



AMERICAN ACADEMY *of* ACTUARIES

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Testimony before the Property and Casualty Insurance (C) Committee, the Catastrophe Insurance (C) Working Group, and the Terrorism Insurance Implementation (C) Working Group of the National Association of Insurance Commissioners

Public Hearing Regarding Use of Catastrophe Modeling by Rating Agencies

December 1, 2007

Thank you for providing me with the opportunity to speak to you today; it is a pleasure to appear before you. My name is Martin M. Simons. I am an Associate of the Casualty Actuarial Society, a Fellow of the Conference of Consulting Actuaries, and a member of the American Academy of Actuaries.

The Academy has been at the forefront of the public dialogue on the interplay between extreme events and actuarial practice. The Extreme Events Committee includes several subcommittees devoted to flood insurance, natural catastrophes, and terrorism risk. The subcommittees recently submitted comments to Congress regarding H.R. 3121, a bill to modify the National Flood Insurance Program and H.R. 2761, the Terrorism Risk Insurance Revision and Extension Act of 2007. Additionally, our RBC Committee provided guidance to the NAIC's P/C RBC Working Group regarding the catastrophic risk charges included in capital requirements in other countries and as calculated by rating agencies and recommended a procedure to extract the catastrophe loss and premium out of the current RBC calculation.

I served as the Chief Casualty Actuary for the South Carolina Department of Insurance from 1985 to 1997, and, in that role, I was very actively involved as a chairman or member of several NAIC Task Forces, Working Groups, and Committees. I am currently co-chair of the Natural Catastrophe Subcommittee of the Academy's Extreme Events Committee, and, in that capacity, I will provide testimony today regarding the use of catastrophic models by insurance rating organizations in their determinations of the financial ratings of property and casualty insurers in the United States.

For the past eleven years, I have served as the lead actuary on the Professional Team of the Florida Commission on Hurricane Loss Projection Methodology. Before a catastrophe model may be used to support a property insurance rate filing in the State of Florida, that model must be determined to be acceptable by the Florida Commission. The Florida Commission reviews hurricane models using a set of standards, including separate standards relating to the meteorological, engineering, and actuarial aspects of hurricane modeling. The Professional Team on which I serve has access to all aspects of the models, including the proprietary and public portions of each model. The Professional Team presents its findings to the Commission each year following on-site

audits at each modeler's location, and the Commission votes on each standard when those presentations are made. If the Commission does not vote favorably on any single standard or part of any standard, then the model fails the Commission's review process and is deemed unacceptable for use in property insurance rate filings in Florida.

I served on the Technical Advisory Committee throughout the life of the Hawaii Hurricane Relief Fund, and currently serve on the Hawaii Insurance Division's Hurricane Model Review Committee. Hawaii bases its review of hurricane models on the Florida Commission's review, combined with a series of additional criteria designed to account for those characteristics that affect hurricane insurance claims in Hawaii but are different from the criteria applicable in the Florida review process.

The use of catastrophe models by rating organizations is affected by many recent developments in catastrophe modeling and ultimately influences all aspects of the hurricane property insurance market. The modeling process is a dynamic one; the fields of meteorological science and engineering are advancing, and more information becomes available following each catastrophic event. Additionally, and importantly, improvements are continuously being made in the methods of accounting for mitigation against losses from those catastrophic events. Because the insured market for earthquake catastrophes is smaller, the changes in the rating organizations' use of catastrophe models may not have a significant impact on this market, which will be discussed later.

2007 was a very busy year for the Florida Commission on Hurricane Loss Projection Methodology, as the Commission was presented with five models for its review. The Professional Team on which I serve is tasked with auditing each model to verify that each model met each of the Commission's standards for the model version under review.

1. AIR (Applied Insurance Research) Worldwide presented a model that was only minimally revised from one that had been determined to be acceptable by the Commission the previous year. The Commission subsequently voted favorably on the AIR submission.
2. Applied Research Associates (ARA) submitted a model with several new meteorological criteria. The Professional Team was unable to verify each standard on its initial on-site audit. ARA revised portions of its new meteorological process, and the Professional Team verified each standard for ARA on its second audit.
3. EQE: The Professional Team was also unable to initially verify all of the Standards for EQECAT on its first visit. EQECAT addressed each of the Commission's concerns, and it was able to verify the EQECAT standards on its second audit visit. The Commission determined that the EQECAT model was acceptable following its second audit.
4. RMS (Risk Management Solutions) submitted its medium-term model to the Commission for the first time in 2007. The Professional Team was unable to verify all of the RMS standards on its first audit. RMS withdrew its medium-term model following its initial audit visit and submitted its long-term model (which had been determined to be acceptable in 2006).

The Professional Team verified all of the standards for the RMS long-term model, and the Commission voted to accept the long-term model following its second audit visit.

5. The Florida Public Model was submitted to the Florida Commission for the first time in 2007. On the Commission's first visit, the Professional Team was unable to verify all of the Public Model Standards, and the Florida Public Model presented a substantially revised version of its model for the second audit visit. Once again, the Professional Team was unable to verify all of the standards, and the Commission voted favorably to allow the Public Model a third visit by the Professional Team. The Professional Team was able to verify the standards on its third audit visit, and the Commission found the Public Model to be acceptable.

This history of the activities of the Florida Commission provides a review of the current issues affecting the use of hurricane models as well as information on the state of the art and the regulatory review of hurricane models. All Commission activity is public, and there is a wealth of information available on the Commission's web site:

(<http://www.sbafla.com/methodology/index.asp>)

Of course, individual regulators determine whether specific hurricane models are appropriate for use in their respective jurisdictions. Despite the extraordinary complexity of today's hurricane models, the 157 years of historical hurricane experience provides a very short time period for projecting hurricane frequencies and strengths without substantial statistical estimation processes. Because of this, models produce results that are often dissimilar from each other despite the use of appropriate scientific and statistical methods.

The model differences are substantially magnified as meteorologists analyze historical hurricane data using two different approaches: a long-term approach that bases its model results on long-term historical data, and a short- or medium-term approach that bases its results on shorter-term cycle patterns that modelers believe indicate higher near-term future frequencies and strengths of hurricanes.

Despite the hurricane exposures, coastal populations are increasing (in some cases, fairly dramatically), resulting in greater potential hurricane losses in all hurricane-prone jurisdictions. Insurers and reinsurers are facing increasing potentials for extreme catastrophic losses resulting from hurricane property damage in exposed coastal areas.

The hurricane activity during 2004 and 2005 was viewed as a wake-up call by some in the industry. These were very active years, and the increased two-year frequency, combined with increased coastal exposures, brought diverse methods of dealing with what the 2004 and 2005 hurricane seasons portended for the future. Although the medium- or short-term hurricane models have not yet been determined to be acceptable for producing loss costs in Florida and other jurisdictions, these models are widely used

by reinsurers and rating agencies in their analyses and determination of the exposures they are attempting to quantify.

While my experience has been with hurricane modeling, there are similar issues with earthquake modeling, in which models are revised frequently to account for new science.

In 2004 and 2005, I served on the Actuarial Assumptions and Financial Alternatives Working Groups of the California Earthquake Authority (CEA). In that capacity, I was part of a working group that met with investment bankers and representatives of Moody's and Standard and Poor's in Manhattan. I found the rating agencies to be open to working with our group in developing recommended ways to replace a portion of the CEA's assumed reinsurance with catastrophe bonds. The rating agencies had performed their own audits and analyses of earthquake models, and they explained that their decisions would be based substantially on the output loss cost projections of those models.

Some effects of this historical perspective on the use of catastrophe models by rating organizations are as follows:

- Rating agencies continue to tighten their catastrophic capacity and risk management requirements based on the outputs of catastrophic models. Following the hurricane activity of 2003 – 2005, the rating agencies increased their stress test scenarios to consider multiple events. This change, without any other change in catastrophe models, increased the capital charge used by rating agencies. Of course, additional changes in the models put additional upward pressure on the results.
- Consequently, insurers have had to restrict capacity in exposed areas or face a possible diminution of their financial ratings.
- Insurers have increased prices and limited hurricane exposures in coastal areas and will likely continue to do so.
- Even though there has been little damaging earthquake activity since 1994, prices for earthquake coverage have also increased. The changes to the rating agency capital models can also affect earthquake insurers. Additionally, the 2004 and 2005 hurricane activity drove up all catastrophe reinsurance prices. Rating agency reaction to the hurricane losses also carried over to earthquake coverage, since the agencies are very sensitive to any natural catastrophe exposure that can cause companies to weaken financially.
- The effects since the 2004 and 2005 hurricane seasons have carried over to earthquake insurance, since insurers and rating agencies are sensitive to natural catastrophic loss potentials (as well as the potential for catastrophic losses following a terrorism event).
- Reinsurance providers are reducing their exposures to reduce the threat of substantial capacity reductions following a major event.
- The impact of rating organizations' and reinsurers' actions on the coastal property insurance market is increasing year by year.
- Rating agencies are sensitive to all potential future events that may cause the financial solvency of front-line insurers to weaken.

- Also, the increasing emphasis on Enterprise Risk Management (ERM) by the rating agencies has worked in concert with catastrophe modeling to raise the standards

Thank you for your attention. I would be happy to respond to any questions you may have.