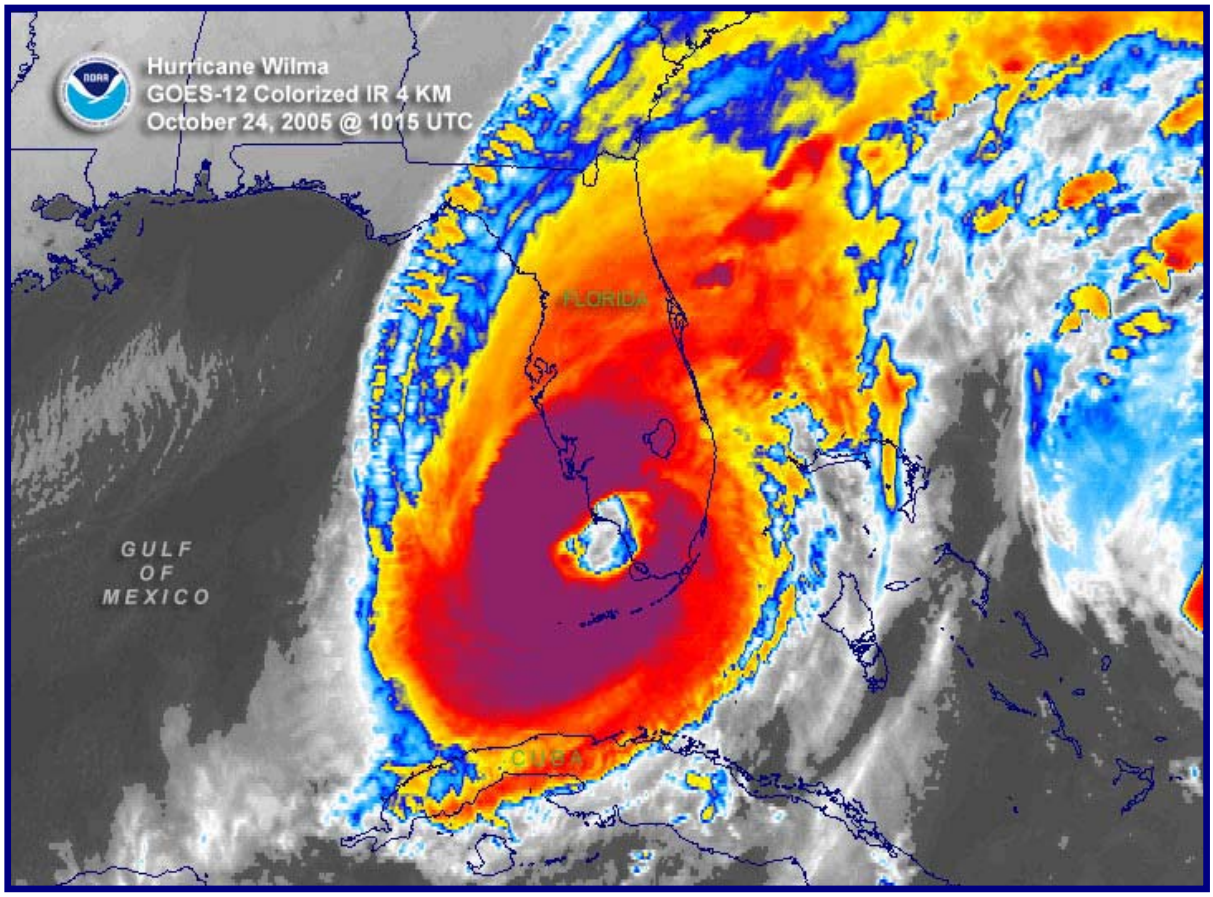
Florida Commission on Hurricane Loss Projection Methodology



Professional Team Report
2006 Standards

EQECAT, Inc.

On-Site Review
April 25 – 27, 2007

On April 25-27, 2007, the Professional Team visited on-site at EQECAT, Inc. (EQE) in Oakland, California. The following individuals participated in the review.

EQECAT

Shawna S. Ackerman, FCAS, MAAA, Principal and Consulting Actuary – Pinnacle Actuarial Resources, Inc. (via phone)
Branimir Betov, M.S., Senior Software Engineer
Richard Clinton, CPCU, President
Apoorv Dabral, Ph.D., Wind Engineering
Jun-Rong Huo, Ph.D., Principal Engineer, Structural Engineering
Petros G. Keshishian, Ph.D., Principal Engineer
Mahmoud M. Khater, Ph.D., P.E., Senior Vice President, Chief Science and Technology Officer
Omar Khemici, Ph.D., P.E., Director (Structural Engineering)
Thomas I. Larsen, Senior Vice President
Andreas Mueller, Ph.D, Meteorologist
Krishnaraj Santhanam, Ph.D., Atmospheric Scientist
Nilesh Shome, Ph.D., Senior Project Engineer (Statistics)
David F. Smith, Director, Technology Development and Consulting
Qing Xia, Ph.D., Meteorologist

Professional Team

Jenni Evans, Ph.D., Meteorologist
Paul Fishwick, Ph.D., Computer Scientist
Mark Johnson, Ph.D., Statistician, Team Leader
Marty Simons, ACAS, Actuary
Fred Stolaski, P.E., Structural Engineer
Donna Sirmons, Staff

The review began with introductions and an overview of the audit process. EQE began with an explanation of the land use land cover reversion to the prior year data base. An initial presentation on demand surge was provided with a more detailed description postponed until the Actuarial Standards review.

Reviewed the following corrections to be included in the revised submission provided to the Commission prior to the May 8-11, 2007 meetings in addition to the editorial corrections noted in the Professional Team pre-visit letter.

1. Page 2, Notification Letter, corrected to reflect actual changes made to the model
2. Page 11, G-1.2, corrected to reflect reversion to the prior year number of stochastic storm simulation results
3. Page 17, G-1.3, corrected to reflect reversion to the prior year number of storms in the probabilistic storm data base
4. Page 22, G-1.5, corrected to reflect actual changes made to the model
5. Page 47, M-3.1, revised to reflect the overland wind threshold used in the model for by-passing events
6. Page 51, M-5, corrected to reflect reversion to the prior year land use land cover data
7. Page 53, M-5.4, corrected to reflect reversion to the prior year land use land cover data

8. Page 57, M-5.6, corrected map of Hurricane Wilma winds (color and legend)
9. Page 57, M-5.7, clarified the differing treatment of the decay factor between historical and stochastic storms
10. Page 62, Form M-2, corrected
11. Page 78, Form V-1, corrected
12. Page 99, A-6.3, Figure 14 corrected
13. Page 111, A-10.2, A-10.3, and A-10.4 corrected to reflect reversion to prior year submission for number of stochastic storm simulation results and land use land cover data
14. Page 115, Form A-2, corrected
15. Page 118, Form A-3, corrected
16. Page 119, Form A-4, corrected
17. Page 127, Form A-5, corrected
18. Page 131, Form A-6, corrected
19. Page 172, Form A-7, corrected
20. Page 175, Form A-8, corrected
21. Page 180, S-1.5, corrected Figure 23, uncertainty analysis for frequency
22. Page 184, S-2.1, corrected Figure 26, sensitivity analysis for number of events
23. Page 189, S-4, corrected to reflect reversion to the prior year number of stochastic storm simulation results
24. Page 194, Form S-2, corrected
25. Page 195, Form S-3, corrected to include demand surge in the modeled comparisons
26. Page 201, Form S-4, corrected

Pre-Visit Letter

The following editorial corrections are noted. The Professional Team will need to review the corrected pages before completing the on-site review.

1. Page 87, correct Disclosure numbering.
2. Page 108, response to A-9.C, Forms A-1 and A-2 should be Form A-1.
3. Page 110, first sentence in response to Disclosure 1, “Form A-9” should be Form A-6.
4. Page 179, correct year of Commission’s Florida storm set.
5. Page 185, last sentence before Disclosure 2, “Form A-6” should be Form A-5.
6. Page 192, last sentence before Disclosure 2, “511,500” should be 473,150.

Provide for the Professional Team’s review, all insurance company claims data received since the review by the Professional Team in 2004 (three years prior). Be prepared to describe any processes used to amend or validate the model that incorporates this data.

Provide for the Professional Team’s review, all engineering data (post event surveys, tests, etc.) received since the review by the Professional Team in 2004 (three years prior). Be prepared to describe any processes used to amend or validate the model that incorporates this data.

Reviewed claims data received since the previous Professional Team review and communications with the companies for clarification of the data.

Modeler confirmed that no new engineering survey data have been collected since the prior on-site review.

The Professional Team reviewed the editorial corrections noted above during the course of the audit. Corrections will be included in the revised submission that will be provided to the Commission.

The Professional Team's pre-visit letter questions are provided in the report under the corresponding Standards.

GENERAL STANDARDS – Mark Johnson, Leader

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

*(*Significant Revision due to new Audit language)*

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

Audit

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

2. All software located within the model, used to compile data used by the model, used to validate the model, and used to project model loss costs (1) fall within the scope of the Computer Standards, and (2) will be reviewed interactively (viewed simultaneously by all Professional Team members in conjunction with the review of each Standard).

3. Databases or data files relevant to the modeler's submission will be reviewed.

Pre-Visit Letter

1. G-1, Disclosure 2, page 11 – Referring to paragraph, "Probabilistic Annual Damage…," explain the origin of the 473,150 number and its basis.

2. G-1, Disclosure 2, page 14 – Referring to paragraph under "Probability Distributions," provide the goodness-of-fit tests used to compare modeled distributions of various parameters with the underlying historical data as cited.

3. G-1, Disclosure 2, page 14 – Referring to paragraph under "Sensitivity and Uncertainty Analyses," provide the cited analyses.

4. G-1, Disclosure 5, page 22 – Discuss the land use/land cover update within M-5.

Verified: YES

Professional Team Comments:

Responses to G-1.2, page 11, and G-1.3, page 17, revised to reflect reversion to the prior year number of stochastic storm simulation results.

Response to G-1.5, page 22, revised to reflect the actual changes made in the model from the prior year's submission.

Discussed the reversion to last year's total number of stochastic storm simulation results and the reversion to last year's land use land cover data in light of technical difficulties encountered by the modeler prior to the on-site review.

Discussed the version nomenclature application process.

G-2 Qualifications of Modeler Personnel and Consultants

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

B. The model or any modifications to an accepted model shall be reviewed by either modeler personnel or consultants in the following professional disciplines: structural/wind engineering (licensed Professional Engineer), statistics (advanced degree), actuarial science (Associate or Fellow of Casualty Actuarial Society), meteorology (advanced degree), and computer/information science (advanced degree). These individuals shall be signatories on Forms G-1 through G-6 as applicable and shall abide by the standards of professional conduct if adopted by their profession.

Audit

1. The professional vitae of modeler personnel and consultants responsible for the current model and information on their predecessors if different than current personnel will be reviewed. Background information on individuals providing testimonial letters in the submission shall be provided.

2. Forms G-1, G-2, G-3, G-4, G-5, G-6, and all independent peer reviews of the model under consideration will be reviewed. Signatories on the individual Forms will be required to provide a description of their review process.

3. Discuss any incidents where modeler personnel or consultants have been found to have failed to abide by the standards of professional conduct adopted by their profession.

Pre-Visit Letter

5. G-2, Disclosure 2.B, page 27 – Provide resumes of new personnel, Apoorv Dabral and Jason Mok.

Verified: YES

Professional Team Comments:

Verified that no former employees left for violation of professional ethical standards.

Discussed the timeliness and appropriateness of the independent reviews performed by Daryl Orts and Chuck Walrad in 1998 on the computer science aspects of the model.

Reviewed resumes of new personnel:

- Apoorv Dabral, Ph.D. in Wind Science and Engineering, Texas Tech University, Dissertation Topic: Probabilistic Damage and Loss Modeling for Metal Roof using Artifical Neural Network; M.S. in Civil Engineering, Texas Tech University, B.E. in Civil Engineering, Pune University, India
- Jason Mok, B.S. in Computer Engineering, San Jose State University

G-3 Risk Location

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

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

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

Audit

1. Provide geographic displays for all ZIP Codes. The location of specific centroids will be reviewed.

2. Provide the third party vendor, if applicable, and a complete description of the process used to validate ZIP Code information.

Pre-Visit Letter

6. G-3.C, page 32 – Describe the process used to validate the ZIP Code data.

Verified: YES

Professional Team Comments:

Verified that ZIP Codes were not updated in the 2006 submission; ZIP Codes updated last year.

Reviewed the handling of a specific ZIP Code as a check on the process for handling exposure data at this resolution.

G-4 Independence of Model Components

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

Audit

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

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

Verified: YES

Professional Team Comments:

No bias detected among the meteorological, vulnerability, and actuarial components of the model.

METEOROLOGICAL STANDARDS – Jenni Evans, Leader

M-1 Base Hurricane Storm Set*

*(*Significant Revision)*

For validation of landfall and by-passing storm frequency in the stochastic storm set, the modeler shall use the latest updated Official Hurricane Set or the National Hurricane Center HURDAT as of June 1, 2006 or later. Complete additional season increments based on updates to HURDAT approved by the Tropical Prediction Center/National Hurricane Center are acceptable modifications to these storm sets. Peer reviewed atmospheric science literature can be used to justify modifications to the Base Hurricane Storm Set.

Audit

1. The modeler's Base Hurricane Storm Set will be reviewed.

Verified: YES

Professional Team Comments:

Verified the storm set used is the Official Hurricane Set as of November 1, 2006 and also includes the 2006 hurricane season with no landfalling hurricanes.

M-2 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, tracks, the spatial and time variant wind fields, and conversion factors, shall be based on information documented by currently accepted scientific literature.

Audit

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

2. Prepare graphical depictions of hurricane characteristics as used in the model. Describe and justify:
   - the data set basis for the fitted distributions,
   - the modeled dependencies among correlated characteristics in the wind field component and how they are represented,

- the asymmetric nature of hurricanes,
- the fitting methods used and any smoothing techniques employed.

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

4. For wind and/or pressure fields not previously reviewed, the modeler will present time-based contour animations (capable of being paused) to demonstrate scientifically reasonable wind field characteristics.

5. The treatment of uncertainties associated with the conversion of gradient winds to surface winds will be compared with currently accepted literature. Variation of the conversion factor with storm intensity will be reviewed.

6. All modeler-specific scientific literature provided in Standard G-1 will be reviewed to determine acceptability.

7. Identify all external data sources that affect model generated wind fields.

Pre-Visit Letter

7. M-2, Disclosure 1, page 44 – Explain how gradient to sustained wind speed is considered in the model and note whether this is a necessary step in the model calculations.

8. M-2, Disclosure 10, page 46 – Provide the parameters used for these three storms.

Verified: YES

Professional Team Comments:

Confirmed that gradient winds are not an input to the model and therefore no gradient to surface wind conversion is necessary.

Reviewed the storm parameters in the model for Hurricanes Charley, Katrina, and Wilma.

Discussed how the profile factor in the storm parameter is derived. Discussed the use of a constant profile factor in the stochastic storm set. Discussed the basis for determining the use of a constant profile factor rather than a variable profile factor.

Modeler communicated that they will review latest data to determine whether profile factor revision is warranted.

Reviewed sensitivity tests performed on the profile factor using various constants and a log normal distribution for the default value in the model and for a mean based on recent historical storms. Reviewed the exceedance curves from the sensitivity test results. Reviewed scatter plots showing the relationship among two constant profiles and a variable profile factor.

Reviewed the historical database for landfalling hurricanes, including landfall location and intensity.

M-3 Landfall Intensity

Models shall use maximum one-minute sustained 10-meter wind speed when defining hurricane landfall intensity. This applies both to the Base Hurricane Storm Set used to develop landfall strike probabilities as a function of coastal location and to the modeled winds in each hurricane which causes damage. The associated maximum one-minute sustained 10-meter wind speed shall be within the range of wind speeds (in statute miles per hour) categorized by the Saffir-Simpson scale.

Saffir-Simpson Hurricane Scale:

Category	Winds (mph)	Damage
1	74 – 95	Minimal
2	96 – 110	Moderate
3	111 – 130	Extensive
4	131 – 155	Extreme
5	Over 155	Catastrophic

Audit

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

Verified: YES

Professional Team Comments:

Response to M-3.1, page 47, revised to reflect the overland wind threshold used in the model for by-passing events.

Confirmed the definition of a by-passing storm used in the model.

Confirmed the determination of storm intensity at landfall has not been changed from the previous submission.

Reviewed computer code for overland wind threshold for by-passing storms.

M-4 Hurricane Probabilities

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

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

Audit

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

2. Demonstrate that the quality of fit extends beyond the Florida border by showing results for appropriate coastal segments in Alabama, Georgia, and Mississippi.

3. Describe and support the method of selecting stochastic storm tracks.

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

5. Provide any modeler specific research performed to develop the functions used for simulating model variables or to develop databases.

6. Describe any short term and long term variations in annual storm frequencies incorporated in the model.

Pre-Visit Letter

12. Form M-1, page 60 – Discuss the entries in the Modeled Annual Occurrence Rates tables which result from differences in the landfall count in the Commission's Official Hurricane Set.

Verified: YES

Professional Team Comments:

Confirmed that the differing historical rates in Form M-1 were derived entirely from interpretations of the Commission's Official Hurricane Set.

Confirmed no long or short term variations are included in the model being reviewed by the Commission. Verified that the complete 107-year record through 2006 is included for landfall frequencies.

M-5 Land Friction and Weakening

A. The magnitude of land friction coefficients shall be consistent with currently accepted scientific literature relevant to current geographic surface roughness distributions and shall be implemented with appropriate geographic information system data.

B. The hurricane overland weakening rate methodology used by the model shall be consistent with historical records.

Audit

1. Identify other variables in the model that affect over land wind speed estimation.

2. Maps depicting land friction effects are required. Describe the representation of land friction effects in the model. Describe the variation in decay rate over land used in the model.

3. Comparisons of the model's weakening rates to weakening rates for historical Florida hurricanes will be reviewed.

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

5. Form M-2 will be reviewed.

Pre-Visit Letter

9. M-5, page 51 – Describe in detail, the source of the data, and all calculations, and adjustments performed in the process of including the land use land cover data in the model. Describe any changes in the model affecting Florida or its neighboring states, between the descriptions above, and those applicable to each of the two prior submissions.

10. M-5, Disclosure 5, pages 55-56 – Discuss Figures 5 and 6 with reference to the corresponding figures in the previous submission in light of the change in the land cover treatment.

11. M-5, Disclosure 7, page 57 – Elaborate on the response given.

12. [This questions is under Standard M-4]

13. Form M-2, pages 63-64 – The Professional Team will review your surface friction map. Discuss Figures 9 and 10 with reference to the corresponding figures in the previous submission.

Verified: YES

Professional Team Comments:

Responses to Standard M-5, page 51, and M-5.4, page 53, revised to reflect reversion to the prior year land use land cover data.

Response to M-5.6, page 57, revised to correct map of Hurricane Wilma winds.

Response to M-5.7, page 57, revised to clarify the differing treatment of the decay factor between historical and stochastic storms.

Corrected Form M-2 to be included in the revised submission.

Reviewed the differing treatment of decay factor for the stochastic and historical storms.

Discussed the reversion to last year's land use land cover data in light of technical difficulties.

Reviewed Figures 5 and 6 and confirmed that Figure 6 is now appropriate given the reversion to last year's land use land cover data.

Reviewed updated Figures 9 and 10 provided in the revised Form M-2.

M-6 Logical Relationships of Hurricane Characteristics

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

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

Audit

1. Form M-3 and the modeler's sensitivity analyses provide the information used in auditing this Standard.

2. Justify the relationship between central pressure and radius of maximum winds.

Verified: YES

Professional Team Comments:

Reviewed Form M-3 with reference to Hurricane Charley because of concern with the Rmax bounds on the stochastic set.

VULNERABILITY STANDARDS – Fred Stolaski, Leader

V-1 Derivation of Vulnerability Functions

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

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

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

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

E. In the derivation and application of vulnerability functions, assumptions concerning building code revisions and building code enforcement shall be justified.

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

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

Audit

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

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

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

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

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

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

7. Form V-1 will be reviewed.

Pre-Visit Letter

14. V-1, Disclosure 4, page 70 – Discuss the process used to determine validation versus modification of vulnerability functions due to new claims data.

Verified: YES

Professional Team Comments:

Reviewed revised Form V-1 after the reversion to the previous year's number of stochastic storm simulations and land use land cover data.

Confirmed there were no changes to the vulnerability functions since the previous submission. No new papers or reports, except for new insurance data, available to use in reviewing existing vulnerability functions.

Modeler confirmed that no new engineering survey data have been collected since the prior on-site review.

Confirmed that no changes to construction types and characteristics were made. Confirmed that the effect of building codes and enforcement shown in new insurance data, which are tied to year built, has not been changed. Further research will be done to determine if vulnerability functions can be validated or require modification.

Discussed process for updating vulnerability functions and structural modifiers if needed in the model after review of new claims data and site inspections.

Discussed on-going analyses of recent claims data received. Reviewed new data from three companies and reviewed coding, construction characteristics, and appurtenant structures.

Reviewed the results provided in Form V-1.

Reviewed value of wind speed at which damage starts to occur and the associated code.

V-2 Mitigation Measures*

*(*Significant Revision due to new Audit language)*

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

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

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

Audit

1. Forms V-2 and V-3 provide the information used in auditing this Standard.

2. Individual mitigation measures as well as total effect on damage due to use of multiple mitigation measures will be reviewed. Any variation in the change over the range of wind speeds for individual and multiple mitigation measures will be reviewed.

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

Pre-Visit Letter

15. Form V-2, page 79 – Explain 0.0% for Nailing of Deck row in Roof Covering section.

16. Form V-3 – Please complete the REFERENCE STRUCTURE row in Form V-3. Provide a copy of Form V-3 when the Professional Team arrives, and also provide the electronic file used to complete Form V-3 on a removable drive medium. (This material will be used during the on-site review and will be returned when the on-site review is complete.)

Verified: YES

Professional Team Comments:

Reviewed results provided in Form V-2 and Form V-3 (Trade Secret List). Confirmed with actual calculations that the Form V-2 values were consistent with the values in Form V-3. Reviewed spreadsheets used to generate Forms V-2 and V-3.

Discussed row of zeroes in Form V-2 for Nailing of Deck.

Confirmed there were no changes to the mitigation measures since the previous submission.

Reviewed material potentially to be presented at the Trade Secret session.

Documentation reviewed:

- Secondary Structural Modifiers: Features and Model Description, USWind Catastrophic Wind Damage/Loss Assessment, July 28, 2003

ACTUARIAL STANDARDS – Marty Simons, Leader

A-1 Modeled Loss Costs

Modeled loss costs shall reflect all damages from storms that reach hurricane strength and produce minimum damaging wind speeds or greater on land in Florida.

Audit

1. The model will be reviewed to determine that the definition of an event in the model is consistent with Standard A-1.

2. The model will be reviewed to determine that by-passing storms and their effects are considered in a manner that is consistent with Standard A-1.

Verified: YES

Professional Team Comments:

Discussed with Shawna Ackerman her confirmation that there were no changes in the model relative to the definition of an event and the handling of by-passing storms.

Reviewed the computer code where damaging winds are applied for calculating losses in Florida.

Reviewed model accounting for by-passing storms causing damage in Florida.

A-2 Underwriting Assumptions

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

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

Audit

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

Verified: YES

Professional Team Comments:

Discussed with Shawna Ackerman her review of the new claims data, the validation process, methods used to deal with anomalies or apparent errors (when necessary), methods for applying deductibles, and the insurance to value numbers on each policy. Discussed her review of the initial regression analyses that did not show a significant difference and therefore based on the analyses thus far, no adjustments have yet been made to the vulnerability curves.

Reviewed the 90% confidence band of the mean damage ratio from the 2004 and 2005 claims data for frame and masonry building structures in Florida.

Reviewed plot of hurricane building damage for frame structures in different regions of Florida for 2004 and 2005 claims data. Reviewed the average damage by region and the methods used for calculating these values.

A-3 Loss Cost Projections*

*(*Significant Revision)*

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

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

Audit

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

Verified: YES

Professional Team Comments:

Discussed with Shawna Ackerman her confirmation that the method for producing loss costs has not changed from the previous submission.

Reviewed insurance claims data from 2004 to see how modeler handles claims data, anomalies, and so forth.

Prohibited items listed in the Standard are not included in the loss costs.

A-4 Demand Surge*

*(*New Standard)*

A. Demand surge shall be included in the model's calculation of loss costs.

B. The methods, data, and assumptions used in the estimation of demand surge shall be actuarially sound.

Audit

1. Provide the data and methods used to determine the effects of demand surge.

Pre-Visit Letter

17. A-4, page 86 – Provide a detailed description of the process used in the model to account for demand surge, including any analyses performed to determine that the resulting demand surge adjustments are actuarially reasonable. Have available any data, reports, expert opinions, etc. used in developing this process.

Verified: YES

Professional Team Comments:

Reviewed the methodology, development, and implementation of the demand surge model that was first introduced in 1996. Discussed the current relevance of the original demand surge formulation.

Discussed with Shawna Ackerman her review of the implementation of demand surge in the model.

Reviewed map showing the historical migration of Florida's population centroid.

Reviewed the inventory estimation calculation used in formulating the demand surge function in 1996 and the source for the variables in the equation.

Reviewed application of the demand surge factor to modeled losses for Hurricane Charley.

Reviewed the computer code for implementation of demand surge in the model.

Documentation reviewed:

- EQE May 6, 1996, Memorandum, USW Vulnerability Functions, Development and status of USW demand-surge methodology

A-5 User Inputs

All modifications, adjustments, assumptions, and defaults necessary to use the inputs in the model shall be actuarially sound and included with the model output. Treatment of missing values for user inputs required to run the model shall be actuarially sound and described with the model output.

Audit

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

2. All insurer inputs and assumptions will be reviewed.

Verified: YES

Professional Team Comments:

Discussed with Shawna Ackerman her review of assumptions made regarding inputs in the model and verified no change in the methodology from the previous submission.

A-6 Logical Relationship to Risk

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

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

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

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

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

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

G. The relationship of loss costs for individual coverages, (e.g., structures and appurtenant structures, contents, and loss of use/additional living expense) shall be consistent with the coverages provided.

Audit

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

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

3. Individual loss cost relationships will be reviewed. Forms A-1, A-2, A-3, A-4, and A-5 will be used to assess coverage relationships.

Pre-Visit Letter

21. Form A-5, page 130 – Describe the process used to produce this figure, including computer code or other means used to generate the figure.

Verified: YES

Professional Team Comments:

Response to A-6.3, page 99, revised to correct Figure 14, and Forms A-2, A-3, A-4, and A-5 revised after reversion to the prior year's number of stochastic storm simulations and land use land cover data.

Reviewed with Shawna Ackerman her review of both versions of the various forms to determine whether the loss costs were logical.

A-7 Deductibles and Policy Limits

A. The methods used in the development of mathematical distributions to reflect the effects of deductibles and policy limits shall be actuarially sound.

B. The relationship among the modeled deductible loss costs shall be reasonable.

C. Deductible loss costs shall be calculated in accordance with s. 627.701(5)(a), F.S.

Audit

1. Describe the process used to determine the accuracy of the insurance-to-value criteria in data used to develop or validate the model results.

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

Verified: YES

Professional Team Comments:

Discussed with Shawna Ackerman her confirmation that no changes were made in the model relative to applying deductibles and policy limits from the previous submission.

A-8 Contents

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

B. The relationship between the modeled structure and contents loss costs shall be reasonable, based on the relationship between historical structure and contents losses.

Audit

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

Pre-Visit Letter

18. A-8, Disclosure 1, page 107 – Describe the process (including the amount of data used) to generate Figure 17.

Verified: YES

Professional Team Comments:

Discussed with Shawna Ackerman her confirmation that no changes were made in the model relative to contents losses from the previous submission.

A-9 Additional Living Expense (ALE)

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

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

C. The relationship between the modeled structure and ALE loss costs shall be reasonable, based on the relationship between historical structure and ALE losses.

D. ALE loss costs produced by the model shall appropriately consider ALE claims arising from damage to the infrastructure.

Audit

1. The actuary for the modeler may be asked to attest to the actuarial soundness of the procedure for calculating loss costs for ALE coverage. Documentation and justification of the following will be reviewed:
   a. The method of derivation and data on which the ALE vulnerability function is based;
   b. Validation data specifically applicable to ALE;
   c. Assumptions regarding the coding of ALE losses by insurers;
   d. The effects of demand surge on ALE for Hurricane Andrew;
   e. Assumptions regarding the variability of ALE by size of property;
   f. Statewide application of ALE assumptions;
   g. Assumptions regarding ALE for mobile homes, tenants, and condo unit owners exposure;
   h. The methods used to incorporate the estimated time required to repair or replace the property;
   i. The methodology and available validation for determining the extent of infrastructure damage and its effect on ALE costs.

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

3. Justify the differences in the relationship of structure and ALE loss costs from those previously found acceptable.

Verified: YES

Professional Team Comments:

Discussed with Shawna Ackerman her confirmation that no changes were made in the model relative to ALE losses from the previous submission.

A-10 Output Ranges

A. Output ranges shall be logical and any deviations supported.

B. All other factors held constant, output ranges produced by the model shall reflect lower loss costs for:

1. masonry construction versus frame construction,

2. residential risk exposure versus mobile home risk exposure,

3. in general, inland counties versus coastal counties, and

4. in general, northern counties versus southern counties.

Audit

1. Forms A-6, A-7, and A-8 will be reviewed.

2. The modeler will be required to justify the following:
   a. Changes from the prior submission of greater than five percent in weighted average loss costs for any county.
   b. Changes from the prior submission of five percent or less in weighted average loss costs for any county.

3. Output ranges will be reviewed to ensure appropriate differentials among deductibles, coverage, and construction types.

4. Anomalies in the output range data will be reviewed and shall be justified.

Pre-Visit Letter

19. A-10, Disclosure 2, page 111 – Explain in detail the response provided. Describe the process changes as well as the reasons for the changes and the results of the changes in detail.

20. A-10, Disclosures 3 & 4, page 111 – Justify the responses in relation to the information provided on Forms A-7 and A-8. Describe the effect of each of the items listed as affecting the changes in output loss costs. Explain why the inclusion of demand surge in this current submission is not listed as an underlying cause of change.

21. [This question is under Standard A-6]

22. Form A-7, page 174 – Review the process and provide examples of data and methods used to complete this Form.

Verified: YES

Professional Team Comments:

Responses to A-10.2, A-10.3, and A-10.4, page 111, and Forms A-6, A-7, and A-8 corrected to reflect reversion to the prior year submission for number of stochastic storm simulation results land use land cover data.

Discussed with Shawna Ackerman her review of the output ranges and the differences from the previous submission.

Reviewed the percentage changes in the revised Form A-7 as a result of updating the storm set to include the 2005 storms and demand surge. Reviewed the small increase in Masonry Owners for inland counties and the large increase for Frame Renters for the South region.

STATISTICAL STANDARDS – Mark Johnson, Leader

S-1 Modeled Results and Goodness-of-Fit

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

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

Audit

1. Forms S-1 and S-2 will be reviewed.

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

Pre-Visit Letter

23. S-1, Disclosure 6, page 182 – Comment on Figure 24(b) as the x-axis changed so a point with T > 40 is now gone.

25. Form S-2, page 194 – Discuss increase in Estimated Loss for the Return Times of 1,000 to 10,000 from previous submission.

Verified: YES

Professional Team Comments:

Response to S-1.5, page 180, revised to correct Figure 23, uncertainty analysis for frequency (incorporating demand surge while reverting to previous land use land cover data).

Form S-2, page 194, revised to reflect reversion to the prior year submission for number of stochastic storm simulation results.

Reviewed consistency of recent claims data with vulnerability functions in the model.

Discussed the goodness-of-fit provided in Figure 24(b) using numerical goodness-of-fit statistics versus a graphical assessment.

S-2 Sensitivity Analysis for Model Output

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

Audit

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

2. Form S-5 will be reviewed for models submitted by modeling organizations which have not previously provided the Commission with this analysis.

Verified: YES

Professional Team Comments:

Response to S-2.1, page 184, revised to correct Figure 26, sensitivity analysis for number of events (incorporating demand surge while reverting to previous land use land cover data).

Reviewed sensitivity tests performed on the profile factor using various constants and a log normal distribution for the default value in the model and for a mean based on recent historical storms. Reviewed the exceedance curves from the sensitivity test results. Reviewed scatter plots showing the relationship among two constant profiles and a variable profile factor. Examined the relationship between the estimated profile factor and landfall wind speed.

S-3 Uncertainty Analysis for Model Output

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

Audit

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

2. Form S-5 will be reviewed for models submitted by modeling organizations which have not previously provided the Commission with this analysis.

Verified: YES

Professional Team Comments:

Reviewed uncertainty study in the context of loss exceedance curves for the profile factor.

S-4 County Level Aggregation

At the county level of aggregation, the contribution to the error in loss cost estimates attributable to the sampling process shall be negligible.

Audit

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

Verified: YES

Professional Team Comments:

Response to S-4, page 189, revised to reflect reversion to the prior year number of stochastic storm simulation results.

S-5 Replication of Known Hurricane Losses

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

Audit

1. The following information for each insurer and hurricane will be reviewed:
   a. The validity of the model assessed by comparing expected losses produced by the model to actual observed losses incurred by insurers at both the state and county level,
   b. The version of the model used to calculate modeled losses for each hurricane provided,
   c. A general description of the data and its source,
   d. A disclosure of any material mismatch of exposure and loss data problems, or other material consideration,
   e. The date of the exposures used for modeling and the date of the hurricane,
   f. An explanation of differences in the actual and modeled hurricane parameters,
   g. A listing of the departures, if any, in the wind field applied to a particular hurricane for the purpose of validation and the wind field used in the model under consideration,
   h. The type of property used in each hurricane to address:
      i. Personal versus commercial
      ii. Residential structures
      iii. Mobile homes
      iv. Condominiums
      v. Structures only
      vi. Contents only,
   i. The inclusion of demand surge, storm surge, loss adjustment expenses, or law and ordinance coverage in the actual losses, or the modeled losses.

2. The following documentation will be reviewed:
   a. Publicly available documentation referenced in the submission,
   b. The data sources excluded from validation and the reasons for excluding the data from review by the Commission (if any),
   c. An analysis that identifies and explains anomalies observed in the validation data,
   d. User input sheets for each insurer and hurricane detailing specific assumptions made with regard to exposed property.

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

4. Form S-3 will be reviewed.

5. The results of one hurricane event for more than one insurance company and the results from one insurance company for more than one hurricane event will be reviewed to the extent data are available.

Verified: YES

Professional Team Comments:

Form S-3 as originally submitted did not include demand surge as part of the modeled results. Reviewed a corrected Form S-3 with demand surge included. A corrected Form S-3 will be provided in the revised submission.

Reviewed other comparisons for more recent storms affecting Florida.

S-6 Comparison of Projected Hurricane Loss Costs

The difference, due to uncertainty, between historical and modeled annual average statewide loss costs shall be reasonable, given the body of data, by established statistical expectations and norms.

Audit

1. Form S-4 will be reviewed.

2. Justify the following:
   a. Meteorological parameters,
   b. The effect of by-passing storms,
   c. The effect of actual hurricanes that had 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, and
   e. Exposure assumptions.

Pre-Visit Letter

24. S-6, Disclosure 1, page 192 – Discuss number of storms used in the modeling.

25. [This question is under Standard S-1]

Verified: YES

Professional Team Comments:

Reviewed results provided in Form A-3 with those provided in Form S-4. Corrected Form S-4 provided to reflect Professional Team calculation.

Discussed reversion back to the prior year number of stochastic storm simulation results.

COMPUTER STANDARDS – Paul Fishwick, Leader

C-1 Documentation

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

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

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

Audit

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

2. All documentation shall be easily accessible from a central location.

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

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

5. Provide verification that documentation is created separately from the source code.

Pre-Visit Letter

26. Provide material cited as available for review by the Professional Team under C-1 (page 203), C-2 (page 204), C-3 (page 205), C-4 (page 206), C-6 (page 210), and C-7 (page 211).

27. C-1, page 203 – Provide documentation on all code and data relating to G-1, Disclosure 5.

Verified: YES

Professional Team Comments:

Reviewed the primary document binder and the master list of reference documents dated December 1997 – May 2007.

C-2 Requirements

The modeler shall maintain a complete set of requirements for each software component as well as for each database or data file accessed by a component.

Audit

1. Provide confirmation that a complete set of requirements for each software component, as well as for each database or data file accessed by a component, has been maintained and documented.

Pre-Visit Letter

26. Provide material cited as available for review by the Professional Team under C-2 (page 204)

28. C-2, page 204 – Provide documentation on the new requirements indicated by G-1, Disclosure 5.

Verified: YES

Professional Team Comments:

Reviewed requirements documentation associated with software and data management changes, including the update to the storm frequencies in the stochastic storm set.

C-3 Model Architecture and Component Design

The modeler shall maintain and document (1) detailed control and data flow diagrams and interface specifications for each software component, and (2) schema definitions for each database and data file. Documentation shall be to the level of components that make significant contributions to the model output.

Audit

1. The following will be reviewed:
   a. Detailed control and data flow diagrams, completely and sufficiently labeled for each component,
   b. Interface specifications for all components in the model,
   c. Documentation for schemas for all data files, along with field type definitions,
   d. Each network diagram including components, sub-component diagrams, arcs, and labels.

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

Pre-Visit Letter

26. Provide material cited as available for review by the Professional Team under C-3 (page 205)

29. C-3, page 205 – Describe how the items in G-1, Disclosure 5 are reflected in changes to the model architecture and component design.

Verified: YES

Professional Team Comments:

Reviewed the product release flowchart for USWIND 5.11® / WORLDCATenterprise™ 3.9 illustrating model control flow.

Verified that the model architecture and component design flow diagrams and schema definitions have not been changed from the prior year.

C-4 Implementation

A. The modeler shall maintain a complete procedure of coding guidelines consistent with accepted software engineering practices.

B. The modeler shall maintain a complete procedure used in creating, deriving, or procuring and verifying databases or data files accessed by components.

C. All components shall be traceable, through explicit component identification in the flow diagrams, down to the code level.

D. The modeler shall maintain a table of all software components affecting loss costs, with the following table columns: (1) Component name, (2) Number of lines of code, minus blank and comment lines; and (3) Number of explanatory comment lines.

E. Each component shall be sufficiently and consistently commented so that a software engineer unfamiliar with the code shall be able to comprehend the component logic at a reasonable level of abstraction.

Audit

1. The interfaces and the coupling assumptions will be reviewed.

2. Provide the documented coding guidelines and confirm that these guidelines are uniformly implemented.

3. The procedure used in creating, deriving, or procuring and verifying databases or data files accessed by components will be reviewed.

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

5. The following information shall be available and will be reviewed for each component, either in a header comment block, source control database, or the documentation: component name, date created, dates modified and by whom, purpose or function of the component, and input and output parameter definitions.

6. The table of all software components as specified in C-4.D will be reviewed.

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

8. Comments within components will be examined for sufficiency, consistency, and explanatory quality.

Pre-Visit Letter

26. Provide material cited as available for review by the Professional Team under C-4 (page 206)

30. C-4, pages 206-207 – Show the modified code implementation resulting from the changes in G-1, Disclosure 5.

Verified: YES

Professional Team Comments:

Reviewed a Visual Basic macro used for computing, through interpolation, the cat inflation factor associated with estimating demand surge.

Reviewed the code for damage curve calculation.

Reviewed the code for computing site specific winds for geographic exposure areas.

Verified the relation between the presented method for computing demand surge and its implementation.

Verified the modeler's on-site addition of a comment header block in the demand surge function code.

Reviewed the code in Mathcad for smoothing the frequency of occurrence by landfall mileposts relating to the storm set.

Reviewed the software metrics table.

Reviewed the updated storm parameter data files and associated Mathcad code for reading the files.

C-5 Verification

A. General

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

B. Component Testing

1. The modeler shall use testing software to assist in documenting and analyzing all components.

2. Unit tests shall be performed and documented for each component.

3. Regression tests shall be performed and documented on incremental builds.

4. Aggregation tests shall be performed and documented to ensure the correctness of all model components. Sufficient testing shall be performed to ensure that all components have been executed at least once.

C. Data Testing

1. The modeler shall use testing software to assist in documenting and analyzing all databases and data files accessed by components.

2. The modeler shall perform and document integrity, consistency, and correctness checks on all databases and data files accessed by the components.

Audit

1. The components will be reviewed for containment of sufficient logical assertions, exception-handling mechanisms, and flag-triggered output statements to test the correct values for key variables that might be subject to modification.

2. The testing software used by the modeler will be reviewed.

3. The component (unit, regression, aggregation) and data test processes and documentation will be reviewed.

Pre-Visit Letter

31. C-5, pages 208-209 – Describe the code and data testing and verification procedures resulting from the changes in G-1, Disclosure 5.

Verified: YES

Professional Team Comments:

Discussed errors with the accuracy associated with a tested land use land cover database. These errors were surfaced by the modeler performing tests by comparing hand calculations to the modeled output.

Reviewed the EQECAT Automated Build Process.

Reviewed ABS Quality Assurance Procedures documentation for:

- Work Instructions for Technology Development
- EQECAT Product Development Process
- Work Instructions for the Software Build Process
- Work Instructions for Product Verification
- Product Verification Process

C-6 Model Maintenance and Revision

A. The modeler shall maintain a clearly written policy for model revision, including verification and validation of revised components, databases, and data files.

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

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

Audit

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

2. The policy for model revision will be reviewed.

3. The tracking software will be reviewed.

Pre-Visit Letter

26. Provide material cited as available for review by the Professional Team under C-6 (page 210)

32. C-6, page 210 – Describe how the changes in G-1, Disclosure 5 are reflected by the requirements for this Standard.

Verified: YES

Professional Team Comments:

Reviewed the policy for model revision and for incremental builds.

C-7 Security

The modeler shall have implemented and fully documented security procedures for: (1) secure access to individual computers where the software components or data can be created or modified, (2) secure operation of the model by clients, if relevant, to ensure that the correct software operation cannot be compromised, (3) anti-virus software installation for all machines where all components and data are being accessed, and (4) secure access to documentation, software, and data in the event of a catastrophe.

Audit

1. The written policy for all procedures and methods used to ensure the security of code, data, and documentation will be reviewed. Specify all security procedures.

2. Documented security procedures for access, client model use, anti-virus software installation, and off-site procedures in the event of a catastrophe will be reviewed.

Pre-Visit Letter

26. Provide material cited as available for review by the Professional Team under C-7 (page 211)

Verified: YES

Professional Team Comments:

Reviewed the policy for procedures and methods used to ensure the security of code, data, and documentation.