October 4, 2019

Dear Reader,

Pursuant to Texas Insurance Code Section 2210.3511 the Texas Windstorm Insurance Association (TWIA or the Association) is making its rate adequacy analysis publicly available in advance of the meeting of the TWIA Board of Directors at which a rate filing may be considered. The material includes:

(a) All user selected hurricane model input assumptions
(b) Output data with the same content and in the same format that is customarily provided to (i) TWIA by hurricane modelers and (ii) the Texas Department of Insurance by TWIA.

This material is being provided in Excel and PDF file formats, providing a searchable electronic format that allows for efficient analysis. The material includes detailed information regarding (i) industry loss experience for the catastrophe area and (ii) average annual hurricane loss output by county from each of the catastrophe models for the Association's insurance portfolio based on data as of November 30, 2018. The assumptions, rate adequacy analysis and rate indication exhibits are unchanged from the version posted prior to the August 6th Board of Directors meeting.

The material included on the website includes the following:

1. Cover Letter
2. Hurricane model input assumptions
3. TWIA Residential Rate Adequacy Analysis, including a discussion of actuarial methodologies and conclusions
4. Residential Rate Indication Exhibits
5. Commercial Rate Adequacy Analysis, including a discussion of actuarial methodologies and conclusions.
6. Commercial Rate Indication Exhibits
7. Model Output: Average Annual Loss by County (Excel files)

In reviewing this information, please note that actuarial estimates are subject to uncertainty from various sources, including changes in claims reporting patterns, claim settlement patterns, judicial decisions, legislation, weather, and economic conditions. Any analysis of projected loss amounts involves estimates of future contingencies. While the analysis represents our best professional judgment, arrived at after careful analysis of the available information, it is important to note that a significant degree of variation from our analysis is not only possible, but is, in fact, probable. The sources of this variation are numerous.

Differences between our projections and actual amounts depend on the extent to which future experience conforms to the assumptions made for the rate making analysis. It is certain that the actual experience will not conform exactly to the assumptions used in this analysis. Actual amounts will differ from projected amounts to the extent that actual experience is better or worse than expected.

We hope that this information is helpful to our policyholders and other important constituencies. If you have any questions, please email: CommunicationsMail@twia.org Thank you.

Texas Windstorm Insurance Association

TEXAS WINDSTORM INSURANCE ASSOCIATION

TWIA Actuarial & Underwriting Committee

Rate Adequacy Analysis

October 17, 2019

Contents

Casualty Actuarial Society Statement of Principles*

Ratemaking is prospective because the property and casualty insurance rate must be developed prior to the transfer of risk.

Principle 1: A rate is an estimate of the expected value of future costs.

- Ratemaking should provide for all costs so that the insurance system is financially sound.

Principle 2: A rate provides for all costs associated with the transfer of risk.

- Ratemaking should provide for the costs of an individual risk transfer so that equity among insureds is maintained. When the experience of an individual risk does not provide a credible basis for estimating these costs, it is appropriate to consider the aggregate experience of similar risks. A rate estimated from such experience is an estimate of the costs of the risk transfer for each individual in the class.

Principle 3: A rate provides for the costs associated with an individual risk transfer.

- Ratemaking produces cost estimates that are actuarially sound if the estimation is based on Principles 1, 2, and 3. Such rates comply with four criteria commonly used by actuaries: reasonable, not excessive, not inadequate, and not unfairly discriminatory.

Principle 4: A rate is reasonable and not excessive, inadequate, or unfairly discriminatory if it is an actuarially sound estimate of the expected value of all future costs associated with an individual risk transfer.

*Adopted by the Board of Directors of the CAS May 1988

Statutory Language

Sec. 2210.001. PURPOSE. The primary purpose of the Texas Windstorm Insurance Association is the provision of an adequate market for windstorm and hail insurance in the seacoast territory of this state. The legislature finds that the provision of adequate windstorm and hail insurance is necessary to the economic welfare of this state, and without that insurance, the orderly growth and development of this state would be severely impeded. This chapter provides a method by which adequate windstorm and hail insurance may be obtained in certain designated portions of the seacoast territory of this state. The association is intended to serve as a residual insurer of last resort for windstorm and hail insurance in the seacoast territory. The association shall:

(1) function in such a manner as to not be a direct competitor in the private market; and

(2) provide windstorm and hail insurance coverage to those who are unable to obtain that coverage in the private market.

Statutory Language

Sec. 2210.355. GENERAL RATE REQUIREMENTS; RATE STANDARDS.

(a) Rates for coverage under this chapter must be made in accordance with this section.

(b) In adopting rates under this chapter, the following must be considered:

(1) the past and prospective loss experience within and outside this state of hazards for which insurance is made available through the plan of operation, if any;

(2) expenses of operation, including acquisition costs;

(3) a reasonable margin for profit and contingencies;

(4) payment of public security obligations issued under this chapter, including the additional amount of any debt service coverage determined by the association to be required for the issuance of marketable public securities; and

(5) all other relevant factors, within and outside this state.

(c) Rates must be reasonable, adequate, not unfairly discriminatory, and nonconfiscatory as to any class of insurer.

….

h) In adopting rates under this chapter, recognized catastrophe models may be considered.

Statutory Language

Sec. 2210.351. ASSOCIATION FILINGS.

(a) The association must file with the department each manual of classifications, rules, rates, including condition charges, and each rating plan, and each modification of those items that the association proposes to use.

(b) A filing under this section must indicate the character and the extent of the coverage contemplated and must be accompanied by the policy and endorsement forms proposed to be used. The forms may be designed specifically for use by the association without regard to other forms filed with, approved by, or prescribed by the department for use in this state.

(c) Except as provided by Subsection (d), as soon as reasonably possible after the filing has been made, the commissioner in writing shall approve or disapprove the filing. A filing is considered approved unless disapproved on or before the 30th day after the date of the filing. If the commissioner disapproves a filing, the commissioner shall state in writing the reasons for the disapproval and the criteria the association is required to meet to obtain approval.

Statutory Language

Sec. 2210.351. ASSOCIATION FILINGS. (Continued)

(d) The association may use a rate filed by the association without prior commissioner approval if:

(1) the **filing is made not later than the 30th day before the date of any use** or delivery for use of the rate;

(2) the **filed rate does not exceed 105 percent of the rate in effect** on the date on which the filing is made;

(3) the **filed rate does not reflect a rate change for an individual rating class that is 10 percent higher than the rate in effect** for that rating class on the date on which the filing is made; and

(4) the **commissioner has not disapproved the filing in writing, advising of the reasons for the disapproval and the criteria the association is required to meet to obtain approval.**

Overview of Rate Adequacy Analysis

- **The Association employs the "Loss Ratio Method" to determine rate level indications.**
  - This approach compares the estimated percentage of each premium dollar needed to cover future losses, loss adjustment expense and other fixed expenses for a prospective accident year to the amount of each premium dollar that is available to pay for such costs (referred to as the permissible loss ratio).
  - This relationship is defined as:

$$\textbf{Indicated Rate Change Factor} = \frac{\textbf{(Loss \& LAE Ratio + Fixed Expense Ratio)}}{\textbf{(1.0 – Variable Expense Ratio – Target UW Profit)}}$$

Overview of Rate Adequacy Analysis

- **The Loss and LAE Ratio includes a provision for:**
  - Hurricane losses
  - Non-Hurricane Losses

- **Fixed Expense Ratio includes:**
  - General operating expenses
  - The net cost of reinsurance (total premiums less expected average annual recoveries)
  - Debt service outstanding pre-event Class 1 Public securities
    - Note: Previously considered part of provision for contribution to CRTF . Now that proceeds of Series 2014 Bonds have been used for Hurricane Harvey, debt service is considered a fixed expense

- **Variable Expense Ratio includes:**
  - Commissions, taxes, licenses and fees.
  - Provisions for CRTF and contingencies

Historical Rate Changes

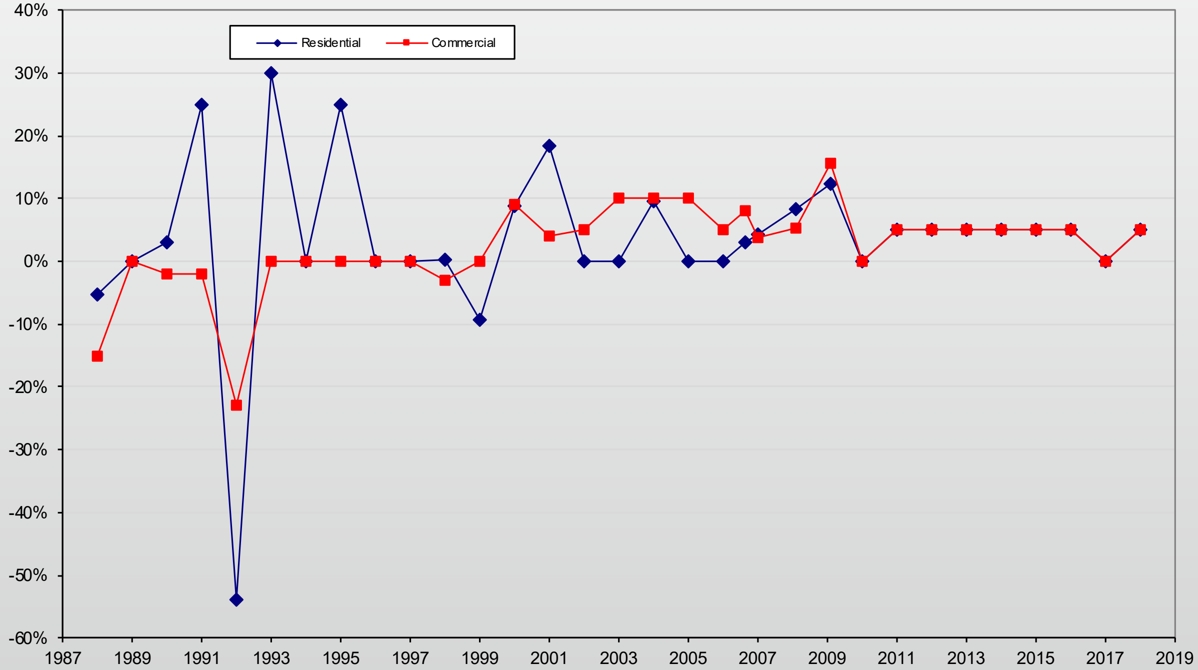
History of Rate Changes

Year	Residential	Commercial
1988	-5.4%	-15.0%
1989	0.0%	0.0%
1990	3.1%	-2.1%
1991	25.0%	-2.0%
1992	-54.0%	-22.9%
1993	30.0%	0.0%
1994	0.0%	0.0%
1995	25.0%	0.0%
1996	0.0%	0.0%
1997	0.0%	0.0%
1998	0.2%	-3.0%
1999	-9.4%	0.0%
2000	8.7%	9.0%
2001	18.5%	4.0%
2002	0.0%	5.0%
2003	0.0%	10.0%
2004	9.6%	10.0%
2005	0.0%	10.0%
2006	0.0%	5.0%
2006 (Sep)	3.1%	8.0%
2007	4.2%	3.7%
2008 (Feb)	8.2%	5.4%
2009 (Feb)	12.3%	15.6%
2010	0.0%	0.0%
2011	5.0%	5.0%
2012	5.0%	5.0%
2013	5.0%	5.0%
2014	5.0%	5.0%
2015	5.0%	5.0%
2016	5.0%	5.0%
2017	0.0%	0.0%
2018	5.0%	5.0%
2019	0.0%	0.0%

Since 1988		
Cumulative Change	114.5%	94.8%
Annual Average	2.4%	2.1%

Since 2006		
Cumulative Change	83.7%	101.6%
Annual Average	4.8%	5.5%

Incremental Rate Changes



Notes
1992 - Elimination of 400% beach / 25% inland surcharges
1993 - Addition of 30% to residential benchmark rates
2002 - Separation of residential rates from benchmark rates

Rate Adequacy Conclusions

		Residential		Commercial	
		2018	2019	2018	2019
	Rate Element	Review	Review	Review	Review
	Non-Hurricane Loss Provision	15.4%	14.2%	9.1%	9.3%
	Hurricane Loss Provision				
	Experience	41.5%	42.7%	55.1%	56.9%
	Modeled	50.8%	51.9%	57.5%	59.7%
	Combined	46.2%	47.3%	56.3%	58.3%
	Fixed Expenses				
	Operating	5.7%	6.2%	5.7%	6.2%
	Reinsurance	16.0%	16.6%	16.0%	16.6%
	Outstanding Class 1 Bond Debt Service	18.6%	25.1%	18.6%	25.1%
	Total	40.3%	47.9%	40.3%	47.9%
(A)	Total Loss Provision plus Fixed Expenses	101.9%	109.4%	105.7%	115.5%
	Variable Expenses				
	Commissions	16.0%	16.0%	16.0%	16.0%
	Taxes and Fees	2.0%	2.0%	2.0%	2.0%
	CRTF Funding & Contingencies	5.0%	5.0%	5.0%	5.0%
(B)	Total Variable Expenses	23.0%	23.0%	23.0%	23.0%
(C)	Permissable Loss & LAE Ratio (1-B)	77.0%	77.0%	77.0%	77.0%
(D)	Rate Indication (A/D)	32.3%	42.1%	37.3%	50.0%

Impact of Alternative Rate Increases - Residential

	2019	Residential Rate Increase - Illustrative							Indicated
Rate Element	0.0%	2.5%	5.0%	7.5%	10.0%	12.5%	15.0%	....	42%
Non-Hurricane Loss Provision	14.2%	13.9%	13.5%	13.2%	12.9%	12.6%	12.3%		10.0%
Hurricane Loss Provision									
Experience	42.7%	41.7%	40.7%	39.7%	38.8%	38.0%	37.1%		30.1%
Modeled	51.9%	50.6%	49.4%	48.3%	47.2%	46.1%	45.1%		36.5%
Combined	47.3%	46.1%	45.0%	44.0%	43.0%	42.0%	41.1%		33.3%
Fixed Expenses									
Operating	6.2%	6.0%	5.9%	5.8%	5.6%	5.5%	5.4%		4.4%
Reinsurance	16.6%	16.2%	15.8%	15.4%	15.1%	14.7%	14.4%		11.7%
Outstanding Class 1 Bond Debt Service	25.1%	24.5%	23.9%	23.3%	22.8%	22.3%	21.8%		17.7%
Total	47.9%	46.7%	45.6%	44.6%	43.5%	42.6%	41.6%		33.7%
Total Loss Provision plus Fixed Expenses	109.4%	106.7%	104.2%	101.8%	99.4%	97.2%	95.1%		77.0%
Variable Expenses									
Commissions	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%		16.0%
Taxes and Fees	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%		2.0%
CRTF Funding & Contingencies	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%		5.0%
Total Variable Expenses	23.0%	23.0%	23.0%	23.0%	23.0%	23.0%	23.0%		23.0%
Rate Indication	42.1%	38.6%	35.3%	32.2%	29.2%	26.3%	23.5%		0.0%

Impact of Alternative Rate Increases - Commercial

	2019	Commercial Rate Increase - Illustrative						Indicated
Rate Element	0.0%	2.5%	5.0%	7.5%	10.0%	12.5%	15.0%	50%
Non-Hurricane Loss Provision	9.3%	9.1%	8.9%	8.7%	8.5%	8.3%	8.1%	6.2%
Hurricane Loss Provision								
Experience	56.9%	55.5%	54.2%	52.9%	51.7%	50.6%	49.5%	37.9%
Modeled	59.7%	58.2%	56.9%	55.5%	54.3%	53.1%	51.9%	39.8%
Combined	58.3%	56.9%	55.5%	54.2%	53.0%	51.8%	50.7%	38.9%
Fixed Expenses								
Operating	6.2%	6.0%	5.9%	5.8%	5.6%	5.5%	5.4%	4.1%
Reinsurance	16.6%	16.2%	15.8%	15.4%	15.1%	14.7%	14.4%	11.1%
Outstanding Class 1 Bond Debt Service	25.1%	24.5%	23.9%	23.3%	22.8%	22.3%	21.8%	16.7%
Total	47.9%	46.7%	45.6%	44.6%	43.5%	42.6%	41.6%	31.9%
Total Loss Provision plus Fixed Expenses	115.5%	112.7%	110.0%	107.4%	105.0%	102.7%	100.4%	77.0%
Variable Expenses								
Commissions	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%
Taxes and Fees	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
CRTF Funding & Contingencies	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Total Variable Expenses	23.0%	23.0%	23.0%	23.0%	23.0%	23.0%	23.0%	23.0%
Rate Indication	50.0%	46.3%	42.8%	39.5%	36.4%	33.3%	30.4%	0.0%