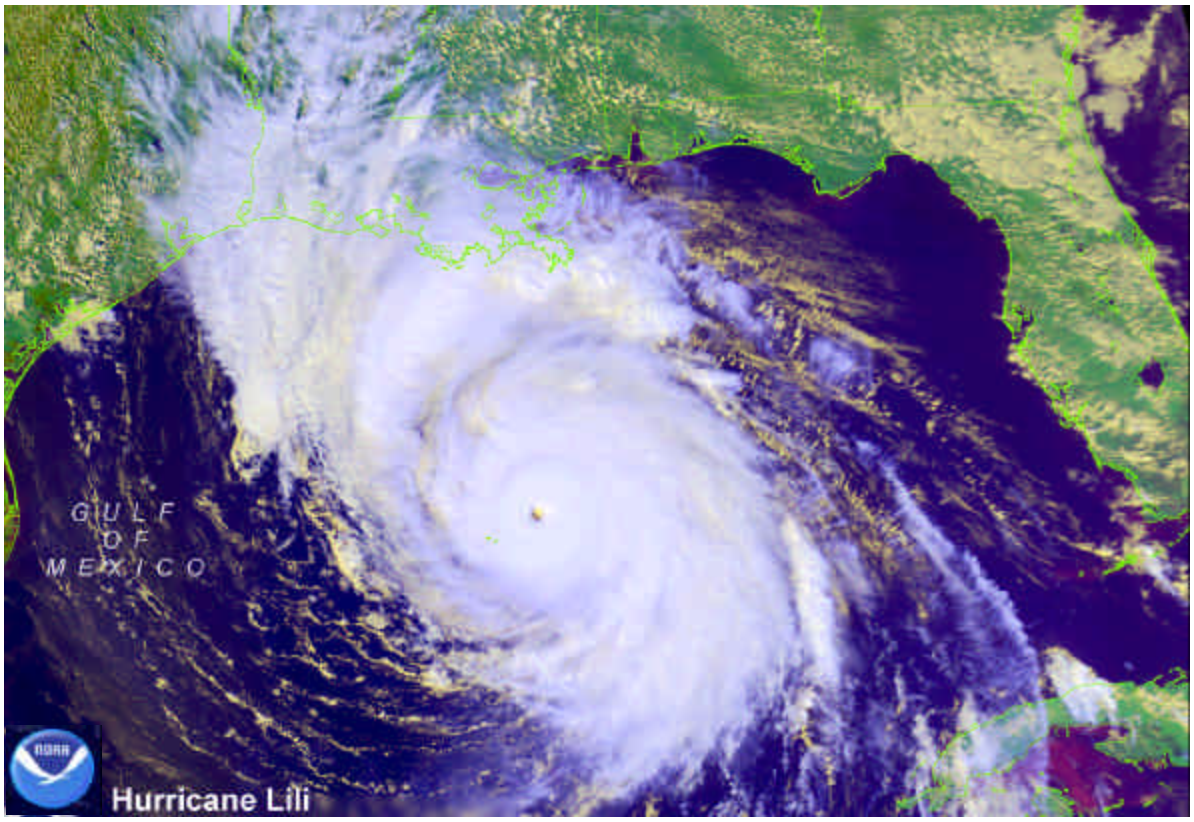
Report of Activities as of November 1, 2002



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" of the Commission as of November 1, 2002. This report documents the seventh 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 powers 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: Tom Feeney, 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.

Section 627.0628(3)(b), Florida Statutes, states that "to the extent feasible," the Florida State Board of Administration (FSBA) 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 Florida Hurricane Catastrophe Fund (FHCF).

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 FSBA. 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. As noted above, the FHCF must use the Commission's findings, to the extent feasible, in establishing reimbursement premium rates. 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 Department of Insurance. 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 Department 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 Department of Insurance. The Department of Insurance 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 Department of Insurance 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 Department of Insurance 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 FSBA as regards to

the FHCF or on the Department of Insurance. 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 Department of Insurance; (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 are 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.

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, and again in September 2002.

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**
Applied Insurance Research, Inc.	1996, 1997, 1998, 1999, 2000, 2001
Applied Research Associates	1999, 2000, 2001
E.W. Blanch Co.	1998, 1999, 2000
EQECAT, Inc.	1997, 1998, 1999, 2000, 2001
Risk Management Solutions, Inc.	1997, 1998, 1999, 2000, 2001
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 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*

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 their reasonableness. *History-New 9-21-95*

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. Thus, while the Commission is administratively housed within the Florida State Board of Administration (FSBA), the FSBA annually appoints one of the Commission members to serve as chair, and the FSBA provides the Commission, as a cost of administration of the Florida Hurricane Catastrophe Fund (FHCF), with travel reimbursement, expenses, and staff support. The FSBA has no governing authority over the Commission.

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 Chief Operating Officer of the Florida Hurricane Catastrophe Fund;
3. The Executive Director of the Residential Property and Casualty Joint Underwriting Association;
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 Insurance Commissioner, as follows:
    a. An employee of the Department of Insurance 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, Chief Operating Officer of the FHCF, Executive Director of the Residential Property and Casualty Joint Underwriting Association, 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 Insurance Commissioner shall serve until the end of the Insurance Commissioner's term of office, unless the Insurance Commissioner 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 FSBA 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.

B. The **VICE CHAIR** shall:
   In the absence 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 needs to make every effort to attend all meetings, in person or by telephone, and be prepared to actively participate. In particular, each member is responsible for the following 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 FHCF 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 FHCF staff. If the special conflict becomes apparent during a meeting, the member should immediately inform the Chair or Vice Chair. The conflicted member shall recluse him 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 and developing standards. A public notice is required, but it is not necessary that a quorum be present since all official business requiring voting shall be done at Commission meetings.

In conjunction with the Committee meetings that are for the purpose of developing standards, the Commission will attempt 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

Each year the Commission will determine which component to review in depth.

Budget Consideration

All projects that have a fiscal impact shall be identified prior to January 1 of the calendar year so that appropriate funding can be obtained through the state budgetary process. All projects shall consist of a proposal, a cost, and a time frame for completion. The Commission will vote on all proposals for projects, and the Commission's budget will be subject to the FSBA Trustees' approval 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 make 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 several 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 statistically sound loss costs for the entire state of Florida.

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. “Reliable” is defined for computer simulation models as meaning that they consistently produce dependable results.

FINDINGS OF THE COMMISSION

Concerning Proprietary Information

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

The Commission finds that 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. The Commission finds that 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. The Commission finds that 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. The Commission finds and recognizes that some or all of the models have been reviewed by various state departments of insurance, by various credit rating agencies, by their direct writer clients, and by their reinsurance clients.

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 whose model 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 a new modeling company.** By February 28 of each year, any new modeling company wishing to have its model reviewed for the first time 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) the data and analyses required by Module 1, Module 2, and Module 3; (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.

More specifically,

a. The letter to the Commission shall state that professionals having credentials and/or experience in the areas of meteorology, statistics, actuarial science, engineering, 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 exceptions to this statement 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 by Modules 1, 2, and 3 shall be enclosed with the letter referenced in 1, above.

c. A copy of any non-proprietary information and documentation that the modeler anticipates presenting to the Commission in connection with the acceptability process, and a general description of any proprietary information that the modeler intends to present to the Professional Team in connection with the acceptability process shall be enclosed.

d. 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 B, Form D, and the Output Ranges shall be provided on CD-ROM in both an Excel and a PDF format;

2. Form F shall be provided on CD-ROM in ASCII 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 and the standards year;

5. All revised data files submitted shall include the revision date, the abbreviated name of the modeler, and the standards year in the file name.

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

e. Format of the Submission:

1. Table of Contents shall be included;

2. Materials submitted shall be consecutively numbered from the first page (excluding cover) using a numbering system from the beginning to the end of the submission;

3. All tables, graphs, and other non-text items shall be clearly labeled and specifically listed in the table of contents;

4. Submission shall state the standard or module item number in italics and give the response in non-italics (note, there is no need to restate module questions);

5. Modelers are encouraged to present graphs in color and to use presentation techniques that enhance readability and understanding.

2. **Notification of readiness for review by an existing modeling company.** By February 28 of each year, any existing 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) the data and analyses required by Module 1, Module 2, and Module 3; (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.

More specifically,

a. The letter to the Commission shall state that professionals having credentials and/or experience in the areas of meteorology, statistics, actuarial science, engineering, 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 exceptions to this statement will be noted in the letter and accompanied by a complete explanation. The letter must also identify any changes made to Modules 1, 2, and 3 which

were submitted the previous year. The letter must also identify changes to multiple pages or new sections in the submission as noted in e.5.

b. The data and analyses required by Modules 1, 2, and 3 shall be enclosed with the letter referenced in 2, above. 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 copy of any non-proprietary information and documentation that the modeler anticipates presenting to the Commission in connection with the acceptability process and a general description of any proprietary information that the modeler intends to present to the Professional Team in connection with the acceptability process shall be enclosed.

d. 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 B, Form D, and the Output Ranges shall be provided on CD-ROM in both an Excel and a PDF format;

    2. Form F shall be provided on CD-ROM in ASCII 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 and the standards year;

    5. All revised data files submitted shall include the revision date, the abbreviated name of the modeler, and the standards year in the file name.

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

e. Format of the Submission:

    1. Table of Contents shall be included;

    2. Materials submitted shall be consecutively numbered from the first page (excluding cover) using a numbering system from the beginning to the end of the submission;

    3. All tables, graphs, and other non-text items shall be clearly labeled and specifically listed in the table of contents;

4. Submission shall state the standard or module item number in italics and give the response in non-italics (note, there is no need to restate module questions);

5. Changes in the submission text from the previous year shall be highlighted or underlined. Instances where changes involve multiple pages (i.e. moving text from one place to another or formatting changes) would not need to be highlighted but should be identified in the letter to the Commission.

6. Modelers are encouraged to present graphs in color and to use presentation techniques that enhance readability and understanding.

3. **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 and whether an on-site review by the Professional Team is warranted and whether a meeting with the Commission is warranted.

4. **Revisions to the Standards or the Model – Significant.** If the Commission does not revise or makes only minor revisions to some existing standards, but makes significant changes to other 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.

5. 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 will 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 or Modules 1, 2, and 3. The Commission or the Chair may request additional information if deemed necessary to clarify the submission. If the Commission determines that the submission is unclear or non-responsive, the Commission may specify a time frame for correcting the deficiency. 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 FSBA staff will arrange a telephone conference call between the modeling company and the Professional Team or a subset of the Professional Team. The purpose of this call is to review the materials, data files, and personnel that will need to be on-site during the review by the Professional Team. 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. 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. **New Modeling Companies.** If a determination has been made that the modeling company is ready for an on-site review, the staff will schedule an on-site review of the Professional Team to (a) review the information provided by the modeling company in Modules 1, 2, and 3; and (b) to audit for compliance with the most recently adopted standards. The FSBA 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 existing standard has been met, and that the data and analyses required in Modules 1, 2, and 3 are acceptable.

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

a. The Professional Team determines that, in its opinion, the model complies with the standards and the modules, 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 modules 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 with the scheduled Commission meeting and present its arguments to the Commission at its meeting to determine acceptability; or (2) it can withdraw its request for review. Such a withdrawal will result in the company having to wait until the next revision or review of the standards before requesting the Commission review its model.

3. **Existing Modeling Companies.** If a determination has been made that an on-site review is necessary, the FSBA 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 any changes provided by the modeling company in Modules l, 2, and 3. The FSBA 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 Modules 1, 2, and 3 are acceptable.

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

a. The Professional Team determines that, in its opinion, the model complies with the standards and the modules, 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 modules 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 with the scheduled Commission meeting and present its arguments to the Commission at its meeting to determine acceptability; or (2) it can withdraw its request for review. Such a withdrawal will result in the expiration of its acceptability under the previous year's standards and cause the modeling company to wait until after the next revision or review of the standards before requesting the Commission review its model. The modeling company will be notified in writing of the termination of its acceptability under the previous year's standards.

D. Professional Team Report

After the new or existing 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 Modules 1, 2, and 3, 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 disagreements among Professional Team members concerning compliance with the standards and modules 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 and will also give the Commission and the modeler an opportunity to address any 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 are expected to give a presentation to the Commission as specified in Module 5.

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 met all applicable standards by a majority vote on each standard.

1. For a new model, the Commission will consider each standard and will determine whether the model meets each standard by a majority vote of those present. Before voting on whether the model meets the standard under consideration, the modeler will make a presentation to the Commission in support of its compliance to the standard. Following the modeler's presentation, the Professional Team will comment on whether the model meets the standard. Commission members will then have the opportunity to ask questions of both the modeler and the Professional Team. Once a motion is made and seconded and the discussion has concluded, a roll call vote will be taken on each standard. The model will be determined to have met the standard if the majority of those present vote that the standard has been met. The Commission will have completed its determination of the acceptability of the model when it has completed voting on each standard individually. This does not preclude the Commission from revisiting a previous vote.

2. For an existing model, the Commission will consider each standard and will determine whether the model meets each standard by a majority vote of those present. Before voting on whether the model meets the standard under consideration, the modeler will make a presentation to the Commission in support of its compliance to the standard. Following the modeler's presentation, the Professional Team will comment on whether the model meets the standard. Commission members will then have the opportunity to ask questions of both the modeler and the Professional Team.

   There are three types of standard changes that will require a vote by the Commission:

   a. No Change – The Commission will vote a blanket acceptability for compliance with the standards with no revisions;

   b. Not Significant – The Commission will determine whether or not it will vote a blanket acceptability for compliance with standards where changes were determined by the Commission as being not significant;

   c. Significant – The Commission will vote separately for compliance on each standard which has significantly changed.

   At the request of any member, the Commission shall review and modify the voting requirements. In conjunction with this process, the Commission shall specifically vote on any standard requested by a member.

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, 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 the State of Florida.

In accordance with the Commission's procedures, this determination of acceptability expires on February 28, 2004, 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, for whatever reason, 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 and input 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 and input in this process.

Sincerely,
(Name), Chair

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. states that professionals having credentials and/or experience in the areas of meteorology, statistics, actuarial science, engineering, and computer science have reviewed the model for compliance with the standards
		b. states that model is ready to be reviewed by the Professional Team
		c. any exceptions to the statements above noted with a complete explanation
		d. identifies any changes made to Modules 1, 2, and 3 from the previous year's submission, if applicable
		2. Summary statement of compliance with each individual standard
		3. General description of information to be presented to the Professional Team and to the Commission
		4. Data and analyses required by Module 1
		5. Data and analyses required by Module 2
		6. Data and analyses required by Module 3
		7. Copy of non-proprietary information and documentation the modeler anticipates presenting to the Commission in connection with the Acceptability Process
		8. General description of any proprietary information the modeler intends to present to the Professional Team in connection with the Acceptability Process
		9. Model Identification
		10. Form A
		11. Form B
		a. Excel format
		b. PDF format
		12. Form C
		13. Form D
		a. Excel format
		b. PDF format
		14. Form E
		15. Form F
		a. ASCII format
		16. Output Ranges
		a. Excel format
		b. PDF format
		c. hard copy included in submission after Form F
		17. 25 Bound Copies
		18. 25 CD ROMs
		a. complete submission in PDF format
		b. PDF file bookmarked and highlightable
		c. data file names include abbreviated name of modeler and standards year
		19. Table of Contents
		20. Materials consecutively numbered from beginning to end starting with the first page
		21. All tables, graphs, and other non-text items clearly labeled
		22. All tables, graphs, and other non-text items specifically listed in Table of Contents
		23. Standards and module item numbers in *italics*, responses in non-italics
		24. Changes in the submission text highlighted, underlined, or listed in letter to Commission

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

_____

_____

_____

_____

Model Name	Modeler Signature	Date

VI. MODULES

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: _____

MODULE 1

MODULE 1

I. General Description of the Model

(Standards 5.5.1-5.5.7 for all items in this Section)

A. In General

1. Specify the model and program version number reflecting the release date. *(Standard 5.1.3)*

2. Provide a complete and concise description of the model, with a one-page introductory summary. Include a description of the methodology, particularly the wind components, the damage components, and the insured loss components used in the model. Indicate where probability distributions have been fit to historical data and demonstrate their agreement. Describe sensitivity and uncertainty analyses used in the development of the model. Describe the computer language/code in which the computer program is written and what type of computer hardware is required. Specify the details of translation from model structure to program structure. *(Standard 5.2.7)*

3. Describe the theoretical basis of the model. Provide precise citations to or, preferably, copies of, the representative or any primary technical papers that help describe the underlying theory that was relied on for any particular component of the model.

4. Provide classes, objects, and procedures that define how the model is represented and how the domain associated with hurricane catastrophe (including all hurricane-related entities) is mapped to elements in the computer program. Explain all interfaces and coupling assumptions.

5. Provide a list and a description of the model variables and the outputs from the model. In describing the variables, state which are qualitative and which are quantitative. Describe the possible range associated with each variable. 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. Indicate which model variables are critical as determined from a sensitivity analysis or suitable equivalent. The objective is to provide an assessment of the attendant uncertainty in the loss costs produced by meteorological variables (including both occurrence and wind field aspects), vulnerability variables and actuarial variables. *(Standards 5.6.4 and 5.6.5)*

6. Are there methods used in the model to incorporate modification factors to the actuarial functions or characteristics? If so, describe. In particular, to what extent are mitigation factors incorporated in the model. *(Standards 5.3.5, 5.4.2, and 5.4.6*)

7. Describe the number of categories of the different vulnerability functions (damage ratios) used within the model. Specifically, include descriptions of the structure types, lines of business, and coverages in which a unique vulnerability function is used. What is the basis for differentiation (e.g., engineering analysis, empirical data, etc.)? *(Standards 5.3.1, 5.3.2, and 5.3.4)*

8. What are the primary or representative documents used or the research results utilized in the development of the model's vulnerability functions (damage ratios)? *(Standard 5.3.1*)

9. What efforts have been made to update or revise the model or specific parts of the model? How many times have revisions been made? Discuss which changes are considered substantive and which are considered technical. When did the revisions occur? What specific revisions were made? *(Standard 5.1.3)*

10. Describe methods and procedures available to the model user so that the user may incorporate modifications into the model. *(Standards 5.4.2 and 5.4.4*)

B. Loss Costs

1. Does the model produce the same loss costs if it runs the same information more than once (i.e., not changing the seed of the random number generator)? *(Standard 5.4.6)*

2. What is the highest level of resolution for which loss costs can be provided? What resolution is used for the reported output ranges? Describe how the model handles beach/coastal areas as distinct from inland areas. *(Standards 5.2.6 and 5.4.12*)

3. How does the model handle deductibles (both flat and percentage), policy limits, replacement costs, and insurance-to-value when estimating loss costs? *(Standards 5.4.6 and 5.4.7*)

4. Are annual aggregate loss distributions available? What review or tests have been done on these? *(Standards 5.4.1, 5.4.3, and 5.4.4*)

5. How are loss adjustment expenses considered within the loss cost estimates?

6. Can the model distinguish among policy form types, for example, home-owners, dwelling property, mobile home, renters, condominium owners etc., and if so, what are the assumptions? Does the model produce loss costs for different types of policies, for example, structure and contents, loss of use, mobile home, commercial residential, or contents only? Discuss in detail. *(Standard 5.4.8)*

7. Provide a list of all engineering and actuarial modifications made to the model including the range of possible impacts on the loss costs produced by the modification. *(Standards 5.3.4 and 5.4.2)*

C. Other Considerations

1. Describe how the model takes into consideration the following:

   a. Socio-economic effects resulting from a large catastrophe, both upside as in FEMA mitigation and downside as in labor and material shortages; *(Standards 5.3.1, 5.4.3, and 5.4.5*)

   b. Building code and enforcement differentiation; *(Standards 5.3.4, 5.4.2, and 5.4.6*)

   c. Specific construction characteristics (e.g., use of hurricane shutters); *(Standards 5.3.4, 5.4.2, and 5.4.6)*

   d. Storm surge and flood damage to the infrastructure. *(Standards 5.1.1, 5.3.6, and 5.4.9)*

2. List the input variables for all of the categories in 1 above. *(Standard 5.1.6*)

II. Specific Description of the Model

(Standards 5.5.1-5.5.7 for all items in this section)

A. Model Variables

1. Using the list of model variables provided in response to I.A.5, describe the source documents and any additional research that was performed to develop the model's variable functions or databases. Particularly describe all such information, including a description of the historical database(s), for the model's hurricane wind speeds and hurricane frequencies. Were there any assumptions used in creating any of these databases? Describe any deviation from the Commission's hurricane set. Describe intensities used for these hurricanes. *(Standards 5.2.3, 5.2.6, and 5.6.2)*

2. List the current primary databases used by the model and the aspects of the model to which they relate. Indicate which databases are "public" and which are "proprietary." *(Standards 5.1.5 and 5.2.3)*

3. What assumptions are made in the following areas:

   a. Meteorology
   b. Damageability
   c. Insurance Coverage

How does the model address the issue of demand surge? (*Standards 5.3.4, 5.4.1, 5.4.4, and 5.4.5*)

4. Are there other major or significant assumptions not listed above? If so, describe. *(Standards 5.4.1 and 5.4.4*)

5. Describe the nature and extent of actual insurance claims data that have been used to develop the model's vulnerability functions (damage ratios). Describe in detail what is included, such as, number of policies, number of insurers, and number of units of dollar exposure; separate into personal lines, commercial, and mobile home. *(Standards 5.3.1, 5.4.1, and 5.4.10)*

B. Methodology

1. Specify the wind speed(s) (e.g., one-minute sustained, peak gusts, etc.) used for loss estimation. *(Standards 5.2.4, 5.2.7, and 5.3.3)*

2. How is the asymmetric nature of hurricanes considered? *(Standard 5.2.4)*

3. Describe the nature of the filling rate function used. *(Standards 5.2.4 and 5.2.9)*

4. Other than the hurricane's characteristics, what other variables affect the wind speed estimation (e.g., surface roughness, topography, etc.)? Describe the database used for land friction calculation and its compatibility with the friction model. *(Standards 5.2.4 and 5.2.8)*

5. Identify the characteristics (e.g., central pressure, radius of maximum winds, etc.) of a hurricane that are used in estimating wind speeds and how this information is applied for the entire state of Florida. *(Standards 5.2.4 and 5.2.8)*

6. Which variables in the wind speed component are dependent, and how is this dependence incorporated in the model? *(Standard 5.2.4)*

7. 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. *(Standards 5.2.3, 5.2.4, 5.2.6, 5.2.7, and 5.6.2)*

8. If stochastic simulation techniques are used, describe how the hurricanes are generated from the underlying probability distributions. How are landfall sites, hurricane paths, and decay rates determined? *(Standards 5.2.3, 5.2.4, 5.2.6, and 5.2.7)*

9. Does the model produce confidence intervals for:

   a. Wind speed estimates given a set of hurricane parameters?
   b. Damage estimates given a wind speed estimate?
   c. Annual loss costs?

   Characterize the uncertainties in the model, for example, with an uncertainty analysis. Uncertainty refers both to possible model misspecifications and inherent random variation. *(Standards 5.6.3 and 5.6.5)*

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

11. What functions or variables does the model consider to be independent? For those functions that are not independent, describe the source of dependence such as latitude. Are there limitations on the functions or variables that are a function of latitude? If so, describe. What are the intermediate (endogenous) variables that are part of the calculations between the inputs and outputs described in I.A.5? *(Standard 5.1.4)*

12. Identify the form of the probability distributions used for each function or variable, if applicable. What statistical techniques were used for distributions that are estimates? What tests were used for goodness-of-fit? *(Standard 5.6.1)*

13. What is the most sensitive aspect of the model? Is this sensitivity based on a) an assumption, b) an underlying datum unique to the model, or c) a technique that the model employs? Discuss fully and provide an example to illustrate how (to what degree) this sensitivity affects output results. *(Standards 5.1.4, 5.6.4, and 5.6.5)*

14. Are there other aspects of the model that may have a significant impact on the sensitivity or variation in output results? *(Standards 5.1.4, 5.6.4, and 5.6.5)*

15. What sensitivity and uncertainty analyses have been performed on the model? *(Standards 5.1.4, 5.6.4, and 5.6.5)*

C. Validation Tests

1. What were the nature and results of the tests performed to validate the wind speeds generated? *(Standard 5.6.2)*

2. What were 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. *(Standards 5.4.11 and 5.6.6)*

3. What were the nature and results of the tests performed to validate the damage estimates generated? *(Standards 5.4.10, 5.4.11, and 5.6.2)*

4. Were insured losses from ancillary perils included within the annual loss cost estimate? If so, describe which perils, the basis for the loss estimation, and the validity testing or peer review that was performed on these calculations.

5. What were the nature and results of any validation tests on any other aspects of the model? *(Standard 5.6.2)*

6. Provide documentation of all validation tests performed. *(Standard 5.6.2)*

MODULE 2

MODULE 2

Background/Professionalism

1. Company Background

A. Describe the ownership structure of the modeling company. Is the company affiliated with any other company? If so, describe the nature of the relationship.

B. How long has the company been in existence?

C. In what year was the model developed?

D. How long has the model been used for ratemaking purposes?

E. In which states has use of the model been attempted for ratemaking purposes? Has the model been accepted for use in any state? If so, what state or states? Provide the Commission with the name of a contact person in all the states where the model has previously been used for ratemaking purposes. (The Commission may contact these persons to discuss the work performed.)

F. Describe generally the modeling company's services and the percentage of the company's annual income derived from each.

G. How long has the model been used for analyzing insurance company exposures or other such uses? Describe these uses.

2. Professional Credentials

(*Standard 5.1.2 for all items in this section)*

A. List the names of the company's technical staff and consultants with highest degree obtained (discipline and University), years of experience with hurricane modeling for ratemaking, and credentials and years of relevant experience.

B. Describe the credentials of the individuals or groups involved in the development of the following aspects of the model:

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

State whether these persons are full-time employees or outside consultants**.**

3. Multi-discipline Team
(*Standard 5.1.2 for all items in this section)*

A. Indicate the different academic disciplines used to provide input and to construct the model.

B. Of the disciplines listed above, which are represented by current employees with the company? Are other disciplines represented through consulting arrangements?

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

4. List of Clients

A. Provide a sample list of the company's clients in the following categories: for ratemaking, for reinsurance and capital markets, for government. Regarding the ratemaking clients, state the number of clients in this category and the total residential market share, in Florida and nationwide, represented by these clients. For ratemaking clients, how many clients have a U.S. aggregate annual property and casualty insurance premium of $100 million or more? Do any of the ratemaking clients have a U.S. aggregate annual property and casualty insurance premium of over $1 billion? (The Commission may contact these persons or firms to discuss the company's work.)

B. Describe the present mix of company clients (ratemaking, reinsurance, capital markets, government, etc.) and whether (and, if so, how) that mix differs from the mix over the last 3 to 5 years.

C. How long have the ratemaking clients been clients of the company?

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

5. Independent Expert Review
(Standard 5.1.2 for all items in this section)

A. What independent peer reviews have been performed on the following parts of the model:

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

B. Provide documentation of independent peer reviews of both the standards and modules and clearly 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. State which of the peer reviews described above were paid for by the company and which were performed for no compensation. Describe any review by an independent organization, such as Standard and Poor's, Moody's, etc.

D. Discuss any adversarial situations (such as a ratemaking hearing) in which the model was subjected to review.

MODULE 3

MODULE 3

The following pages contain questions and follow-up tests of the computer simulation model. Answer each question with as much detail as possible. Answers that do not address the question directly may not help the Commission make the appropriate decisions regarding the model.

The written response and output files must be submitted to the Commission as specified in the Process for Determining the Acceptability of a Computer Simulation Model.

NOTE: The Commission is charged with evaluating the model as a ratemaking tool. Thus, modelers should focus on this charge while explaining the model.

Module 3 - Section I

Meteorology - Hurricane Set

(*Standards 5.2.3, 5.2.4, 5.2.6, 5.2.8, and 5.2.9 for all items in this section*)

1. Define an "event" in the model. Does it include only hurricanes making landfall (i.e., the eye of the hurricane crosses land) or does it also include any hurricane where hurricane force winds cause damage (i.e., the eye need not necessarily cross land)? (*Standard 5.2.5*)

2. What is 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? (*Standards 5.2.5 and 5.2.7*)

Saffir-Simpson Hurricane Scale
(for displayed parameters)

Category	Wind Speed (mph)	Central Pressure (mb)
1	74 - 95	$\geq$ 980
2	96 - 110	965 – 979
3	111 - 130	945 – 964
4	131 - 155	920 – 944
5	> 155	< 920

3. How does the model handle events with multiple landfalls? Are these defined as a single event or multiple events? How does this affect frequency assumptions used in the model? (*Standard 5.2.5*)

4. How does the model handle the definition of an event from an insurance policy perspective? That is, does the model recognize the 72-hour limitation for an occurrence as defined by some insurance policies? From this perspective, are events with multiple landfalls greater than 72 hours apart considered as two events?

5. Describe the hurricane tracks in the model. Discuss the appropriateness of the hurricane tracks used by the model. What historical data are used as the basis for the model's hurricane tracks? *(Standard 5.2.7)*

6. Describe in detail the decay rates or hurricane degradation assumptions used by the model after the hurricane makes landfall. How far inland are hurricane force winds estimated for different category events (as defined by wind speed in the Saffir-Simpson scale)? Does the decay rate vary by region or hurricane segment? *(Standard 5.2.10)*

7. 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. *(Standard 5.4.11)*

8. Name the source of the historical data set used to develop frequency distributions for specific hurricane characteristics. How many years worth of data does the data set contain? Were any modifications made to the data set? If so, describe in detail the modifications and their appropriateness. (*Standard 5.6.1*)

9. Provide ranges for radius of maximum winds, radius of hurricane force winds and far field pressure used by the model for the central pressures provided in ***Figure 1.*** (*Standards 5.2.7 and 5.2.10*)

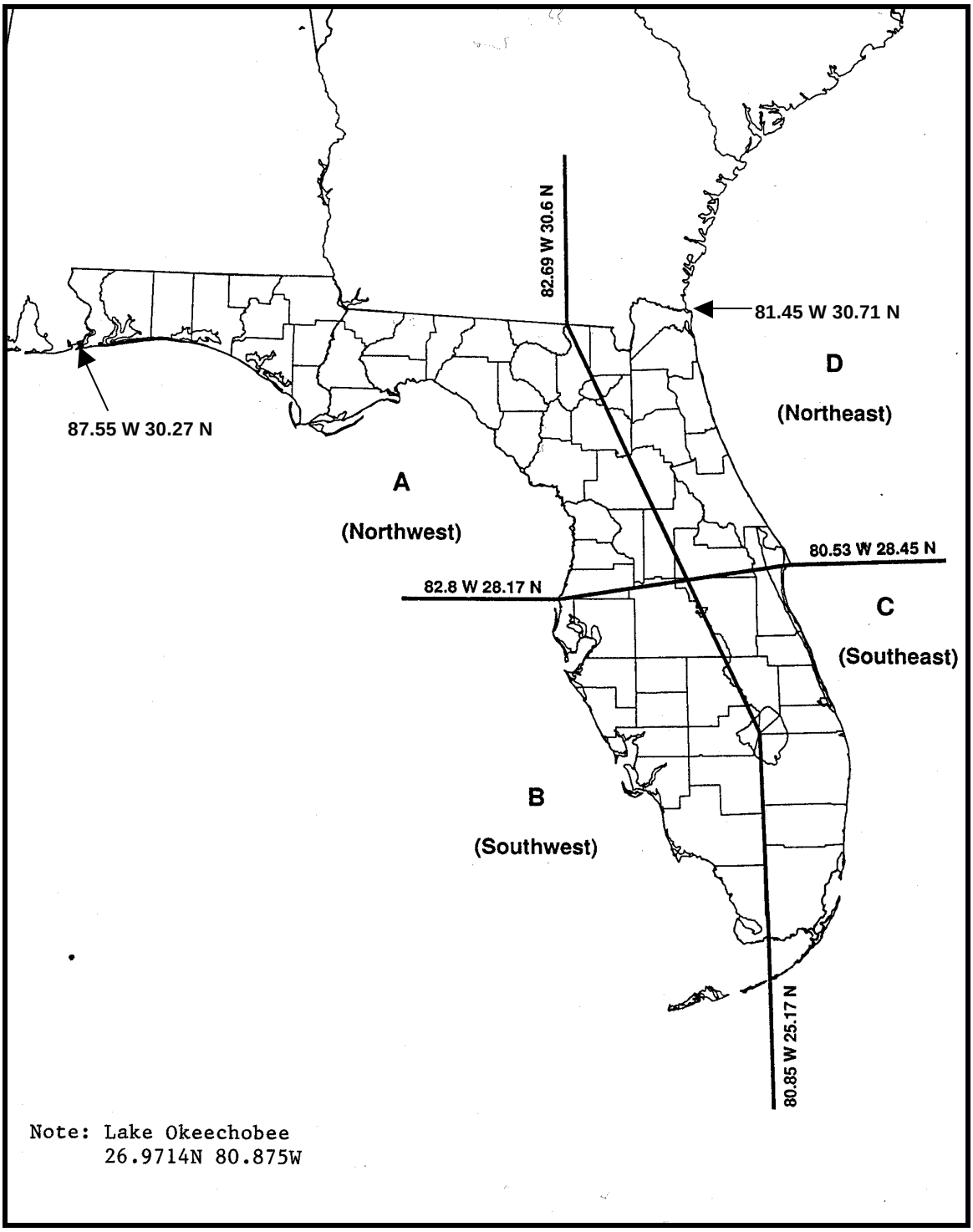
Figure 1

Central Pressure (mb)	Radius of Maximum Winds (mi)	Radius of Hurricane Force Winds (mi)	Far Field Pressure (mb)
900	_____	_____	_____
910	_____	_____	_____
920	_____	_____	_____
930	_____	_____	_____
940	_____	_____	_____
950	_____	_____	_____
955	_____	_____	_____
960	_____	_____	_____
965	_____	_____	_____
970	_____	_____	_____
975	_____	_____	_____
980	_____	_____	_____
985	_____	_____	_____
990	_____	_____	_____

10. Provide maps showing the maximum winds at the zip code level for the modeled 102 year historical storm set and also for a 100 year return period from the stochastic storm set. *(Standard 5.1.7)*

11. Provide frequency and annual occurrence rates from both the historical data set given and 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 2.*** (*Standards 5.2.5, 5.2.7, and 5.4.11)*

Figure 2



12. Complete the tables in ***Figure 3*** with modeled information for Florida in total and by region as defined in ***Figure 2***. For each region, the column labeled "Hurricanes" is the number of hurricanes that made their initial landfall in that region. Category refers to the Saffir-Simpson Hurricane Scale for the hurricane at that landfall. "Coastal X-ings" refers to the total number of crossings in that region, either entering land or exiting land, as long as the storm was a hurricane as it crossed. It is counted in the bin at the strength when it crossed the land/sea boundary. It includes the initial landfall and all subsequent landfalls as well as exits as long as it was still a hurricane on exit. List the number of events, the relative frequency (percent of the total) and annual occurrence rate (probability of an event in a given year) per hurricane category. *(Standards 5.2.5, 5.2.7, and 5.6.2)*

Figure 3

Entire State of Florida

	Hurricanes/Coastal X-ings		Relative Frequency		Annual Occurrence Rate	
Cat.	**Historical**	**Modeled**	**Historical**	**Modeled**	**Historical**	**Modeled**
1	25/37	/	45%/48%	/	.25/.36	/
2	12/18	/	21%/23%	/	.12/.18	/
3	14/17	/	25%/22%	/	.14/.17	/
4	3/3	/	5%/4%	/	.03/.03	/
5	2/2	/	4%/3%	/	.02/.02	/

Region A – Northwest Florida

	Hurricanes/Coastal X-ings		Relative Frequency		Annual Occurrence Rate	
Cat.	**Historical**	**Modeled**	**Historical**	**Modeled**	**Historical**	**Modeled**
1	11/16	/	64%/67%	/	.11/.16	/
2	4/5	/	24%/21%	/	.04/.05	/
3	2/3	/	12%/12%	/	.02/.03	/
4	0/0	/	0/0	/	0/0	/
5	0/0	/	0/0	/	0/0	/

Region B – Southwest Florida

	Hurricanes/Coastal X-ings		Relative Frequency		Annual Occurrence Rate	
Cat.	**Historical**	**Modeled**	**Historical**	**Modeled**	**Historical**	**Modeled**
1	8/9	/	50%/42%	/	.08/.09	/
2	2/4	/	13%/19%	/	.02/.04	/
3	4/6	/	25%/29%	/	.04/.06	/
4	1/1	/	6%/5%	/	.01/.01	/
5	1/1	/	6%/5%	/	.01/.01	/

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

Region C – Southeast Florida

	Hurricanes/Coastal X-ings		Relative Frequency		Annual Occurrence Rate	
Cat.	**Historical**	**Modeled**	**Historical**	**Modeled**	**Historical**	**Modeled**
1	6/10	/	27%/37%	/	.06/.10	/
2	5/6	/	23%/22%	/	.05/.06	/
3	8/8	/	36%/30%	/	.08/.08	/
4	2/2	/	9%/7%	/	.02/.02	/
5	1/1	/	5%/4%	/	.01/.01	/

Region D – Northeast Florida

	Hurricanes/Coastal X-ings		Relative Frequency		Annual Occurrence Rate	
Cat.	**Historical**	**Modeled**	**Historical**	**Modeled**	**Historical**	**Modeled**
1	0/2	/	0/40%	/	0/.02	/
2	1/3	/	100%/60%	/	.01/.03	/
3	0/0	/	0/0	/	0/0	/
4	0/0	/	0/0	/	0/0	/
5	0/0	/	0/0	/	0/0	/

By-Passing Storms

	Hurricanes/Regions Affected		Relative Frequency		Annual Occurrence Rate	
Cat.	**Historical**	**Modeled**	**Historical**	**Modeled**	**Historical**	**Modeled**
1	1/B	/	20%	/	.01	/
2	2/C,C	/	40%	/	.02	/
3	1/A	/	20%	/	.01	/
4	1/B	/	20%	/	.01	/
5	0	/	0	/	0	/

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

13. Complete the table in ***Figure 4*** showing the Probability of Hurricanes by Year. *(Standard 5.6.2)*

Figure 4

MODEL RESULTS
PROBABILITY OF HURRICANES BY YEAR

NUMBER OF HURRICANES PER YEAR	HISTORICAL PROBABILITY	MODELED PROBABILITY
0	0.5784	
1	0.2647	
2	0.1373	
3	0.0196	
4	0.0000	
5	0.0000	
6	0.0000	
7	0.0000	
8	0.0000	
9	0.0000	
10 or more	0.0000	

Module 3 - Section II

Hurricane Wind Field

(Standard 5.2.10 for all items in this section)

1. What wind values (e.g., peak gust, maximum one-minute average sustained) and for what elevation is the model's wind field valid? Describe in detail the rationale for using the wind field in the model.

2. Were the wind speeds generated in the wind field model converted to another form (i.e., from one-minute sustained to peak gust) for use by the vulnerability functions in the model? If so, is there any accuracy lost by doing so? Describe in detail. *(Standard 5.2.2)*

3. Is the duration of wind speeds at a particular location over the life of a hurricane considered in the model? If so, at what point (or wind speed level) is the damage ratio estimated for wind speeds at a location? Does the model take into consideration both damage caused by gusts of wind and damage caused by sustained winds at perhaps a lower wind speed level? Describe in detail.

Module 3 - Section III

Vulnerability Functions
Damage Estimates

(*Standards 5.3.1, 5.3.2, 5.3.3, and 5.3.4 for all items in this section*)

1. At what one-minute average sustained wind speed does the model begin estimating loss?

2. Describe in detail how socio-economic effects are considered (if at all) within the model. Is this applied to every event in the model or limited to select events? If for only select events, how are they selected? If this is not considered directly in the model but only at the request of the insurance company, describe the procedure for including this in the loss estimates. Describe the validation procedures to verify the results. (*Standards 5.4.3, 5.4.4, and 5.4.5*)

3. Describe in detail how building code enforcement is considered (if at all) within the model. If this is not considered directly in the model but only at the request of the insurance company, describe the procedure for including this in the loss estimates. Describe the validation procedures to verify the results. (*Standards 5.4.2, 5.4.4, 5.4.6, and 5.6.2*)

4. Describe in detail how quality of construction type, materials and workmanship are considered (if at all) within the model. If this is not considered directly in the model but only at the request of the insurance company, describe the procedure for including this in the loss estimates. Describe the validation procedures to verify the results. (*Standards 5.4.2, 5.4.4, 5.4.6, and 5.6.2)*

5. Describe in detail how the presence of fixtures or construction techniques designed for hazard mitigation are considered (if at all) within the model. If this is not considered directly in the model but only at the request of the insurance company, describe the procedure for including this in the loss estimates. Describe the validation procedures to verify the results. (*Standards 5.3.5, 5.4.2, 5.4.4, 5.4.6, and 5.6.2*)

6. Describe in detail the "unknown" vulnerability curve used for unknown residential construction types. If a composite of other vulnerability functions is used, describe how they are derived. Cite the documentation or describe the data used as a basis for this curve.

Module 3 - Section IV

Insurance Functions
Company Loss Estimates

(*Standards 5.4.1 and 5.4.4 for all items in this section*)

1. A given wind speed can produce a variety of damage within a given zip code. For example, a 10% average damage ratio could result from a wide variety of damages ranging from no damage up to moderate damage. Some properties may have losses that are entirely below the deductible so that total insured losses in the zip code are well below 10%. In a similar manner for more severe wind speeds, some properties within a zip code could have damages in excess of policy limits. How does the model handle these situations? (*Standard 5.4.7*)

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. (*Standard 5.4.7*)

   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

3. Describe in detail the approach used for the appurtenant structures vulnerability function (if it is a unique function). How is it dependent on the building function? Provide documentation of validation test results to verify the approach used. (*Standards 5.3.1, 5.3.2, and 5.6.2*)

4. Describe in detail the approach used for the mobile home vulnerability function. How is it dependent on other building functions and are there separate mobile home vulnerability functions? Provide documentation of validation test results to verify the approach used. (*Standards 5.3.1, 5.3.2, 5.3.4, and 5.6.2*)

5. Describe in detail the approach used for the contents vulnerability function. How is it dependent on the building function (e.g., is it a function of building loss or other aspect)? Is there a minimum threshold at which loss is calculated (e.g., loss is estimated when the building damage exceeds 20%)? Provide documentation of validation test results to verify the approach used. (*Standards 5.3.1, 5.3.2, 5.4.8, and 5.6.2*)

6. Describe in detail the approach used for the additional living expense vulnerability function. Does it consider 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 (e.g., food spoilage) for loss of power, heat, etc. Is there a minimum threshold at which 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. *(Standards 5.3.1, 5.3.2, 5.3.6, 5.4.9, and 5.6.2)*

7. Some policies, particularly for contents coverage, provide for indemnity on an actual cash value basis. Identify depreciation assumptions and describe in detail 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 ACV losses. (*Standard 5.4.8*)

8. Some policies cover losses that exceed the amount of insurance. Identify property value assumptions and describe in detail 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. *(Standard 5.4.7)*

9. 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 not only the loss estimates, but also 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, provide exposures for only those policies that had a loss. Specify which was used. Also, specify the name of the hurricane event compared. (*Standard 5.4.10*)

Example:

Comparison #1
Hurricane = Andrew
Exposure = Total (or Loss only)

Figure 5

	Company Actual			Modeled		
Construction	Exposure	Loss	Loss/ Exposure	Exposure	Loss	Loss/ Exposure
Wood Frame	_____	_____	_____	_____	_____	_____
Masonry	_____	_____	_____	_____	_____	_____
Mobile Home	_____	_____	_____	_____	_____	_____
Total	_____	_____	_____	_____	_____	_____

10. Disclose, in a model output report, the specific type of input that is required of insurers in order 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 insurer and needed to derive loss estimates from the model, and any variables that a licensed user is authorized to set in implementing the model.

    Include a copy of the input form used by insurers or others to provide input criteria to be used in the model. The information contained in the input form shall be incorporated into the model using standard actuarial and scientific methods. Methods used to include data provided in the input forms shall be disclosed and shall be based on accepted actuarial and other disciplinary procedures.

    All modifications, adjustments, assumptions, defaults, and treatments of missing values shall be fully disclosed in a form to be included with the model output. The modeler's submission shall include the output form that discloses any and all modifications, adjustments, assumptions, or other criteria that are included in producing the model output.

    The modeler shall demonstrate that the input form relates directly to the model output. The model name and version number must be included on the forms.

11. Provide the input forms used by the modeler in developing the loss cost calculations in Standard 5.4.12, Output Ranges and by users of the model in the rate filing process. Provide the output forms that disclose any and all modifications, adjustments, assumptions, or other criteria that are included in producing the loss cost calculations in 5.4.12. If there are no such criteria, the output form should indicate so.

Module 3 - Section V

Average Annual Loss Functions
Loss Costs

(*Standard 5.4.3 for all items in this section)*

1. Provide copies of documentation and reports available to the insurer to be used to analyze loss costs or as supporting documentation in rate filings.

2. In responding to the following questions, demonstrate that the results of the model are reasonably consistent with observed insurance data and other scientifically based observations. Where appropriate, explain possible inconsistencies. Document data sources. (*Standards 5.3.2, 5.4.6, 5.4.8, 5.4.10, and 5.4.11*)

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

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

   - Demonstrate that loss cost relationships between territories or regions are consistent and reasonable.

3. Provide copies of 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. *(Standards 5.1.7 and 5.4.7)*

4. Provide to the Commission output ranges in the format shown in the file named "**2002OutPut.xls"** on the enclosed CD-ROM. A hard copy of the output range spreadsheets shall be included with the submission and shall appear as indicated, at the end of Module 3, Section VII. Also provide the output ranges on CD-ROM in both an Excel and a PDF format as specified. The file name shall include the abbreviated name of the modeler and the Standards year. (*Standard 5.4.12*)

   Loss costs shall be provided by county in the format adopted by the Commission. Within each county, loss costs shall be shown separately per $1,000 of exposure for personal residential, renters, condos, and mobile home; for each major deductible option; and by construction type. For each of these categories using zip code centroids, the output range shall 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 **"hlpm.exe"** on the enclosed CD-ROM. A file named **"99 FHCF Wts.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 in the format in the file named "**2002OutPut.xls**" on the enclosed CD-ROM. *(Standards 5.3.2, 5.3.6, 5.4.2, 5.4.4, 5.4.6, 5.4.7, 5.4.8, 5.4.9, 5.4.11 and 5.6.6)*

Modelers should indicate if per diem is used in producing loss costs for Coverage D in the Output Ranges submitted to the Commission. If a per diem rate is used in the submission, an illustrative rate of $150.00 per day per policy should be used.

5. Include an explanation of the differences between the prior year and the current year submission (if applicable). *(Standards 5.4.6, 5.4.11, 5.4.12, and 5.6.6)*

NOTE: 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). The modeler should provide a list of those zip codes where this happens. 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. Instead, the modeler should use only those exposures for which it has loss costs in calculating the weighted average loss costs. The modeler should provide a list of those zip codes where the modeler does not have loss costs for a zip code for which there is some exposure.

6. Provide the percentage change in the weighted average loss costs from the Output Ranges from the prior year submission for the following:

   a. statewide (overall percentage change),
   b. by region, as defined in ***Figure 6*** – North, Central and South,
   c. by coastal and inland counties, as defined in ***Figure 7***.

(Standards 5.4.12 and 5.6.6)

Figure 6

State of Florida by Region

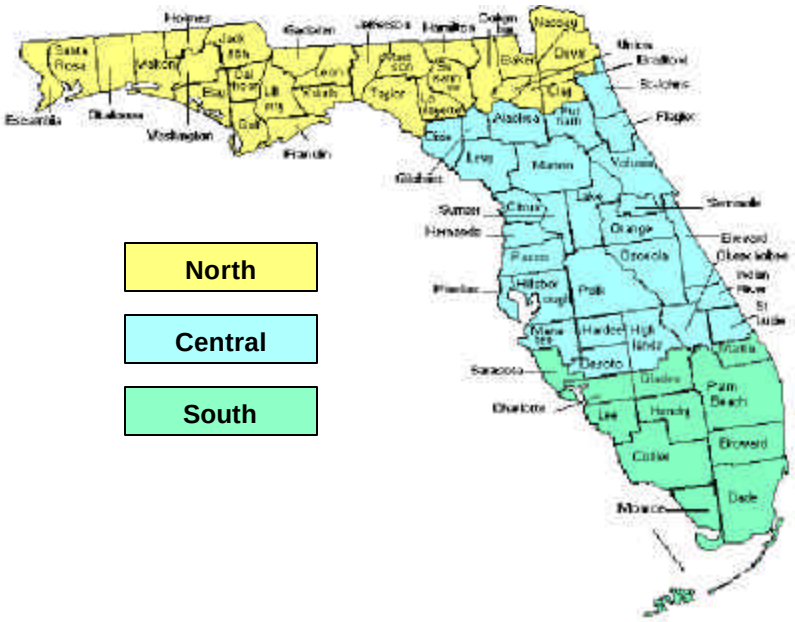
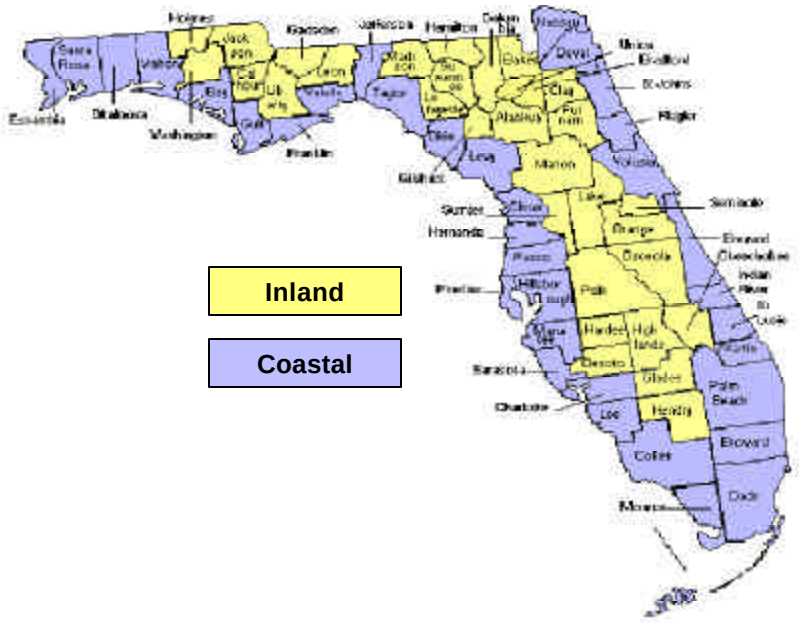


Figure 7

State of Florida by Coastal/Inland Counties



7. Provide a color-coded map reflecting the percentage changes in the weighted average loss costs from the Output Ranges by county. 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. *(Standards 5.1.7, 5.4.12, and 5.6.6)*

8. 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 the monetary contribution from Hurricane Andrew for each affected zip code. *(Standards 5.4.5 and 5.4.10)*

9. Complete the table in ***Figure 8*** showing the Distribution of Hurricanes by Size. For the Expected Annual Hurricane Losses column, the modeler must present personal residential, zero deductible statewide loss costs based on the 1998 Florida Hurricane Catastrophe Fund's (FHCF) aggregate exposure data found in the file named "**hlpm.exe.**"

   In the column, Return Time (Years), the modeler should indicate the return time associated with an 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.

The modeler shall provide to the Commission a detailed explanation of how the Expected Annual Hurricane Losses and Return Time were calculated. *(Standards 5.4.4, 5.4.6, 5.4.7, and 5.4.11)*

Figure 8

MODEL RESULTS 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 FHCF exposure data – file name: **hlpm.exe**.

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 **"99 FHCF Wts.xls"** 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 **"99 FHCF Wts.xls"** 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 **"99 FHCF Wts.xls"** 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 **"99 FHCF Wts.xls"** 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 **"99 FHCF Wts.xls"** 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 **"99 FHCF Wts.xls"** 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.

Module 3 - Section VI

General

1. Describe in detail how invalid zip codes are handled within the model or modeling practice. Are they deleted from the analysis, allocated, mapped back into the exposure data set, or handled in some other fashion? (*Standard 5.1.5*)

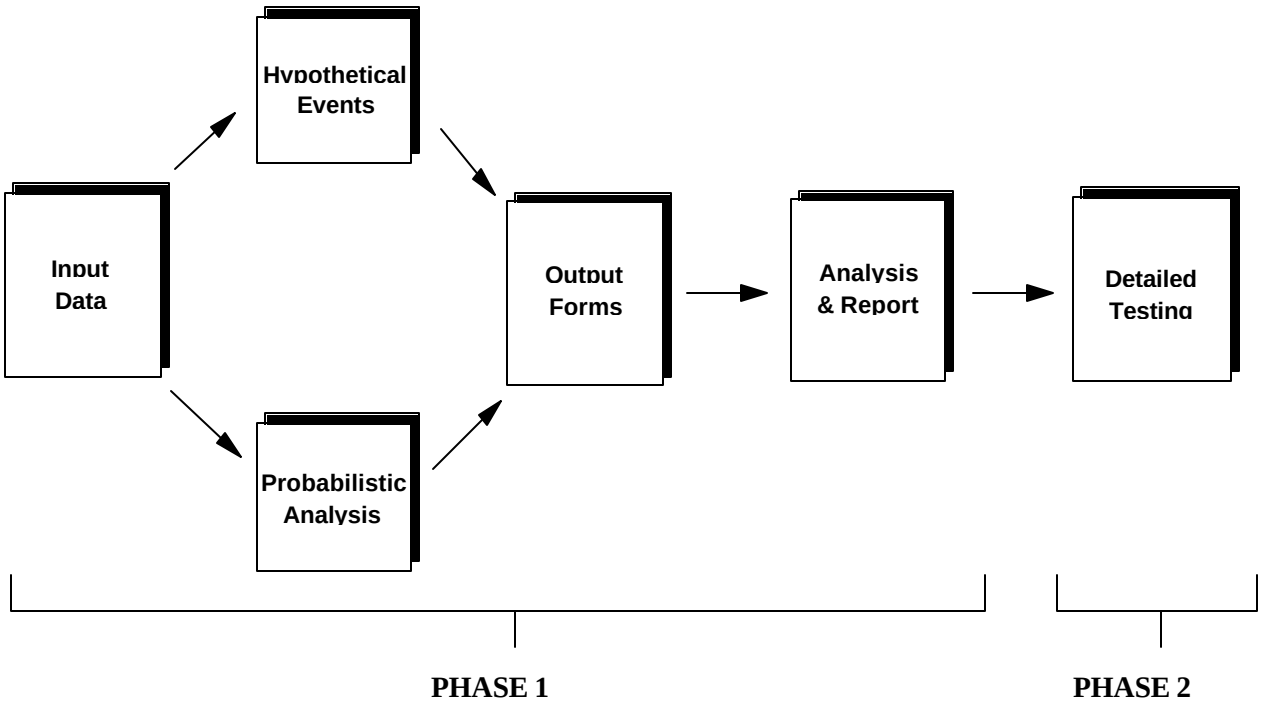
2. Describe what is done to prevent tampering of the computer code by users. How is the security of the model code addressed? (*Standard 5.5.2*)

Module 3 - Section VII

I. Data Flow Chart

Following is a data flow chart depicting the process of evaluating hurricane catastrophe simulation models:

Data Flow Chart



Baseline Tests

(*Standards 5.4.3, 5.4.5, and 5.4.6 for all items in this section)*

Sample Input Data

Sample input data have been provided to the modeler on the enclosed CD-ROM in the file named **"FormDInput02.xls."** The Commission is asking that the modeler run various scenario hurricane events (hypothetical and probabilistic) through the model on the sample input exposure data. The attached output forms must be completed and specified loss files provided to the Commission on CD-ROM in both an Excel and a PDF format. The file names should include the abbreviated name of the modeler and the Standards year.

This data set consists of one $100,000 building for each construction type for each zip code in the state of Florida. The data set contains 6,052 records. The following 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 18***
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 = Unknown
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. The Commission requests a copy of this mapping and proper documentation describing the reason for the mapping. In addition, the modeler is requested to provide information as to the assumptions made with the unknown construction types by the model.
- 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 must be reviewed with Commission staff. The intent is to keep all assumptions consistent among the modelers.

TESTS

Zip Code Data Base - Form A

The accuracy of the model zip code database will be compared to the most current available. Complete ***Form A***:

Form A
Zip Code Data Base
(Standard 5.1.5)

Zip codes used in the model shall be weighted by population.

Describe methods used to verify the accuracy of zip code data. Describe the mapping of the construction codes provided with the data to the construction codes used by the model, if any. Describe how the unknown construction code is handled.

Model zip code database as of _____.
Sample exposure zip codes as of most current available.

	Matched	**Unmatched**
No. of Records	_____	_____
% of Total Records	_____	_____
Total Exposure	_____	_____
% of Total Exposure	_____	_____

30 Hypothetical Events - Form B (Hypothetical Event Evaluation)

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. The Commission is requesting the maximum estimated one-minute sustained 10-meter wind speed associated with the events as well as the estimated loss by coverage type. The purpose of this analysis is to evaluate the consistency of the wind speeds and loss estimates among the different models.

A description of the events is contained in the file named **"FormBInput02.xls"** on the enclosed CD-ROM. 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 and the Standards year. Complete ***Form B*** using the specified file layout:

Form B
30 Hypothetical Events

(Standards 5.2.5, 5.2.10, 5.3.2, 5.3.6, 5.4.4, 5.4.8, and 5.4.9)

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

Modeled estimated one-minute average wind speeds produced in ***Form B*** shall be consistent with central pressure inputs.

One Hypothetical Event - Form C (Hypothetical Event Evaluation)

Wind speeds for 336 zip codes have been provided to the modeler by the Commission on the enclosed CD-ROM in the file named **"FormCInput02.xls."** The wind speeds* and zip codes represent a hypothetical hurricane track. The modeler is instructed to model the sample exposure data against these wind speeds at the specified zip codes and provide the Commission with damage ratios summarized by wind speed (mph) and construction type. If additional assumptions are necessary to complete this form (for example, regarding duration), the modeler shall indicate those used. The purpose of this analysis is to compare the estimated damages by wind speed and construction type among the different models. Complete ***Form C***:

Form C
One Hypothetical Event

(Standards 5.2.10, 5.3.2, 5.4.4, 5.4.8, and 5.4.9)

Wind Speed* (mph)	**Total Loss**/ 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	_____

Construction Type	**Total Loss**/ Subject Exposure**
Wood Frame	_____
Masonry	_____
Mobile Home	_____
Unknown	_____

*Wind speeds are one-minute sustained, ten-meter wind speeds.

**Total loss is the sum of loss to all buildings in that category. For example, the total loss to all buildings affected by 58 mph or greater winds or the total loss to all buildings with wood frame construction.

Loss Costs - Form D (Probabilistic Analysis)

Provide loss costs for each construction type for each zip code in the sample data set named **"FormDInput02.xls."** The following is a description of the requested file layout. Follow the instructions on ***Form D*** 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).

Form D
Loss Costs

(Standards 5.3.2, 5.3.4, 5.3.6, 5.4.2, 5.4.4, 5.4.7, 5.4.8, 5.4.9, and 5.6.6)

Provide the expected annual loss costs by construction type and coverage for each zip code in the sample data set. There are 1,513 zip codes in the sample data set and 4 construction types; therefore, the completed file should have 6,052 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 an Excel and a PDF format using the following file layout. The file name should include the abbreviated name of the modeler and the Standards year.

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, 4 = Unknown
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 = 25
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 D*** data are shown below:

Field Name	**Value**
Analysis Date	1999/11/15
County Code	Miami-Dade County = 25
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:

1999/11/15,25,33102,1,0.01,100000,10000,50000,20000,0.092857,0.092857,0.046429,0.023214

Probable Maximum Loss (PML) - Form E (Probabilistic Analysis)

Complete ***Form E:*** Provide estimates of the insured loss for various probability levels using the hypothetical data set. Provide the following:

a. The annual aggregate mean, median, standard deviation, and interquartile range for PML distribution; that is, the mean, median, standard deviation, and interquartile range of the annual aggregate insured losses.
b. The occurrence mean, median, standard deviation, and interquartile range for PML distribution; that is, the mean, median, standard deviation, and interquartile range of the insured losses from individual events.

Form E
Probable Maximum Loss
(Standard 5.4.4)

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

	Annual Aggregate	Occurrence
Mean	_____	_____
Median	_____	_____
Standard Deviation	_____	_____
Interquartile Range	_____	_____

Form F
Hypothetical Events for Sensitivity and Uncertainty Analysis

(Standards 5.2.4, 5.2.7, 5.2.8, 5.2.9, 5.2.10, 5.3.2, 5.3.3, 5.3.4, 5.3.6, 5.4.2, 5.4.4, 5.6.4, and 5.6.5)

The modeler shall supply output in ASCII files, which are based on running a series of storms as provided in the Excel file "**FormFInput02.xls.**" Specifically, the output shall consist of wind speeds (in miles per hour for one minute sustained, ten-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. Specification of quantiles allows the Professional Team to produce meaningful uncertainty and sensitivity analysis results for all modelers prior to the on-site reviews. If quantile input variables are used, the modeler shall describe how the fourth and/or fifth input variables were used and provide the specific values that correspond to the quantiles in Form F. 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 B***, 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.

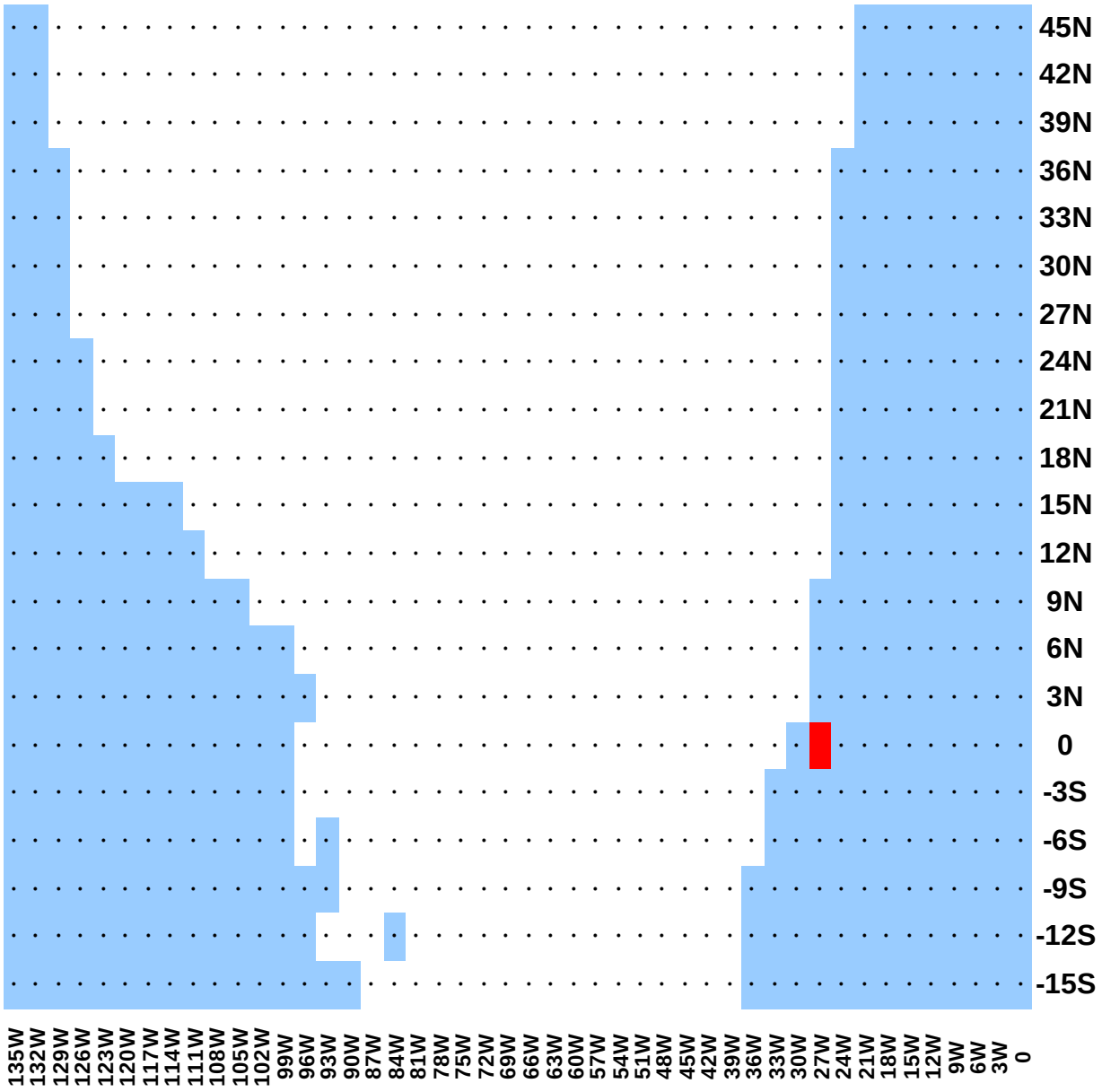
These conditions will be used in the uncertainty analysis for CP. The third worksheet (Unc Anal for Rmax), fourth worksheet (Unc Anal for VT), fifth worksheet (Unc Anal for Quantile 1), and sixth worksheet (Unc Anal for Quantile 2) are similar to the second worksheet and are used for performing uncertainty 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 supply 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 9*** for all three storm categories. For purposes of storm decay, the modeler is instructed to use existing terrain consistent with the grid in ***Figure 9***.

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 9***. 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 9



Output is to be provided on CD-ROM in ASCII format. Five output files (or six if second quantile input variable is used) shall be written for each of the three storm categories. These files shall be named as shown in ***Figure 10*** with the XXX denoting the abbreviated name of the modeler:

Figure 10

Summary of Form F Input and Output Files*

Storm Category	Input Values given in FormFInput02.xls file	Output File	Modeler Wind Speed Output File Name
1	Sensitivity Analysis all Variables	1	XXXOutput02FormF1SA.dat
	Uncertainty Analysis CP	2	XXXOutput02FormF1UACP.dat
	Uncertainty Analysis Rmax	3	XXXOutput02FormF1UARmax.dat
	Uncertainty Analysis VT	4	XXXOutput02FormF1UAVT.dat
	Uncertainty Analysis Quantile	5	XXXOutput02FormF1UAQuantile 1.dat
3	Sensitivity Analysis all Variables	6	XXXOutput02FormF3SA.dat
	Uncertainty Analysis CP	7	XXXOutput02FormF3UACP.dat
	Uncertainty Analysis Rmax	8	XXXOutput02FormF3UARmax.dat
	Uncertainty Analysis VT	9	XXXOutput02FormF3UAVT.dat
	Uncertainty Analysis Quantile	10	XXXOutput02FormF3UAQuantile 1.dat
5	Sensitivity Analysis all Variables	11	XXXOutput02FormF5SA.dat
	Uncertainty Analysis CP	12	XXXOutput02FormF5UACP.dat
	Uncertainty Analysis Rmax	13	XXXOutput02FormF5UARmax.dat
	Uncertainty Analysis VT	14	XXXOutput02FormF5UAVT.dat
	Uncertainty Analysis Quantile	15	XXXOutput02FormF5UAQuantile 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: the output file was previously written to an Excel file, but Excel is limited to 65,536 lines. In addition, 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 ASCII output files shall 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 F*** 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 F Uncertainty and Sensitivity Analysis Extended to Loss Cost

In addition to uncertainty and sensitivity analyses performed for wind speed in ***Form F***, 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 9***. 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 F*** 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 11***.

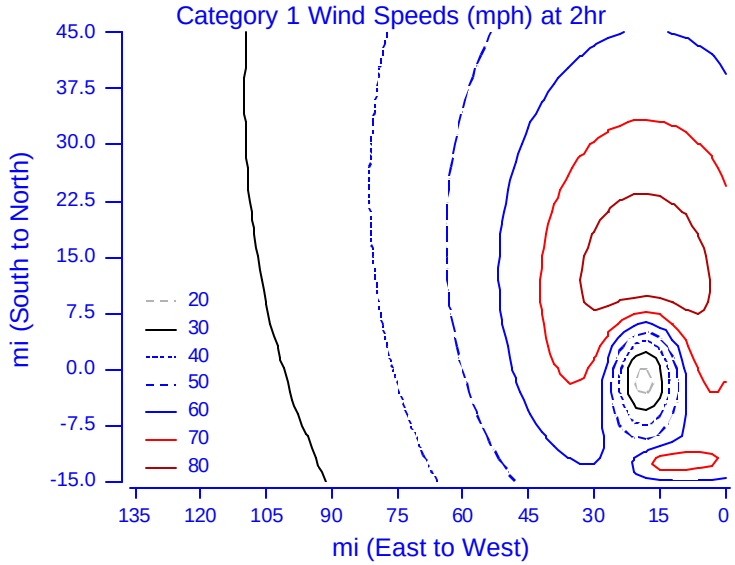
Figure 11

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 10*** (39 contour plots). See example contour plot provided in ***Figure 12***.
Sensitivity Analysis	Hourly plots of standardized regression coefficients based on ***Form F*** input as specified in ***Figure 10*** and the corresponding wind speed output files 1, 6 and 11 in ***Figure 10*** (39 contour plots). See example contour plot provided in ***Figure 13***.
Uncertainty Analysis	Hourly plots of the expected percentage reduction in variance based on ***Form F*** input as specified in ***Figure 10*** 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 10*** Radius of maximum winds: output files 3, 8 and 13 in ***Figure 10*** Translational velocity: output files 4, 9 and 14 in ***Figure 10*** Quantile: output files 5, 10, and 15 in ***Figure 10*** See example contour plot provided in ***Figure 14***.
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 10*** is to be calculated at each land-based grid point in ***Figure 9***. The 586 land-based grid points in ***Figure 9*** are identified in the last worksheet (Land-Water ID) of the ***Form F*** 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 15***.

Figure 12 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.

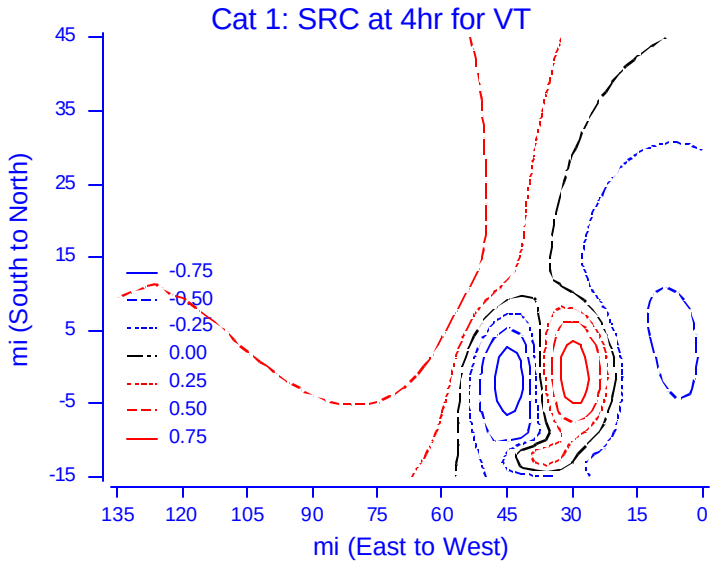
Figure 12



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

Figure 13 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.

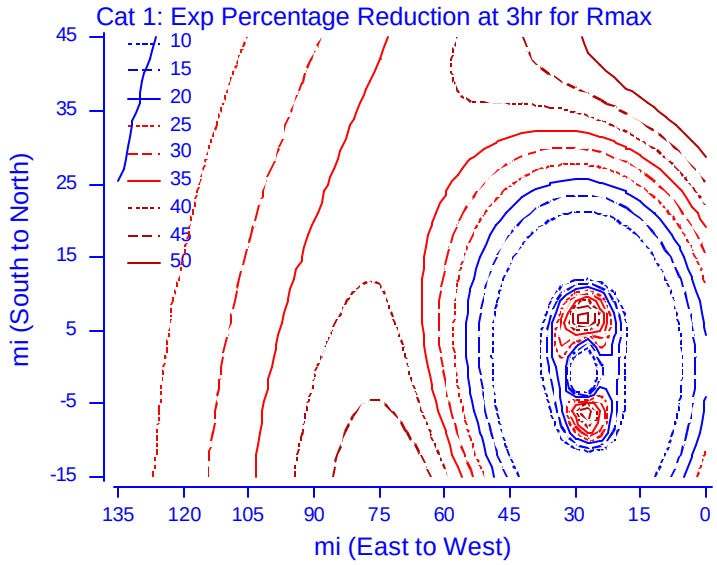
Figure 13



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

Figure 14 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.

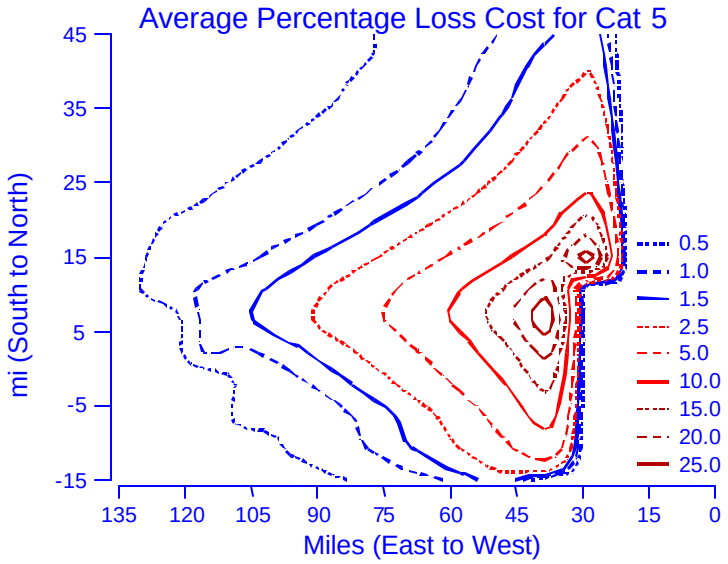
Figure 14



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

Figure 15 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 15*** 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 15*** corresponds to the Florida coast line south of Miami. While the average percentage loss cost depicted in ***Figure 15*** 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.

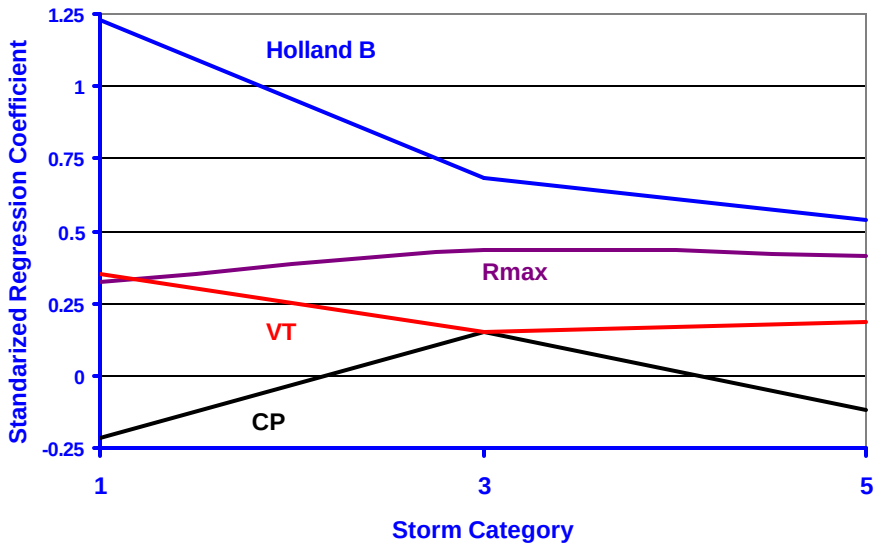
Figure 15



Average Percentage Loss Cost Contours for a Category 5 Hurricane

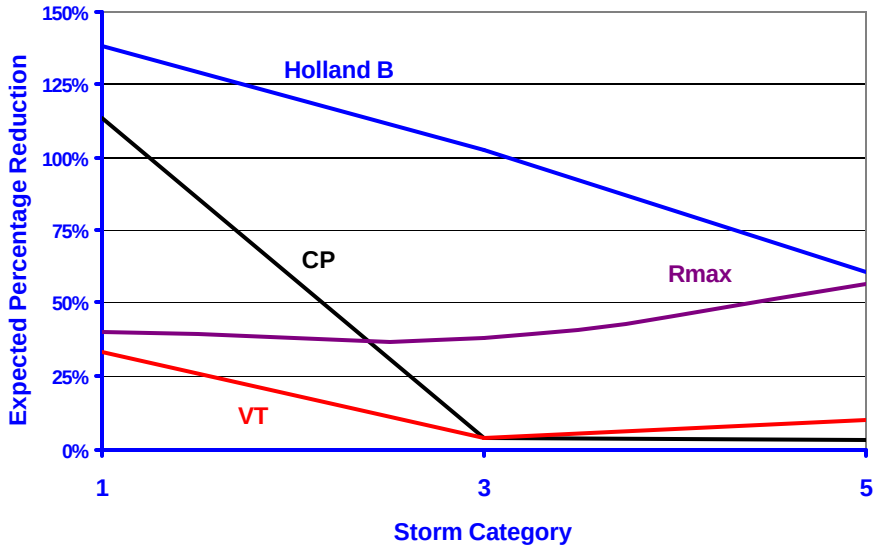
Figure 16 shows sample sensitivity analysis results for loss cost for all input variables based on a model that utilizes the Holland B parameter as the quantile variable. ***Figure 17*** shows the corresponding uncertainty analysis results. The results shown in ***Figure 16*** and ***Figure 17*** are 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 16



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

Figure 17



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

Figure 18

Florida County Codes

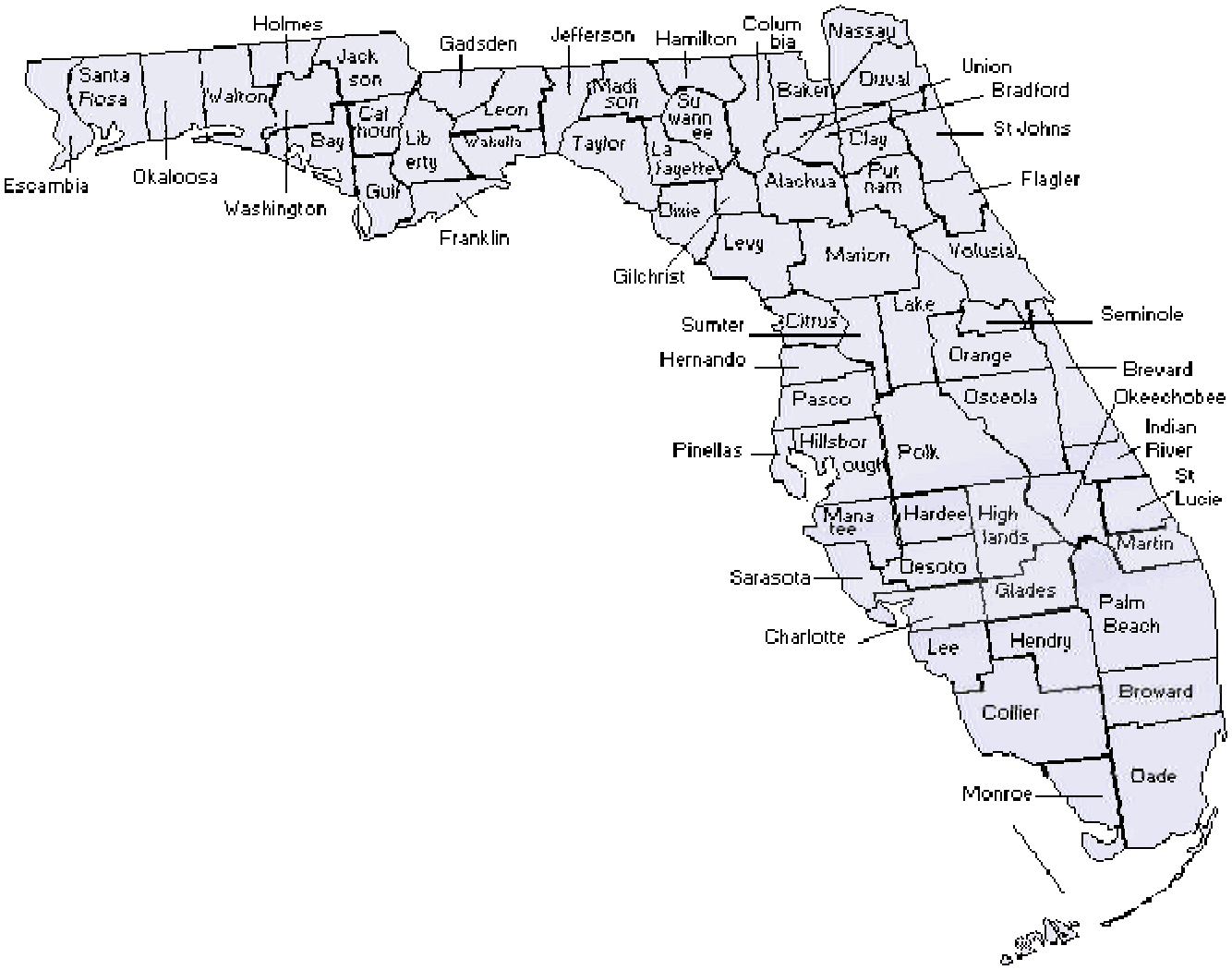
County Code	County Name	County Code	County Name	County Code	County Name
001	Alachua	**047**	Hamilton	**093**	Okeechobee
003	Baker	**049**	Hardee	**095**	Orange
005	Bay	**051**	Hendry	**097**	Osceola
007	Bradford	**053**	Hernando	**099**	Palm Beach
009	Brevard	**055**	Highlands	**101**	Pasco
011	Broward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

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 data files provided to the modelers do not reflect this change. Dade County continues to be identified as 025. Modelers should map to the old County Code 025 and if necessary, re-identify 086 to 025.

Figure 19

State of Florida
By County



OUTPUT RANGES SHALL APPEAR HERE

IN THE SUBMISSION

MODULE 4

Module 4

Professional Team On-Site Review

I. On-Site Review by Professional Team

A. General Purpose

The purpose of the on-site review is to consider verification of the standards, not to provide a preliminary peer review of the model. The on-site review by the Professional Team will also involve the following:

1. Due diligence

   a. The Professional Team will perform a "due diligence" review regarding information submitted by the modeler contained in Modules 1, 2, and 3.

   b. For existing modelers, the "due diligence" review will concentrate on any changes in Modules 1, 2, and 3 as noted in the notification of readiness letter.

   c. The on-site evaluation will consist of the following components:

      1. On-site Tests – This shall consist of 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.

      2. Verification and Inquiry – The interest of the Commission is that due diligence be done to verify that information provided by the modeler in Modules 1, 2, and 3 is valid and is an accurate and fairly complete description of the model.

2. Audit for compliance with standards

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

   b. The Professional Team will attempt to consider each individual section of the standards as a unit.

c. After completing its review of each of the standards in a section, the Professional Team will meet privately and then provide immediate feedback to the modeling company.

B. Preparation for On-site Review

1. 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 FSBA staff will arrange a telephone conference call between the modeling company and the Professional Team or a subset of the Professional Team. The purpose of this call is to review the materials, data files, and personnel that will need to be on-site during the review by the Professional Team. 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. 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. The Professional Team will assist the Commission and the FSBA staff in determining if the modeling company is ready for an on-site review.

3. During the telephone conference call, the Professional Team will assist the modeling company in preparing for the on-site review by responding to requests for clarifications of the due diligence and audit requirements and any materials that the Professional Team has stated should be available during the review, according to the Guidebook and the pre-visit letter.

4. The FSBA staff is responsible for scheduling on-site review dates and the subsequent post-audit Commission meetings for the review of the model. 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.

5. The modeler shall have all necessary materials and data on-site for review by the Professional Team.

6. All materials, charts, graphs and maps used in support of the model shall be presented in a manner that enables simultaneous viewing by the entire Professional Team.

C. Post On-site Review

1. After completing its review of Modules 1, 2, and 3 and all of the standards, the Professional Team will conduct an exit briefing with the modeling company. During this briefing, the Professional Team will provide to the modeling company 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 only to correct factual errors and to remove any confidential or proprietary information. The format for the report is as follows:

    - Introduction section: what occurred on-site
    - On-site test results
    - Verification of modeler responses provided in Modules 1, 2, and 3
    - Verification of modeler responses to the standards
    - Additional information which the modeler is willing to make public
    - Suggestions for Model Specifications, Standards, and Guidelines.

2. After leaving the modeling company premises, the Professional Team, in coordination with FSBA 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.

3. It is possible that a subset of the standards or changes made to Modules 1, 2, or 3 may require further on-site review by a subset of the Professional Team. In such cases, the FSBA staff will arrange a follow-up on-site review, in accordance with the Acceptability Process, to ascertain compliance to those standards and/or modules.

II. Composition and Selection of the Professional Team

On-site reviews of the modeling companies seeking a determination of acceptability by the Commission will be conducted by a team of professional individuals known as the "Professional Team." 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 FSBA staff will select the Professional Team members, and the FSBA 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 FSBA 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 for the On-Site Review

1. Participate in preparations and discussions with the Commission and the FSBA 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 FSBA staff in developing, reviewing, and revising Module 3 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 FSBA Staff

The Professional Team will report to designated FSBA staff. The FSBA 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 Module 3 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 preferred approach is that the modeling company provide any such 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 for their review.

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.

MODULE 5

Module 5

Modeler Presentation

I. How the Modeler Presentation will be Conducted

A. New Model Presentation – The new modeler is expected to give a presentation to the Commission on each standard. The presentation should also focus on details and issues related to the modules and the model as used for residential rate making purposes in the state of Florida.

Existing Model Presentation – The existing modeler is expected to present an overview of the model, recognizing that more detailed information is contained in Module 1. 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 also focus on, but not be limited to, changes from the previously accepted model and the effect those changes have on loss costs. The presentation should provide a verification of each standard. In order to facilitate the model review and voting process, the presentation on standards verification should be organized as outlined in the Acceptability Process, Section II, D. 2 (i.e., grouped by standards with no changes, standards with non-significant changes, and standards with significant changes).

B. The modeler presentation should serve to enlighten the Commission regarding various issues that have arisen throughout the entire evaluation process - Module 1, Module 2, Module 3, Module 4, and compliance with the standards. The various issues may relate to:

1. Informational needs of the Commission.
2. The theoretical soundness of the model.
3. Use of reasonable assumptions.
4. Other related aspects dealing with accuracy or reliability.

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

D. The modeler presentation is for the purpose of helping the Commission understand outstanding issues and to communicate as to how the model meets the standards.

E. All presentation materials presented to the Commission shall be provided to FSBA staff in electronic format.

2002 STANDARDS - MODULES CROSS REFERENCE

2002 Standards - Modules Cross Reference

		Module 1 Section I	Module 1 Section II	Module 2	Module 3
General	5.1.1	C.1.d			
	5.1.2			2, 3, 5	
	5.1.3	A1, A9			
	5.1.4		B11, B13, B14, B15		
	5.1.5		A2		VI #1, Form A
	5.1.6	C2			
	5.1.7				I #10,V #3, #7
Meteoro-logical	5.2.1				
	5.2.2				II #2
	5.2.3		A1, A2, B7, B8		I
	5.2.4		B1, B2, B3, B4, B5, B6, B7, B8		I, Form F
	5.2.5				I #1, #2, #3, #11, #12, Form B
	5.2.6	B2	A1, B7, B8		I
	5.2.7	A2	B1, B7, B8		I #2, #5, #9, #11, #12, Form F
	5.2.8		B4, B5		I, Form F
	5.2.9		B3		I, Form F
	5.2.10				I #6, #9, II, Form B, Form C, Form F
Vulnerability	5.3.1	A7, A8, C.1.a	A5		III, IV #3, #4, #5, #6
	5.3.2	A7			III, IV #3, #4, #5, #6, V #2, #4, Form B, Form C, Form D, Form F
	5.3.3		B1		III, Form F
	5.3.4	A7, B7, C.1.b, C.1.c	A3		III, IV #4, Form D, Form F
	5.3.5	A6			III #5
	5.3.6	C.1.d			IV #6, V #4, Form B, Form D, Form F
Actuarial	5.4.1	B4	A3, A4, A5		IV
	5.4.2	A6, A10, B7, C.1.b, C.1.c			III #3, #4, #5, V #4, Form D, Form F
	5.4.3	B4, C.1.a			III #2,V, VII
	5.4.4	A10, B4	A3, A4		III #2, #3, #4, #5, IV, V #4, #9, Form B, Form C, Form D, Form E, Form F
	5.4.5	C.1.a	A3		III #2, V #8, VII
	5.4.6	A6, B1, B3, C.1.b, C.1.c			III #3, #4, #5, V #2, #4, #5, #9, VII
	5.4.7	B3			IV #1, #2, #8, V #3, #4, #9, Form D
	5.4.8	B6			IV #5, #7, V #2, #4, Form B, Form C, Form D
	5.4.9	C.1.d			IV #6, V #4, Form B, Form C, Form D

2002 Standards - Modules Cross Reference

		Module 1 Section I	Module 1 Section II	Module 2	Module 3
Actuarial (cont'd)	5.4.10		A5, C3		IV #9; V #2, #8
	5.4.11		C2, C3		I #7, #11; V #2, #4, #5, #9
	5.4.12	B2			V #4, #5, #6, #7
Computer	5.5.1	A,B,C	A,B,C		
	5.5.2	A,B,C	A,B,C		VI #2
	5.5.3	A,B,C	A,B,C		
	5.5.4	A,B,C	A,B,C		
	5.5.5	A,B,C	A,B,C		
	5.5.6	A,B,C	A,B,C		
	5.5.7	A,B,C	A,B,C		
Statistical	5.6.1		B12		I #8
	5.6.2		A1, B7, C1, C3, C5, C6		I #12, #13, III #3, #4, #5; IV #3, #4, #5, #6
	5.6.3		B9		
	5.6.4	A5	B13, B14, B15		Form F
	5.6.5	A5	B9, B13, B14, B15		Form F
	5.6.6		C2		V #4, #5, #6, #7, Form D

Disclaimer: This cross reference is intended to be as complete as possible. However, if errors or omissions have occurred, report this to Commission staff for correction in subsequent editions.

VII. COMPLIANCE WITH THE STANDARDS AND RELATED INFORMATION

2002 STANDARDS

2002 Standards

5.1 General Standards

5.1.1 Scope of the Computer Model and Its Implementation

The computer model shall project loss costs for personal lines residential property from hurricane events, excluding flood and storm surge, except as flood and storm surge apply to Additional Living Expense (ALE). References to the model throughout the Standards shall include its implementation.

If the modeler uses historical data that include losses from flood and storm surge, then the modeler shall disclose the techniques employed to exclude such losses, and those techniques shall be based on accepted scientific methods.

If the modeler uses engineering or other data that include losses from flood and storm surge, then the modeler shall disclose the techniques employed to exclude such losses, and those techniques shall be based on justifiable methods.

Reference: Module 1, Section I, C.1.d (storm surge and flood damage to the infrastructure)

5.1.2 Qualifications of Modeler Personnel and Independent Experts

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.

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 or Member of the American Academy of Actuaries), meteorology (advanced degree), and computer science/engineering (advanced degree). These individuals shall abide by the standards of professional conduct adopted by their profession.

Reference: Module 2 #2 (professional credentials),
#3 (multi-discipline team),
#5 (independent expert review)

5.1.3 Model Revision Policy

The modeler shall have developed and implemented a clearly written policy for model revision with respect to methodologies and data. The modeler shall clearly identify the model version under review. Any revision to any portion of the model that results in a change in any Florida residential hurricane loss cost must be accompanied by a new model version number.

Reference: Module 1, Section I, A.1 (model version number),
A.9 (model revisions)

5.1.4 Independence of Model Components

The meteorology, vulnerability, and actuarial components of the model shall each be demonstrated to 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 demonstrated to be reasonable.

Reference: Module 1, Section II, B.11 (independent functions or variables),
B.13 (model sensitivity),
B.14 (sensitivity in output results),
B.15 (SA & UA performed on model)
Standard 5.5.3 (Model Architecture and Component Design)
Standard 5.5.5 (Verification)

5.1.5 Risk Location

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 disclosed.

Zip code centroids, when used in the model, shall be based on population data and shall be visually demonstrated to be reasonable.

Zip code information purchased by the modeler shall be verified by the modeler for accuracy and appropriateness.

Reference: Module 1, Section II, A.2 (primary databases)
Module 3, Section VI, #1 (handling of invalid zip codes)
Module 3, Section VII, Form A (Zip Code Data Base)

5.1.6 Identification of Units of Measure and Conversion Factors

All units of measure for model inputs and outputs shall be clearly identified. All conversion factors used by the model shall be disclosed.

Reference: Module 1, Section I, C.2 (input variables)

5.1.7 Visual Presentation of Data

Visualizations shall be accompanied by legends and labels for all elements. Individual elements shall be clearly distinguishable, whether presented in original or copy form.

a. For data indexed by latitude and longitude, by county or by zip code, a color contour map and a continuous tone map with superimposed county and zip code boundaries shall be produced.

b. Florida Map Colors: Maps will use two colors, blue and red, along with shades of blue and red, with dark blue and dark red designating the lowest and highest quantities, respectively. The color legend and associated map shall be comprised of an appropriate number of intervals to provide readability.

Reference: Module 3, Section I, #10 (maps of maximum winds at zip code level)
Module 3, Section V, #3 (maps of loss costs by zip code),
#7 (maps of output ranges % change by county)

5.2 Meteorological Standards

5.2.1 Units of Measure for Model Output

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

5.2.2 Damage Function Wind Inputs

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 which are supported by literature and/or documented measurements available to the Commission.

Reference: Module 3, Section II, #2 (wind speed conversion)
Standard 5.1.6 (Identification of Units of Measure and Conversion Factors)

5.2.3 Official Hurricane Set or Suitable Approved Alternatives

Modelers shall include in their base storm set all hurricanes, including by-passing hurricanes, which produce hurricane force winds in Florida. The storm set, derived from the Tropical Prediction Center/National Hurricane Center (TPC/NHC) document *Tropical Cyclones of the North Atlantic Ocean, 1871-1998,* updated through the 2001 hurricane season and/or the HURDAT (HURricane DATa) data set, is found in the *Report of Activities as of November 1, 2002* under Section VII, Compliance With Standards and Related Information, #4 (Base Storm Set). All proposed alternatives to the characteristics of specific storms in the storm set shall be subject to the approval of the Commission.

Reference: Module 1, Section II, A.1 (deviation from official hurricane set),
A.2 (primary databases),
B.7 (parameters for hurricane frequency),
B.8 (stochastic hurricane generation)
Module 3, Section I (Hurricane Set)

5.2.4 Hurricane Characteristics

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, and tracks shall be based on information documented by scientific literature or modeler information accepted by the Commission.

Reference: Module 1, Section II, B.1 (wind speeds used for loss estimation),
B.2 (asymmetric nature of hurricanes),
B.3 (filling rate function),
B.4 (land friction),
B.5 (characteristics used for wind speed estimation),
B.6 (dependent wind speed variables),
B.7 (parameters for hurricane frequency),
B.8 (stochastic hurricane generation)
Module 3, Section I (Hurricane Set)
Module 3, Section VII, Form F (Hypothetical Events for SA & UA)
Standard 5.6.2 (Comparison of Historical and Modeled Results)

5.2.5 Landfall Intensity

Models shall use maximum one-minute sustained 10-meter wind speed when defining hurricane landfall intensity. This applies both to the base storm set adopted in 5.2.3 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):
A scale from 1 to 5 that measures hurricane intensity.

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

Reference: Module 3, Section I, #1 (definition of event),
#2 (upper limit of wind speeds produced),
#3 (multiple landfalls),
#11 (frequency and annual occurrence rates),
#12 (number of events, relative frequency and annual occurrence rate by category)
Module 3, Section VII, Form B (30 Hypothetical Events)
Standard 5.6.2 (Comparison of Historical and Modeled Results)
Standard 5.6.3 (Uncertainty Characterization)

5.2.6 Hurricane Probabilities

Modeled hurricane probabilities shall reasonably match the historical record through 2001 for category 1 to 5 hurricanes, shall be consistent with those observed for each geographical area of Florida, and shall be displayed in vertical bar graphs. "Consistent" means: (1) spatial distributions of modeled hurricane probabilities shall accurately depict vulnerable coastlines in Florida and the states of Alabama, Georgia, and Mississippi; and (2) probabilities are compared with observed hurricane frequency using methods documented in accepted scientific literature or proposed by the modeler and accepted by the Commission.

Reference: Module 1, Section I, B.2 (handling of beach/coastal areas)
Module 1, Section II, A.1 (historical database for wind speeds and frequency),
B.7 (parameters for hurricane frequency),
B.8 (stochastic hurricane generation)
Module 3, Section I (Hurricane Set)
Standard 5.6.2 (Comparison of Historical and Modeled Results)
Standard 5.6.3 (Uncertainty Characterization)

5.2.7 Hurricane Probability Distributions

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 as documented in accepted scientific literature available to the Commission.

Reference: Module 1, Section I, A.2 (probability distributions)
Module 1, Section II, B.1 (wind speeds used for loss estimation),
B.7 (parameters for hurricane frequency),
B.8 (stochastic hurricane generation)
Module 3, Section 1, #2 (upper limit of wind speeds produced),
#5 (hurricane tracks),
#9 (radius of hurricane force winds, Rmax and FFP by CP),
#11 (frequency and annual occurrence rates),
#12 (number of events, relative frequency and annual occurrence rate by category)
Module 3, Section VII, Form F (Hypothetical Events for SA & UA)
Standard 5.6.2 (Comparison of Historical and Modeled Results)
Standard 5.6.3 (Uncertainty Characterization)

5.2.8 Land Friction

Land friction shall be used in the model to reduce wind speeds over land, shall be based on scientific methods, and shall provide realistic wind speed transitions between adjacent zip codes, counties, and territories. The magnitude of friction coefficients shall be consistent with accepted scientific literature, consistent with geographic surface roughness, and shall be implemented with appropriate geographic information system data.

Reference: Module 1, Section II, B.4 (land friction),
B.5 (characteristics used for wind speed estimation)
Module 3, Section I (Hurricane Set)
Module 3, Section VII, Form F (Hypothetical Events for SA & UA)

5.2.9 Hurricane Overland Weakening Rate

The hurricane overland weakening rate methodology used by the model shall be provided to the Commission and shall be shown to be (1) reasonable as observed in comparison to historical records, and (2) documented in accepted scientific literature or in modeler information accepted by the Commission.

Reference: Module 1, Section II, B.3 (filling rate function)
Module 3, Section I (Hurricane Set)
Module 3, Section VII, Form F (Hypothetical Events for SA & UA)

5.2.10 Temporal and Spatial Wind Field Characteristics

The time variant wind field, including the radial distribution of wind speeds, shall be demonstrated to be consistent with accepted scientific principles, such as:

1. The radius of maximum winds shall reflect specified hurricane characteristics.
2. The magnitude of the asymmetry shall increase as translational speed increases, all other factors held constant.
3. The wind speed shall decrease with increasing surface roughness (friction), all other factors held constant.

Reference: Module 3, Section I, #6 (decay rates),
#9 (radius of hurricane force winds, Rmax and FFP by CP)
Module 3, Section II (Hurricane Wind Field)
Module 3, Section VII, Form B (30 Hypothetical Events),
Form C (One Hypothetical Event),
Form F (Hypothetical Events for SA & UA)

5.3 Vulnerability Standards

5.3.1 Derivation of Vulnerability Functions

Development of the vulnerability functions is to be based on one or more of the following: (1) historical data; (2) tests; (3) structural calculations; (4) expert opinion. Any development of the vulnerability functions based on structural calculations and/or expert opinion shall be supported by tests and historical data to the extent such data are available.

The derivation of the vulnerability functions shall be described and demonstrated to be theoretically sound.

Any modification factors/functions to the vulnerability functions or structural characteristics and their corresponding effects shall be disclosed and shall be clearly defined and their theoretical soundness demonstrated.

Reference: Module 1, Section I, A.7 (categories of vulnerability functions),
A.8 (documents/research used in development of vulnerability functions),
C.1.a (socio-economic effects)
Module 1, Section II, A.5 (claims data used in development of vulnerability functions)
Module 3, Section III (Vulnerability Functions-Damage Estimates)
Module 3, Section IV, #3 (appurtenant structures vulnerability function),
#4 (mobile home vulnerability function),
#5 (contents vulnerability function),
#6 (ALE vulnerability function)

Standard 5.4.1 (Underwriting Assumptions)
Standard 5.6.2 (Comparison of Historical and Modeled Results)

5.3.2 Required Vulnerability Functions

Vulnerability functions shall separately compute damages for building structures, mobile homes, appurtenant structures, contents, and additional living expense.

Reference: Module 1, Section I, A.7 (categories of vulnerability functions),
Module 3, Section III (Vulnerability Functions-Damage Estimates)
Module 3, Section IV, #3 (appurtenant structures vulnerability function),
#4 (mobile home vulnerability function),
#5 (contents vulnerability function),
#6 (ALE vulnerability function)
Module 3, Section V, #2 (loss cost relationships by type of coverage and type of construction),
#4 (output ranges)
Module 3, Section VII, Form B (30 Hypothetical Events),
Form C (One Hypothetical Event),
Form D (Loss Costs),
Form F (Hypothetical Events for SA & UA)

5.3.3 Wind Speeds Causing Damage

Damage associated with a declared hurricane event shall include damage incurred for wind speeds above and below the hurricane threshold of 74 mph. The minimum wind speed that generates damage shall be specified.

Reference: Module 1, Section II, B.1 (wind speeds used for loss estimation)
Module 3, Section III (Vulnerability Functions-Damage Estimates)
Module 3, Section VII, Form F (Hypothetical Events for SA & UA)

5.3.4 Construction and Codes

In the derivation and application of vulnerability functions assumptions concerning construction type, construction characteristics, new building codes, and revisions to existing building codes shall be demonstrated to be reasonable and appropriate.

Reference: Module 1, Section I, A.7 (categories of vulnerability functions),
B.7 (vulnerability modifications range of impacts on loss costs),
C.1.b (building code and enforcement),
C.1.c (construction characteristics)
Module 1, Section II, A.3 (damageability assumptions)
Module 3, Section III (Vulnerability Functions-Damage Estimates)

Module 3, Section IV, #4 (mobile home vulnerability function),
Module 3, Section VII, Form D (Loss Costs),
Form F (Hypothetical Events for SA & UA)

5.3.5 Mitigation Measures

Modeling of mitigation measures to improve a building's wind resistance and the corresponding effects on vulnerability shall be disclosed and demonstrated to be theoretically sound. These measures shall include, but not be limited to, 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.

The percentage changes in the statewide, zero deductible personal residential non-mitigated loss costs that would be produced in the output ranges due to each mitigation measure shall be individually and specifically provided to the Commission, including ranges of possible impacts on damage for each mitigation measure listed.

Methods for estimating the effects of mitigation measures shall be shown to be reasonable both individually and in combination.

Reference: Module 1, Section I, A.6 (mitigation factors)
Module 3, Section III, #5 (hazard mitigation)

5.3.6 Additional Living Expenses (ALE)

In the estimation of Additional Living Expenses (ALE), the model shall consider hurricane damage including storm surge damage to the infrastructure.

The ALE vulnerability function shall consider the time it will take to repair/reconstruct the home.

Reference: Module 1, Section I, C.1.d (storm surge and flood damage to the infrastructure)
Module 3, Section IV, #6 (ALE vulnerability function)
Module 3, Section V, #4 (output ranges)
Module 3, Section VII, Form B (30 Hypothetical Events),
Form D (Loss Costs),
Form F (Hypothetical Events for SA & UA)
Standard 5.4.9 (ALE)

5.4 Actuarial Standards

5.4.1 Underwriting Assumptions

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 on accepted actuarial, underwriting, and statistical procedures. The methods used shall be documented in writing.

For damage 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 shall be identified and demonstrated to be reasonable and appropriate.

Reference: Module 1, Section I, B.4 (annual aggregate loss distributions)
Module 1, Section II, A.3 (damageability assumptions),
A.4 (other assumptions),
A.5 (claims data used in development of vulnerability functions)
Module 3, Section IV (Insurance Functions-Company Loss Estimates)
Standard 5.3.4 (Construction and Codes)
Standard 5.6.1 (Use of Historical Data)
Standard 5.6.2 (Comparison of Historical and Modeled Results)

5.4.2 Actuarial Modifications

All actuarial modifications made to the model shall be disclosed to the Commission and based on accepted engineering and actuarial criteria.

Reference: Module 1, Section I, A.6 (actuarial functions modification factors),
A.10 (modifications available for model user),
B.7 (actuarial modifications range of impacts on loss costs),
C.1.b (building code and enforcement),
C.1.c (construction characteristics)
Module 3, Section III, #3 (building code enforcement),
#4 (quality of construction type, materials and workmanship),
#5 (hazard mitigation)
Module 3, Section V, #4 (output ranges)
Module 3, Section VII, Form D (Loss Costs),
Form F (Hypothetical Events for SA & UA)
Standard 5.3.4 (Construction and Codes)

5.4.3 Loss Cost Projections

Loss cost projections produced by hurricane loss projection models shall not include expenses, risk load, investment income, premium reserves, taxes, assessments, or profit margin. Hurricane loss projection models shall not make a prospective provision for economic inflation.

Reference: Module 1, Section I, B.4 (annual aggregate loss distributions),
C.1.a (socio-economic effects)
Module 3, Section III, #2 (socio-economic effects)
Module 3, Section V (Average Annual Loss Functions-Loss Costs)
Module 3, Section VII (Baseline Tests)

5.4.4 Insurer Inputs

The modeler shall disclose any assumptions, fixed and/or variable, that relate to insurer input. Such assumptions shall be demonstrated to be actuarially sound. Assumptions that can vary by specific insurer shall be disclosed in a model output report. Fixed assumptions, that do not vary, need to be disclosed to the Commission.

Reference: Module 1, Section I, A.10 (modifications available for model user),
B.4 (annual aggregate loss distributions)
Module 1, Section II, A.3 (damageability assumptions),
A.4 (other assumptions)
Module 3, Section III, #2 (socio-economic effects),
#3 (building code enforcement),
#4 (quality of construction type, materials and workmanship),
#5 (hazard mitigation)
Module 3, Section IV (Insurance Functions-Company Loss Estimates)
Module 3, Section V, #4 (output ranges),
#9 (distribution of hurricanes by size)
Module 3, Section VII, Form B (30 Hypothetical Events),
Form C (One Hypothetical Event),
Form D (Loss Costs),
Form E (PML),
Form F (Hypothetical Events for SA & UA)
Standard 5.4.11 (Comparison of Estimated Hurricane Loss Costs)
Standard 5.4.12 (Output Ranges)

5.4.5 Demand Surge

Loss cost projections shall not explicitly include demand surge. Any adjustment to the model or historical data to remove implicit demand surge, shall be disclosed and demonstrated to be reasonable.

Reference: Module 1, Section I, C.1.a (socio-economic effects)

Module 1, Section II, A.3 (demand surge)
Module 3, Section III, #2 (socio-economic effects)
Module 3, Section V, #8 (Hurricane Andrew loss costs)
Module 3, Section VII (Baseline Tests)

5.4.6 Logical Relation to Risk

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.

1. Loss costs produced by the model shall be positive and non-zero for all zip codes.

2. Modelers shall produce color-coded maps for the purpose of comparing loss costs by five-digit zip code within each county and on a statewide basis.

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

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

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

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

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

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

The above tests are intended to apply in general. There may be certain anomalies that are insignificant or are explainable by special circumstances. This standard applies separately to each coverage.

Reference: Module 1, Section 1, A.6 (actuarial functions modification factors),
B.1 (consistent loss costs produced),
B.3 (deductibles, policy limits, replacement costs, insurance-to-value)
C.1.b (building code and enforcement),
C.1.c (construction characteristics)
Module 3, Section III, #3 (building code enforcement),
#4 (quality of construction type, materials and workmanship),
#5 (hazard mitigation)
Module 3, Section V, #2 (loss cost relationships by type of coverage

and type of construction),
#4 (output ranges),
#5 (explanation of differences in output ranges from prior year),
#9 (distribution of hurricanes by size)
Module 3, Section VII (Baseline Tests)
Standard 5.1.7 (Visual Presentation of Data)
Standard 5.2.8 (Land Friction)
Standard 5.3.4 (Construction and Codes)
Standard 5.3.5 (Mitigation Measures)
Standard 5.4.7 (Deductibles and Policy Limits)

5.4.7 Deductibles and Policy Limits

The model shall provide a mathematical representation of the distribution of losses to reflect the effects of deductibles and policy limits, and the modeler shall demonstrate its actuarial soundness.

The relationship among the modeled deductible loss costs shall be shown to be reasonable. Differences in these relationships from those previously found acceptable, if applicable, shall be explained and shown to be reasonable. If applicable, changes in the methods used to reflect the effects of policy limits shall be disclosed.

Reference: Module 1, Section I, B.3 (deductibles, policy limits, replacement costs, insurance-to-value)
Module 3, Section IV, #1 (variety of damage produced by a given wind speed),
#2 (insurer loss calculation),
#8 (property value and replacement cost calculations)
Module 3, Section V, #3 (maps of loss costs by zip code),
#4 (output ranges),
#9 (distribution of hurricanes by size)
Module 3, Section VII, Form D (Loss Costs)
Standard 5.6.2 (Comparison of Historical and Modeled Results)

5.4.8 Contents

The model shall provide a separate mathematical representation of contents loss costs, and the modeler shall demonstrate its actuarial soundness.

The relationship between the modeled building and contents loss costs shall be shown to be reasonable. If applicable, differences and the reasons for those differences from prior submissions in the relativities between loss costs for the building and the corresponding loss costs for contents shall be explained and shown to be reasonable.

Reference: Module 1, Section I, B.6 (distinction for different policy types)

Module 3, Section IV, #5 (contents vulnerability function),
#7 (depreciation assumptions)
Module 3, Section V, #2 (loss cost relationships by type of coverage and type of construction),
#4 (output ranges)
Module 3, Section VII, Form B (30 Hypothetical Events),
Form C (One Hypothetical Event),
Form D (Loss Costs)
Standard 5.6.2 (Comparison of Historical and Modeled Results)

5.4.9 Additional Living Expenses (ALE)

The model shall provide a separate mathematical representation of Additional Living Expense (ALE) loss costs, and the modeler shall demonstrate its actuarial soundness.

The relationship between the modeled building and ALE loss costs shall be shown to be reasonable. If applicable, differences and the reasons for those differences from prior submissions in the relativities between loss costs for the building and the corresponding loss costs for ALE shall be explained and shown to be reasonable.

The modeler shall disclose the methods used in the model to incorporate ALE losses from damage to the infrastructure and the methods shall be shown to be reasonable.

Reference: *Module 1, Section 1, C.1.d (storm surge and flood damage to the infrastructure)*
Module 3, Section IV, #6 (ALE vulnerability function)
Module 3, Section V, #4 (output ranges)
Module 3, Section VII, Form B (30 Hypothetical Events),
Form C (One Hypothetical Event),
Form D (Loss Costs)
Standard 5.6.2 (Comparison of Historical and Modeled Results)

5.4.10 Replication of Known Hurricane Losses

The model shall be shown to 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 mobile homes to the extent data are available. Personal residential experience may be used to replicate building-only and contents-only losses. The modeler shall demonstrate that the replications were produced on an objective body of loss data by county or an appropriate level of geographic detail.

Reference: *Module 1, Section II, A.5 (claims data used in development of vulnerability functions),*

C.3 (damage estimates validation tests)
Module 3, Section IV, #9 (validation comparisons of actual exposures and loss to modeled exposures and loss)
Module 3, Section V, #2 (loss costs relationships by type of coverage and type of construction),
#8 (Hurricane Andrew loss costs)
Standard 5.6.2 (Comparison of Historical and Modeled Results)
Standard 5.6.3 (Uncertainty Characterization)

5.4.11 Comparison of Estimated Hurricane Loss Costs

The model shall provide the annual average zero deductible statewide loss costs produced using the list of hurricanes in 5.2.3 historical hurricanes in Florida based on the 1998 Florida Hurricane Catastrophe Fund's (FHCF) aggregate personal residential exposure data, as of November 1, 1999. These will be compared to the statewide loss costs produced by the model on an average industry basis. The difference, due to uncertainty, between historical and modeled annual average statewide loss costs shall be demonstrated to be statistically reasonable.

Reference: Module 1, Section II, C.2 (expected loss estimates validation tests), C.3 (damage estimates validation tests)
Module 3, Section I, #7 (decay rate compared to Kaplan-DeMaria), #11 (frequency and annual occurrence rates)
Module 3, Section V, #2 (loss cost relationships by type of coverage and type of construction),
#4 (output ranges),
#5 (explanation of differences in output ranges from prior year),
#9 (distribution of hurricanes by size)
Standard 5.6.2 (Comparison of Historical and Modeled Results)
Standard 5.6.3 (Uncertainty Characterization)

5.4.12 Output Ranges

Any model previously found acceptable by the Commission shall provide an explanation suitable to the Commission concerning the differences in the updated output ranges. Differences between the prior year submission and the current submission shall be explained in the submission including, but not limited to:

1. Differences and the reasons for those differences from the prior submission of greater than ten percent in the weighted average loss costs for any county shall be specifically listed and explained in the modeler's submission to the Commission. The submission shall include a specific listing of each affected county.
2. Differences and the reasons for those differences from the prior submission of ten percent or less in the weighted average loss costs for any county shall be explained in the aggregate in the modeler's submission to the Commission.

Reference: Module 1, Section I, B.2 (resolution used for output ranges)
Module 3, Section V, #4 (output ranges),
#5 (explanation of differences in output ranges from prior year),
#6 (output ranges % change by county),
#7 (maps of output ranges % change by county)

5.5 Computer Standards

5.5.1 Primary Document Binder

A primary document binder, in either electronic or physical form, shall be created, and shall contain fully documented sections for each subsequent Computer Standard. Development of each section shall be indicative of accepted software engineering practices. All computer software (i.e., user interface, scientific, engineering, actuarial) relevant to the modeler's submission must be consistently documented.

Reference: Module 1, Section I (General Description of the Model)
Module 1, Section II (Specific Description of the Model)

5.5.2 Requirements

The modeler shall document all requirements specifications of the software, such as interface, human factors, functionality, documentation, data, human and material resources, security, and quality assurance.

Reference: Module 1, Section I (General Description of the Model)
Module 1, Section II (Specific Description of the Model)
Module 3, Section VI, #2 (computer code tampering)

5.5.3 Model Architecture and Component Design

The modeler shall document detailed control and data flow diagrams, interface specifications, and a schema for all data files along with field type definitions. Each network diagram shall contain components (including referenced sub-component diagrams), arcs, and labels. A model component custodian shall be identified and documented.

Reference: Module 1, Section I (General Description of the Model)
Module 1, Section II (Specific Description of the Model)

5.5.4 Implementation

The software shall be traceable from the flow diagrams and their components down to the code level. All documentation, including document binder identification, shall be indicated in the relevant component. The highest design level components shall incrementally be translated into a larger number of components until the code level is reached.

Reference: Module 1, Section I (General Description of the Model)
Module 1, Section II (Specific Description of the Model)

5.5.5 Verification

1. General

The modeler shall employ and document procedures employed, such as code inspections, reviews, calculation crosschecks, and walkthroughs, sufficient to demonstrate code correctness. The code shall contain sufficient logical assertions, exception-handling mechanisms, and flag-triggered output statements to test the correct values for key variables that might be subject to modification.

2. Testing

Tests shall be documented for each software component, independent of all other components, to ensure that each component provides the correct response to inputs. The test specifications, procedures, and results shall also be documented to establish that the integration of all components produces model behavior that functions correctly.

Reference: Module 1, Section I (General Description of the Model)
Module 1, Section II (Specific Description of the Model)
Standard 5.1.4 (Independence of Model Components)
Standard 5.6.4 (Sensitivity Analysis for Model Output)
Standard 5.6.5 (Uncertainty Analysis for Model Output)

5.5.6 Model Maintenance and Revision

The modeler shall specify all policies and procedures used to maintain the code, data, and documentation. For each component in the system decomposition, the modeler shall list the installation date under configuration control, the current version number, and the date of the most recent change(s). The modeler shall use tracking software to identify all errors, as well as modifications to the code, data, and documentation.

Reference: Module 1, Section I (General Description of the Model)
Module 1, Section II (Specific Description of the Model)

5.5.7 User Documentation

The modeler shall have complete user documentation including all recent updates.

Reference: Module 1, Section I (General Description of the Model)
Module 1, Section II (Specific Description of the Model)

5.6 Statistical Standards

5.6.1 Use of Historical Data

The use of historical data in developing the model shall be demonstrated to be reasonable using rigorous methods published in the scientific literature.

Reference: Module 1, Section II, B.12 (statistical techniques used for probability distribution estimates)
Module 3, Section I, #8 (source of historical data set)

5.6.2 Comparison of Historical and Modeled Results

The modeler shall demonstrate the agreement between historical and modeled results using accepted scientific and statistical methods.

Reference: Module 1, Section II, A.1 (deviation from official hurricane set),
B.7 (parameters for hurricane frequency),
C.1 (wind speed validation tests),
C.3 (damage estimates validation tests),
C.5 (other validation tests),
C.6 (validation tests documentation)
Module 3, Section I, #12 (number of events, relative frequency and annual occurrence rate by category),
#13 (probability of hurricanes by year)
Module 3, Section III, #3 (building code enforcement),
#4 (quality of construction type, materials and workmanship),
#5 (hazard mitigation)
Module 3, Section IV, #3 (appurtenant structures vulnerability function),
#4 (mobile home vulnerability function),
#5 (contents vulnerability function),
#6 (ALE vulnerability function)

5.6.3 Uncertainty Characterization

The modeler shall provide an assessment of uncertainty using confidence intervals or other accepted scientific characterizations of uncertainty.

Reference: Module 1, Section II, B.9 (confidence intervals produced)

5.6.4 Sensitivity Analysis for Model Output

The modeler shall demonstrate that the model has been assessed with respect to sensitivity of temporal and spatial outputs to the simultaneous variation of input variables using accepted scientific and statistical methods. Statistical techniques used to perform sensitivity analysis shall be explicitly stated and the results of the analysis shall be presented in graphical format.

Reference: Module 1, Section I, A.5 (critical variables determined from SA)
Module 1, Section II, B.13 (model sensitivity),
B.14 (sensitivity in output results),
B.15 (SA & UA performed on model)
Module 3, Section VII, Form F (Hypothetical Events for SA & UA)
Standard 5.2.10 (Temporal and Spatial Wind Field Characteristics)

5.6.5 Uncertainty Analysis for Model Output

The modeler shall demonstrate that the temporal and spatial outputs of the model have been subjected to an uncertainty analysis using accepted scientific and statistical methods. The analysis shall identify and quantify the extent that input variables impact the uncertainty in model output as the input variables are simultaneously varied. Statistical techniques used to perform uncertainty analysis shall be explicitly stated and results of the analysis shall be presented in graphical format.

Reference: Module 1, Section I, A.5 (assessment of uncertainty in loss costs produced by variables)
Module 1, Section II, B.9 (confidence intervals produced),
B.13 (model sensitivity),
B.14 (sensitivity in output results),
B.15 (SA & UA performed on model)
Module 3, Section VII, Form F (Hypothetical Events for SA & UA)
Standard 5.2.10 (Temporal and Spatial Wind Field Characteristics)

5.6.6 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 demonstrated to be negligible using accepted scientific and statistical methods.

Reference: Module 1, Section II, C.2 (expected loss estimates validation tests)
Module 3, Section V, #4 (output ranges),
#5 (explanation of differences in output ranges from prior year),
#6 (output ranges % change by county)
#7 (maps of output ranges % change by county)
Module 3, Section VII, Form D (Loss Costs)
Standard 5.6.3 (Uncertainty Characterization)

COMPARISON OF
2002 STANDARDS TO 2001 STANDARDS

Florida Commission on Hurricane Loss Projection Methodology
2002 Standards Compared to 2001 Standards

Standard	Title	Change	New	Comments
General				
5.1.1	Scope of the Computer Model and Its Implementation	NS		
5.1.2	Qualifications of Modeler Personnel and Independent Experts	None		
5.1.3	Model Revision Policy	None		Editorial change in title only
5.1.4	Independence of Model Components	None		
5.1.5	Risk Location	NS		
5.1.6	Identification of Units of Measure and Conversion Factors	NS		
5.1.7	Visual Presentation of Data	None		
Meteorological				
5.2.1	Units of Measure for Model Output	None		
5.2.2	Damage Function Wind Inputs	None		
5.2.3	Official Hurricane Set or Suitable Approved Alternatives	S		
5.2.4	Hurricane Characteristics	S		
5.2.5	Landfall Intensity	NS		
5.2.6	Hurricane Probabilities	S		
5.2.7	Hurricane Probability Distributions	None		
5.2.8	Land Friction	None		
5.2.9	Hurricane Overland Weakening Rate	S		
5.2.10	Temporal and Spatial Wind Field Characteristics		S	
Vulnerability				
5.3.1	Derivation of Vulnerability Functions	NS		Portion moved from 5.3.5
5.3.2	Required Vulnerability Functions	None		
5.3.3	Wind Speeds Causing Damage	None		
5.3.4	Construction and Codes	S		
5.3.5	Mitigation Measures	S		Moved from 5.3.7 with new language
5.3.6	Additional Living Expenses (ALE)	None		
Actuarial				
5.4.1	Underwriting Assumptions	S		
5.4.2	Actuarial Modifications	NS		
5.4.3	Loss Costs Projections	None		
5.4.4	Insurer Inputs	None		Editorial change
5.4.5	Demand Surge	None		
5.4.6	Logical Relation to Risk	S		
5.4.7	Deductibles and Policy Limits	S		
5.4.8	Contents	NS		
5.4.9	Additional Living Expenses (ALE)	S		
5.4.10	Replication of Known Hurricane Losses	None		
5.4.11	Comparison of Estimated Hurricane Loss Costs	None		Editorial change
5.4.12	Output Ranges	S		
Computer				
5.5.1	Primary Document Binder	None		
5.5.2	Requirements	None		
5.5.3	Model Architecture and Component Design	NS		
5.5.4	Implementation	None		
5.5.5	Verification	NS		Combined 5.5.5 and 5.5.6
5.5.6	Model Maintenance and Revision	NS		Portion moved from 5.5.3
5.5.7	User Documentation	None		

Standard	Title	Change	New	Comments
Statistical				
5.6.1	Use of Historical Data	None		
5.6.2	Comparison of Historical and Modeled Results	NS		
5.6.3	Uncertainty Characterization	None		
5.6.4	Sensitivity Analysis for Model Output	NS		
5.6.5	Uncertainty Analysis for Model Output	None		
5.6.6	County Level Aggregation	NS		Moved from 5.4.16

S = Significant
NS = Not Significant
None = No change from prior year's standard

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

Computer Terms:

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.

Class:

An interface module that declares attributes and methods for accessing the attributes. A Class is a node within an inheritance or aggregation hierarchy.

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.

Computational Model:

A model consisting of well-defined procedures that can be executed on a computer; for example, a model of the stock market, in the form of a set of equations and logic rules.

Computer Architecture:

The structure of software that implements the computer program, using accepted software engineering principles.

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.

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**.

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.

Execute:

To carry out an instruction, process or computer program.

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**.

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**.

Human-Computer Interaction:

A discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them.

Human Factors:

Study of the interrelationships between humans, the tools they use, and the environment in which they live and work. *See also*: **human-computer interaction** and **user interface**.

Implementation:

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

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.

Network diagram:

See **flow diagram**.

Object:

(1) Pertaining to the outcome of an assembly or compilation process; (2) A program constant or variable; (3) An encapsulation of data and services that manipulate data.

Object-Oriented Design:

A software development technique in which a system or component is expressed in terms of objects and connections between those objects.

Program:

See **code**.

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.

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.

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.

Subroutine:

A part of a program that returns control to the program or subprogram that called it. *Synonyms*: **subprogram**, **routine**.

System Decomposition:

The hierarchical breakdown of a system into components.

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.

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.

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.

Insurance Terms:

Actual Cash Value (ACV):

Cost of replacing damaged or destroyed property with comparable new property minus depreciation.

Actuary:

A highly specialized mathematician professionally 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.

All Risk:

Coverage in a property policy that provides protection for all perils except for those specifically excluded.

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.

BCEGS:

Insurance Services Office's Building Code Effectiveness Grading Schedule.

Catastrophe:

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

Catastrophe Loading:

A provision in the rates to pay for expected losses from catastrophes. This loading is included in the rate generally as a factor representing catastrophe losses.

Coinsurance:

A percentage co-payment structured so that the policyholder pays a specified percentage of each loss. The maximum paid by the policyholder on a total loss is the coinsurance percentage times the amount of insurance. Although coinsurance has been rare in homeowners in the past, it is becoming more common in catastrophic exposures such as earthquake and hurricane.

Coinsurance Requirement or Coinsurance Penalty Policy:

A policy provision in a property insurance contract that requires the insured to carry insurance equal to a certain specified percentage of the value of the property to enable the insured to receive full replacement value on a loss. The typical coinsurance requirement requires that the value of the property at the time of a loss be 80% of the replacement value of the property. If the value is less than 80%, the policyholder collects less than the replacement value of the loss but never less than ACV of the loss.

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.

Earned Premium:

The portion of premium paid by an insured which has been allocated to the insurance company's loss experience, expenses, and profit year to date.

Exclusion:

Provision of an insurance policy that indicates which types of property or perils are not covered.

Expense Ratio:

The ratio of expenses to premium. Expenses are typically categorized as follows: (a) commission; (b) general expense; (c) loss adjustment expenses; (d) taxes, licenses, and fees; (e) investment expenses.

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.

Florida Insurance Code:

Chapters 624 through 632, 634, 635, 636, 641, 648, and 651 of the Florida Statutes. Note that as the State Fire Marshal, the Treasurer and Insurance Commissioner also has responsibility for Chapter 633, but that chapter is not part of the Insurance Code.

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.

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.

Involuntary or Residual Markets:

State sponsored markets; markets of last resort. For property insurance in Florida this is Citizens Property Insurance Corporation.

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.

Named Peril:

Coverage in a property policy that provides protection against a loss only from the perils specifically listed in the policy. Examples of named perils include fire, windstorm, theft, smoke, riot, vandalism, water (other than rising water), explosion, aircraft, and hail.

Pass Through:

Generally, an amount that is a cost to an insurer but is permitted by statute to be ultimately absorbed by the consumer. During the 1995 session, the Legislature added a subsection (5) to Section 627.062, Florida Statues, which permits insurers to "recoup the actual amount of reimbursement premium charged by the Florida Hurricane Catastrophe Fund (FHCF) by including the FHCF rates in their rating manuals."

Peril:

The loss producing agent. The contingency that is the cause or agent of loss. Insurance policies are often referred to by the peril insured against, as in a fire policy, a collision policy, or a liability policy.

Policy Term:

Time interval during which a policy is in force.

Premises:

The building, other structures, and land where the insurance protection is applicable. It is usually described and defined in the property and casualty policy. Note, however, that the land is not insured, only the structures and contents located on the land.

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.

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).

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.

Rating Territory (Territory):

In various property and casualty lines, a geographical grouping within which insureds are likely to share an exposure to similar risks. Grouping of insureds by territory helps establish equitable rates for the territory and simplifies premium determination.

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.

Standard Risk:

A property that, according to a company's underwriting standards, is entitled to insurance at standard rates without restrictions.

Trending Procedure:

A process by which an actuary evaluates how changes over time affect such items as claims costs, claim frequencies, expenses, and premiums.

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.

Written Premium:

Premiums billed, collected, or otherwise recorded on the books of the insurer during a calendar year or other period of time.

Voluntary Market:

The market in which a person seeking insurance obtains it with no help from the state, through an insurer of his or her own selection.

Meteorological Terms:

Atlantic Basin:

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

By-Passing Storm:

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

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.

Fastest Mile:

Speed at which it takes one mile of wind to pass a location.

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.

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 Eye:

The relatively calm area in the center of the storm. In this area, winds are light and the sky often is only partly covered by clouds.

Hurricane Season:

That part of the year having a relatively high incidence of hurricanes. In the Atlantic Ocean, Caribbean Sea, and the Gulf of Mexico, the period runs from June 1 through November 30.

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.

Hurricane Warning:

A warning issued by the Tropical Prediction Center/National Hurricane Center that the maximum one-minute average wind speed at 10 meters height is 74 miles per hour or higher associated with a hurricane are expected in a specified coastal area within 24 hours or less. A hurricane warning can remain in effect when dangerously high water or a combination of dangerously high water and exceptionally high waves continue even though winds may be less than hurricane force.

Hurricane Watch:

An announcement issued by the Tropical Prediction Center/National Hurricane Center for specific areas that a hurricane or an incipient hurricane condition poses a possible threat to the coastal areas generally within 36 hours.

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.

Peak Gust:

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

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.

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.

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 Tide:

The actual sea level resulting from the astronomical tide combined with the storm surge.

Storm Track:

The path along that a tropical cyclone has already moved.

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 Depression:

A tropical cyclone in which the maximum one-minute average wind speed at 10 meters height is 38 miles per hour or less.

Tropical Disturbance:

A discrete system of organized convection originating in the tropics having a non-frontal migratory character and maintaining its identity for 24 hours or more. It is a basic

generic designation that, in successive stages of intensification, may be subsequently classified as a tropical wave, tropical depression, tropical storm or hurricane.

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.

Tropical Wave:

A surface cyclonic curvature maximum or trough in the tropics.

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.

Modeling Terms:

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).

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.

Components and Cladding:

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

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.

Event Tree Methodology:

A modeling approach which uses historical information to determine patterns of the key characteristics for defining hurricane events including landfall locations, central pressure, forward speed, and angle. This method segments these probability distributions and then combines the different segments to create a stochastic storm set.

Event:

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

Geocoding:

Assignment of a location to geographic coordinates.

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.

Location Specific Data:

Data represented for each individual risk or unit covered by a policy in an insurer's portfolio of policies.

Main Wind-Force Resisting System:

An assemblage of structural elements assigned to provide support and stability for the overall structure. The system generally receives wind loading from more than one surface.

Mapping of Zip Codes:

Either a point estimate or a physical geographic area.

Mitigation Measure:

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

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.

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.

Property Data Base:

A listing of assumed or actual structures in an area that includes at a minimum the number, location, type, and value of property. It may be the modeler's estimate or an insurance company's actual book of business.

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.

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.

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.

Uncertainty Analysis:

Determination of the variation or imprecision in model output resulting from the collective variation in the model inputs.

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.

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.

Statistical Terms:

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

Organizations:

ISO:

Insurance Services Office is an organization that provides actuarial, structural engineering, fire protection, and loss cost information to the insurance community on a specific location and peril basis.

NOAA:

National Oceanographic and Atmospheric Administration. Created in 1970 by the U.S. Government as part of the Department of Commerce.

NWS:

National Weather Service organizationally a component of NOAA. The NWS has more than 400 field offices and observation networks in 50 states and overseas. Its primary responsibility is to provide scientific and technological assistance in the general field of the atmospheric sciences to save lives, reduce injuries, and minimize property loss from extreme weather events throughout the country. NWS has the following components:

National Center for Environmental Prediction (NCEP) in Washington, DC is the nerve center for all national centers and provides synoptic-scale numerical forecast guidance material and long-range forecasts;

Storm Prediction Center (SPC) in Norman, Oklahoma maintains a constant watch for severe weather potential around the country and issues thunderstorm and tornado watches;

Tropical Prediction Center/National Hurricane Center (TPC/NHC) in Miami, Florida is responsible for issuing many tropical weather forecasts including hurricane advisories for the Atlantic, the Caribbean, the Gulf of Mexico, and the Eastern Pacific to 140W longitude. The Honolulu Forecast Office covers hurricanes in the Central Pacific between 140W and 180W longitude;

Marine Prediction Center (MPC) in Camp Springs, Maryland is responsible for issuing marine warnings, forecasts, and guidance for maritime users;

Aviation Weather Center (AWC) in Kansas City, Missouri is responsible for issuing warnings, forecasts, and analyses of hazardous weather for aviation interests;

Climate Prediction Center (CPC) in Camp Springs, Maryland provides weather forecasts on weekly, monthly, and seasonal time-scales.

PCS:

Property Claims Services is an industry claims reporting service located in New Jersey. Property and casualty insurance companies report to PCS after major losses occur. If the number of claims exceeds 5,000 or the total loss exceeds $25 million, the event is assigned a catastrophe number. The organization is funded by company subscription to its service.

BASE STORM SET

			Landfall Code				Landfall Code			
			A				B			
11/1/2002 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 4	1935	HRCFL2					Exit	977	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
		Total Number of Coastal Crossings								
NOTE: Category defined by wind speed										
HURDAT Landfall Code defined by central pressure										

		Landfall Code				Landfall Code				Landfall Code				
		C				D				By-Pass				
		Enter/	Central	Wind		Enter/	Central	Wind		Region	Central	Wind		# of Coastal
Name	Year	Exit	Pressure	Speed	Category	Exit	Pressure	Speed	Category	Affected	Pressure	Speed	Category	Crossings
NONAME 3	1903	Enter	977	98	2									2
NONAME 2	1906	Enter	979	86	1									1
NONAME 8	1906	Exit	967	81	1									2
NONAME 9	1909									C	978	98	2	1
NONAME 4	1910													1
NONAME 1	1911													1
NONAME 4	1915													1
NONAME 13	1916													1
NONAME 14	1916													1
NONAME 3	1917													1
NONAME 2	1919									B	929	132	4	1
NONAME 6	1921					Exit	980	92	1					2
NONAME 4	1924													1
NONAME 7	1924													1
NONAME 2	1925													1
NONAME 1	1926	Enter	960	109	2									1
NONAME 6	1926	Enter	931	134	4									3
NONAME 10	1926									C	968	110	2	1
NONAME 1	1928	Enter	977	98	2									1
NONAME 4	1928	Enter	935	128	3									1
NONAME 2	1929	Enter	948	114	3									2
NONAME 5	1933	Enter	990	81	1									1
NONAME 12	1933	Enter	948	132	4									1
NONAME 2	1935													2
NONAME 4	1935	Enter	977	75	1									2
NONAME 5	1936													1
NONAME 2	1939	Enter	990	81	1									2
NONAME 5	1941	Enter	954	121	3									3
NONAME 11	1944													1
NONAME 1	1945													1
NONAME 9	1945	Enter	951	116	3									1
NONAME 5	1946													1
NONAME 4	1947	Enter	947	125	3									2
NONAME 8	1947	Exit	993	85	1									2
NONAME 7	1948	Exit	964	92	1									2
NONAME 8	1948	Enter	963	86	1									1
NONAME 2	1949	Enter	954	116	3									1
EASY	1950													1
KING	1950	Enter	955	112	3									1
FLORENCE	1953													1
FLOSSY	1956													1
DONNA	1960					Exit	969	110	2					2
CLEO	1964	Enter	967	99	2									1
DORA	1964					Enter	961	99	2					1
ISBELL	1964	Exit	968	105	2									2
BETSY	1965	Enter	952	115	3									1
ALMA	1966													1
INEZ	1966													1
GLADYS	1968					Exit	966	86	1					2
AGNES	1972													1
ELOISE	1975													1
DAVID	1979	Enter	968	98	2	Exit	971	98	2					2
ELENA	1985									A	959	115	3	1
KATE	1985													1
FLOYD	1987													1
ANDREW	1992	Enter	922	165	5									2
ERIN	1995	Enter	984	86	1									2
OPAL	1995													1
EARL	1998													1
GEORGES	1998									B	981	104	1	1
IRENE	1999	Exit	984	75	1									2
					27				5				5	
														82

NORMATIVE REFERENCES

Normative References and Data Sets

For the purposes of the standards for model specification adopted in this document, the following references or published data sets are deemed normative. Subsequent revisions to these documents shall be construed to supersede the versions listed below. The actual use of information from these documents or data sets in the context of the computer models is addressed in the standards.

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

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

GUIDEBOOK

GUIDEBOOK

The guidebook is intended to assist the modeler in preparing the submission and for the on-site review by the Professional Team whose mandate is to assess the modeler's compliance with the Commission's standards and the modules. Although the ultimate authority for acceptance rests with the Commission, it is deemed helpful to provide some specifics to the modeler as to the extent and depth of the Professional Team review. Such guidance should allow the modeler to prepare for the review. The Professional Team may deem it appropriate, in the course of the on-site review, to investigate certain aspects of the model not explicitly delineated in this guidebook.

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.

The modeler should contact FSBA staff for any needed clarification of submission instructions, especially if the instructions necessitate additional assumptions. Care should be taken in the proper completion of all forms.

The goal of the Professional Team's efforts is to provide the Commission a clear and thorough report of the model, subject to non-disclosure conditions.

5.1 General Standards

5.1.1 Scope of the Computer Model and Its Implementation

Purpose: This standard gives a high level view of the scope of the model to be reviewed – namely, projected loss costs for personal lines residential property from hurricane events. Additional living expense (ALE) will be reviewed in detail since infrastructure degradation due to flood and storm surge can have an impact on ALE. Discussion of ALE will be primarily deferred to 5.3.6, 5.4.4, and 5.4.9. The reference to a computer model explicitly is intended to include the implementation of the model. Direct loss to property from flood and storm surge will be excluded. Indirect losses (ALE) to property resulting from damage to the infrastructure (power generation, public highways, etc.) will be included.

Audit: This standard concerns the scope of the computer model and its implementation that is expected to project loss costs for personal residential property due to hurricane events. ALE is mentioned explicitly since flood and storm surge can in fact impact ALE. 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.

Is there a flood or storm surge component to the model? Is it in the "off" position for the production of Florida output ranges as well as

other information supplied in the standards and modules (e.g., 5.4.11 and Form B)?

5.1.2 Qualifications of Modeler Personnel and Independent Experts

Purpose: This standard was originally adopted as a Finding of the Commission on November 30, 1995, and was subsequently modified and adopted on May 20, 1996, to add language to address the professional conduct of modeler personnel or independent experts involved in the model construction. To meet the standard, the modeler will provide during the audit written evidence of the professional credentials and capabilities, typically in the form of professional vitae of their personnel responsible for the current model and its development. Professional disciplines implicitly represented in Commission standards (structural/wind engineering, statistics, actuarial science, meteorology, computer science/engineering) will be represented among modeler staff and consultants.

Audit: The Professional Team would like to 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. For the actuarial personnel, professional status in the appropriate actuarial organization or organizations is usually apparent on the vitae. For other disciplines, the vitae ought to be sufficient to make a determination for this standard, with further commentary possible during the on-site interactions. Background information on individuals providing testimonial letters in the submission must be provided.

The Commission expects new modelers to be well-prepared for an on-site review of 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. This is especially important for discipline areas not covered by full-time employees or consultants.

Do you have any new personnel (since last year) working on the model? If so, resumés should be available. Were any personnel dismissed for violations of the professional code of conduct? If so, what influence would it have on the model under review?

5.1.3 Model Revision Policy

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. To meet the standard, the modeler will demonstrate control of the evolution of the model to the extent that reviews, updates, modifications, releases, and other revisions follow generally accepted practices and are appropriately identified to the user, especially with respect to computer engineering.

Audit: The Professional Team would like to see the process for model revisions (both methodology and data, especially updates from year-to-year with new storms). What safeguards or controls are in place? How does the annual update take place? How is it identified? How are each of the changes mentioned in 5.4.12 consistent with this policy? Citing specific examples gives further strength to the Professional Team assessment (for 1996 storms, we did the following ... and now the updated storm set is in place....). The Professional Team computer expert could then review the current set up.

5.1.4 Independence of Model Components

Purpose: This standard requires that each of the three primary components be individually sound, and moreover operate independently of each other. For example, the model will 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: This standard will be considered after the review of meteorology, vulnerability, and actuarial sections. The modeler needs to demonstrate to the Professional Team that their choices of model components adequately portray hurricane phenomena and effects (damage and loss costs). This can be accomplished indirectly via agreement with historical loss costs and attendant tests but also requires an assessment of the theoretical soundness of each component. A model would not be found to meet this standard, if an artificial calibration adjustment had been made to improve the match of historical and model results for a specific storm. What impact do changes in the model from the previous year potentially impact this standard? How can you demonstrate that in fact these changes do not impinge on this standard?

5.1.5 Risk Location

Purpose: The zip code information must be updated at least every two years. The modeler needs to be able to do geographic displays for selected zip codes.

Audit: Aside from disclosure of updates, the Professional Team is likely to ask to view the location of centroids for specific zip codes. Interest in specific zip codes arises in the context of logical relationship to risk or in basic assessments of loss costs. What is the effective (official United States Post Office) date corresponding to the database of zip codes? What is the date at which the zip codes and their centroids were introduced into the model?

5.1.6 Identification of Units of Measure and Conversion Factors

Purpose: In reviewing the model, it is essential that the specific units of measure be provided as well as all conversion factors used by the model.

Audit: Are there any units of measure omitted or incorrectly stated?

5.1.7 Visual Presentation of Data

Purpose: Visualization plays a key role in promoting a human understanding of input and output data for the hurricane model. Good visualization techniques are needed so that graphs, charts, and maps are clearly presented and understood. Example visualizations include pie and bar charts, graphs, scatter plots, and geographic maps. Computer animations, where appropriate and relevant, are encouraged. A note on color spaces: red and blue should be the only colors. In RGB color space, this implies that colors extend from (0,0,1) as blue to (1,0,0) as red. For example, (0,0,1) -> (0.1,0.1,1) -> (0.2,0.2,1) -> … -> (1,1,1) -> (1,0.9,0.9) -> (1,0.8,0.8) -> … -> (1,0,0) defines a set of color values using a blue to red transition.

Audit: The modeler will have key maps, charts, and graphs pre-prepared and will have the ability to quickly prepare such maps during an on-site review. All visualizations should be presented in a manner that enables simultaneous viewing by the entire Professional Team.

5.2 Meteorological Standards

5.2.1 Units of Measure for Model Output

Purpose: The Commission requires uniformity of measurements with regard to model outputs in the units given in the standard.

5.2.2 Damage Function Wind Inputs

Purpose: This standard ensures that the output from the wind component is appropriate as input for the damage function (allowing for the possibility of an appropriate conversion).

5.2.3 Official Hurricane Set or Suitable Approved Alternatives

Purpose: The “official” storm set is a baseline. This set covers the period 1900-2001. 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.

Failure to update the storm set, as specified in the standard, is not acceptable. Updates to HURDAT approved by the Tropical Prediction Center/National Hurricane Center are acceptable modifications to the storm set.

Audit: The input file used in generation of the stochastic storm set is useful evidence of compliance with this standard. The modeler should be prepared to show the storm set used.

5.2.4 Hurricane Characteristics

Purpose: This standard requires that the modeler use only scientifically sound information for determining hurricane characteristics. By using graphical depictions and density functions, the modeler should describe the data set and the correlated storm characteristics.

Audit: Prepare graphical depictions (e.g., histograms overlaid with fitted density functions) of storm characteristics as used in the model. The modeler should be prepared to describe the data set basis for the fitted distributions, to describe assessments of correlated characteristics (e.g., central pressure and radius of maximum winds), to describe the fitting methods used and any smoothing techniques employed, and to defend choices of parametric distributions used. The modeler should be prepared to present information on the spatial distribution of hurricane force winds (e.g., the radius of hurricane force winds) associated with both modeled and historical events. Throughout the review of this standard, an assessment of the goodness-of-fit of parametric distributions to historical should be provided, consistent with 5.6.2.

With respect to storm tracks, the stochastic storm set or its equivalent should depict realistic storm tracks. This can be demonstrated through Figure 3 in Module 3, Section 1, for example. Consistency between historical and modeled tracks means: (1) distributions of storm tracks should accurately depict actual storm tracks in Florida; and (2) comparisons are to be based on methods documented in accepted scientific literature or proposed by the modeler and accepted by the Commission.

5.2.5 Landfall Intensity

Purpose: This standard provides a consistent measure of hurricane wind speed and a consistent measure of hurricane intensity. The HURDAT database and the "official" storm set provided by the Commission will form the normative reference to this standard.

Audit: The modeler should be prepared to describe and to support category 3-5 storms with respect to intensity and wind speed. In particular,

defend the goodness-of-fit of historical versus modeled frequencies (by intensity), providing confidence intervals where appropriate.

5.2.6 Hurricane Probabilities

Purpose: This standard requires that the probability of occurrence of hurricanes matches the historical record with respect to intensities and geographical locations. Results provided in Module 3, Section I provide definitions of the four Florida geographic areas of particular interest. Extension beyond Florida boundaries demonstrates continuity of methodology.

Audit: The modeler should be prepared to describe and to support the method of selecting stochastic storm tracks and angle of landfall. The modeler should be prepared to describe and to 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. Assess the goodness-of-fit of modeled to historical frequencies for the four sections of the state and overall. The modeler should be prepared to demonstrate that the quality of fit extends beyond the Florida border by showing results for appropriate coastal segments in Alabama, Georgia, and Mississippi. Explain any significant discrepancies. In particular, defend the goodness-of-fit of historical versus modeled frequencies (by intensity), providing confidence intervals where appropriate.

5.2.7 Hurricane Probability Distributions

Purpose: This standard requires that the modeled probabilities of hurricane characteristics be documented in accepted scientific literature that is available for the Commission's review.

Audit: The modeler should be prepared to disclose the goodness-of-fit of parametric distributions to historical hurricane characteristics.

5.2.8 Land Friction

Purpose: This standard ensures that the required weakening of hurricanes over land is consistent with scientific literature depicting appropriate building/land coefficients. This information will be made available to the Commission for review.

Audit: The modeler should be prepared to describe the handling of land friction. Maps by zip codes are required.

5.2.9 Hurricane Overland Weakening Rate

Purpose: This standard requires the modeler to demonstrate a scientifically sound approach to modeling overland weakening.

Audit: The modeler should be prepared to compare the model's weakening rates to historical Florida storms and to weakening rates documented in scientific literature.

5.2.10 Temporal and Spatial Wind Field Characteristics

Purpose: This standard requires the modeler to demonstrate physical consistency of the model wind field. This is equivalent to 5.4.6.

Audit: Forms B, C, and F provide the information used in auditing this standard. Contour plots of the wind field from Form F are desired. If prepared, they should be presented to the Professional Team on-site and be consistent with the sensitivity and uncertainty analyses for wind speed.

If the modeler has questions as to how a specific form should be filled out, please contact the FSBA staff.

5.3 Vulnerability Standards

5.3.1 Derivation of Vulnerability Functions

Purpose: The development of vulnerability functions cannot be based exclusively on one source, rather their development must be the result of a combination of historical data, tests, structural calculations or expert opinion. However, use of structural calculations and/or expert opinion must be supported by tests and historical data to the extent such data are available.

The methodology development must be documented with respect to the sources and their appropriateness in the development of the vulnerability functions.

All modifications to the vulnerability functions must be disclosed to the Professional Team during their on-site review.

Audit: Historical data shall 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, be prepared to demonstrate the goodness-of-fit of the data to fitted models per 5.6.2. 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 shall be available.

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

All modifications to the vulnerability functions shall be individually listed with the direction (either positive or negative) and the range of magnitude of the change indicated. Any variation in the change over the range of wind speeds shall be identified.

5.3.2 Required Vulnerability Functions

Purpose: Since the damage for building structures, mobile homes, appurtenant structures, contents, and additional living expense is different for a given wind speed, separate vulnerability functions and damages are required.

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

5.3.3 Wind Speeds Causing Damage

Purpose: The minimum wind speed at which damage occurs should be below the hurricane threshold of 74 mph.

Audit: The disclosed minimum wind speed shall be reasonable with validation material available. The computer code showing the inclusion of the minimum wind speed at which damage occurs shall be verified.

5.3.4 Construction and Codes

Purpose: Variation in construction type and characteristics produces different damages for a given wind speed. Such variation must be documented.

Changes in building codes or new building codes that affect the vulnerability functions must be documented.

Audit: Construction types and characteristics used shall be listed and include validation of the range of magnitude and direction of the variations in damage. Any variation in differences, such as less damage to obviously stronger structures (masonry verses frame), shall be fully explained.

All modifications to the vulnerability functions due to a new building code or revisions to the existing building code shall be documented and include the range of magnitude and direction of any changes. Any

variation in the change over the range of wind speeds shall be identified.

These modifications shall fully comply with 5.3.1.

5.3.5 Mitigation Measures

Purpose: State Statutes require rate filings to include, but not be limited to, the fixtures or construction techniques listed in the standard. Subsequent Florida Department of Insurance "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 will not reduce damages by 40%.

Audit: The comprehensive and detailed listings 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.

Total effect on damage due to use of multiple mitigation measures shall be documented and shown to be reasonable.

5.3.6 Additional Living Expenses (ALE)

Purpose: ALE may be incurred, even though the property is not damaged due to wind since storm surge damage to the infrastructure can make the property uninhabitable.

The time factor to repair/reconstruct the property should include any variation due to abnormal working conditions.

Audit: The methodology and available validation for determining the extent of infrastructure damage and its effect on undamaged properties shall be made available to the Professional Team.

Documentation and calculations used to determine the time to repair/reconstruct the property shall be shown. Use of expert opinion or other modifications shall be explained.

5.4 Actuarial Standards

5.4.1 Underwriting Assumptions

Purpose: To ensure that insurance company data include appropriate insurer or modeler adjustments and are indicative of the actual underlying data whenever such data are used.

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.

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

Be prepared to disclose 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.” Be prepared to disclose the methods used to delineate among

the insurer claim practices in the use of historical claims data to verify model outputs.

5.4.2 Actuarial Modifications

Audit: Be prepared to disclose adjustments made to account for future impacts on loss costs brought about by revisions due to building code changes or revised mold claim procedures. If loss costs are not adjusted following a revision in Florida building codes or for revised mold claim procedures, be prepared to provide the actuarial criteria indicating no adjustment is appropriate based on expected future insurance company claim payments.

5.4.3 Loss Cost Projections

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 a computer model. The appropriateness of such "loads" should be resolved between the regulatory actuary and the insurance company actuary.

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.

5.4.4 Insurer Inputs

Purpose: Hurricane loss projection models may rely on certain insurer assumptions. In other cases modelers may make implicit actuarial assumptions relating to insurance to value, the prevalence of appurtenant structures, or demographic risk characteristics. Implicit assumptions may or may not be appropriate for use by a given insurer, depending on the circumstances. All insurer inputs and the following assumptions must be disclosed.

Audit: Potential areas for assumptions may include, but are not limited to, the following:

1. Insurance to Value. Hurricane loss projection models may make assumptions as to the relationship of the amount of insurance to the replacement cost, repair cost, or actual cash value of property. This relationship, called insurance to value, can vary by insurer and can further vary over time.

2. Demographic Assumptions. Hurricane loss projection models may also include assumptions made by insurers using the model. These may include the percentage of houses in a zip code having a particular roof type, cladding, or other structural characteristic. Other assumptions may be more subjective such as maintenance or state of repair.

3. Appurtenant Structures. The model should take into account the prevalence of appurtenant structures by geographic area. In many geographic areas there are relatively few appurtenant structures. Insurers, however, provide an amount of insurance for these structures anyway. Also, change in limits for appurtenant structures may not result in a commensurate change in expected losses because the existing limits may already exceed the value of these structures.

4. Contents. A change in contents limits may not result in a commensurate change in losses because the existing limits may already exceed the value of the contents.

5. Additional Living Expenses. A change in additional living expenses limits may not result in a commensurate change in losses because the existing limits may already exceed the largest likely loss.

6. Insurer Exposures By Zip Code. Some modelers rely on exposure data by zip code provided by insurers in preparation of a rate filing. In such cases, the modeler will validate all zip code information received from insurance company clients to assure that valid zip codes are used.

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

5.4.5 Demand Surge

Purpose: Demand surge is an increase in the cost of materials and labor due to increased demand following a hurricane. Demand surge was observed in Hurricane Andrew, but it has not been observed in smaller U.S. hurricanes. The circumstances necessary for a recurrence of demand surge 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.

Audit: Demonstrate how the presence of demand surge has been incorporated 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.

5.4.6 Logical Relation to Risk

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.

Audit:

A. Prepare graphic representation of loss costs by zip code. Provide statewide, by region, and major population centers.

B. For land friction, provide a color-coded map by zip code of friction for Florida and identify low, average, and high loss costs. Be prepared to call up loss costs for selected zip codes in Florida.

C. Form B will be used to assess coverage relationships.

If the modeler has questions as to how a specific form should be filled out, please contact the FSBA staff.

5.4.7 Deductibles and Policy Limits

Purpose: For a given wind speed and structure type, a range of possible damages result, each with varying degrees of probability. Some damages may fall completely below the deductible. The distribution of damage is therefore important to the determination of the effects of deductibles and policy limits.

Audit: The company actuary will be asked to attest to the actuarial soundness of the procedure. To the extent that historical data are used to develop mathematical depictions of contents functions, be prepared to demonstrate the goodness-of-fit of the data to fitted models as per 5.6.2. Be prepared to discuss and justify changes from the prior submission in the relativities among corresponding deductible amounts for the same coverage.

5.4.8 Contents

Purpose: Some policies cover contents only (called tenants policies) and some policies provide no contents coverage at all (called fire and extended coverage policies). Condominium policies have an increased emphasis on contents. A reasonable representation of contents losses is necessary in order to address these types of policies.

Audit: The company actuary will be asked to attest to the actuarial soundness of the procedure. To the extent that historical data are used to develop mathematical depictions of contents functions, be prepared to demonstrate the goodness-of-fit of the data to fitted models as per 5.6.2. Be prepared to discuss and justify changes from the prior submission in the relativities between loss costs for buildings and the corresponding loss costs for contents.

5.4.9 Additional Living Expenses (ALE)

Purpose: Policies can cover varying levels of additional living expense.

Audit: The company actuary will be asked to attest to the actuarial soundness of the procedure. Also, be prepared to document, discuss, and justify the following during the on-site review:

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. For Hurricane Andrew, be prepared to quantify and discuss the effects of demand surge on ALE;
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 condominium exposure;
H. Logical relation to contents, especially contents versus ALE for condominiums; and
I. ALE resulting from damage to the infrastructure.

To the extent that historical data are used to develop mathematical depictions of ALE functions, be prepared to demonstrate the goodness-of-fit of the data to fitted models as per 5.6.2.

5.4.10 Replication of Known Hurricane Losses

Purpose: Each model should demonstrate that it can 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.

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. The validity of the model will be assessed by comparing expected losses produced by the model to actual observed losses incurred by insurers at both the state and county level. A number of storms should be examined and unusual results should be explained.

To the extent possible, each of the three functions of wind field, vulnerability, and insurance should be separately tested and verified.

It is important that the stochastic part of the model be tested, which is the part of the model used to produce loss costs used in rate-making.

Audit:

A. Provide the following for each insurer and hurricane:

1. The version of the model used to calculate modeled losses for each storm provided;
2. For each storm, a general description of the data and its source;
3. A disclosure of any material mismatch of exposure and loss data problems, or other material consideration. For each storm, the date of the exposures used for modeling and the date of the hurricane;
4. An explanation of differences in the actual and modeled storm parameters;
5. 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;
6. 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
7. For each example, the inclusion of demand surge, storm surge, loss adjustment expenses, or law and ordinance coverage in the actual losses, or the modeled losses.

B. Have the following documentation available for on-site review:

1. Provide a copy of the publicly available documentation that you plan to provide to the Commission;
2. A listing of all 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. For Hurricane Andrew, be prepared to quantify and discuss the effects of demand surge; and
5. User input sheets for each insurer and hurricane detailing specific assumptions made with regard to exposed property.

C. Use confidence intervals per 5.6.3 to gauge the comparison between historical and modeled losses.

5.4.11 Comparison of Estimated Hurricane Loss Costs

Comment: The FSBA will provide FHCF aggregate personal residential exposure data to the modelers.

Audit: Be prepared to discuss and justify the following during the on-site review:

A. Meteorological parameters;
B. The effect of by-passing storms;
C. The effect of actual storms that have two landfalls impacting Florida;
D. 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;
E. Exposure assumptions;
F. Identify and explain any unusual results;
G. Use confidence intervals per 5.6.3 to gauge the comparison between historical and modeled losses;
H. The zero deductible statewide loss for each hurricane in the Official Storm Set; and
I. The zero deductible loss by zip code for Hurricane Andrew.

5.4.12 Output Ranges

Audit: Be prepared to discuss and justify the following during the on-site review:

1. Changes from the prior submission of greater than ten percent in weighted average loss costs for any county.
2. Changes from the prior submission of ten percent or less in weighted average loss costs for any county.

5.5 Computer Standards

5.5.1 Primary Document Binder

Purpose: There are many binders associated with the computer standards and they should be available through a hierarchical referencing scheme. This provides a logical order to all computer-related documentation.

Audit: The Professional Team will audit all aspects of the submission. Modeler personnel, or their designated proxies, responsible for each aspect of the software (i.e. user interface, quality assurance, engineering, actuarial) shall be present at the break-out meeting when the computer standards are being audited.

5.5.2 Requirements

Purpose: Software development begins with a thorough specification of requirements. 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. Example requirements categories, along with sample requirements are:

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 COST. 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.

Audit: The Professional Team will ask modelers for the requirements specifications documentation and review onsite.

5.5.3 Model Architecture and Component Design

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 COST, etc. 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 site-specific winds;

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

4. COST accepts the output from DAMAGE and generates loss costs.

Audit*:* All codes will be designed in diagrams that depict the flow of data and control. Other synonyms for "component" are module, function, plug-in, or object. In all cases, a component has a clear input/output interface. The idea of interacting components with flows extending from one component to another came about in systems theory and engineering and was extended to software engineering. While the standards do not dictate programming paradigm, they require that the top-level design of the code is in an aggregate form that references common components such as STORMS, WIND FIELD, DAMAGE, and COST.

All model component custodians or their designated proxies must be available at the time of audit.

5.5.4 Implementation

Purpose: A high-level graphical view of a program promotes understanding and maintenance. Such views are achievable, regardless of programming paradigm. All compositions will be made clear through explicit textual or interactively supported reference within each graphical component. For example, if component X subdivides into Y and Z where Y feeds into Z, then there will be a clear trace from X to the (Y, Z) network. This is accomplished in hardcopy media using text or interactively through human-computer interaction.

Audit: Each of the components in 5.5.3 is refined into subcomponents, and at the end of the component "tree" there are blocks of code. All documentation and binder identifications will be referenced within this tree. This creates a traceable design from aggregate components down to the code level.

5.5.5 Verification

Purpose: It is critical to verify that the code is producing 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 should include hand-calculations or parallel coding efforts (using a different language or tool, but with the same requirements).

Testing is a fundamental type of verification. Each component will be tested with full disclosure of test results. This testing is identical to tests that are done in engineering, where for example a sub-component part is tested by itself prior to its insertion into a larger component.

Audit: Some compilers will contain the ability to declare logical assertions. For those compilers without this capability, one can create "if-statements" with the appropriate flag. Assertions as to "what should be true" at specific points in the code aids in producing correct code.

To test the whole, unit testing is required on each of the parts. When each part is verified as working on an independent basis, then the parts can be combined together to create the final program. Tests should be run by varying component inputs to ensure correct output. To the extent that component inputs are varied according to sensitivity and uncertainty analyses, provide this material to the Professional Team for review.

5.5.6 Model Maintenance and Revision

Purpose: Once the software is constructed, it is essential to use software to track and maintain all source code. Many available packages exist to support this activity.

Audit: Software maintenance includes a written and implemented policy for backup procedures. There are numerous software applications that aid the programming in source revision and control. Even if there are very few programmers, such an approach is necessary to track changes and ensure a quality software engineering process.

5.5.7 User Documentation

Purpose: 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 Professional Team will talk to users of the software, including those familiar with the code as well as those who use the code without any knowledge of its components or their internal interfaces.

5.6 Statistics Standards

5.6.1 Use of Historical Data

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 distribution representation is reasonable on statistical grounds. A maximum likelihood fit may be the best estimation method available, but if the fit is poor, the distribution choice may be inappropriate. Graphical depictions of the parametric data with the fitted parametric curve gives a direct assessment. Numerical assessments such as

goodness-of-fit tests can also be useful.

Audit: Although the chi-square goodness-of-fit test is a commonly used procedure, there are more powerful (rigorous) tests available. Either the Kolmogorov-Smirnov (with relevant adjustments for parameter estimation) or Cramer-von Mises tests should be applied using a reasonable significance level. The Commission does not consider the chi-square goodness-of-fit test to be a rigorous methodology for demonstrating the reasonableness of models of historical data.

5.6.2 Comparison of Historical and Modeled Results

Purpose: For situations where the modeled data are a complex output of the storm generations (such as in the production of stochastic storm set landfall frequencies by coastal segment), a classical goodness-of-fit test could be used to assess the consistency. This standard very explicitly requires the modelers to have the results of data fitting with probability distributions available for the model assessments. Also, this standard forces the production of 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).

Audit: Examples include hurricane frequencies, tracks, intensities and physical damage.

5.6.3 Uncertainty Characterization

Audit: Note that confidence limits could be used for distribution parameter limits and prediction limits could be used for situations in which future values are envisaged.

5.6.4 Sensitivity Analysis for Model Output

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.

5.6.5 Uncertainty Analysis for Model Output

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.

Audit: Although some modelers may use parameters as synonyms for input variables, the latter terminology is preferred here.

5.6.6 County Level Aggregation

Purpose: Sample size consideration is an issue in many statistical applications and simulating estimated loss costs is not an exception. 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.

Audit: Provide a graph assessing the accuracy associated with low impact areas such as Nassau County. Assess where appropriate, the contribution of simulation uncertainty via confidence intervals per 5.6.3.

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

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

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

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.

IX. APPENDICES

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. 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 Chief Operating Officer of the Florida Hurricane Catastrophe Fund.
3. The Executive Director of the Residential Property and Casualty Joint Underwriting Association.

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 Insurance Commissioner, as follows:
    a. An employee of the Department of Insurance 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 Insurance Commissioner under subparagraph (b)6. shall serve on the commission until the end of the term of office of the Insurance Commissioner who appointed them, unless earlier removed by the Insurance Commissioner 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 department 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.

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)

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

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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