September 28, 2007

Good afternoon,

My name is David Lalonde. I am Senior Vice President of AIR Worldwide Corporation, a catastrophe modeling company headquartered in Boston. AIR is pleased to have this opportunity to come before the NAIC and present our views on the topics of regulation and near-term hurricane models.

In my discussion today, I will first present a brief history of the evolution of catastrophe

Models are based upon detailed data gathered from historical catastrophic events. Where historical data is either limited or not available, the models use science to fill in the gaps. This allows for analyses that consider a wide range of possible forward-looking scenarios, thus leading to more stability in the estimated expected annual losses.

Model output is one of several sources of information that companies use for managing their distribution of exposure, analyzing the effects of policy conditions, developing appropriate insurance rates and underwriting guidelines, and making decisions regarding the transfer of risk. The same unbiased model output is used by all interested parties when negotiating the assumption and transfer of risk.

The hurricane losses incurred in 2004 and 2005 are recent reminders that the risk of loss from catastrophic events is real. At the same time, the loss estimates produced by the models continue to increase due to the ever increasing ng reinsurance companies use catastrophe models as one of the tools to help assess hurricane risk, it is not surprising that public focus has turned to understanding what catastrophe models are, how they work and how model output is used by companies to assess risk.

AIR is not an advisory organization, yet our work is already subject to extensive state regulation in the context of rate and loss cost filings by our clients. AIR does not have member companies and does not make filings, but, just like any actuarial consulting firm, we are called upon to explain our work to insurance regulators. Independent state bodies such as the Florida Commission on Hurricane Loss Projection Methodology as well as state insurance departments have had complete access to all aspects of our models. We understand the desire for regulatory scrutiny of models that are being used for important and wide-reaching financial decisions, and in fact AIR has already committed significant resources to meeting model review standards in a number of states.

The models also have been reviewed thoroughly in the commercial marketplace. AIR models are based on years of scientific research and data analysis. Since AIR's inception, its models have undergone a comprehensive process of refinement, enhancement, validation, and review. In addition to our continuous cycle of internal peer review, model components (including components of our near-term hurricane model) have been subject to independent scientific peer review, and scrutinized by rating agencies, state insurance departments, and our clients.

The models have been reviewed in-depth by rating agencies, including Standard & Poor's, Moody's, Fitch and AM Best. The rating agencies have exposed the models to extensive levels of sensitivity and stress testing. As part of their review process, some agencies have engaged external consultants to scrutinize the underlying data and assumptions employed within the model. AIR models have been used in numerous catastrophe bond transactions, and investors have relied on the research and due diligence performed by the rating agencies to make their investment decisions. Significant sums of money have been invested based upon loss estimates from catastrophe models. AIR continues to provide documentation and education to the rating agencies to keep them informed of updates to the models.

AIR has provided volumes of information about its models to state insurance departments, and has answered all questions about model components that have arisen. We have opened the model to state agencies for detailed review, both visiting state offices to discuss the model and inviting the agencies to view model information at our headquarters. We have responded to formal requests for model information in many states, including Florida, South Carolina, Louisiana, Texas and Hawaii.

Insurance rates, in part, based on AIR models have been filed and approved in many states. The AIR hurricane model was certified under the original 1996 standards of the Florida Commission on Hurricane Loss Projection Methodology and has been certified by the commission in all subsequent years. The Commission was established with the mission to "assess the effectiveness of various methodologies that 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."

AIR clients are sophisticated business professionals who do not use the models blindly. We provide our clients with technical documentation, and offer continuing model education through structured training, conferences, seminars and white papers. In addition, we frequently speak publicly about our models.

From 2001 through 2006, a public funded hurricane model was developed for the state of Florida. The public model, developed at Florida International University, was intended to act as a fully transparent check and balance to commercial hurricane models. Proving that the commercial models are not biased in favor of insurance companies, the public model and commercial models have derived essentially the same range of estimated hurricane losses for Florida.

In our view, additional regulation of catastrophe models is not necessary given the extensive review already being performed by state insurance departments and, given the commercial nature of our business, by independent scientists, rating agencies and our clients. However, if regulators decide that catastrophe models should be subject to additional regulation, we wish to stress the need for efficiency and standardization in regulatory review, to prevent modelers from facing separate requirements and filings in multiple states.

For example, in the past the NAIC has developed interrogatories, one to be completed by the modeler and a complementary one to be completed by companies using computer models as part of their rate filings. AIR has participated in the completion of these interrogatories for our clients, and we would be willing to work with the NAIC to review and update that approach in a way that makes the model review process effective. Regulations must be set in such a way as to be meaningful to state insurance departments and to supply information in a way that does not hinder scientific and technological progress.

Finally this afternoon, I would like to address the issue of near-term hurricane risk, which has been discussed at great length during the past few years.

Catastrophe models develop probability distributions of long-run potential losses; they are not forecasting tools. Forecasting hurricane activity on a short term time horizon, such as five years ahead, is very difficult because of the many climatological factors that influence hurricane activity in the North Atlantic.

For example, the energy source of the hurricane "engine" is heat and moisture from the ocean's surface. The warmer the ocean, the more heat energy is available to tropical storms. Scientists have observed that sea surface temperatures (SSTs) in the North Atlantic undergo fluctuations above and below their long run average in phases that can last multiple decades. Some scientists refer to these fluctuations, collectively, as the Atlantic Multi-Decadal Oscillation, or AMO.

As yet, there is no clear scientific consensus on why these fluctuations occur or how long they are likely to persist. Some scientists believe that any appearance of cyclical activity is coincidental, and that one of the drivers of fluctuations in SSTs is randomly occurring volcanic activity, which releases aerosol sulfates into the atmosphere that block sunlight.

Other climate signals that have an impact on hurricane activity include:

- El Niño Southern Oscillation (ENSO), which measures sea surface temperature anomalies in the Pacific Ocean off the coast of Peru. These SSTs alternate over an approximate three- to eight-year cycle with an opposite cold phase known as "La Niña." The presence of El Niño has a mitigating effect on the frequency of hurricane activity in the Atlantic and the opposite effect in the central Pacific.
- North American Oscillation (NAO), a pressure pattern between the high pressure system near the Azores and the low pressure system near Iceland. Scientists have observed that the large-scale general circulation associated with the NAO steers North Atlantic tropical cyclones in a characteristic pattern to the west and eventually to the north. When it is in a more southwesterly position, hurricanes are more likely to make landfall in the U.S. than when it is further north and east, off the northern African coast. The strength and location of the NAO, or "Bermuda High," can change several times during a single hurricane season.
- Quasi-Biennial Oscillation (QBO), a signal tracking the direction of the equatorial winds in the stratosphere. One theory hypothesizes that when these winds blow from west to east, they have a positive impact on hurricane formation. The QBO has an approximate two-year cycle.

Of the four signals identified above, scientific research has focused on SSTs as the best predictor of hurricane risk.

Whatever the cause of the temperature fluctuations, there does seem to be a weak but statistically significant correlation between elevated SSTs and hurricane activity in the

Atlantic. It is not unreasonable, therefore, for warmer SSTs to be considered when measuring one's potential risk.

Since 1995, SSTs in the North Atlantic have been in a warm phase characterized by elevated SSTs and above-normal hurricane activity. However, quantifying the time horizon and magnitude of this elevated risk and its impact on landfall frequency and insured losses is too uncertain to incorporate into AIR's standard hurricane model, which represents the long-term view of the probabilities of losses of different sizes. Therefore, AIR has performed sensitivity analyses to provide a measure of the uncertainty arising from the possible impact of SST anomalies on hurricane activity.

The statistical models developed by AIR, and peer reviewed by noted climate scientists, suggest only a weak correlation between SSTs and hurricane landfalls. Therefore, the relationship between elevated SSTs in the Atlantic and hurricane landfalls in the U.S. is characterized by significant uncertainty. Furthermore, the time horizon and magnitude of this elevated risk, and its impact on regional insured losses, is highly uncertain.

Since 2006, AIR has released a near-term catalog of stochastic storms—one that represents potentially increased hurricane risk. The near-term catalog is issued as a *supplement* to, rather than a replacement for, AIR's standard U.S. hurricane catalog, which is based on more than 100 years of historical data and over 20 years of research and development. By providing two credible estimates of hurricane risk, AIR is providing clients with more information. AIR continues to emphasize that near-term catalogs are associated with higher uncertainty than the standard catalog.

In closing, I wish to emphasize that AIR has been willing to open its modeling technology to review and to provide materials and documentation to help educate regulators about how the models work. AIR is not an advisory organization; our role is providing information and scientific interpretation to all parties. We do not believe that additional regulation is necessary because our models are already subject to extensive review by the states and they are self-regulated by the commercial nature of our business. However, if the NAIC decides to regulate the use of models, such review and regulation must be efficient and meaningful, so as not to hinder the modelers' ability to run their businesses or to refine their modeling technology as new scientific discoveries come to light.

Thank you.