage estimates, annual loss, and loss costs will be reviewed.

S-2 Sensitivity Analysis for Model Output

The modeler shall have assessed the sensitivity of temporal and spatial outputs with respect to the simultaneous variation of input variables using currently accepted scientific and statistical methods and have taken appropriate action.

Purpose: Sensitivity analysis goes beyond mere quantification of the magnitude of the output (e.g. wind speed, loss cost, etc.) 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 modelers 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 model output. The simultaneous variation of the input variables is an important diagnostic tool for the modelers and provides needed assurance of the robustness and viability of the model output.

Disclosures

1. Provide a detailed explanation of the sensitivity analyses that were performed on the model.

2. Provide a description of the statistical methods used to perform the sensitivity analysis.

3. Identify the most sensitive aspect of the model and the basis for making this determination. Provide a full discussion of the degree to which these sensitivities affect output results and illustrate with an example.

4. Describe other aspects of the model that may have a significant impact on the sensitivities in output results.

5. Describe actions taken in light of the sensitivity analyses performed.

6. Provide a completed Form S-12, Hypothetical Events for Sensitivity and Uncertainty Analysis (requirement for new modeling companies which have not previously provided the Commission with this analysis).

Audit

The modeler's sensitivity analysis will be reviewed in detail. Statistical techniques used to perform sensitivity analysis shall be explicitly stated. The results of the sensitivity analysis displayed in graphical format (e.g., contour plots with temporal animation) will be reviewed.

Form S-12 will be reviewed for new modeling companies which have not previously provided the Commission with this analysis.

S-3 Uncertainty Analysis for Model Output

The modeler shall have performed an uncertainty analysis on the temporal and spatial outputs of the model using currently accepted scientific and statistical methods and have taken appropriate action. The analysis shall identify and quantify the extent that input variables impact the uncertainty in model output as the input variables are simultaneously varied.

Purpose: Modelers have traditionally quantified the magnitude of the uncertainty in the output (e.g. wind speed, loss cost, etc.) 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 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 for the modelers and provides needed assurance of the robustness and viability of the model output.

Disclosures

1. Provide a detailed explanation of the uncertainty analyses that were performed on the model.

2. Provide a description of the statistical methods used to perform the uncertainty analysis.

3. Identify the major contributors to the uncertainty in 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.

4. Describe other aspects of the model that may have a significant impact on the uncertainties in output results.

5. Describe actions taken in light of the uncertainty analyses performed.

6. For new modeling companies, which have not previously provided this analysis to the Commission, Form S-12 was disclosed under Standard S-2 and will be used in the verification of Standard S-3.

Audit

The modeler's uncertainty analysis will be reviewed in detail. Statistical techniques used to perform uncertainty analysis shall be explicitly stated. The results of the uncertainty analysis displayed in graphical format (e.g., contour plots with temporal animation) will be reviewed.

Form S-12 will be reviewed for new modeling companies which have not previously provided the Commission with this analysis.

S-4 County Level Aggregation

At the county level of aggregation, the contribution to the error in loss costs estimates induced by the sampling process shall be negligible based upon currently accepted scientific and statistical methods.

Purpose: The intent of this Standard is to ensure that sufficient runs of the simulation have been made and a suitable sampling design invoked so that the contribution to the error of the loss cost estimates due to its probabilistic nature is negligible.

Disclosures

1. Describe the sampling plan used to obtain the average annual loss costs and output ranges. For a direct Monte Carlo simulation, indicate steps taken to determine sample size. For importance sampling design, describe the underpinnings of the design.

Audit

Provide a graph assessing the accuracy associated with a low impact area such as Nassau County. We would expect that if the contribution error in an area such as Nassau County is small, the error in the other areas would be small as well. Assess where appropriate, the contribution of simulation uncertainty via confidence intervals.

S-5 Replication of Known Hurricane Losses

The model shall reasonably replicate incurred losses on a sufficient body of past hurricane events, including the most current data available to the modeler. This Standard applies separately to personal residential and, to the extent data are available, to mobile homes. Personal residential experience may be used to replicate building-only and contents-only losses. The replications shall be produced on an objective body of loss data by county or an appropriate level of geographic detail.

Purpose: Each model should reasonably replicate past known events for storm frequency and severity. The meteorological Standards assess the model's storm frequency projections and storm tracks. This Standard applies to severity or the combined effects of wind field, vulnerability functions, and insurance loss limitations. To the extent possible, each of the three functions of wind field, vulnerability, and insurance should be separately tested and verified.

Given a past storm event and a book of insured properties at the time of the storm, the model should be able to provide expected losses.

Disclosures

1. Describe the nature and results of the analyses performed to validate the loss estimates generated by the model.

2. Provide a standardized residual plot of the modeled and historical losses. (y-axis is standardized residuals and x-axis is actual losses.) Provide separate plots for personal residential and, if available, for mobile homes.

3. Provide a completed Form S-6, Five Validation Comparisons.

Audit

The following information for each insurer and hurricane will be reviewed:

1. The validity of the model assessed by comparing expected losses produced by the model to actual observed losses incurred by insurers at both the state and county level,

2. The version of the model used to calculate modeled losses for each storm provided,

3. A general description of the data and its source,

4. A disclosure of any material mismatch of exposure and loss data problems, or other material consideration,

5. The date of the exposures used for modeling and the date of the hurricane,

6. An explanation of differences in the actual and modeled storm parameters,

7. A listing of the departures, if any, in the wind field applied to a particular hurricane for the purpose of validation and the wind field used in the model under consideration,

8. The type of property used in each storm to address:
    a. Personal versus commercial
    b. Residential structures
    c. Mobile homes
    d. Condominiums
    e. Buildings only
    f. Contents only,

9. The inclusion of demand surge, storm surge, loss adjustment expenses, or law and ordinance coverage in the actual losses, or the modeled losses.

The following documentation will be reviewed:

1. Publicly available documentation referenced in the submission,

2. The data sources excluded from validation and the reasons for excluding the data from review by the Commission (if any),

3. An analysis that identifies and explains anomalies observed in the validation data,

4. User input sheets for each insurer and hurricane detailing specific assumptions made with regard to exposed property.

The confidence intervals used to gauge the comparison between historical and modeled losses will be reviewed.

Form S-6 will be reviewed.

S-6 Comparison of Estimated Hurricane Loss Costs

The difference, due to uncertainty, between historical and modeled annual average statewide loss costs shall be statistically reasonable.

Disclosures

1. Describe the nature and results of the tests performed to validate the expected loss estimates generated. If a set of simulated hurricanes or simulation trials was used to determine these loss estimates, specify the convergence tests that were used and the results. Specify the number of hurricanes or trials that were used.

2. Identify differences, if any, in how the model produces loss costs for specific historical events versus loss costs for events in the stochastic hurricane set.

3. Provide the annual average zero deductible statewide loss costs produced using the list of hurricanes in the Official Storm Set based on the 1998 Florida Hurricane Catastrophe Fund's (FHCF) aggregate personal residential exposure data, as of November 1, 1999 (hlpm1998.exe). Provide a comparison with the statewide loss costs produced by the model on an average industry basis. Provide the 95% confidence interval on the differences between the mean of the historical and modeled loss.

4. Provide the annual average zero deductible statewide loss costs produced using the list of hurricanes in the Official Storm Set based on the 2002 Florida Hurricane Catastrophe Fund's (FHCF) aggregate personal residential exposure data, as of August 1, 2003 (hlpm2002.exe). Provide a comparison with the statewide loss costs produced by the model on an average industry basis. Provide the 95% confidence interval on the differences between the mean of the historical and modeled loss.

5. Provide a completed Form S-4, Zero Deductible Loss Costs by ZIP Code.

6. Provide a completed Form S-5, Average Annual Zero Deductible Statewide Loss Costs.

7. Provide a completed Form S-7, Official Storm Set Average Annual Zero Deductible Statewide Loss Costs.

8. Provide a completed Form S-8, Hurricane Andrew Loss Costs.

9. Provide a completed Form S-9, Distribution of Hurricanes by Size.

Audit

Forms S-4, S-5, S-7, S-8, and S-9 will be reviewed.

Justify the following:

1. Meteorological parameters,

2. The effect of by-passing storms,

3. The effect of actual storms that have two landfalls impacting Florida,

4. The departures, if any, from the wind field, vulnerability functions, or insurance functions applied to the actual hurricanes for the purposes of this test and those used in the model under consideration, and

5. Exposure assumptions.

S-7 Output Ranges

For a model previously found acceptable by the Commission, the differences in the updated output ranges shall be reasonable.

Disclosures

1. Provide an explanation of the differences in the output ranges between the prior year and the current year submission.

2. Provide justification for changes from the prior submission of greater than ten percent in weighted average loss costs for any county, specifically by county.

3. Provide justification for changes from the prior submission of ten percent or less in the weighted average loss costs for any county, in the aggregate.

4. Provide a completed Form S-1A, Output Ranges using the 1998 Florida Hurricane Catastrophe Fund aggregate exposure data.

5. Provide a completed Form S-1B, Output Ranges using the 2002 Florida Hurricane Catastrophe Fund aggregate exposure data.

6. Provide a completed Form S-2, Percentage Change in Output Ranges.

7. Provide a completed Form S-3, Percentage Change in Output Ranges by County.

Audit

Forms S-1A, S-1B, S-2, and S-3 will be reviewed.

Justify the following:

1. Changes from the prior submission of greater than five percent in weighted average loss costs for any county.

2. Changes from the prior submission of five percent or less in weighted average loss costs for any county.

Form S-1A: Output Ranges

Provide output ranges in the format shown in the file named **"2003FormS1A.xls"**. A hard copy of the output range spreadsheets should be included with the submission at the end of the Statistical Standards section. Provide the output ranges on CD-ROM in both Excel and PDF format as specified. The file name should include the abbreviated name of the modeler, the Standards year, and the Form name.

Provide loss costs by county. Within each county, loss costs should be shown separately per $1,000 of exposure for personal residential, renters, condo unit owners, and mobile home; for each major deductible option; and by construction type. For each of these categories using ZIP Code centroids, the output range should show the highest loss cost, the lowest loss cost, and the weighted average loss cost based on the 1998 Florida Hurricane Catastrophe Fund (FHCF) aggregate exposure data provided to each modeler in the file named **"hlpm1998.exe"**. A file named **"99FHCFWts.xls"** has also been provided for use in determining the weighted average loss costs. Include the statewide range of loss costs (i.e., low, high, and weighted average). For each of the loss costs provided, identify what that loss cost represents by line of business, deductible option, construction type, and coverages included, i.e., structure, contents, appurtenant structures, or additional living expenses as specified.

Output ranges should be computed assuming no modifications for a non-mitigated average building.

Modelers should indicate if per diem is used in producing loss costs for Coverage D (ALE) in the output ranges. If a per diem rate is used in the submission, a rate of $150.00 per day per policy should be used.

If a modeler has loss costs for a ZIP Code for which there is no exposure, then the modeler should give the loss costs zero weight (i.e., assume the exposure in that ZIP Code is zero). Provide a list of those ZIP Codes where this occurs.

If the modeler does not have loss costs for a ZIP Code for which there is some exposure, the modeler should not assume such loss costs are zero, but should use only the exposures for which it has loss costs in calculating the weighted average loss costs. Provide a list of the ZIP Codes where this occurs.

Form S-1B: Output Ranges

Provide output ranges in the format shown in the file named "**2003FormS1B.xls"**. A hard copy of the output range spreadsheets should be included with the submission at the end of the Statistical Standards section. Provide the output ranges on CD-ROM in both Excel and PDF format as specified. The file name should include the abbreviated name of the modeler, the Standards year, and the Form name.

Provide loss costs by county. Within each county, loss costs should be shown separately per $1,000 of exposure for personal residential, renters, condo unit owners, and mobile home; for each major deductible option; and by construction type. For each of these categories using ZIP Code centroids, the output range should show the highest loss cost, the lowest loss cost, and the weighted average loss cost based on the 2002 Florida Hurricane Catastrophe Fund (FHCF) aggregate exposure data provided to each modeler in the file named **"hlpm2002.exe"**. A file named **"02FHCFWts.xls"** has also been provided for use in determining the weighted average loss costs. Include the statewide range of loss costs (i.e., low, high, and weighted average). For each of the loss costs provided, identify what that loss cost represents by line of business, deductible option, construction type, and coverages included, i.e., structure, contents, appurtenant structures, or additional living expenses as specified.

Output ranges should be computed assuming no modifications for a non-mitigated average building.

Modelers should indicate if per diem is used in producing loss costs for Coverage D (ALE) in the output ranges. If a per diem rate is used in the submission, a rate of $150.00 per day per policy should be used.

If a modeler has loss costs for a ZIP Code for which there is no exposure, then the modeler should give the loss costs zero weight (i.e., assume the exposure in that ZIP Code is zero). Provide a list of those ZIP Codes where this occurs.

If the modeler does not have loss costs for a ZIP Code for which there is some exposure, the modeler should not assume such loss costs are zero, but should use only the exposures for which it has loss costs in calculating the weighted average loss costs. Provide a list of the ZIP Codes where this occurs.

Output Range Specifications
"Owners" Policy Type

Coverage A: Structure

- Amount of Insurance = $100,000
- Replacement Cost Included Subject to Coverage "A" Limit
- Ordinance or Law Not Included

Coverage B: Appurtenant Structures

- Amount of Insurance = 10% of Coverage "A" Amount
- Replacement Cost Included Subject to Coverage "B" Limit
- Ordinance or Law Not Included

Coverage C: Contents

- Amount of Insurance = 50% of Coverage "A" Amount
- Replacement Cost Included Subject to Coverage "C" Limit

Coverage D: Additional Living Expense

- Amount of Insurance = 20% of Coverage "A" Amount
- Time Limit = 12 Months
- Per Diem = $150.00/day per policy, if used

- Loss Costs per $1,000 should be related to the Coverage "A" Amount.

- For weighting the Coverage "D" Loss Costs, use the file named **"99FHCFWts.xls"** for Form S-1A and **"02FHCFWts.xls"** for Form S-1B for distribution for Coverage "A."

- Loss Costs for the various deductibles should be determined based on "per occurrence" deductibles.

- Explain any deviations and differences from the prescribed format above.

- Specify the model name and version number reflecting the release date as a footnote on each page of the output.

Output Range Specifications
"Renters" Policy Type

Coverage C: Contents

- Amount of Insurance = $25,000
- Replacement Cost Included Subject to Coverage "C" Limit

Coverage D: Additional Living Expense

- Amount of Insurance = 40% of Coverage "C" Amount
- Time Limit = 12 Months
- Per Diem = $150.00/day per policy, if used

- Loss Costs per $1,000 should be related to the Coverage "C" Amount.

- For weighting the Coverage "D" Loss Costs, use the file named **"99FHCFWts.xls"** for Form S-1A and **"02FHCFWts.xls"** for Form S-1B for distribution for Coverage "C."

- Loss Costs for the various deductibles should be determined based on "per occurrence" deductibles.

- For weighting the Coverage "C" Loss Costs, use the file named **"99FHCFWts.xls"** for Form S-1A and **"02FHCFWts.xls"** for Form S-1B for distribution for Coverage "C."

- Explain any deviations and differences from the prescribed format above.

- Specify the model name and version number reflecting the release date as a footnote on each page of the output.

Output Range Specifications
"Condo Unit Owners" Policy Type

Coverage A: Structure

- Amount of Insurance = 10% of Coverage "C" Amount
- Replacement Cost Included Subject to Coverage "A" Limit

Coverage C: Contents

- Amount of Insurance = $50,000
- Replacement Cost Included Subject to Coverage "C" Limit

Coverage D: Additional Living Expense

- Amount of Insurance = 40% of Coverage "C" Amount
- Time Limit = 12 Months
- Per Diem = $150.00/day per policy, if used

- Loss Costs per $1,000 should be related to the Coverage "C" Amount.

- For weighting the Coverage "D" Loss Costs, use the file named **"99FHCFWts.xls"** for Form S-1A and **"02FHCFWts.xls"** for Form S-1B for distribution for Coverage "C."

- Loss Costs for the various deductibles should be determined based on "per occurrence" deductibles.

- For weighting the Coverage "C" Loss Costs, use the file named **"99FHCFWts.xls"** for Form S-1A and **"02FHCFWts.xls"** for Form S-1B for distribution for Coverage "C."

- Explain any deviations and differences from the prescribed format above.

- Specify the model name and version number reflecting the release date as a footnote on each page of the output.

Output Range Specifications
"Mobile Home Owners" Policy Type

Coverage A: Structure

- Amount of Insurance = $50,000
- Replacement Cost Included Subject to Coverage "A" Limit

Coverage B: Appurtenant Structures

- Amount of Insurance = 10% of Coverage "A" Amount
- Replacement Cost Included Subject to Coverage "B" Limit

Coverage C: Contents

- Amount of Insurance = 50% of Coverage "A" Amount
- Replacement Cost Included Subject to Coverage "C" Limit

Coverage D: Additional Living Expense

- Amount of Insurance = 20% of Coverage "A" Amount
- Time Limit = 12 Months
- Per Diem = $150.00/day per policy, if used

- Loss Costs per $1,000 should be related to the Coverage "A" Amount

- For weighting the Coverage "D" Loss Costs, use the file named **"99FHCFWts.xls"** for Form S-1A and **"02FHCFWts.xls"** for Form S-1B for distribution for Coverage "A."

- Loss Costs for the various deductibles should be determined based on "per occurrence" deductibles.

- Explain any deviations and differences from the prescribed format above.

- Specify the model name and version number reflecting the release date as a footnote on each page of the output.

Form S-2: Percentage Change In Output Ranges

Provide the percentage change in the weighted average loss costs using the 1998 Florida Hurricane Catastrophe Fund's (FHCF) aggregate personal residential exposure data, as of November 1, 1999 only, from the output ranges from the prior year submission for the following:

- statewide (overall percentage change),
- by region, as defined in ***Figure 4*** – North, Central and South,
- by coastal and inland counties, as defined in ***Figure 5***.

Provide this Form on CD-ROM in both an Excel and a PDF format. The file name should include the abbreviated name of the modeler, the Standards year, and the Form name.

Figure 4

State of Florida by North/Central/South Regions

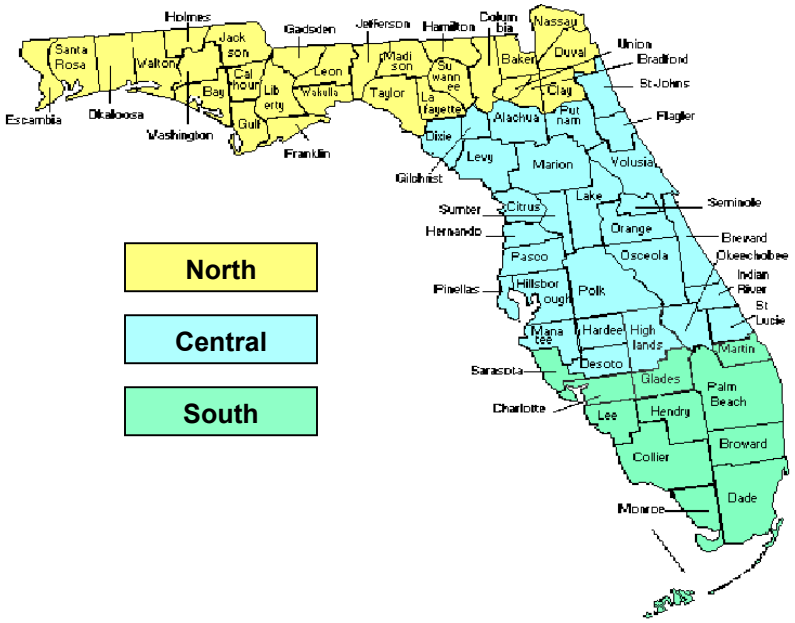
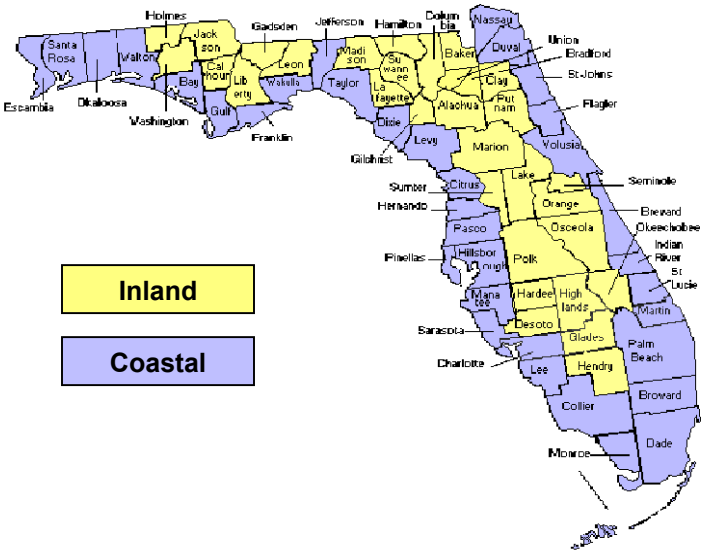


Figure 5

State of Florida by Coastal/Inland Counties



Form S-3: Percentage Change in Output Ranges by County

Provide a color-coded map reflecting the percentage changes in the weighted average loss costs from the output ranges by county using the 1998 Florida Hurricane Catastrophe Fund's (FHCF) aggregate personal residential exposure data, as of November 1, 1999 only. Counties with a negative percentage change (reduction in loss costs) would be indicated with shades of blue; counties with a positive percentage change (increase in loss costs) would be indicated with shades of red, and counties with no percentage change would be white. The larger the percentage change, the more intense the color-shade.

Form S-4: Zero Deductible Loss Costs by ZIP Code

Provide thematic maps (with a minimum of 6 value ranges) displaying zero deductible loss costs by 5-digit ZIP Code for frame, masonry, and mobile home.

Form S-5: Average Annual Zero Deductible Statewide Loss Costs

For models that have been previously found acceptable by the Florida Commission on Hurricane Loss Projection Methodology, provide the estimations for the 1998 FHCF exposure data for the current year and the two most recent years. For the 2002 FHCF exposure data, only the current year is required.

Average Annual Zero Deductible Statewide Loss Costs

Time Period	Historical Hurricanes		Produced by Model	
Current Year				
First Prior				
Second Prior				

Form S-6: Five Validation Comparisons

Provide five (5) validation comparisons of actual exposures and loss to modeled exposures and loss. These comparisons must be provided by line of insurance, construction type, policy coverage, county or other level of similar detail in addition to total losses. Include loss as a percent 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 loss. If this is not available, use exposures for only those policies that had a loss. Specify which was used. Also, specify the name of the hurricane event compared.

Example Formats:

Hurricane = _____
Exposure = Total exposure or loss only (please specify) _____

	Company Actual	Modeled	
Construction	**Loss / Exposure**	**Loss / Exposure**	**Difference**
Wood Frame			
Masonry			
Other (specify)			
Total			

Hurricane = _____
Exposure = Total exposure or loss only (please specify) _____

	Company Actual	Modeled	
Coverage	**Loss / Exposure**	**Loss / Exposure**	**Difference**
A			
B			
C			
D			
Total			

Hurricane = _____
Exposure = Total exposure or loss only (please specify) _____

	Company Actual	Modeled	
Line of Insurance	**Loss / Exposure**	**Loss / Exposure**	**Difference**
Total			

Form S-7: Official Storm Set Average Annual Zero Deductible Statewide Loss Costs

Provide the monetary contribution to the average annual personal residential zero deductible statewide loss costs from each specific storm in the Official Storm Set. Provide this Form on CD-ROM in both an Excel and a PDF format. The file name should include the abbreviated name of the modeler, the Standards year, and the Form name.

Form S-8: Hurricane Andrew Loss Costs

Provide the monetary contribution (in 1992 dollars) from Hurricane Andrew for each affected ZIP Code. Provide this Form on CD-ROM in both an Excel and a PDF format. The file name should include the abbreviated name of the modeler, the Standards year, and the Form name.

Form S-9: Distribution of Hurricanes by Size

A. Provide a detailed explanation of how the Expected Annual Hurricane Losses and Return Time are calculated.

B. Complete **Form S-9** showing the Distribution of Hurricanes by Size. For the Expected Annual Hurricane Losses column, provide personal residential, zero deductible statewide loss costs based on the 2002 Florida Hurricane Catastrophe Fund's (FHCF) aggregate exposure data found in the file named "**hlpm2002.exe.**"

   In the column, Return Time (Years), provide the return time associated with the average loss within the ranges indicated on a cumulative basis.

   For example, if the average loss is $4,705 million for the range $4,501 million to $5,000 million, provide the return time associated with a loss that is $4,705 million or greater.

   For each range limit in millions ($1,001-$1,500, $1,501-$2,000, $2,001-$2,500) the average loss within that range should be identified and then the return time associated with that loss calculated. The return time is then the reciprocal of the probability of the loss equaling or exceeding this average loss size.

   The probability of equaling or exceeding the average of each range should be smaller as the ranges increase (and the average losses within the ranges increase). Therefore, the return time associated with each range and average loss within that range should be larger as the ranges increase. Return times should be based on cumulative probabilities.

   A return time for an average loss of $4,705 million within the $4,501-$5,000 million range should be lower than the return time for an average loss of $5,455 million associated with a $5,001- $6,000 million range.

C. Provide this Form on CD-ROM in both an Excel and a PDF format. The file name should include the abbreviated name of the modeler, the Standards year, and the Form name.

Form S-9: Distribution of Hurricanes by Size

LIMIT RANGE (MILLIONS)			TOTAL LOSS	AVERAGE LOSS (Millions)	NUMBER OF STORMS	EXPECTED ANNUAL HURRICANE LOSSES*	RETURN TIME (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					
$ 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	$ 85,000					
$ 85,001	to	$ Maximum					
Total							

*Personal residential zero deductible statewide loss using 2002 FHCF exposure data – file name: **hlpm2002.exe.**

Form S-10: Probability of Hurricanes per Year

Complete the table below showing the Probability of Hurricanes per Year.

Model Results
Probability of Hurricanes per Year

Number Of Hurricanes Per Year	Historical Probability	Modeled Probability*
0	0.5825	
1	0.2621	
2	0.1359	
3	0.0194	
4	0.0000	
5	0.0000	
6	0.0000	
7	0.0000	
8	0.0000	
9	0.0000	
10 or more	0.0000	

**Round to 4 decimal places*

Form S-11: Probable Maximum Loss (PML)

Provide estimates of the insured loss for various probability levels using the hypothetical data set provided in the file named **"FormA2Input03.xls."** Provide the total average annual loss for the PML distribution. If the methodology of your model does not allow you to produce a viable answer, please state so and why.

Part A

Return Time (years)	Probability of Exceedance	Estimated Loss
Top Event	_____	_____
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

Mean (Total Average Annual Loss) _____

Median _____

Standard Deviation _____

Interquartile Range _____

Sample Size _____

Form S-12: Hypothetical Events for Sensitivity and Uncertainty Analysis (requirement for new modeling companies which have not previously provided the Commission with this analysis)

Provide output in ASCII files based on running a series of storms as provided in the Excel file "**FormS12Input03.xls.**" Specifically, the output shall consist of wind speeds (in miles per hour for one minute sustained 10-meter winds) at hourly intervals over a 21×46 grid for the 500 combinations (600 combinations if the second quantile in the following list is used) of initial conditions specified in the Excel file for the following model inputs:

- CP = central pressure (in millibars)
- Rmax = radius of maximum winds (in statute miles)
- VT = translational velocity (forward speed in miles per hour)
- Quantiles for other input used by the modeler ($0 \le p \le 1$), e.g. Holland B parameter
- Quantiles for possible additional input variable (use is optional)

The value of CP in the Excel file will be used by some modelers as a direct input while other modelers will use CP as the basis for calculating pressure difference, which will then be used as an input. Modelers should indicate whether CP was used as a direct input or as the basis for calculating pressure difference. Rmax and VT are to be used as direct inputs.

The fourth (and optional fifth) input in the above list specifies quantiles ($0 \le p \le 1$) of the distribution for any remaining model input such as the Holland B parameter. Quantiles from 0 to 1 have been provided in the Excel input file rather than specific values since modelers may use different ranges and distributions for the Holland B parameter or other input variables.

As an illustration, if the quantile has been specified as 0.345 in the Excel input file, then the modeler should input the specific value of x into the model such that $P(X \le x) = 0.345$ where X is a random variable representing the distribution of the Holland B parameter or other input variable used by the modeler.

If quantile input variables are used, describe how the fourth and/or fifth input variables were used and provide the specific values that correspond to the quantiles in Form S-12. For example, if the first quantile input is used for the Holland B parameter, then the modeler needs to make that known and provide the specific values of the Holland B parameter that were used on each run.

The Excel input file contains 500 (or 600) combinations of initial conditions for each of three categories of storms (1, 3 and 5), which follow a straight due west track passing through the point (25.7739N, 80.1300W). These storms are similar to those in ***Form A-1***, event ID 11, 13 and 15. The first 100 combinations of initial conditions for storm categories 1, 3 and 5 are used in sensitivity analysis calculations. These initial conditions are given in the first worksheet (Sen Anal all Variables) of the Excel input file. The second set of 100 initial conditions for storm categories 1, 3 and 5 are given in the second worksheet (Unc Anal for CP) in the Excel input file. These conditions will be used in the uncertainty analysis for CP. The third worksheet (Unc Anal for Rmax), fourth worksheet (Unc Anal for VT), fifth worksheet (Unc Anal for Quantile 1), and sixth worksheet (Unc Anal for Quantile 2) are similar to the second worksheet and are used for

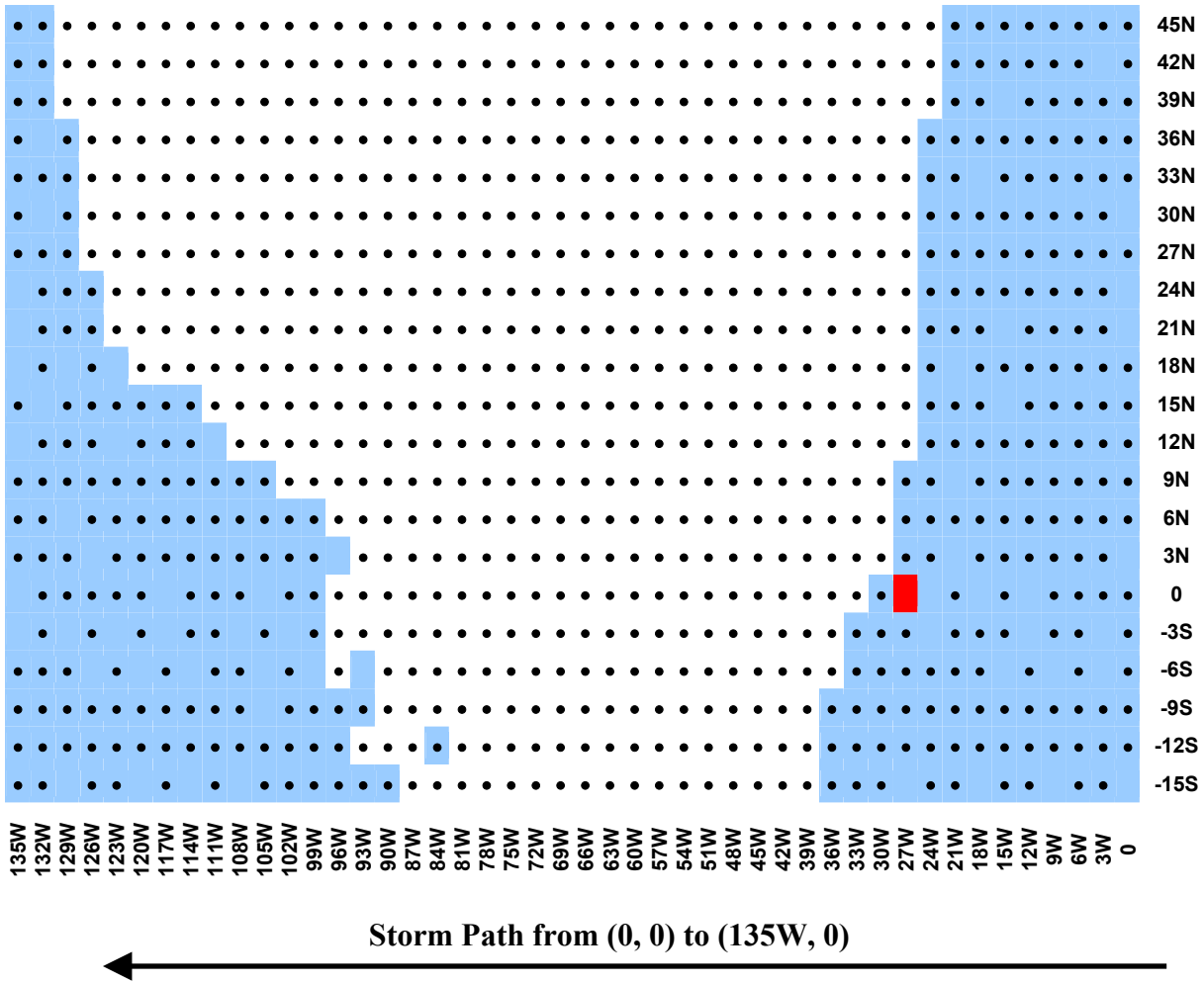
performing uncertainty analyses for Rmax, VT and the input variable corresponding to the given quantiles, respectively.

Depending on the operational model, each of the 500 (or 600) simulated hypothetical events may not produce a maximum wind speed over the grid within the category given in the Saffir-Simpson scale. This is to be expected due to the deviation from the mean levels in a specific simulated event (for example, higher than average central pressure, slower than average forward speed could lead to a weak storm) and the grid resolution may not detect the maximum wind speed. However, the modeler should provide the maximum wind speed produced over the 12 hours, if available, which may occur at an intermediate time point. For example, if the maximum wind speed occurs at 1.5 hours, this wind speed is the value that should be provided.

The 21×46 grid of coordinates uses an approximate 3 statute mile spacing and is depicted in ***Figure 6*** for all three storm categories. For purposes of storm decay, the modeler is instructed to use existing terrain consistent with the grid in ***Figure 6***.

The point (0, 0) is the location of the center of the storm at time 0, and is 30 miles east of the landfall location (25.7739N, 80.1300W), identified by the red rectangle in ***Figure 6***. The exact latitudes and longitudes for the 966 vertices in the grid (21×46) are given in the seventh worksheet of the Excel input file.

Figure 6



Provide output on CD-ROM in ASCII and PDF format. Five output files (or six if second quantile input variable is used) should be provided for each of the three storm categories. These files shall be named as shown in ***Figure 7***:

Figure 7

Summary of Form S-12 Input and Output Files*

Storm Category	Input Values given in FormS12Input03.xls file	Output File	Modeler Wind Speed Output File Name
1	Sensitivity Analysis all Variables	1	XXX03FormS121SA.dat
	Uncertainty Analysis CP	2	XXX03FormS121UACP.dat
	Uncertainty Analysis Rmax	3	XXX03FormS121UARmax.dat
	Uncertainty Analysis VT	4	XXX03FormS121UAVT.dat
	Uncertainty Analysis Quantile	5	XXX03FormS121UAQuantile 1.dat
3	Sensitivity Analysis all Variables	6	XXX03FormS123SA.dat
	Uncertainty Analysis CP	7	XXX03FormS123UACP.dat
	Uncertainty Analysis Rmax	8	XXX03FormS123UARmax.dat
	Uncertainty Analysis VT	9	XXX03FormS123UAVT.dat
	Uncertainty Analysis Quantile	10	XXX03FormS123UAQuantile 1.dat
5	Sensitivity Analysis all Variables	11	XXX03FormS125SA.dat
	Uncertainty Analysis CP	12	XXX03FormS125UACP.dat
	Uncertainty Analysis Rmax	13	XXX03FormS125UARmax.dat
	Uncertainty Analysis VT	14	XXX03FormS125UAVT.dat
	Uncertainty Analysis Quantile	15	XXX03FormS125UAQuantile 1.dat

*If the second quantile input variable is used, a sixth output file will be required for each storm category.

Each of the files will contain 96,600 lines (100×21×46 = 96,600), each written according to the format (3I5,14F6.1).

Note: Use of ASCII files reduces the size of the files. Zipping the ASCII files is encouraged as it greatly reduces the file size.

Each row in the output files should contain the following values:

1. Sample number (1-100)
2. E-W Grid Coordinate (0, 3, 6, 9, 12, 15, …, 135)
3. N-S Grid Coordinate (-15, -12, -9, -6, -3, 0, 3, 6, 9, …, 45)
4. Wind speed at time 0hr
5. Wind speed at time 1hr
6. Wind speed at time 2hr
7. Wind speed at time 3hr
8. Wind speed at time 4hr
9. Wind speed at time 5hr
10. Wind speed at time 6hr
11. Wind speed at time 7hr
12. Wind speed at time 8hr
13. Wind speed at time 9hr
14. Wind speed at time 10hr
15. Wind speed at time 11hr

16. Wind speed at time 12hr
17. Maximum wind speed*

*This is the maximum wind speed overall, if produced. Otherwise, provide the maximum wind speed over the 13 time points.

Successful completion of ***Form S-12*** demonstrates that the modeler 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.

Form S-12 Uncertainty and Sensitivity Analysis Extended to Loss Cost

In addition to uncertainty and sensitivity analyses performed for wind speed in ***Form S-12***, modelers are to perform uncertainty and sensitivity analyses for loss cost using a $100,000 fully insured structure with a zero deductible policy at each of the 586 non-shaded grid points in ***Figure 6***. The Excel input file contains a seventh worksheet (Land-Water ID) that lists the 966 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 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

The Professional Team will extend analyses to loss cost based on a surrogate damage function as part of its preparation prior to reviewing the modeler's internal analyses (using the model's actual damage functions) during the on-site reviews. The modeler shall present to the Professional Team their analysis of their model using the model's vulnerability functions.

The Professional Team will use commercial software to create contour plots based on ***Form S-12*** input and output for the following:

Hourly wind speed for each storm category
Hourly standardized regression coefficients for sensitivity analysis
Expected percentage reduction in the variance of wind speed for uncertainty analysis
Loss cost based on the Professional Team's surrogate damage function

A summary of all the contour plots is given in ***Figure 8***.

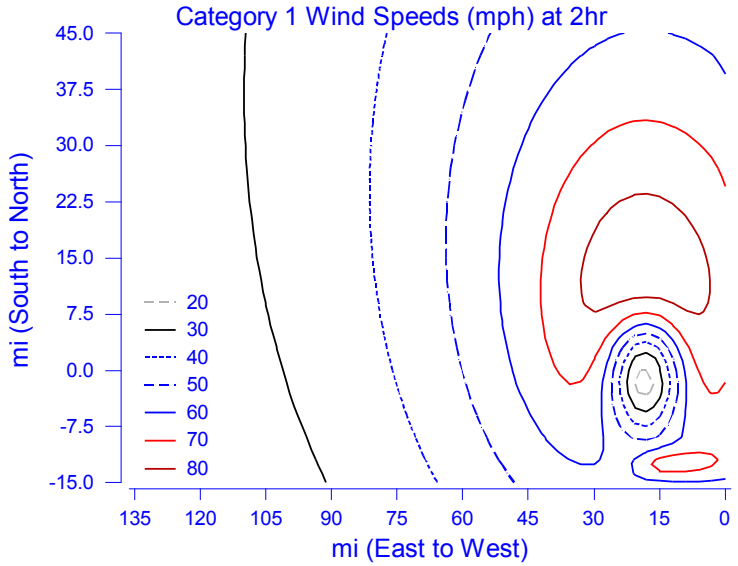
Figure 8

Summary of Contour Plots

Model Output	Contour Plot
Wind Speed	Hourly plots for the wind speeds in output files 1, 6 and 11 in ***Figure 7*** (39 contour plots). See example contour plot provided in ***Figure 9***.
Sensitivity Analysis	Hourly plots of standardized regression coefficients based on ***Form S-12*** input as specified in ***Figure 7*** and the corresponding wind speed output files 1, 6 and 11 in ***Figure 7*** (39 contour plots). See example contour plot provided in ***Figure 10***.
Uncertainty Analysis	Hourly plots of the expected percentage reduction in variance based on ***Form S-12*** input as specified in ***Figure 7*** and the corresponding output files (39 contour plots for each of the following input variables), which are as follows: Central pressure: output files 2, 7 and 12 in ***Figure 7*** Radius of maximum winds: output files 3, 8 and 13 in ***Figure 7*** Translational velocity: output files 4, 9 and 14 in ***Figure 7*** Quantile: output files 5, 10, and 15 in ***Figure 7*** See example contour plot provided in ***Figure 11***.
Loss Cost	Loss cost based on the maximum wind speed recorded over the 12hr time period in output files 1, 6 and 11 in ***Figure 7*** is to be calculated at each land-based grid point in ***Figure 6***. The 586 land-based grid points in ***Figure 6*** are identified in the last worksheet (Land-Water ID) of the ***Form S-12*** input file. Since there are 100 input vectors for each storm category, there are 100 estimates of loss cost at each of the land-based grid points. The contour plots are based on these values expressed as a percentage. See example loss cost contour plot provided in ***Figure 12***.

Figure 9 is a contour plot of wind speed (mph) for a Category 1 hurricane at 2hr. Contours in this figure represent average wind speeds over all 100 input vectors at each grid point at t=2hr. The dark red and red contours represent hurricane or near hurricane force winds. These contours show the effect of decay as the storm moves from right to left across the grid as time increases.

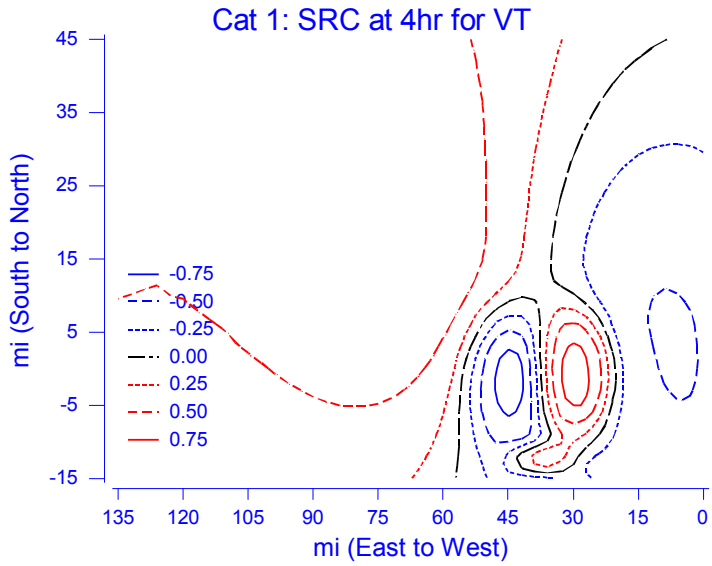
Figure 9



Average Wind Speed (mph) Contours for Category 1 Hurricane at 2hr

Figure 10 shows contours of standardized regression coefficients (SRC) for VT for a Category 1 hurricane at 4hr. 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. The contours in this figure represent average SRCs for VT over all 100 input vectors at each grid point at t=4hr. Red contours represent positive values of SRC while the blue contours represent negative values. If the SRC is positive, wind speed increases as VT increases while negative SRC values indicate that wind speed decreases as VT increases. These contours show the effect of each input variable on the magnitude of wind speed (and therefore on loss cost) as the storm moves from right to left across the grid as time increases.

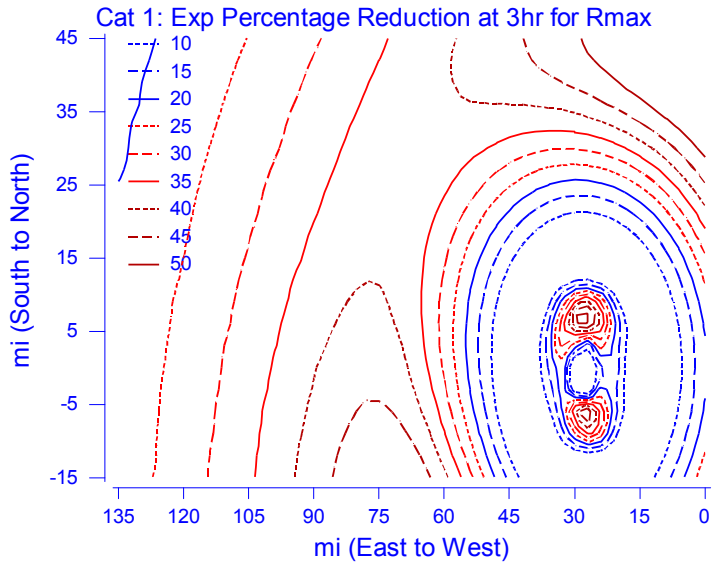
Figure 10



Contours of Standardized Regression Coefficients for VT for a Category 1 Hurricane at 4hr

Figure 11 shows contours of the expected percentage reduction in variance for Rmax for a Category 1 hurricane at 3hr. The calculation of the expected percentage reduction is explained on pages 26-30 of the *Professional Team Demonstration Uncertainty/Sensitivity Analysis*. The contours in this figure represent the average value of the expected percentage reduction in the variance of the wind speed attributable to Rmax when taken over all 100 input vectors at each grid point at t=3hr. Dark red contours represent expected percentage reductions of 40-50% while the red contours represent reductions of 25-35%. Blue contours represent expected percentage reductions of 20% or less. These contours illustrate the effect of each input variable on the uncertainty in wind speed (and therefore the uncertainty in loss cost) as the storm moves from right to left across the grid as time increases.

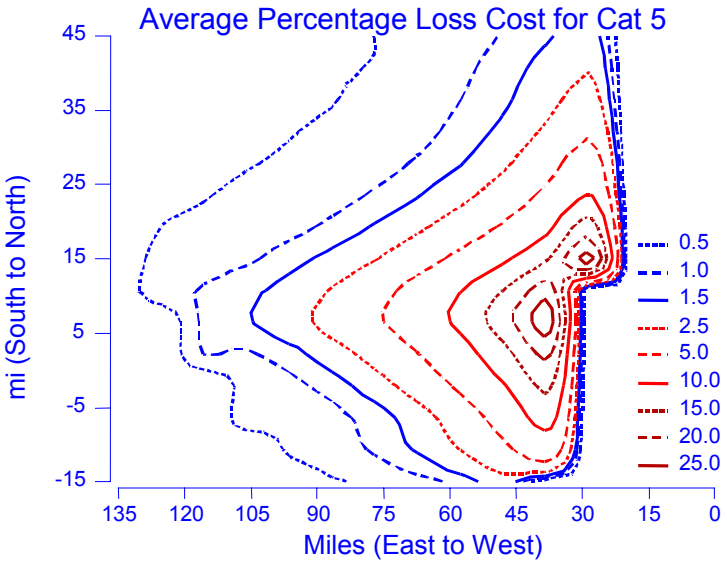
Figure 11



Contours of the Expected Percentage Reduction for Rmax for a Category 1 Hurricane at 3hr

Figure 12 shows contours of the average percentage loss cost for a Category 5 hurricane for each land-based grid point. A percentage loss cost should be calculated for each land-based grid point based on the maximum wind speed observed at the point during the 12hr duration of the storm track. This calculation is repeated for each of the 100 input vectors. The contours in ***Figure 12*** represent the averages of these 100 percentages at each grid point over the 12hr duration of the storm track. Dark red contours correspond to average percentage loss costs of 15-25%. The largest losses occur shortly after landfall to the right of the hurricane path. The pattern in the lower right-hand corner of ***Figure 12*** corresponds to the Florida coastline south of Miami. While the average percentage loss cost depicted in ***Figure 12*** are based on the Professional Team's surrogate loss cost function, modelers are to generate average percentage loss cost contours based on their own loss cost calculations.

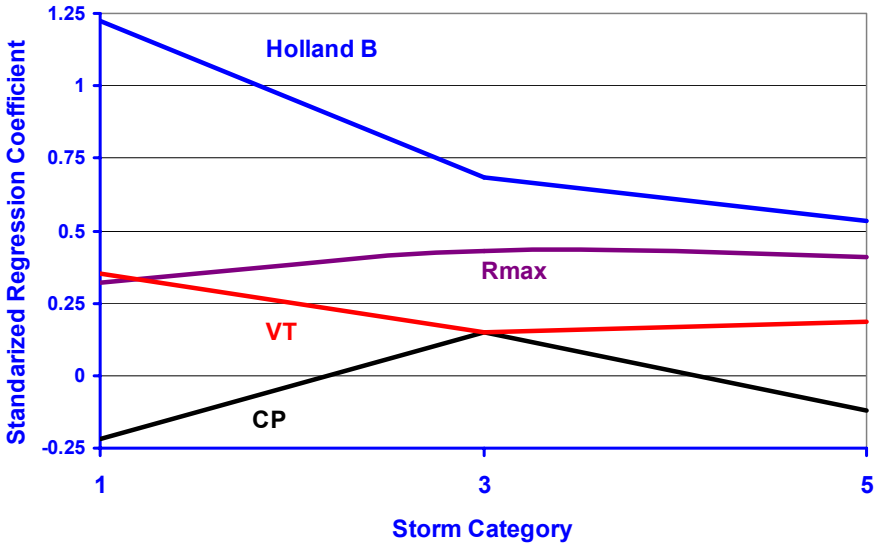
Figure 12



Average Percentage Loss Cost Contours for a Category 5 Hurricane

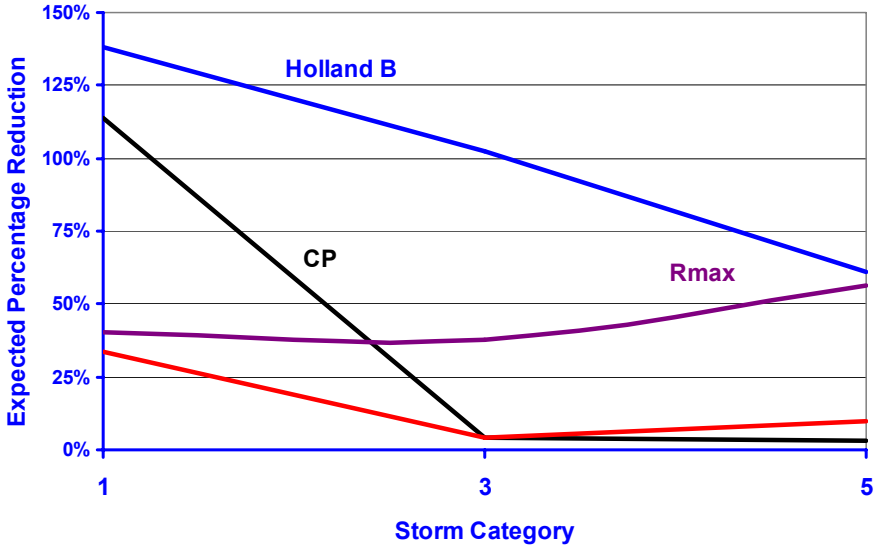
Figure 13 shows sample sensitivity analysis results for loss cost for all input variables based on a model that utilizes the Holland B parameter as the quantile variable. ***Figure 14*** shows the corresponding uncertainty analysis results. The results shown in ***Figure 13*** and ***Figure 14*** are based on log transformed data to ameliorate the influence of some very large observations. Such a transformation may or may not be beneficial for individual modelers.

Figure 13



Standardized Regression Coefficients for Loss Cost by Storm Category for Each Input Variable

Figure 14



Expected Percentage Reduction for Loss Cost by Storm Category for Each Input Variable

COMPUTER STANDARDS

C-1 Documentation

A. The modeler shall maintain a complete set of documents specifying the model structure, detailed software description, and functionality. Development of each section shall be indicative of accepted software engineering practices.

B. All computer software (i.e., user interface, scientific, engineering, actuarial) relevant to the modeler's submission shall be consistently documented.

C. Documentation shall be created separately from the source code.

Purpose: The primary document binder should contain all the elements of the model and its evolutionary development.

There may be many binders associated with the compliance with the Computer Standards, and they should be available through a hierarchical referencing scheme. This provides a logical order to all computer-related documentation. In some cases, a user may be offsite, and in others, the users are in the modeling company. In either case, clearly written documentation is necessary to maintain the consistency and survivability of the code, independent of specific modeler personnel.

Audit

The primary document binder, in either electronic or physical form, and its maintenance process will be reviewed. The binder shall contain fully documented sections for each Computer Standard.

Complete user documentation, including all recent updates, will be reviewed.

Modeler personnel, or their designated proxies, responsible for each aspect of the software (i.e. user interface, quality assurance, engineering, actuarial) shall be present when the Computer Standards are being audited. The Professional Team will interview internal users of the software.

C-2 Requirements

The modeler shall maintain a complete set of requirements for the model, its computer implementation, and all appropriate model documentation.

Purpose: Software development begins with a thorough specification of requirements. These requirements are frequently documented informally in natural language, with the addition of diagrams and other illustrations that aid both users and software engineers in specifying the control parameters for the software product and process. Sample requirements categories include:

1. ***Interface:*** 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:*** 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:*** Make the software design at the topmost level a dataflow graph containing the following components: STORMS, WIND FIELD, DAMAGE, and LOSS COSTS. Write the low-level code in Java.

4. ***Documentation:*** Use Acrobat PDF for the layout language, and add PDF hyperlinks in documents to connect the sub-documents.

5. ***Data:*** Use a relational database, with an underlying XML schema.

6. ***Human Resources:*** Task individuals for the six-month coding of the wind field simulation. Ask others to design the user-interface by working with the Quality Assurance team.

7. ***Security:*** Store tapes off-site, with incremental daily backups. Password-protect all source files.

8. ***Quality Assurance:*** Filter insurance company data against norms and extremes created for the last project.

Disclosures

1. Provide a description of the documentation for interface, human factors, functionality, documentation, data, human and material resources, security, and quality assurance.

Audit

The documentation of the requirements specifications will be reviewed.

C-3 Model Architecture and Component Design

The modeler shall maintain information defining the model architecture and design of model components and sub-components.

Purpose**:** Component-based design is essential in creating software that reduces errors and promotes comprehension of the role for each component. Moreover, the component network needs to be shown to operate "as a whole." Example components include STORMS, WIND FIELD, DAMAGE, and LOSS COSTS. The purpose of each example component is, as follows:

1. STORMS accepts historical storm sets and generates historical and stochastic storm trajectories;

2. WIND FIELD accepts the output from STORMS and produces site-specific winds;

3. DAMAGE accepts the output of WIND FIELD and generates damage to structure; and

4. LOSS COSTS accepts the output from DAMAGE and generates loss costs.

Audit

The following will be reviewed:

1. Detailed control and data flow diagrams,

2. Interface specifications for all components in the model,

3. Documentation for schemas for all data files, along with field type definitions,

4. Each network diagram including components, sub-component diagrams, arcs, and labels.

A model component custodian, or designated proxy, should be available for the review of each component.

C-4 Implementation

The software shall be traceable from the flow diagrams down to the code level.

Purpose: A high-level graphical view of a program promotes understanding and maintenance. All compositions should be made clear through explicit textual or interactively supported reference within each graphical component. Each component is refined into subcomponents, and at the end of the component "tree" there are blocks of code. All documentation and binder identifications should be referenced within this tree. This creates a traceable design from aggregate components down to the code level.

Disclosure

1. Specify the hardware, operating system, other software, and all computer languages required to use the model.

Audit

The traceability among components at all levels of representation will be reviewed.

Model components and the method of mapping to elements in the computer program will be reviewed.

The interfaces and the coupling assumptions will be reviewed.

C-5 Verification

A. General

The modeler shall maintain procedures for verification, such as code inspections, reviews, calculation crosschecks, and walkthroughs, sufficient to demonstrate code correctness.

B. Testing

Tests shall be performed for each software component, independent of all other components, to ensure that each component provides the correct response to inputs. The modeler shall use testing software to assist in documenting and analyzing all component test procedures and cases.

Purpose: Tests should be run by varying component inputs to ensure correct output. Invariants are one method of achieving verification, where one brackets a block of code to ensure that data values do not stray from their required ranges. Other methods of verification include hand-calculations or parallel coding efforts (using a different language or tool, but with the same requirements).

Audit

The code 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.

The testing of each component will be reviewed.

C-6 Model Maintenance and Revision

A. The modeler shall have developed and implemented a clearly written policy for model revision with respect to methodologies and data.

B. A revision to any portion of the model that results in a change in any Florida residential hurricane loss cost shall result in a new model version number.

C. The modeler shall use tracking software to identify all errors, as well as modifications to code, data, and documentation.

Purpose: The Commission will determine to be acceptable only those models for which the owners have a clearly written policy for model revision with respect to methodologies and data.

Once the software is constructed, it is essential to track and maintain all source code, data, and documentation.

Disclosures

1. Identify procedures used to maintain code, data, and documentation.

Audit

All policies and procedures used to maintain the code, data, and documentation will be reviewed. For each component in the system decomposition, the modeler should provide the installation date under configuration control, the current version number, and the date of the most recent change(s).

C-7 Security*

*(*New Standard)*

The modeler shall have implemented security procedures for access to code, data, and documentation in accordance with standard industry practices.

Purpose: Security procedures are necessary to maintain an adequate, secure, and correct base for code, data, and documentation. The modeler 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.

Disclosure

1. Describe methods used to ensure the security and integrity of the code, data, and documentation.

Audit

Provide a written policy for all procedures and methods used to ensure the security of code, data, and documentation. Specify all security procedures.

COMPARISON OF
2003 STANDARDS TO 2002 STANDARDS

Florida Commission on Hurricane Loss Projection Methodology
2003 Standards Compared to 2002 Standards

Standard	Title	Old Reference	Comments
General			
G-1	Scope of the Computer Model and Its Implementation	5.1.1	
G-2	Qualifications of Modeler Personnel and Independent Experts	5.1.2	
G-3	Risk Location	5.1.5	
G-4	Units of Measurement	5.1.6, 5.2.1, 5.2.2	
G-5	Independence of Model Components	5.1.4	
Meteorological			
M-1	Official Hurricane Set	5.2.3	Significant Revision
M-2	Hurricane Characteristics	5.2.4	Significant Revision
M-3	Landfall Intensity	5.2.5	
M-4	Hurricane Probabilities	5.2.6, 5.2.7	
M-5	Land Friction and Weakening	5.2.8, 5.2.9	Significant Revision
M-6	Logical Relationships of Hurricane Characteristics	5.2.10	
Vulnerability			
V-1	Derivation of Vulnerability Functions	5.3.1, 5.3.2, 5.3.3, 5.3.4	Significant Revision
V-2	Mitigation Measures	5.3.5	Significant Revision
Actuarial			
A-1	Underwriting Assumptions	5.4.1	
A-2	Loss Costs Projections	5.4.3, 5.4.5	
A-3	User Inputs	5.4.4	
A-4	Logical Relationship to Risk	5.4.6	
A-5	Deductibles and Policy Limits	5.4.7	
A-6	Contents	5.4.8	
A-7	Additional Living Expenses (ALE)	5.4.9, 5.3.6	
Statistical			
S-1	Use of Historical Data	5.6.1, 5.6.2	
S-2	Sensitivity Analysis for Model Output	5.6.4	
S-3	Uncertainty Analysis for Model Output	5.6.5	
S-4	County Level Aggregation	5.6.6	
S-5	Replication of Known Hurricane Losses	5.4.10	
S-6	Comparison of Estimated Hurricane Loss Costs	5.4.11	
S-7	Output Ranges	5.4.12	
Computer			
C-1	Documentation	5.5.1	
C-2	Requirements	5.5.2	
C-3	Model Architecture and Component Design	5.5.3	
C-4	Implementation	5.5.4	
C-5	Verification	5.5.5	
C-6	Model Maintenance and Revision	5.5.6, 5.1.3	
C-7	Security	New	

Note: ***The Commission has determined that "significant changes" are those that result in or have potential for changes to loss costs. The Commission may determine, in its judgment, whether a change is significant.***

WORKING DEFINITIONS

Working Definitions

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 insurance, whose functions include the calculations involved in determining proper insurance rates, evaluating reserves, and various aspects of insurance research.

Additional Living Expense (ALE):

If a home becomes uninhabitable due to a covered loss, additional living expense coverage pays for the extra costs of housing, dining expenses, etc. up to the limits for ALE in the policy.

Aggregated Data:

Summarized data sets 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.

Annual Aggregate Loss Distributions:

For the Commission's purposes, the aggregate losses which are expected to occur for all hurricane events in any one year. Another way to state it is the aggregate probable maximum loss. See below for Probable Maximum Loss (PML).

Appurtenant Structures:

Coverage for detached buildings and other structures located on the same property as the principal insured building, e.g., detached garage, fences, swimming pools, patios, etc.

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.

Atlantic Basin:

The area including the entire North Atlantic Ocean, the Caribbean Sea, and the Gulf of Mexico.

Average:

Arithmetic average or arithmetic mean.

By-Passing Storm:

A hurricane in which the eye does not cross the coast, but does contain hurricane force winds over land.

Catastrophe:

A natural or man-made event that causes more than $25 million in insured losses as defined by Property Claims Services.

Characteristics:

The variables that define an event. For the Commission's purposes, since the event is a hurricane, these might include such things as central pressure, forward speed, or wind speeds.

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**.

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 inter-changeably or defined to be sub-elements of one another in different ways depending on the context. Example components include programs, objects, procedures, and functions.

Components and Cladding:

Elements of the building envelope that do not qualify as part of the main wind-force resisting system.

Control Flow:

The sequence in which operations are performed during the execution of a computer program. *Synonym*: **Flow of Control**. *Contrast with*: **Data Flow**.

Control Flow Diagram:

A diagram that depicts the set of all possible sequences in which operations may be performed during the execution of a system or program. Types include box diagram, flowchart, input-process-output chart, state diagram. *Contrast with*: **Data Flow Diagram**.

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 meet specified requirements; (3) the degree to which software, documentation, or other items meets user needs and expectations, whether specified or not.

Damage:

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 companies 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 models for purposes of 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.

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 Flow Diagram:

A diagram that depicts data sources, data sinks, data storage, and processes performed on data as nodes, a flow of data as links between the nodes. *Contrast with*: **Control Flow Diagram**.

Decay Rate/Filling Rate:

The rate at which a tropical cyclone decays as measured by its rise in central pressure. 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 natural or man-made terrain roughness.

Demand Surge:

An increase in the cost of materials and labor due to increased demand following a hurricane.

Depreciation:

The decrease in the value of property over time.

Event:

For purposes of modeling hurricane losses, a hurricane is considered an event.

Exception:

A condition that may arise during execution of a program, that may cause a deviation from the normal execution sequence, and for which means exist to define, raise, recognize, ignore, or handle it. For example: "(ON ERROR) condition" in PL/1; overflow; range error.

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.

Flow Chart:

A control flow diagram in which suitably annotated geometrical figures are used to represent operations, data, or equipment, and arrows are used to indicate the sequential flow from one to another.

Flow Diagram:

See **Control Flow Diagram** and **Data Flow Diagram**.

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 but not impossible.

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**.

Geocoding:

Assignment of a location to geographic coordinates.

Ground Up Loss:

Incurred 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.

Homeowner's Policy:

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 wind speed at 10 meters height is 74 miles per hour or greater.

Hurricane Strike Probabilities:

The probability in percent that a hurricane eye will pass within 50 miles to the right or 75 miles to the left of the listed location within the indicated time period when looking at the coast in the direction of the hurricane's movement.

Implementation:

The process of transforming a design into hardware components, software components, or both. *See also*: **Code**.

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.

Insurance to Value:

The relationship of the amount of insurance to replacement cost is called Insurance to Value. 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.

Intensity:

The maximum one-minute sustained surface (i.e. 10-meter) winds measured near the center of a tropical storm.

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:

In calculating loss costs, losses shall be expressed as insured losses.

Mapping of ZIP Codes:

Either a point estimate or a physical geographic area.

Miles Per Hour (mph):

Miles per hour**.** Standard unit of wind speed measurement.

Millibar (mb):

Metric unit of air pressure. See Minimum Central Pressure.

Minimum Central Pressure:

Minimum Central Pressure is defined as the minimum pressure at the center of a tropical cyclone. The atmosphere exerts a pressure force. Pressure is measured in inches of mercury and in millibars. Average sea level pressure is 29.92 inches of mercury or 1013.25 millibars. Tropical Cyclones have low pressure at the center of the cyclone. The lower the pressure, the stronger the tropical storm, both in terms of wind speed and storm surge height. The lowest pressure ever measured in a hurricane in the Atlantic basin was 888 mb/26.22 inches in Hurricane Gilbert.

Mitigation Measure:

A factor or function that improves a building's wind resistance.

Model Architecture:

The structure of components in a program/system, their interrelationships, and the principles and guidelines governing their design and evolution over time.

Model Component Custodian:

The individual who can explain the functional behavior of the component and respond to questions concerning changes in code, documentation, or data for that component.

Model Validation:

A comparison between model behavior and empirical (i.e., physical) behavior.

Model Verification:

A comparison between model behavior and program behavior.

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.

Network diagram:

See **Flow Diagram**.

Peak Gust:

Highest wind recorded. Generally in a 2- to 3-second interval.

Peak Hurricane Intensity:

The peak intensity over the lifetime of a storm.

Premium:

The consideration paid or to be paid to an insurer for the issuance and delivery of any binder or policy of insurance; see Section 626.014(2), Florida Statutes. Premium is the amount charged to the policyholder and includes all taxes and commissions.

Probable Maximum Loss (PML):

The largest single event that is likely to befall an insurer. This is important to assess the adequacy of surplus to support the policies issued by the insurer and is also used to evaluate reinsurance needs.

Program:

See **Code**.

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 Section 624.604, Florida Statutes).

Radius of Maximum Winds:

The radius from tropical cyclone center to the point of maximum winds surrounding a tropical cyclone. For a typical hurricane, the distance is about 15-20 miles.

Rate:

The amount by which the exposure is multiplied to determine the premium. See Section 627.041(1), Florida Statutes. 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.

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.

Requirements Specification:

A document that specifies the requirements for a system or component. Typically included are functional requirements, performance requirements, interface requirements, design requirements, and development standards.

Return Time:

Average span in years between expected, similar events.

Roughness:

The characteristics of a surface related to its ability to disrupt airflow. The rougher the surface, the quicker a storm decays, the greater the turbulence, and the higher the difference between peak winds and sustained winds.

Man-Made Roughness:

Man-made obstacles; e.g., structures, which affect the wind speeds and surge or wave action of hurricanes.

Natural Roughness:

Natural obstacles in a particular area; e.g., valleys, mountains, trees, coastline, which affect wind speed and storm surge or wave action of hurricanes.

Saffir-Simpson Scale:

A scale ranging from one to five based on the hurricane's present intensity. This scale can be used to give an estimate of the potential property damage and flooding expected along the coast from a hurricane. In practice, wind speed is the parameter that determines category since storm surge is strongly dependent on the slope of the continental shelf.

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 describe the structure of a database.

Sensitivity:

The effect that a change in the value of a 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 Change:

Those changes to the standards or any changes to the model that result in changes to loss costs or have potential for changes to the loss costs. The Commission may determine in its judgment whether a change is significant.

Software Engineering:

The application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software; that is, the application of engineering to software.

Statistical Terms:

Definitions of statistical terms are available in: A Dictionary of Statistical Terms, Fifth Edition, F.H.C. Marriott, John Wiley & Sons, 1990.

Storm Surge:

An abnormal rise in sea level accompanying a hurricane, 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 hurricane. Storm surge is usually estimated by subtracting the normal or astronomical tide from the observed storm tide.

Storm Track:

The path along that a tropical cyclone has already moved.

System Decomposition:

The hierarchical breakdown of a system into components.

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.

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.

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 wind speed 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.

User:

A person who uses a computer to execute code, provides the code with input from a user interface, and obtains 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.

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.

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 or simulation implementation accurately represents the developer's conceptual description and specification. Verification also evaluates the extent to which the model or simulation has been developed using sound and established software engineering techniques.

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.

Visualization:

A two or three-dimensional graphical display, chart, or plot meant to augment or replace a numerical table.

Vulnerability Assessment:

A determination as to how likely a particular insured structure is to be damaged by a hurricane and an estimate of the loss potential.

Vulnerability Functions:

The curve that represents the damage ratios expected at various wind speeds for a given structural type.

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.

Weakening/Decay:

A reduction in the maximum one-minute sustained 10-meter winds.

Wind Field:

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 weighing the distribution of population over the ZIP Code.

REFERENCES

References

For the purposes of the Standards, Disclosures, and Forms for model specification adopted in this document, the following references or published data sets are listed. Subsequent revisions to these documents and data sets shall supersede the versions listed below.

1. **Meteorological Criteria for Standard Project Hurricane and Probable Maximum Hurricane Wind Fields, Gulf and East Coasts of the United States**, **NOAA Technical Report NWS 23,** Washington, D.C., September, 1979

2. **Hurricane Climatology for the Atlantic and Gulf Coasts of the United States, NOAA Technical Report NWS 38,** Washington, D.C., April, 1987

3. **North Atlantic Storm Data Base, HURDAT**

4. Kaplan/DeMaria, *"A Simple Empirical Model for Predicting the Decay of Tropical Cyclone Winds After Landfall,"* **Journal of Applied Meteorology,** Volume 34, #11, November, 1995, page 2499

5. Tropical Prediction Center/National Hurricane Center (TPC/NHC), **Tropical Cyclones of the North Atlantic Ocean, 1871-1998**, with updates

6. Vickery, P.J. and Twisdale, L.A., *"Wind-Field and Filling Models for Hurricane Wind-Speed Predictions,"* **Journal of Structural Engineering**, Volume 121, #11, November, 1995, page 1700

7. **United States Geological Survey National Land Cover Data,** latest edition

8. **Florida Water Management District Land Use Land Cover Database,** latest edition

9. **Minimum Design Loads for Buildings and Other Structures, American Society of Civil Engineers 7-98**

10. Iman, R.L., *"Latin Hypercube Sampling,"* **Encyclopedia of Statistical Sciences**, Update Volume 3, 1999

VIII. FUTURE INQUIRIES OR INVESTIGATIONS

Future 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. 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.

Commercial Residential Property – Inactive
(Note: Report was provided to the FCHLPM)

The Commission asked the Professional Team to address the issue relating to the inclusion of commercial residential property in the modeling process and asked them to obtain information during their next on-site reviews and provide input for consideration of possible standards.

Wind-related Construction Classifications – Inactive
(Note: Report was provided to the FCHLPM)

The Commission asked the Professional Team to work toward improvement of the standards by building on the current construction classifications, to make them more hurricane-related rather than fire-related.

Radius of Hurricane Force Winds

The Professional Team will continue its efforts to assess the extent to which modeled storms match the observed radius of hurricane force winds. At present, no modeler explicitly includes a parameter or parameters to capture this characteristic directly. However, in the assessment of models, it is reasonable to consider the modeled wind field and the extent of its agreement with the region of hurricane force winds.

Demand Surge – Inactive
(Note: Report was provided to the FCHLPM)

The Commission asked the Professional Team to try and determine if there is information on which reasonable demand surge estimations can be made. The Professional Team will gather information from the modelers on how demand surge is incorporated in the model calculations, what is the scientific basis, and why the modelers consider it inappropriate to exclude demand surge.

Form C – Inactive
(Note: Report was provided to the FCHLPM)

The Commission asked the Professional Team to review the benefits of Form C, to determine if there is a method to monitor changes in the model using Form C, and if another category should be added to account for Hurricane Andrew.

Impact on Modelers – Inactive
(Note: Report was provided to the FCHLPM)

The Commission asked the Professional Team to discuss with the modelers the cost factor involved with meeting the standards and the acceptability process, the impact changes have on this cost, and any suggestions on ways to cut that cost.

Transition of Hurricanes

The Commission asked the Professional Team to determine if a Standard would be appropriate to ensure accepted models account for the transition of hurricanes from over water to over land using currently acceptable meteorological science. Further study would include the methods in which transition effects are currently considered within the models, the methods used to determine the impacts of those effects on hurricane characteristics, and the most appropriate methods to be employed in the process of auditing and reviewing for the inclusion of transition effects.

HURDAT Data Revisions

The Commission asked the Professional Team to assess what the changes would be if the revisions to HURDAT were included in the Commission's Official Storm Set.

ALE/Storm Surge/Infrastructure

The Commission asked the Professional Team to review how ALE claim payments are affected by storm surge damage to the infrastructure.

IX. APPENDICES

Florida Statutes, 2003

627.0628 Florida Commission on Hurricane Loss Projection Methodology--

(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 may 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.

(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 11 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 of the Department of Community Affairs.
5. The actuary member of the Florida Hurricane Catastrophe Fund Advisory Council.
6. Six members appointed by the Chief Financial Officer, as follows:

a. An employee of the office who is an actuary responsible for property insurance rate filings.
b. 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.
c. 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.
d. 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.
e. An expert in computer system design who is a full time member of the faculty of the State University System.
f. An expert in meteorology who is a full time member of the faculty of the State University System and who specializes in hurricanes.

(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. Members appointed by the Chief Financial Officer under subparagraph (b)6. 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 the 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. 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) 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.

(c) With respect to a rate filing under s. 627.062, an insurer may employ actuarial methods, principles, standards, models, or output ranges found by the commission to be accurate or reliable to determine hurricane loss factors for use in a rate filing under s. 627.062, which findings and factors are admissible and relevant in

consideration of a rate filing by the office or in any arbitration or administrative or judicial review.

(d) The commission shall adopt revisions to previously adopted actuarial methods, principles, standards, models, or output ranges at least annually.

History.--s. 6, ch. 95-276; s. 6, ch. 96-194; s. 3, ch. 97-55; s.4, ch. 2000-333; ch. 2003-261.

Note: As amended by Senate Bill 1712, 2003 Florida Legislative Session, effective 6/26/03.

Meeting Schedule and Topics of Discussion

1995

July 14 -	Organizational Meeting
August 10 -	Discussion of the Problem
August 24 -	Discussion on Our Mission, Goals and Objectives
September 7 -	Meeting with Modelers
September 21 -	Development of Work Plan
October 5 -	Canceled Due to Hurricane Opal
October 19 -	Development of Descriptive Criteria and Tests of the Model
November 2 -	The Evaluation Process
November 16 -	Meeting with Modelers to provide input for the Evaluation Process
November 30 -	Adoption of Initial Standards and Guidelines

1996

January 8 -	Review of Modeler Responses for Modules 1 and 2
January 29 -	Comparison of Models
February 12 -	Tests and Evaluations
February 26 -	Tests and Evaluations B Continued
April 1 -	Professional Team Report
April 15 -	Module 3 Phase 2 Test Results
April 19 -	AIR Presentation
April 20 -	EQECAT Presentation
April 26 -	Tillinghast Presentation
April 27 -	RMS Presentation
May 6 -	Committee Meetings B Session 1 Adopting Standards
May 20 -	Committee Meetings B Session 2 Adopting Standards
June 3 -	Adopting a Specification of Acceptable Computer Models or Output Ranges
August 26 -	Planning and Update as to Modeler Progress
November 13 -	Vulnerability Standards Committee Meeting
December 11 -	Actuarial Standards Committee Meeting

1997

February 7 -	Review of Standards and Procedures
	Vulnerability Standards Committee Meeting
April 11 -	Review of AIR Model
May 6 -	Meteorology Standards Committee Meeting
May 7 -	General Standards Committee Meeting
May 16 -	Review of AIR Model (Continued)
	Computer Standards Committee Meeting
May 22 -	Vulnerability Standards Committee Conference Call

	May 29 -	Review of AIR Model (Continued) and Adoption of Revised Standards for 1997
	September 29 -	Planning for Calendar Year and Review of Models
	October 23 -	Vulnerability Committee Meeting
	October 24-	Review of AIR Model
	December 11 -	Review of EQECAT Model
	December 12 -	Review of EQECAT Model (Continued)
	December 16 -	Review of RMS Model
1998		
	April 23 -	Acceptability Process Committee Meeting
		Computer Programming Committee Meeting
		Meteorological Standards Committee Meeting
		Actuarial Standards Committee Meeting
	April 24 -	Vulnerability Standards Committee Meeting
		General Standards Committee Meeting
		1998 Standards Adopted
	May 21 -	Module and Acceptability Process Adopted
	November 17 -	Review of Tillinghast Model
	November 18 -	Review of Tillinghast Model (Continued)
	November 19 -	Review of E.W. Blanch Model
	November 20 -	Review of E.W. Blanch Model (Continued)
	December 8 -	Review of RMS Model
	December 9 -	Review of EQECAT Model
	December 10 -	Review of AIR Model
1999		
	March 19 -	Commission Workshop
		New Timeframe for Model Review
	July 15 -	Acceptability Process Committee Meeting
		General Standards Committee Meeting
		Vulnerability Standards Committee Meeting
	July 16 -	Actuarial Standards Committee Meeting
		Computer Standards Committee Meeting
	July 28 -	Meteorology Standards Committee Meeting
	August 17 -	Adoption of Standards for 1999, Modules, Acceptability Process, Findings and "Report of Activities"
2000		
	March 15 -	Discussion of Model Submissions and Determination of On-Site Reviews
	May 9 -	Review of AIR Model – Suspended Consideration;
		E.W. Blanch and RMS Models Determined Acceptable under the 1999 Standards

May 10 -	EQE Model Determined Acceptable under the 1999 Standards; Review of Risk Engineering Model
May 11 -	Review of Risk Engineering Model (Continued) – Suspended Consideration
May 12 -	Review of AIR Model (Continued) – Postponement Approved
July 25 -	Review of ARA Model
July 26 -	ARA Model Determined Acceptable under the 1999 Standards
July 27 -	Committee Meetings
July 28 -	Committee Meetings (Continued); AIR Model Determined Acceptable under the 1999 Standards
Sept 14 -	Adoption of 2000 Standards and Report of Activities
Sept 15 -	Adoption of 2000 Standards and Report of Activities (Continued)

2001

March 27 -	Discussion of Model Submissions and Determination of On-Site Reviews
May 10 -	EQE and E.W. Blanch Models Determined Acceptable under the 2000 Standards
May 11 -	AIR and ARA Models Determined Acceptable under the 2000 Standards
July 30 -	RMS Model Determined Acceptable under the 2000 Standards; Committee Meetings
July 31 -	Committee Meetings (Continued)
Sept 19 -	Adoption of 2001 Standards and Report of Activities
Oct 15 -	Adoption of 2001 Standards and Report of Activities (Continued)

2002

March 27 -	Discussion of Model Submissions and Determination of On-Site Reviews
May 29 -	RMS Model Determined Acceptable under the 2001 Standards
May 30 -	EQE and AIR Models Determined Acceptable under the 2001 Standards
May 31 -	ARA Model Determined Acceptable under the 2001 Standards
July 23 -	Committee Meetings
July 24 -	Committee Meetings (Continued)
September 18 -	Adoption of 2002 Standards and Report of Activities
September 19 -	Adoption of 2002 Standards and Report of Activities (Continued)

2003

April 1 -	Discussion of Model Submissions and Determination of On-Site Reviews
May 29 -	AIR and ARA Models Determined Acceptable under the 2002 Standards
May 30 -	EQE and RMS Models Determined Acceptable under the 2002 Standards
July 22 -	Committee Meetings
July 23 -	Committee Meetings (Continued)
August 21 -	Adoption of 2003 Standards and Report of Activities
August 22 -	Adoption of 2003 Standards and Report of Activities (Continued)

Transcript Information

All meetings of the Florida Commission on Hurricane Loss Projection Methodology were transcribed by a Court Reporter. The meetings were not put on videotape or audiotape. 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, 1996 -	Cathy Webster, C & N Reporters, 850-926-2020
April 20, 1996 -	Cathy Webster, C & N Reporters, 850-926-2020
April 26, 1996 -	Cathy Webster, C & N Reporters, 850-926-2020
April 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, 1997 -	Cathy Webster, C & N Reporters, 850-926-2020
October 24, 1997 -	Cathy Webster, C & N Reporters, 850-926-2020
December 11, 1997 -	Nancy Metzke, C & N Reporters, 850-926-2020
December 12, 1997 -	Nancy Metzke, C & N Reporters, 850-926-2020
December 16, 1997 -	Nancy Metzke, C & N Reporters, 850-926-2020
April 23, 1998 -	Nancy Metzke, C & N Reporters, 850-926-2020
April 24, 1998 -	Nancy Metzke, C & N Reporters, 850-926-2020
May 21, 1998 -	Cathy Webster, C & N Reporters, 850-926-2020
November 17, 1998 -	Cathy Webster, C & N Reporters, 850-926-2020
November 18, 1998 -	Cathy Webster, C & N Reporters, 850-926-2020
November 19, 1998 -	Cathy Webster, C & N Reporters, 850-926-2020
November 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, 1999 -	Nancy Metzke, C & N Reporters, 850-697-8314
July 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, 2000 -	Nancy Metzke, C & N Reporters, 850-697-8314
May 10, 2000 -	Nancy Metzke, C & N Reporters, 850-697-8314
May 11, 2000 -	Nancy Metzke, C & N Reporters, 850-697-8314
May 12, 2000 -	Nancy Metzke, C & N Reporters, 850-697-8314
July 25, 2000 -	Nancy Metzke, C & N Reporters, 850-697-8314
July 26, 2000 -	Nancy Metzke, C & N Reporters, 850-697-8314
July 27, 2000 -	Nancy Metzke, C & N Reporters, 850-697-8314
July 28, 2000 -	Nancy Metzke, C & N Reporters, 850-697-8314
September 14, 2000 -	Nancy Metzke, C & N Reporters, 850-697-8314
September 15, 2000 -	Nancy Metzke, C & N Reporters, 850-697-8314
March 27, 2001 -	Nancy Metzke, C & N Reporters, 850-697-8314
May 10, 2001 -	Nancy Metzke, C & N Reporters, 850-697-8314
May 11, 2001 -	Nancy Metzke, C & N Reporters, 850-697-8314
July 30, 2001 -	Nancy Metzke, C & N Reporters, 850-697-8314
July 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, 2002 -	Catherine Wilkinson, Catherine Wilkinson & Associates, 850-224-0127
May 30, 2002 -	Catherine Wilkinson, Catherine Wilkinson & Associates, 850-224-0127
May 31, 2002 -	Catherine Wilkinson, Catherine Wilkinson & Associates, 850-224-0127
July 23, 2002 -	Catherine Wilkinson, Catherine Wilkinson & Associates, 850-224-0127
July 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, 2003 -	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
May 30, 2003 -	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
July 22, 2003 -	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
July 23, 2003 -	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
August 21, 2003 -	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221
August 22, 2003 -	Lori Dezell, Accurate Stenotype Reporters, Inc., 850-878-2221

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

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