South Carolina Department of Insurance

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Director of Insurance

BULLETIN 2005-01

TO: All Licensed Insurers Offering Property and Casualty Insurance in South Carolina and Licensed Rating Organizations for Property Insurance

FROM: Eleanor Kitzman
Director

DATE: May 26, 2005

RE: Models for Hurricane and Other Wind Exposure in South Carolina

This Bulletin provides guidance on supplemental rate filing requirements for catastrophic modeling for property and casualty insurance coverages in South Carolina. Earthquake catastrophes will be addressed in another bulletin at a later date.

The South Carolina Department of Insurance (Department) will be reviewing the appropriateness of catastrophe models for hurricane and other wind exposure in South Carolina. As such, rate filings submitted to the Department will not be deemed complete or filed unless the specific model used has been reviewed by the Department. An insurer's rate filing must identify the model and specific version that is used in the filing. The insurer must also provide a copy of the modeler's output form depicting information provided by the insurer in the running of the model. The filing insurer must provide an output form depicting any adjustments or modifications made by the insurer to the model output loss costs. The modeler must demonstrate that it uses South Carolina data sets.

Insurers and model developers are strongly encouraged to file models with the Department in advance of their use in rate filings. The Department is prepared to review model-only filings separately to determine the appropriateness of individual models for use in supporting South Carolina property insurance rates. After a model and version have been accepted as appropriate by the Department, insurers may reference an accepted model and version and provide appropriate supporting documentation in property rate filings.

Model-only filings may be made by a model developer or by an insurer. Regardless of the filing party, the model-only filing should include the following items submitted in a manner that can be reviewed by Department staff and their consultants (visual resolution, chart labeling, definitions, etc). Modelers are requested to comply with the Florida

Commission on Hurricane Loss Projection Methodology's visual presentation of data requirements whenever applicable in responding to these issues.

1. Provide the names of the modeler's technical staff and consultants along with their educational background, experience with hurricane modeling for ratemaking, and professional affiliations along with a description of their role in the development or revisions of the model.
2. Is the model the same as that which has been accepted by the Florida Commission on Hurricane Loss Projection Methodology (FCHLPM)? If not, please describe the differences between the South Carolina model and that which has been accepted by the FCHLPM.
3. Describe how the model defines "hurricane"
4. Identify input items specific to an insurer's application of the model in setting property insurance rates. Specify pre-determined default values and describe how the model treats any missing values.
5. Provide a copy of output forms describing model output loss costs and any adjustments or modifications.
6. Provide an overview of how the model works. For example, if coastlines are divided into segments, describe segment widths. Describe level of geographic detail of model calculations (i.e., latitude/longitude, zip code or finer)
7. Provide detailed description of the historical storms used in developing the stochastic storms used to run the model. Specifically provide details of the impact of each of the following criteria on the creation of the stochastic storm set:
    a. Hurricanes and/or tropical storms (describe wind speeds in historical storms used by the model.)
    b. Historical time period of data available and used in creation of the model used in South Carolina
    c. Atlantic hurricane historical information available (i.e., central pressure, wind speed, forward velocity, eye diameter, radius of maximum winds and radius of hurricane force winds) and how the Atlantic hurricane information is incorporated in the model.
    d. What quality control reviews have been applied to the historical information?
    e. Describe wind speed criteria used in the model (i.e., one-minute sustained vs. peak gusts, etc.)
    f. Criteria used by the model whenever specific historical information is not available (i.e., wind speed derived from central pressure; calculation of Rmax; one-minute sustained vs. peak gust wind speeds)
    g. Effects of land friction/surface roughness on hurricane strength
    h. Effects of hurricane weakening/filling rates
    i. Effects of geography and topography on modeled storm characteristics

j. Effects of atmospheric conditions on hurricane tracks, intensity, etc.
k. Effects of bypassing storms on the historical inputs and the model output

8. Provide details (both written and graphic) of the process used to develop the expected paths for storms that impact South Carolina. Provide maps at two-and-a-half degree latitude and longitude grid resolution, showing the storm frequencies generated by the model for the area defined by 65 W and 85 W Longitude AND 23 N and 35 N Latitude.
9. Provide the 100 and 500- year recurrence interval 3-second gust wind speeds for the following airport locations:
   a. Myrtle Beach
   b. Charleston
   c. Hilton Head
10. Provide details (both written and graphic) of the process used to develop the expected landfall frequencies of storms by hurricane strength for each area of South Carolina.
11. What is the minimum central pressure for all hurricanes in the stochastic storm set used for South Carolina? What is the source for verification of the minimum central pressure? What is the maximum wind speed associated with this hurricane in the model?
12. Describe the process used in the model to account for the effects of extra-tropical transition, and how those effects produce differences in hurricane characteristics form those produced by the model in Florida?
13. Provide detailed description of the process used to determine the vulnerability functions used in the model, and how the vulnerability functions are consistent with South Carolina's building stock.
   a. Describe the basis of vulnerability function development relative to South Carolina construction characteristics.
   b. Describe the studies and methods used in the development of the building stock.
   c. Describe the studies and methods used in the validation and verification of the building stock.
   d. Describe the studies and methods used in the development of the vulnerability functions.
   e. Describe the studies and methods used in the validation and verification of the vulnerability functions.
   f. Describe the studies and methods used to determine that the construction characteristics within the model appropriately reflect South Carolina construction characteristics.
14. Does the model produce credits for various forms of hazard mitigation? If so, provide the specific loss cost adjustments produced in the model for hazard mitigation, including but not limited to the following:
   a. Mitigation category (i.e., opening protection, roof sheathing strengthening, roof to wall tie downs, complete load path, etc.)

b. Range of loss cost reductions produced from an unmitigated building
c. Basis of hazard mitigation loss cost adjustment derivations (i.e., site inspections, engineering evaluation report, test, etc.)
d. Justification for any variations in the loss cost changes (i.e., by island, etc.)

15. Provide details as to the process used in the model to provide for differences in the building stock among the geographic regions of South Carolina.
16. Provide data used to compare model outputs with historical data. Provide results of any such comparisons performed.
17. Provide the total aggregate zero deductible personal residential (homeowners plus dwelling policies) losses produced by your model for Hurricanes Bertha, Fran and Hugo.
18. Provide comparisons (in as much detail as model and data will allow) of Hurricanes Bertha, Fran and Hugo actual losses with model output losses for Hurricanes Bertha Fran and Hugo.
19. Provide details as to how the model develops loss costs specifically for the each of the following:
    a. buildings
    b. contents
    c. appurtenant structures
    d. additional living expense
20. Provide details as to how the model incorporates each of the following criteria
    a. deductibles
    b. coinsurance
    c. policy provisions (i.e., homeowners, dwelling policies)
    d. policy limits
    e. building codes
    f. building code enforcement
    g. quality of construction
    h. Post-storm surge in demand for rebuilding resources.
21. Describe any tests performed to validate the following criteria, especially as the model relates to South Carolina:
    a. wind speeds, directions, strengths (Meteorology)
    b. damage estimates (Vulnerability)
    c. loss costs produced by the model (Actuarial)
22. Provide the date of publication and the date of analysis of the land use/land cover data used in the model for South Carolina.
23. Provide additional or supplemental data upon request of the Department.

Hurricane models will be given confidential treatment. Models are considered trade secrets and proprietary information and are not subject to disclosure under the South Carolina Freedom of Information Act. *See* S.C. Code Ann. § 38-4-40 (2002). Proprietary

information must be conspicuously stamped "PROPRIETARY AND CONFIDENTIAL" on each page. Questions or concerns regarding this Bulletin should be submitted in writing and addressed to Mike Cronin.

CAT MODELERS

AIR Worldwide Corporation
Applied Research Associates, Inc.
EQECAT
Risk Management Solutions, Inc.