TEXAS WINDSTORM INSURANCE ASSOCIATION
COMMERCIAL PROPERTY RATE LEVEL REVIEW
2018

July 2018

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INTRODUCTION

The Texas Windstorm Insurance Association (TWIA) has completed studies sufficient to support rate level indications for its commercial coverages. This report documents the procedures and results of this analysis.

DISTRIBUTION AND USE

This report was prepared for internal use by the management of TWIA. A complete copy of the report may be submitted to the Texas Department of Insurance (TDI or Department) for use in the approval of a rate change. This report may also be provided to the TWIA actuarial committee. Use of this report for other than the stated purpose may not be proper and must be preceded by written authorization.

RELIANCE UPON DATA

The following data and information used in this analysis were prepared by TWIA and are the responsibility of TWIA's management:

- TWIA losses and loss adjustment expenses
- TWIA written and earned premiums
- History of rate changes impacting TWIA commercial premium
- TWIA's statutory annual statements and insurance expense exhibits.

At the time of this analysis, some of the data was unaudited. The data was reviewed for reasonableness and consistency, and the TWIA written premium and paid loss data provided for this analysis were reconciled to TWIA's annual statements.

In addition to TWIA's own data, we utilized insurance industry premium and loss data supplied by the TDI.

We also used the results of two different hurricane simulation models -- one prepared by Applied Insurance Research (AIR) and one model prepared by Risk Management Solutions (RMS). Both models utilized TWIA exposure data as of 11/30/2017. TWIA has not directly verified the accuracy of these simulation models, but has relied on documentation provided directly by the modeling firms and submission documentation provided to the Florida Commission on Hurricane Loss Projection Methodology to comply with Actuarial Standard of Practice #38, "Using Models Outside the Actuary's Area of Expertise."

LIMITATIONS

The indicated rate level change as shown in this report represents a reasonable estimate of the rate level necessary to cover the TWIA's expected costs of providing commercial wind/hail coverage. The actual costs of providing commercial property coverage for a specific year may differ substantially from the indicated rate level range shown in this report. The possibility of this variability arises from the fact that the events covered by TWIA are inherently unpredictable from year to year. The indicated rate level is, however, our best estimate of the expected annual cost of providing commercial wind/hail coverage.

This actuarial report provides professional input and guidance to TWIA; however, the final decision regarding implementation and actual rate level change is a management decision.

The attached exhibits should be considered an integral part of this report.

EXECUTIVE SUMMARY

This section provides a brief synopsis of the key findings and recommendations contained in our study.

1. We have estimated the indicated total rate level change using a combination of two different methodologies for projecting the expected hurricane portion of the indicated rate level. The indicated total rate level changes are shown in Exhibit 1 and the following table:

Indicated Rate Change: Long Term Hurricane Methodologies

Hurricane Projection Methodology	Indicated Rate Change
Actual Experience and Models Combined	+37%
Actual Industry Experience	+36%
Hurricane Simulation Models	+39%

The indicated rate change shown is based on a combination of actual industry experience and hurricane simulation models. The indications based on each of these methodologies alone are also shown for reference. All methodologies use a long-term approach to develop the hurricane portion of the indicated rate level.

The hurricane simulation models utilized are widely used for insurance company catastrophe management and ratemaking. Versions of these simulation models have undergone verification by and been approved by the Florida Commission on Hurricane Loss Projection Methodology.

2. The indicated rate level change includes different hurricane projection methodologies. The different methods were used because the actuarial methods used to incorporate hurricane losses into rate indications are still evolving. Traditionally, actuarial methods have been based on insurance industry hurricane loss experience. More recently, actuarial methods have incorporated the results of hurricane simulation models to minimize the weaknesses of the traditional approaches.

The method using actual industry experience relies on a more traditional approach and is based on 52 years of actual insurance industry premiums and losses and 167 years of actual hurricane experience. This method possesses the advantage of finding broader regulatory acceptance in many states (including Texas). The alternate method incorporates the results of hurricane simulation models. This has the advantage of minimizing many of the theoretical weaknesses of the traditional actuarial methodologies. The overall indication assigns equal weight to these hurricane projection methodologies.

3. The current rate indication is 9% more than the corresponding indication from the prior TWIA commercial rate study. Addition of 2017 accident year experience (Harvey) and change in modeled loss ratios are the primary reasons for the change.

   Details on the key differences between the current and prior rate indications are described in the Analysis section of this report.

4. The indicated rate changes presented in this report reflect a separate provision for contributions to funding and uncertainties in pricing hurricanes. The total funding and contingency provision is 5% of TWIA premium. The CRTF was completely depleted for paying losses associated with 2017 Hurricane Harvey.

   The Pre-event Class 1 securities provision 18.6% is necessary to repay debt service for outstanding debt issued in 2014. As of June 30, 2018, the Pre-event Class 1 securities were used in its entirety to pay claims associated with Hurricanes Harvey.

   The provision for reinsurance expense is 16% of TWIA premium. The provision for reinsurance expense reflects the estimated actual net cost of purchasing catastrophe reinsurance (reinsurance premiums paid net of the expected reduction in TWIA retained losses). Catastrophe reinsurance provides TWIA with annually renewable protection against large storm losses.

ACTUARIAL ANALYSIS

Overview of Analysis

The goal of the rate level adequacy review is to compare the current rate level to TWIA's expected costs for providing commercial property insurance coverage. This comparison is achieved by estimating the projected loss, loss adjustment expense (LAE), and fixed expense ratio for a prospective accident year and then comparing this ratio to the "permissible" loss, LAE, and fixed expense ratio. The permissible ratio is the portion of premium remaining to pay loss, LAE, and fixed expenses after payment of TWIA variable expenses. If the projected ratio is higher than the permissible ratio, then a rate increase is indicated. If the projected ratio is lower than the permissible, then a rate decrease is indicated.

The steps employed to estimate the projected loss, LAE, and fixed expense ratio are as follows:

1. Adjust historical premium to the current rate level (to facilitate calculation of historical loss ratios at current rates).
2. Determine LAE factors to add projected LAE to projected loss.
3. Estimate the projected non-hurricane loss and LAE ratio.
4. Estimate the projected hurricane loss and LAE ratio.
5. Estimate the projected fixed expense ratio.
6. Sum the projected non-hurricane and hurricane loss ratios and the projected fixed expense ratio to obtain the projected total loss, LAE, and fixed expense ratio.

The steps employed to determine the permissible loss and LAE ratio are as follows:

(a) Analyze historical variable expense to premium ratios to estimate the projected total variable expense ratio.
(b) Subtract the projected total variable expense ratio from 1.00 to derive the permissible loss, LAE and fixed expense ratio.

Steps 1-5 and (a)-(b) are described in more detail in the remainder of this report.

Earned Premium at Current Rates

Historical TWIA written premium is adjusted to the current rate level and adjusted to an earned basis based on a uniform monthly earning assumption. Earned premium at current rates for prior years permits the calculation of historical loss ratios at the current rate level. Exhibit 10 shows the calculation of earned premium at current rates.

Loss Adjustment Expense Factors

In Exhibit 4, the historical ratio of LAE to loss is analyzed to develop LAE factors. Separate LAE factors are developed for hurricane and non-hurricane losses. The hurricane LAE factors are developed based on the LAE to loss ratio for years with hurricanes. The non-hurricane LAE factors are developed based on the ratio for years without hurricanes. TWIA statutory annual statement incurred loss and LAE data is utilized to derive these ratios.

The indicated LAE to loss ratios are shown in Exhibit 4, Sheet 1. For hurricane losses, the indicated LAE ratio of 0.146 is equal to the weighted average of the 10 hurricane years included in the analysis. For non-hurricane losses, the indicated ratio of 0.261 is equal to the weighted average of the most recent 10 non-hurricane years included in the analysis.

The development of these LAE factors is necessary to add LAE to the projected hurricane and non-hurricane loss ratios. The development of loss ratios is described in the following sections.

Projected Non-Hurricane Loss and LAE Ratio

Exhibit 2 shows the development of the projected non-hurricane loss and LAE ratio. The loss portion of this ratio is estimated by comparing the indicated ultimate non-hurricane loss for accident years 2008 - 2017 to the earned premium at current rates for the same ten years. The indicated ultimate non-hurricane loss for each year is based on actual paid loss as of 12/31/17 and the paid loss development method. LAE is then added to each year's ultimate loss through the non-hurricane LAE factor developed in Exhibit 4.

Paid loss development factors are selected based on both the current average of all available years and the prior selection. Given the positive skewness of the observed age-to-age

development factors, a straight average may be more preferable than an average excluding the highest and lowest observation to avoid understating the expected development.

Each year's estimated ultimate loss and LAE is compared to the earned premium at present rates.

The resulting loss and LAE ratios are then trended forward to the expected prospective inflation level. The net trend factor is equal to a loss trend offset by a premium trend. The loss trend is calculated using industry-wide construction cost and consumer price indices. Premium trend is derived from historical changes in average written premium at present rates. Both premiums and losses are trended to current levels by applying the actual, historical changes in the appropriate data. Future premium and loss trends are selected based on all available and relevant data. Because the selected trends are estimates of the future trend between the current and prospective earned and accident dates, and because they are not used to trend historical experience to current premium and loss levels, it may not be necessary to use experience only from periods where both premium and loss data are available.

The resulting loss and LAE ratios for each accident year from 2008 - 2017 form the basis for the indicated projected loss and LAE ratio. The indicated loss and LAE ratio equals the premium-weighted average ratio from the 2008 - 2017 accident period.

Projected Hurricane Loss and LAE Ratio

Two different methods are used to develop the projected hurricane loss and LAE ratios. The first method is based on insurance industry and meteorological hurricane experience for the last 52 and 167 years, respectively. The other method is based on hurricane simulation models. The "52/167-year" method is utilized because the Texas Insurance Code required until recently the consideration of a 30-year minimum experience period. The simulation method is utilized because it minimizes many of the theoretical weaknesses of the historical method. These weaknesses include:

- A 52-year period is insufficient to measure long-term hurricane intensity.
- A 52-year period of insurance industry experience includes years where land use, population densities, construction techniques and materials, engineering techniques and building codes were different than today. These differences diminish the relevance of insurance data from several decades ago in evaluating today's commercial property rates.

Differences between the two methods are the result of expected variances in the frequency and severity of hurricanes, and fundamental differences between the aggregate historical industry exposures and current TWIA exposures. Because of the readily identifiable nature of hurricanes, there should be no over- or understatement of expected losses resulting from either method.

For each method, the projected hurricane loss ratio is estimated first. LAE is added to each loss ratio using the hurricane LAE factor developed in Exhibit 4. Each method's development of the projected hurricane loss ratio is described as follows:

Actual 52/167-Year Industry Hurricane Experience

In Exhibit 6, Texas insurance industry seacoast dwelling extended coverage experience for the 1966-2017 period is used in the development of a projected hurricane loss ratio. For each year, insurance industry loss ratios at current rates are calculated using information provided by the TDI. For the years where sufficient detail is available (1983-2017), these loss ratios are adjusted to TWIA's rate level and re-weighted based on the TWIA's current premium distribution by territory within the seacoast area.

A projected hurricane loss ratio is developed from these 52 years of loss ratios by separating the 52 years into the 13 hurricane years and 39 non-hurricane years. The 39 non-hurricane years are used to develop an estimated non-hurricane loss ratio.

Hurricane loss ratios are then estimated by subtracting the non-hurricane loss ratio from the total loss ratio in each of the 13 hurricane years. An average hurricane loss ratio for hurricane years is calculated as the average of the 13 hurricane loss ratios: 125.7%.

The 52-year period that underlies the selected hurricane loss ratio has experienced significantly fewer hurricanes than the long-term average. As shown in Exhibit 9, the annual hurricane frequency during this 52-year period is 0.288, while the annual frequency during the most recent 167-year period is 0.383. The 52-year period represents all years for which TWIA has been provided industry data by TDI. Because the expected frequency of hurricanes is unrelated to the availability of insurance industry data, there is no reason to use only the most recent 52-year period to estimate the expected frequency of hurricane activity. Given the relatively infrequent occurrence of hurricanes, the largest possible experience period should be considered in order to obtain the most credible result. The selected hurricane frequency is therefore set equal to the 167-year historical hurricane frequency. As shown in Exhibit 6, Sheet 1, multiplying the selected loss ratio for hurricane years by the selected hurricane frequency yields a projected hurricane loss ratio of 48.1%.

Hurricane Simulation Models

The projected hurricane loss ratio is determined by averaging two different hurricane simulation models: AIR Touchstone v5 and RMS RiskLink v17. Both models were run using exposure data provided by TWIA as of 11/30/2017. This exposure data included location-level detail including physical characteristics of each risk and all relevant coverages. Both models were run using historical (long-term) event rates and both results include loss amplification (demand surge) and exclude storm surge and loss adjustment expenses. A separate provision for storm surge was included, equal to 10% of the increase in modeled average annual losses due to the inclusion of storm surge in the model output. The AIR and RMS models generated 4,751 and 9,775 unique events, respectively, with the following distribution of intensity ratings:

Saffir-Simpson Category	AIR	RMS
Category 0	15.3%	48.1%
Category 1	35.3%	14.3%
Category 2	22.2%	12.5%
Category 3	18.4%	14.2%
Category 4	8.0%	9.7%
Category 5	0.8%	1.2%

The intensity at first landfall is shown for AIR and RMS events. The total frequency for events of each intensity is shown with the intensity most relevant to Texas exposures. Events shown as Category 0 include events with no us landfall, Cat 0 events making landfall in TX, and events making landfall in neighboring states or Mexico.

As shown in Exhibits 7 and 8, these models yield projected hurricane loss ratios of 59.3% and 55.7%. The average of these loss ratios is 57.5%.

Fixed Expenses and Variable Permissible Loss and LAE Ratio

Exhibit 11 shows the expense assumptions used to develop the projected fixed expense ratio and the variable permissible loss and LAE ratio. Fixed expenses include general expenses, pre-event class 1 public security repayment and the net cost of reinsurance. The sum of these projected expenses provides for a 40.3% fixed expense ratio. Variable expenses include commission, taxes, and catastrophe trust fund contribution. Subtracting these expenses from 100% yields a permissible loss and LAE ratio of 77.0%.

As stated above, the expenses include a provision for an annual contribution to the catastrophe reserve trust fund, repayment of Class 1 public securities, and the projected net cost of TWIA's purchasing of reinsurance. The 16.0% provision for reinsurance expense reflects the estimated net actual cost of purchasing reinsurance (reinsurance premiums net of the expected reduction in TWIA retained losses). TWIA's purchasing of reinsurance provides additional current year protection to TWIA and coastal policyholders and TWIA members.

Indicated Rate Change

Exhibit 1 summarizes the indicated rate change using a combination of the two hurricane loss ratio projection methods. The individual indications resulting from the use of each methodology are also shown for reference. The indicated rate change for each method is calculated by dividing the total projected loss, LAE, and fixed expense ratio by the permissible loss and LAE ratio. This method of calculating the indicated rate change assumes that TWIA's variable expenses vary proportionally with premium while the fixed expenses do not.

Data Issues

Reconciliation of Data to TWIA's Annual Statements

Exhibit 12, Sheets 1 and 2 show a reconciliation of the TWIA premium and loss data used in this report (ratemaking data) to TWIA's annual statements. Sheet 1 reconciles paid loss data by accident year; Sheet 2 reconciles written premium data by calendar year.

The paid loss reconciliation shows small differences between the ratemaking paid loss data and the annual statement data for all accident years except 2008 where relatively larger differences are indicated.

The written premium reconciliation shows the differences between the ratemaking written premium data and the annual statement data for calendar years 1994 - 2017. Differences of less than 1% exist for all recent years except 2010.

Key Differences Versus Prior Indications

The indicated rate change shown in this report is 7% more than the comparable indication based on the prior (July 2016) study. The reasons for higher indications are summarized in the following table.

Reconciliation of Current vs. Prior Indications

Rate Indication/Reason for Change	Impact of Change	Rate Indication
Previous Rate Indication (Combined Method)		**+28%**
Change in modeled loss ratio	+5%	
2017 rate increase	-6%	
Addition of 2017 AY experience (Harvey)	+6%	
Change due to all other factors	+4%	
Current Rate Indication (Combined Method)		**+37%**

These reasons are discussed below:

Change in modeled loss ratio

TWIA compares expected annual hurricane loss to in-force premium as of Nov 30, 2017 at present rates for the modeled loss ratio provision. In the previous rate analysis, TWIA compared expected annual hurricane loss to 2016 earned premium at present rates for the modeled loss ratio provision. Since the expected annual hurricane loss was modeled on TWIA policies in-force as of Nov 30, 2017 and TWIA policies decreases by about 9% annually, this change represents improved accuracy compared to previous rate analysis. The change has a 4% impact (increase) on indicated rates. Impact due to model changes is about 1%.

Change in reinsurance provision

The indicated rate change decreases approximately 2% as a result of decreases in reinsurance provision (16% reinsurance provision vs previous 17%). There are several moving pieces in TWIA 2018-2019 reinsurance program such as recent decrease in exposure, including exposure decrease due to Depop, changes in reinsurance coverage layer, drop down of the attachment point, reinsurance rate on line, pre-paid second season coverage layer. The overall net impact of the above listed driving factors on rates is -1%.

Change in Experience Period - Addition of 2017 AY experience (Harvey)

The indicated rate change increases approximately 6% as a result of the inclusion of actual experience from 2017. 2017 industry incurred loss ratio is about 415.4% for commercial extended coverage. 2017 incurred loss ratio represents the second worst incurred loss ratio in Texas history, right next to 2008 incurred loss ratio of 464.0% mainly due to IKE.

SUMMARY OF EXHIBITS

Exhibit Number	Exhibit Title or Purpose
1	Summary of Indicated Rate Change
2	Projected Ultimate Non-Hurricane Loss & LAE Ratio
3	Paid Loss Development Factors and Premium and Loss Trend Analysis
4	Development of LAE Factor
5	Summary of Indicated Hurricane Loss & LAE Ratios
6	Development of Hurricane Loss Ratio – 52/167-Year Method
7	Hurricane Loss Ratio – AIR Model
8	Hurricane Loss Ratio – RMS Model
9	Texas Hurricanes 1850 - 2017
10	Earned Premium at Present Rates
11	Fixed Expenses and Variable Permissible Loss & LAE Ratios
12	Reconciliation of Premium Data to Annual Statement

Exhibit 1

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Summary of Indicated Rate Change
By Method for Projecting Hurricane Loss & LAE

	Indicated Loss & LAE Ratio						
Hurricane Projection Method	Hurricane	Non-Hurricane	Fixed Expenses	Total	Permissible LLAE Ratio	Indicated Rate Change	Proposed Rate Change
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Using Experience and Models	56.3%	9.1%	40.3%	105.7%	77.0%	+37%	+5.0%
Using Actual Industry Experience	55.1%	9.1%	40.3%	104.5%	77.0%	+36%	
Using Hurricane Models	57.5%	9.1%	40.3%	106.9%	77.0%	+39%	

Notes:
(2) Exhibit 5
(3) Exhibit 2, Sheet 1
(4) Exhibit 11
(5) = (2) + (3) + (4)
(6) Exhibit 11
(7) = (5) / (6) - 1
(8) Selected

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Projected Ultimate Non-Hurricane Loss & LAE Ratio

Accident Year	Ultimate Non-Hurricane Loss	LAE Factor	Net Trend Factor	Projected Non-Hurricane Loss & LAE	Earned Premium at Current Rate Level	Indicated Non-Hurricane Loss & LAE Ratio
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2008	1,127,682	0.261	1.351	1,921,131	175,132,113	1.1%
2009	2,553,456	0.261	1.313	4,227,739	159,214,792	2.7%
2010	7,478,289	0.261	1.352	12,749,526	151,048,188	8.4%
2011	19,217,587	0.261	1.333	32,303,092	138,891,291	23.3%
2012	14,546,400	0.261	1.262	23,148,879	137,525,969	16.8%
2013	7,491,004	0.261	1.227	11,590,433	139,160,577	8.3%
2014	1,079,519	0.261	1.177	1,602,219	129,234,128	1.2%
2015	18,704,510	0.261	1.114	26,275,235	114,980,596	22.9%
2016	2,818,284	0.261	1.116	3,966,103	100,738,792	3.9%
2017	2,180,981	0.261	1.096	3,014,238	83,489,580	3.6%
Total	77,197,712			120,798,595	1,329,416,026	9.1%

Notes:

(2) Exhibit 2, Sheet 2
(3) Exhibit 4, Sheet 1
(4) = Exhibit 2, Sheet 4
(5) = (2) * [1 + (3)] * (4)
(6) Exhibit 10, Sheet 1
(7) = (5) / (6)

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Projected Ultimate Non-Hurricane Loss

Accident Year	TWIA Non-Hurricane Paid Loss	Development Factor	Ultimate Non-Hurricane Loss
(1)	(2)	(3)	(4)
2008	1,127,682	1.000	1,127,682
2009	2,553,456	1.000	2,553,456
2010	7,478,289	1.000	7,478,289
2011	19,217,587	1.000	19,217,587
2012	14,459,642	1.006	14,546,400
2013	7,351,329	1.019	7,491,004
2014	1,056,281	1.022	1,079,519
2015	17,779,952	1.052	18,704,510
2016	2,478,702	1.137	2,818,284
2017	1,598,960	1.364	2,180,981
Total	75,101,880		77,197,712

Notes:
(2) Exhibit 2, Sheet 3, as of 12/31/17
(3) Exhibit 3, Sheet 1
(4) = (2) * (3)

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Summary of TWIA Historical Paid Loss as of 12/31/17

Accident Year	Paid Loss Excluding Expense		
	Non-Hurricane	Hurricane	Total
(1)	(2)	(3)	(4)
2008	1,127,682	854,630,232	855,757,914
2009	2,553,456	0	2,553,456
2010	7,478,289	0	7,478,289
2011	19,217,587	0	19,217,587
2012	14,459,642	0	14,459,642
2013	7,351,329	0	7,351,329
2014	1,056,281	0	1,056,281
2015	17,779,952	0	17,779,952
2016	2,478,702	0	2,478,702
2017	1,598,960	277,699,964	279,298,924
Total	75,101,880	1,132,330,196	1,207,432,076

Notes:
(2), (3) Provided by TWIA, includes commercial and farm
(4) = (2) + (3)

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Calculation of Net Trend Factors

Year / Quarter	Average Writen premium Per 1000 amount of insurance At present rates
(1)	(2)
2010 / 4	40.50
2011 / 4	41.18
2012 / 4	40.38
2013 / 4	40.00
2014 / 4	39.60
2015 / 4	38.06
2016 / 4	38.11
2017 / 4	38.02

(3) Current Average Earned Date	7/1/2017
(4) Current Average Accident Date	7/1/2017
(5) Prospective Average Earned / Accident Date	1/1/2020
(6) Premium Trend Length	2.500
(7) Loss Trend Length	2.500
(8) Selected Premium Trend	-1.8%
(9) Selected Loss Trend	1.9%

Accident Year	Current Premium Trend	Current Loss Trend	Prospective Premium Trend	Prospective Loss Trend	Net Trend Factor
(10)	(11)	(12)	(13)	(14)	(15)
2008	0.939	1.157	0.956	1.048	1.351
2009	0.939	1.124	0.956	1.048	1.313
2010	0.939	1.158	0.956	1.048	1.352
2011	0.923	1.123	0.956	1.048	1.333
2012	0.942	1.084	0.956	1.048	1.262
2013	0.951	1.064	0.956	1.048	1.227
2014	0.960	1.031	0.956	1.048	1.177
2015	0.999	1.015	0.956	1.048	1.114
2016	0.998	1.016	0.956	1.048	1.116
2017	1.000	1.000	0.956	1.048	1.096

Notes:

(2) Exhibit 3, Sheet 2 (9)
(3) Latest Year / Quarter Ending Date - 6 Months
(4) Latest Accident Year Ending Date - 6 Months
(5) Rate Effective Date + 12 Months
(6) = (5) - (3)
(7) = (5) - (4)
(8) Exhibit 3, Sheet 2
(9) Exhibit 3, Sheet 3a
(11) = (2) Indexed to 2017 / 4
(12) Exhibit 3, Sheet 3a
(13) = [1 + (8)] ^ (6)
(14) = [1 + (9)] ^ (7)
(15) = [(12) * (14)] / [(11) * (13)]

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Paid Loss Development Factors
TWIA Commercial Property Paid Loss

Accident Year	Months of Development 12	24	36	48	60	72	84
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2008	952	1,040	1,040	1,128	1,128	1,128	1,128
2009	706	2,289	2,553	2,553	2,553	2,553	2,553
2010	4,489	6,162	6,783	7,280	7,280	7,302	7,478
2011	13,360	16,138	18,435	18,758	19,119	19200	19,218
2012	8,512	11,404	13,135	13,284	13309	14,460	
2013	6,886	7,243	7,338	7351	7,351		
2014	641	875	1015	1,056			
2015	15,923	17690	17,780				
2016	2,055	2,479					
2017	1,599						

Accident Year	Development Factors 12 - 24	24 - 36	36 - 48	48 - 60	60 - 72	72 - 84	84 - Ult
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2008	1.093	1.000	1.085	1.000	1.000	1.000	
2009	3.241	1.115	1.000	1.000	1.000	1.000	
2010	1.373	1.101	1.073	1.000	1.003	1.024	
2011	1.208	1.142	1.018	1.019	1.004	1.001	
2012	1.340	1.152	1.011	1.002	1.086		
2013	1.052	1.013	1.002	1.000			
2014	1.365	1.160	1.040				
2015	1.111	1.005					
2016	1.206						
Average	1.492	1.096	1.033	1.004	1.019	1.006	
Avg x hi / lo	1.242	1.088	1.029	1.000	1.002	1.000	
Avg 3 Year	1.227	1.059	1.018	1.007	1.031	1.008	
Avg 5 Year	1.215	1.094	1.029	1.004	1.019	1.006	
Prior	1.150	1.066	1.026	1.003	1.006	1.006	1.000
Selected	1.200	1.081	1.029	1.003	1.012	1.006	1.000
Cumulative	1.364	1.137	1.052	1.022	1.019	1.006	1.000

Notes:
Provided by TWIA, includes commercial and farm,
excludes hurricanes Brett (1999), Claudette (2003), Rita (2005), Humberto (2007), Dolly (2008), and Ike (2008), Harvey (2017)

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Premium Trend Analysis
TWIA Commercial Earned Premium at Present Rates

Year / Quarter	Amount of insurance in 1000s In-Force	Annualized AOI In-Force	Written Premium	On-Level Factors	Written Premium at Present Rate Written	Written Premium at Present Rates Annualized	Average	Exponential Fitted Trends All-Year	5-Year	4-Year	3-Year
(1)	(2)	(3)	(4)	(5)	(6)	(8)	(9)	(10)	(11)	(12)	(13)
2009 / 2	4,423,523		31,841,452	1.407	44,804,121						
2009 / 3	4,581,622		35,544,214	1.407	50,014,279						
2009 / 4	3,331,855		24,176,074	1.407	34,018,164						
2010 / 1	3,276,322		23,376,688	1.407	32,893,348	161,729,911					
2010 / 2	4,621,454	3,928,072	34,131,354	1.407	48,026,243	164,952,033	41.99	41.52			
2010 / 3	4,238,909	3,909,974	31,767,550	1.407	44,700,133	159,637,887	40.83	41.39			
2010 / 4	2,986,689	3,823,989	20,776,517	1.407	29,234,646	154,854,369	40.50	41.25			
2011 / 1	2,602,948	3,696,672	19,850,492	1.340	26,601,558	148,562,579	40.19	41.12			
2011 / 2	3,814,474	3,511,628	29,228,333	1.340	39,168,762	139,705,098	39.78	40.99			
2011 / 3	4,018,190	3,383,165	31,567,447	1.340	42,303,398	137,308,363	40.59	40.85			
2011 / 4	3,129,713	3,373,453	23,026,165	1.340	30,857,263	138,930,981	41.18	40.72			
2012 / 1	3,189,106	3,464,601	24,771,378	1.276	31,615,253	143,944,676	41.55	40.59			
2012 / 2	4,104,981	3,574,184	32,088,566	1.276	40,954,045	145,729,960	40.77	40.46			
2012 / 3	4,018,821	3,610,576	32,876,434	1.276	41,959,587	145,386,148	40.27	40.33			
2012 / 4	3,204,363	3,619,987	24,799,106	1.276	31,650,642	146,179,526	40.38	40.20			
2013 / 1	3,026,032	3,608,934	24,974,712	1.216	30,356,919	144,921,192	40.16	40.07	40.58		
2013 / 2	3,988,826	3,574,030	32,706,056	1.216	39,754,415	143,721,562	40.21	39.94	40.40		
2013 / 3	4,073,452	3,566,339	35,220,808	1.216	42,811,112	144,573,088	40.54	39.81	40.22		
2013 / 4	3,086,020	3,558,375	24,211,988	1.216	29,429,823	142,352,269	40.00	39.68	40.05		
2014 / 1	2,606,961	3,491,199	23,028,882	1.158	26,658,810	138,654,160	39.72	39.55	39.87	39.98	
2014 / 2	4,003,723	3,440,677	35,219,745	1.158	40,771,257	139,671,002	40.59	39.43	39.70	39.80	
2014 / 3	3,379,936	3,355,849	29,887,118	1.158	34,598,075	131,457,965	39.17	39.30	39.52	39.61	
2014 / 4	2,604,228	3,208,936	21,627,063	1.158	25,036,029	127,064,171	39.60	39.17	39.35	39.43	
2015 / 1	2,841,812	3,178,068	24,808,373	1.103	27,351,231	127,756,592	40.20	39.05	39.18	39.24	39.15
2015 / 2	3,674,921	3,166,324	33,339,199	1.103	36,756,467	123,741,802	39.08	38.92	39.01	39.06	38.98
2015 / 3	3,144,031	3,095,736	28,055,666	1.103	30,931,372	120,075,099	38.79	38.79	38.84	38.88	38.81
2015 / 4	2,087,369	3,001,641	17,430,504	1.103	19,217,131	114,256,201	38.06	38.67	38.67	38.69	38.64
2016 / 1	2,462,033	2,889,561	22,487,925	1.050	23,612,321	110,517,291	38.25	38.54	38.50	38.51	38.47
2016 / 2	3,095,782	2,769,696	28,623,450	1.050	30,054,623	103,815,446	37.48	38.42	38.33	38.33	38.31
2016 / 3	2,620,934	2,631,917	25,417,054	1.050	26,687,907	99,571,981	37.83	38.30	38.16	38.15	38.14
2016 / 4	1,719,064	2,520,491	14,955,154	1.050	15,702,912	96,057,762	38.11	38.17	38.00	37.98	37.98
2017 / 1	1,919,711	2,406,663	17,482,209	1.050	18,356,319	90,801,760	37.73	38.05	37.83	37.80	37.81
2017 / 2	2,712,789	2,290,999	25,224,489	1.050	26,485,713	87,232,851	38.08	37.93	37.67	37.62	37.65
2017 / 3	2,020,056	2,168,015	19,050,031	1.050	20,002,533	80,547,477	37.15	37.80	37.50	37.45	37.48
2017 / 4	1,508,019	2,066,525	13,077,837	1.050	13,731,729	78,576,294	38.02	37.68	37.17	37.27	37.32
(14) Average Annual Change								-1.3%	-1.8%	-1.9%	-1.7%
(15) Correlation Coefficient								79.5%	81.4%	73.6%	56.5%
(16) Selected Premium Trend											-1.8%

Notes: (2) Provided by TWIA
(3) Calculated from (2) using uniform quarterly writing assumption
(4) Provided by TWIA
(5) Factor to bring written premium to current rate level
(6) = (4) * (5) Indexed to 2017 / 4

(8) = Sum of for prior 4 quarters
(9) = (8) / (3)
(10) - (13) fitted to an exponential distribution
(14) Fitted average annual change
(15) Evaluates the predictability of the fitted curve
(16) Selected based on judgment

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Loss Trend Analysis
Summary of Indices and Calculation of Prospective Loss Costs

Calendar Year Ending 12/31/xx	Commercial Statewide Boeckh	Commercial Coastal Boeckh	Residential Statewide Boeckh	Residential Coastal Boeckh	Modified CPI	Weighted Average
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2008	1.193	1.185	1.168	1.166	1.072	1.157
2009	1.151	1.136	1.145	1.137	1.086	1.124
2010	1.172	1.181	1.139	1.140	1.087	1.158
2011	1.132	1.141	1.125	1.133	1.070	1.123
2012	1.090	1.095	1.095	1.103	1.049	1.084
2013	1.067	1.070	1.064	1.071	1.044	1.064
2014	1.036	1.032	1.030	1.028	1.029	1.031
2015	1.018	1.014	1.010	1.011	1.019	1.015
2016	1.023	1.020	1.021	1.022	1.003	1.016
2017	1.000	1.000	1.000	1.000	1.000	1.000
Factors to Adjust For Prospective Loss Costs						
(8) Fitted Trend	2.2%	2.1%	1.5%	1.6%	1.1%	1.9%
(9) Cost Factor	1.056	1.054	1.039	1.041	1.029	1.048

Notes:
(2) = Exhibit 3, Sheet 3b trended forward to 12/31/2017
(3) = Exhibit 3, Sheet 3c trended forward to 12/31/2017
(4) = Residential Exhibit 3, Sheet 3b trended forward to 12/31/2017
(5) = Residential Exhibit 3, Sheet 3c trended forward to 12/31/2017
(6) = Exhibit 3, Sheet 3d
(7) = 25% CPI and 75% Boeckh (most appropriate available by year)
(8) = (2) - (7) fitted to an exponential curve using 5 years' data (where available)
(9) = [1 + (8)] ^ 2.5 (trended from 7/1/2017 to 1/1/2020)

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Loss Trend Analysis
Boeckh Commercial Construction Index Trend (Statewide)

Calendar Year Ending	Texas Statewide Index	Fitted Trends All Years Linear	Exponential
(1)	(2)	(3)	(4)
3/31/2008	2017.57		
6/30/2008	2035.39		
9/30/2008	2055.55		
12/31/2008	2078.92		
3/31/2009	2108.32		
6/30/2009	2141.00		
9/30/2009	2157.97		
12/31/2009	2155.18	2110.32	2114.37
3/31/2010	2141.73	2122.77	2125.88
6/30/2010	2124.68	2135.21	2137.45
9/30/2010	2115.34	2147.66	2149.08
12/31/2010	2116.48	2160.11	2160.78
3/31/2011	2127.08	2172.55	2172.54
6/30/2011	2141.50	2185.00	2184.36
9/30/2011	2163.68	2197.45	2196.25
12/31/2011	2192.00	2209.89	2208.21
3/31/2012	2217.77	2222.34	2220.22
6/30/2012	2239.55	2234.79	2232.31
9/30/2012	2258.47	2247.23	2244.46
12/31/2012	2275.37	2259.68	2256.67
3/31/2013	2288.71	2272.12	2268.96
6/30/2013	2300.16	2284.57	2281.30
9/30/2013	2312.55	2297.02	2293.72
12/31/2013	2324.29	2309.46	2306.20
3/31/2014	2338.66	2321.91	2318.76
6/30/2014	2357.74	2334.36	2331.38
9/30/2014	2375.53	2346.80	2344.06
12/31/2014	2394.51	2359.25	2356.82
3/31/2015	2413.17	2371.70	2369.65
6/30/2015	2425.58	2384.14	2382.55
9/30/2015	2434.16	2396.59	2395.51
12/31/2015	2437.78	2409.04	2408.55
3/31/2016	2435.64	2421.48	2421.66
6/30/2016	2430.75	2433.93	2434.84
9/30/2016	2426.85	2446.38	2448.09
12/31/2016	2426.13	2458.82	2461.42
3/31/2017	2432.15	2471.27	2474.81
6/30/2017	2445.14	2483.71	2488.28
9/30/2017	2463.09	2496.16	2501.82
12/31/2017	2480.92	2508.61	2515.44
Annual Trend		2.0%	2.2%
R-Squared		0.944	0.939

Notes:
(2) = Average Index for Austin, Corpus Christi, Dallas, El Paso, Fort Worth, Houston, Odessa, and San Antonio
(3) - (4) = (2) fitted to linear and exponential distributions

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Loss Trend Analysis
Boeckh Commercial Construction Index Trend (Coastal)

Calendar Year Ending	Texas Coastal Index	Fitted Trends All Years Linear	Exponential
(1)	(2)	(3)	(4)
3/31/2006			
6/30/2006			
9/30/2006			
12/31/2006			
3/31/2007			
6/30/2007			
9/30/2007			
12/31/2007	2031.76	2048.36	2055.71
3/31/2008	2050.67	2060.36	2066.55
6/30/2008	2068.99	2072.36	2077.44
9/30/2008	2089.34	2084.36	2088.39
12/31/2008	2114.71	2096.36	2099.39
3/31/2009	2145.16	2108.36	2110.46
6/30/2009	2180.12	2120.36	2121.58
9/30/2009	2204.40	2132.36	2132.77
12/31/2009	2204.50	2144.36	2144.01
3/31/2010	2186.90	2156.36	2155.31
6/30/2010	2162.64	2168.36	2166.67
9/30/2010	2138.17	2180.36	2178.09
12/31/2010	2121.49	2192.36	2189.57
3/31/2011	2123.27	2204.36	2201.11
6/30/2011	2135.31	2216.36	2212.71
9/30/2011	2160.02	2228.36	2224.37
12/31/2011	2194.60	2240.36	2236.09
3/31/2012	2222.30	2252.36	2247.88
6/30/2012	2245.64	2264.36	2259.73
9/30/2012	2266.95	2276.36	2271.64
12/31/2012	2288.14	2288.36	2283.61
3/31/2013	2305.89	2300.36	2295.65
6/30/2013	2318.32	2312.36	2307.75
9/30/2013	2329.99	2324.36	2319.91
12/31/2013	2341.89	2336.36	2332.14
3/31/2014	2362.28	2348.36	2344.43
6/30/2014	2386.51	2360.36	2356.79
9/30/2014	2407.30	2372.36	2369.21
12/31/2014	2428.32	2384.36	2381.70
3/31/2015	2443.32	2396.36	2394.25
6/30/2015	2455.44	2408.35	2406.87
9/30/2015	2464.89	2420.35	2419.55
12/31/2015	2470.01	2432.35	2432.31
3/31/2016	2469.65	2444.35	2445.13
6/30/2016	2465.77	2456.35	2458.01
9/30/2016	2460.52	2468.35	2470.97
12/31/2016	2456.69	2480.35	2483.99
3/31/2017	2459.24	2492.35	2497.09
6/30/2017	2470.50	2504.35	2510.25
9/30/2017	2486.09	2516.35	2523.48
12/31/2017	2504.97	2528.35	2536.78
Annual Trend		1.9%	2.1%
R-Squared		0.932	0.929

Notes:
(2) = Average Index for Corpus Christi and Houston
(3) - (4) = (2) fitted to linear and exponential distributions

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Loss Trend Analysis
Modified Consumer Price Index - External Trend

Calendar Year Ending	Modified CPI	Fitted Trends All Years Linear	All Years Exponential	5 Years Linear	5 Years Exponential	4 Years Linear	4 Years Exponential	3 Years Linear	3 Years Exponential
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
9/30/2007	178.34	176.37	176.53						
12/31/2007	179.24	176.78	176.92						
3/31/2008	180.31	177.20	177.32						
6/30/2008	180.58	177.62	177.72						
9/30/2008	181.04	178.04	178.12						
12/31/2008	181.06	178.46	178.53						
3/31/2009	180.55	178.88	178.93						
6/30/2009	180.07	179.30	179.33						
9/30/2009	179.30	179.72	179.74						
12/31/2009	178.80	180.14	180.14						
3/31/2010	178.46	180.55	180.55						
6/30/2010	178.56	180.97	180.96						
9/30/2010	178.59	181.39	181.37						
12/31/2010	178.72	181.81	181.78						
3/31/2011	178.97	182.23	182.19						
6/30/2011	179.61	182.65	182.60						
9/30/2011	180.52	183.07	183.01						
12/31/2011	181.55	183.49	183.42						
3/31/2012	182.78	183.91	183.84						
6/30/2012	183.87	184.32	184.25						
9/30/2012	184.57	184.74	184.67						
12/31/2012	185.03	185.16	185.08						
3/31/2013	185.38	185.58	185.50	184.74	184.78				
6/30/2013	185.51	186.00	185.92	185.28	185.31				
9/30/2013	185.82	186.42	186.34	185.82	185.84				
12/31/2013	186.03	186.84	186.76	186.36	186.37				
3/31/2014	186.43	187.26	187.18	186.90	186.90	186.72	186.74		
6/30/2014	186.87	187.68	187.60	187.44	187.43	187.28	187.29		
9/30/2014	187.59	188.09	188.03	187.98	187.97	187.84	187.84		
12/31/2014	188.62	188.51	188.45	188.52	188.50	188.40	188.40		
3/31/2015	189.46	188.93	188.88	189.06	189.04	188.96	188.95	189.28	189.29
6/30/2015	189.59	189.35	189.30	189.60	189.58	189.52	189.51	189.79	189.79
9/30/2015	190.03	189.77	189.73	190.15	190.12	190.08	190.06	190.30	190.30
12/31/2015	190.50	190.19	190.16	190.69	190.66	190.64	190.62	190.82	190.81
3/31/2016	190.95	190.61	190.59	191.23	191.20	191.20	191.19	191.33	191.32
6/30/2016	192.03	191.03	191.02	191.77	191.75	191.76	191.75	191.85	191.84
9/30/2016	192.82	191.45	191.45	192.31	192.30	192.32	192.31	192.36	192.35
12/31/2016	193.56	191.86	191.88	192.85	192.84	192.88	192.88	192.88	192.87
3/31/2017	193.86	192.28	192.32	193.39	193.39	193.45	193.45	193.39	193.39
6/30/2017	194.07	192.70	192.75	193.93	193.95	194.01	194.02	193.90	193.91
9/30/2017	194.20	193.12	193.18	194.47	194.50	194.57	194.59	194.42	194.43
12/31/2017	194.18	193.54	193.62	195.01	195.05	195.13	195.16	194.93	194.95
Annual Trend		0.9%	0.9%	1.1%	1.1%	1.1%	1.2%	1.1%	1.1%
R-Squared		0.897	0.898	0.983	0.983	0.976	0.975	0.950	0.950

Notes:
(2) = Weighted average of CPI for Lodging, Apparel, Furnishings, and Medical Care
(3) - (10) = (2) fitted to linear and exponential distributions

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Development of LAE factor Using TWIA Commercial + Residential Experience

Accident Year	Projected Ultimate Loss	Projected Ultimate LAE	Ultimate LAE to Loss Ratio	Hurricane Indicator
(1)	(2)	(3)	(4)	(5)
1980	12,911	1,318	0.102	H
1981	2,512	543	0.216	
1982	796	565	0.710	
1983	148,999	9,127	0.061	H
1984	999	324	0.324	
1985	512	297	0.580	
1986	881	505	0.573	H
1987	1,897	1,056	0.557	
1988	1,160	357	0.308	
1989	12,296	3,528	0.287	H
1990	335	225	0.672	
1991	1,217	729	0.599	
1992	489	554	1.133	
1993	3,375	1,375	0.407	
1994	679	507	0.747	
1995	2,977	903	0.303	
1996	1,166	582	0.499	
1997	2,964	1,343	0.453	
1998	22,401	4,732	0.211	
1999	8,773	2,388	0.272	H
2000	6,227	1,885	0.303	
2001	24,605	1,880	0.076	
2002	5,167	5,226	1.011	
2003	155,001	5,122	0.033	H
2004	5,167	1,471	0.285	
2005	154,981	20,235	0.131	H
2006	15,745	1,110	0.070	
2007	15,745	4,941	0.314	H
2008	2,583,017	346,615	0.134	H
2009	10,417	2,222	0.213	
2010	18,052	4,288	0.238	
2011	96,309	15,209	0.158	
2012	67,320	15,896	0.236	
2013	70,787	13,941	0.197	
2014	7,203	7,159	0.994	
2015	139,335	39,896	0.286	
2016	28,961	15,886	0.549	
2017	1,385,687	260,464	0.188	H
All Years Total	5,017,065	794,404	0.158	
Hurricane Years Total	4,478,291	654,243	0.146	
Non-Hurricane Years				
Total	538,774	140,161	0.260	
10 Year	438,384	114,497	0.261	

Notes:
(2) Exhibit 4, Sheet 2
(3) Exhibit 4, Sheet 4
(4) = (3) / (2)
(5) "H" indicates hurricane year

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Ultimate Loss (TWIA All Lines)

Accident Year	Incurred Loss at 12/31/17	Development Factor	Indicated Ultimate Loss
(1)	(2)	(3)	(4)
1980			12911
1981			2,512
1982			796
1983			148,999
1984			999
1985			512
1986			881
1987			1,897
1988			1,160
1989			12,296
1990			335
1991			1,217
1992			489
1993			3,375
1994			679
1995			2,977
1996			1,166
1997			2,964
1998			22,401
1999			8,773
2000			6,227
2001			24,605
2002			5,167
2003			155,001
2004			5,167
2005			154,981
2006			15,745
2007			15,745
2008			2,583,017
2009			10,417
2010			18,052
2011	96,309	1.000	96,309
2012	67,658	0.995	67,320
2013	71,286	0.993	70,787
2014	7,261	0.992	7,203
2015	140,459	0.992	139,335
2016	29,612	0.978	28,961
2017	1,278,467	1.084	1,385,687

Notes:
(2) Exhibit 4, Sheet 3
(3) Exhibit 4, Sheet 3
(4) 2011 - 2017: (2) * (3); 1980 - 2010: from prior TWIA annual statements

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Incurred Loss Development Factors
TWIA Schedule P Incurred Loss (Including IBNR)

Months of Development

Accident Year	12	24	36	48	60	72	84
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2008	1,902,481	1,774,393	2,273,398	2,384,020	2,680,497	2,632,000	2,583,017
2009	8,267	10,825	10,581	10,732	10,453	10,404	10,417
2010	15,215	18,166	18,173	18,522	18,361	18,267	18,052
2011	94,870	96,967	97,503	96,828	96,263	95,964	96,309
2012	62,722	69,764	67,287	66,724	66,328	67,658	
2013	77,204	75,204	72,860	71,823	71,286		
2014	6,739	7,854	7,298	7,261			
2015	147,927	139,955	140,459				
2016	31,292	29,612					
2017	1,278,467						

Development Factors

Accident Year	12 - 24	24 - 36	36 - 48	48 - 60	60 - 72	72 - 84	84 - Ult
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2008	0.933	1.281	1.049	1.124	0.982	0.981	
2009	1.309	0.977	1.014	0.974	0.995	1.001	
2010	1.194	1.000	1.019	0.991	0.995	0.988	
2011	1.022	1.006	0.993	0.994	0.997	1.004	
2012	1.112	0.964	0.992	0.994	1.020		
2013	0.974	0.969	0.986	0.993			
2014	1.165	0.929	0.995				
2015	0.946	1.004					
2016	0.946						
Average	1.067	1.016	1.007	1.012	0.998	0.994	
Avg x hi / lo	1.051	0.987	1.003	0.993	0.996	0.995	
Avg 3 Year	1.019	0.967	0.991	0.994	1.004	0.998	
Avg 5 Year	1.029	0.974	0.997	0.989	0.998	0.994	
Prior	1.054	0.984	1.003	1.005	0.993	0.993	1.000
Selected	1.044	0.986	1.000	0.999	0.998	0.995	1.000
Cumulative	1.084	0.978	0.992	0.992	0.993	0.995	1.000

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Ultimate LAE (TWIA All Lines)

Accident Year	Incurred ALAE at 12/31/17	Development Factor	Indicated Ultimate DCC	Incurred AAO	Incurred LAE
(1)	(2)	(3)	(4)	(5)	(6)
1980					1,318
1981					543
1982					565
1983					9,127
1984					324
1985					297
1986			270	235	505
1987			652	404	1,056
1988			235	122	357
1989			2,727	801	3,528
1990			119	106	225
1991			403	326	729
1992			270	284	554
1993			806	569	1,375
1994			192	315	507
1995			698	205	903
1996			355	227	582
1997			892	451	1,343
1998			3,920	812	4,732
1999			1,757	631	2,388
2000			1,209	676	1,885
2001			1,207	673	1,880
2002			3,643	1,583	5,226
2003			3,239	1,883	5,122
2004			844	627	1,471
2005			15,229	5,006	20,235
2006			860	250	1,110
2007	2,489	1.000	2,489	2,452	4,941
2008	99,668	1.000	99,668	246,947	346,615
2009	223	1.000	223	1,999	2,222
2010	323	1.000	323	3,965	4,288
2011	798	1.000	798	14,411	15,209
2012	880	1.025	902	14,994	15,896
2013	991	1.018	1,009	12,932	13,941
2014	1,266	1.074	1,360	5,799	7,159
2015	2,355	1.181	2,781	37,115	39,896
2016	678	1.216	824	15,062	15,886
2017	891	1.398	1,246	207,140	260,464

Notes:

(2) Exhibit 4, Sheet 5
(3) Exhibit 4, Sheet 5
(4) 2008 - 2017: (2) * (3); 1986 - 2007: from TWIA's annual statements
(5) From TWIA's annual statements
(6) 1986 - 2016: (4) + (5); prior years from prior TWIA annual statements. 2017: from Actuarial Q1 Reserve analysis

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Incurred DCC Development Factors
TWIA Schedule P Incurred DCC (Including IBNR)

Accident Year	Months of Development 12	24	36	48	60	72	84
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2007	2,660	3,107	2,921	2,519	2,497	2,490	2,489
2008	167,316	139,787	106,761	111,632	120,296	92,426	99,668
2009	7,335	359	226	231	223	223	223
2010	391	312	322	316	335	324	323
2011	515	592	609	682	629	745	798
2012	516	679	719	632	917	880	
2013	802	806	715	1,089	991		
2014	516	493	1,085	1,266			
2015	973	1,818	2,355				
2016	412	678					
2017	891						

Accident Year	Development Factors 12 - 24	24 - 36	36 - 48	48 - 60	60 - 72	72 - 84	84 - Ult
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2007	1.168	0.940	0.862	0.991	0.997	1.000	
2008	0.835	0.764	1.046	1.078	0.768	1.078	
2009	0.049	0.630	1.022	0.965	1.000	1.000	
2010	0.798	1.032	0.981	1.060	0.967	0.997	
2011	1.150	1.029	1.120	0.922	1.184	1.071	
2012	1.316	1.059	0.879	1.451	0.960		
2013	1.005	0.887	1.523	0.910			
2014	0.955	2.201	1.167				
2015	1.868	1.295					
2016	1.646						
Average	1.08	1.09	1.08	1.05	0.98	1.03	
Avg x hi / lo	1.11	1.00	1.04	1.00	0.98	1.02	
Avg 3 Year	1.49	1.46	1.19	1.09	1.04	1.02	
Avg 5 Year	1.36	1.29	1.13	1.06	0.98	1.04	
Prior	1.15	1.03	1.06	1.06	0.99	1.01	1.00
Selected	1.15	1.03	1.10	1.06	0.99	1.03	1.00
Cumulative	1.40	1.22	1.18	1.07	1.02	1.03	1.00

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Summary of Indicated Hurricane Loss & LAE Ratios

Exhibit 5

Basis for Hurricane Loss Ratio	Indicated Loss Ratio	LAE Factor	Indicated Loss & LAE Ratio
(1)	(2)	(3)	(4)
Industry Experience	48.1%	0.146	55.1%
Hurricane Models			
AIR Model	51.7%	0.146	59.2%
RMS Model	48.6%	0.146	55.7%
Average of Models	50.2%	0.146	57.5%

Notes:
(2) Exhibit 6 - Exhibit 8, Sheet 1
(3) Exhibit 4, Sheet 1
(4) = (2) * [1 + (3)]

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Industry Experience -- Commercial Extended Coverage
1967 - 2017 -- Hurricane Years Only

Accident Year	Earned Premium at Current TWIA Rate Level	Incurred Loss Ratio
(1)	(2)	(3)
1970	58,356,336	39.6%
1971	63,040,303	88.7%
1980	70,042,582	54.9%
1983	41,090,972	334.7%
1986	52,951,602	8.0%
1989	83,916,652	6.0%
1990	71,387,141	88.8%
1999	167,478,166	8.6%
2003	200,309,387	23.3%
2005	252,973,058	181.3%
2007	330,332,938	15.4%
2008	297,781,052	464.0%
2017	200,446,643	415.4%

(4)	Simple Average Loss Ratio for Hurricane Years	133.0%	
(5)	Selected Non-Hurricane Loss Ratio	7.3%	
(6)	Average Hurricane Loss Ratio for Hurricane Years	125.7%	
(7)	Historical Hurricane Frequency		
	(a) 52.0-Year (1/1/1966 - 12/31/2017)	0.288	(1 Hurricane Every 3.5 years)
	(b) 167-Year (1/1/1851 - 12/31/2017)	0.383	(1 Hurricane Every 2.6 years)
	Selected Frequency	0.383	(1 Hurricane Every 2.6 years)
(8)	Indicated Hurricane Loss Ratio	48.1%	

Notes:
(2) Exhibit 6, Sheet 2. 1999 year ending 12/31/99; all other accident years ending 9/30/xx
(3) Exhibit 6, Sheet 2. 1999 year ending 12/31/99; all other accident years ending 9/30/xx
(4) = Average of (3)
(5) Exhibit 6, Sheet 2
(6) = (4) - (5)
(7) Exhibit 9
(8) = (6) * (7) Selected

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Industry Experience -- Commercial Extended Coverage
1967 - 2017

Accident Year	Earned Premium	Earned Premium at 1992 CMR	Earned Premium at Current Rates	Incurred Losses	Incurred Loss Ratio	Hurricane Indicator
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1970	10,874,210	18,835,352	58,356,336	23,092,142	39.6%	H
1971	13,340,143	20,347,170	63,040,303	55,893,676	88.7%	H
1972	18,906,678	24,314,307	75,331,423	8,704,522	11.6%	
1973	21,737,541	23,257,532	72,057,286	3,837,493	5.3%	
1974	22,348,193	22,844,661	70,778,115	2,193,087	3.1%	
1975	24,396,629	24,958,305	77,326,680	3,943,412	5.1%	
1976	26,795,934	24,109,943	74,698,255	2,218,115	3.0%	
1977	30,910,821	27,119,226	84,021,720	1,898,346	2.3%	
1978	32,709,599	26,415,338	81,840,910	2,535,872	3.1%	
1979	31,306,685	24,514,306	75,951,067	4,535,147	6.0%	
1980	28,751,765	22,607,257	70,042,582	38,431,071	54.9%	H
1981	24,129,384	21,398,588	66,297,842	4,272,728	6.4%	
1982	18,505,004	17,523,231	54,291,078		3.4%	
1983	12,680,397	13,262,706	41,090,972		334.7%	H
1984	12,736,031	14,992,627	46,450,673		7.7%	
1985	15,169,575	16,422,895	50,881,979		3.7%	
1986	21,130,682	17,090,896	52,951,602		8.0%	H
1987	31,114,529	26,771,157	82,943,320		1.4%	
1988	25,065,531	24,117,319	74,721,108		8.3%	
1989	24,167,085	27,085,314	83,916,652		6.0%	H
1990	19,677,404	23,041,233	71,387,141		88.8%	H
1991	21,794,680	25,534,881	79,113,047		53.6%	
1992	23,737,753	26,950,473	83,498,883		1.4%	
1993	21,990,182		68,125,584		6.0%	
1994	16,604,950		51,442,134		9.1%	
1995	32,374,229		100,295,361		20.8%	
1996	55,367,089		171,527,241		2.5%	
1997	53,196,024		164,801,282		3.9%	
1998	53,986,058		169,786,152		15.2%	
1999	52,435,243		167,478,166		8.6%	H
2000	41,739,697		127,598,253		7.4%	
2001	42,330,042		121,614,211		5.8%	
2002	69,156,402		190,110,949		14.1%	
2003	78,368,305		200,309,387		23.3%	H
2004	112,957,791		262,400,948		2.0%	
2005	119,598,806		252,973,058		181.3%	H
2006	148,019,940		287,762,390		2.2%	
2007	186,207,969		330,332,938		15.4%	H
2008	177,673,659		297,781,052		464.0%	H
2009	191,269,906		292,069,146		2.3%	
2010	199,600,899		280,838,465		5.6%	
2011	191,364,592		262,743,584		12.7%	
2012	208,580,125		272,614,224		16.1%	
2013	229,675,281		285,945,726		6.0%	
2014	240,360,140		285,067,125		1.4%	
2015	233,128,458		263,202,030		15.2%	
2016	216,488,331		232,941,444		3.9%	
2017	190,901,565		200,446,643		415.4%	H
Total / Average	3,675,361,936		6,931,196,468		41.8%	
Average of Non-Hurricane Years					7.9%	
Average of Non-Hurricane Years Excluding 1991					6.6%	
Selected					7.3%	

Notes: (2) Provided by TDI. 1970 - 1995 are year ending 9/30/xx as of Evaluated as of; 1996 - 2017 are year ending 12/31/xx as of 12/31/17
(3) Provided by TDI (1992 MR = 1992 manual rates)
(4) 1983 - 2016: Sum of Exhibit 6, Sheet 4 - Sheet 7, (5); 1970 - 1982: (3) * 3.098
(5) Provided by TDI. 1970 - 1981 are year ending 9/30/xx as of 12/31/99; 1982 - 2016 are year ending 12/31/xx as of 12/31/17
(6) 1983 - 2016: Exhibit 6, Sheet 3; 1970 - 1982: (5) / (4)

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Industry Experience -- Commercial Extended Coverage

Loss Ratios by Territory / Tier

Accident Year	Territory 8	Territory 9	Territory 10	Tier 2	Weighted Loss Ratio
(1)	(2)	(3)	(4)	(5)	(6)
1983	878.7%	3.8%	40.9%	147.2%	334.7%
1984	7.5%	3.8%	9.7%	14.1%	7.7%
1985	3.7%	2.5%	4.3%	7.9%	3.7%
1986	2.9%	1.0%	15.9%	12.4%	8.0%
1987	0.5%	1.6%	2.0%	3.0%	1.4%
1988	11.5%	3.4%	8.1%	4.7%	8.3%
1989	13.3%	1.7%	1.9%	5.4%	6.0%
1990	235.5%	2.5%	8.8%	6.8%	88.8%
1991	21.3%	21.0%	99.9%	4.6%	53.6%
1992	0.7%	1.0%	2.1%	3.8%	1.4%
1993	13.5%	1.7%	1.7%	5.7%	6.0%
1994	0.3%	3.7%	19.6%	7.9%	9.1%
1995	7.8%	10.3%	37.6%	20.6%	20.8%
1996	1.5%	2.9%	3.1%	6.6%	2.5%
1997	5.2%	2.0%	3.6%	9.0%	3.9%
1998	20.7%	13.7%	11.4%	9.0%	15.2%
1999	2.7%	12.6%	11.7%	8.9%	8.6%
2000	2.1%	2.0%	13.8%	58.9%	7.4%
2001	7.0%	3.2%	5.7%	28.7%	5.8%
2002	11.7%	31.3%	7.2%	9.6%	14.1%
2003	2.4%	8.4%	49.0%	31.1%	23.3%
2004	2.9%	0.6%	2.0%	3.1%	2.0%
2005	66.6%	1.7%	378.2%	50.9%	181.3%
2006	2.3%	1.0%	2.6%	5.8%	2.2%
2007	1.6%	56.4%	5.9%	9.9%	15.4%
2008	700.9%	36.5%	483.0%	490.2%	464.0%
2009	2.5%	3.2%	1.6%	10.2%	2.3%
2010	1.5%	4.3%	9.8%	3.5%	5.6%
2011	3.9%	15.7%	18.6%	19.3%	12.7%
2012	19.0%	11.5%	16.0%	11.0%	16.1%
2013	14.2%	1.3%	1.3%	7.4%	6.0%
2014	0.6%	2.7%	1.3%	4.5%	1.4%
2015	12.1%	4.9%	23.4%	13.5%	15.2%
2016	0.8%	7.7%	3.9%	30.4%	3.9%
2017	67.7%	946.5%	443.3%	143.7%	415.4%
Average	61.3%	35.1%	50.0%	34.6%	50.7%

TWIA 2017 Written Premium by Territory / Tier

		Territory 8	Territory 9	Territory 10	Tier 2	Total
(7)	Amount	27,004,438	16,387,710	31,123,274	672,346	75,187,768
(8)	% Share	35.92%	21.80%	41.39%	0.89%	100.00%

Notes:

(2) Exhibit 6, Sheet 4
(3) Exhibit 6, Sheet 5
(4) Exhibit 6, Sheet 6
(5) Exhibit 6, Sheet 7
(6) = Weighted average of (2) to (5), using (8)
(7) Provided by TWIA
(8) = (7) / (7) Total

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Industry Experience -- Commercial Extended Coverage
Tier 1 -- Territory 8 (Galveston County)

Accident Year	Earned Premium	Earned Premium at 1992 MR	TWIA Factor to Current Rate Level	Earned Premium at Current Rates	Incurred Loss	Incurred Loss Ratio
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1983	913,865	968,224	3.098	2,999,558	26,357,425	878.7%
1984	1,195,339	1,366,667	3.098	4,233,934	318,455	7.5%
1985	2,581,481	2,777,593	3.098	8,604,983	314,878	3.7%
1986	3,013,362	2,349,181	3.098	7,277,763	211,282	2.9%
1987	3,004,153	2,585,122	3.098	8,008,708	37,480	0.5%
1988	2,905,355	2,728,206	3.098	8,451,982	969,836	11.5%
1989	2,825,114	3,015,974	3.098	9,343,487	1,244,199	13.3%
1990	2,303,321	2,474,141	3.098	7,664,889	18,053,460	235.5%
1991	2,203,500	2,080,579	3.098	6,445,634	1,371,244	21.3%
1992	2,352,391	2,012,473	3.098	6,234,641	46,331	0.7%
1993	2,406,016		3.098	7,453,838	1,005,945	13.5%
1994	2,807,090		3.098	8,696,365	28,034	0.3%
1995	2,645,757		3.098	8,196,555	635,625	7.8%
1996	5,519,716		3.098	17,100,080	249,644	1.5%
1997	5,461,636		3.098	16,920,148	886,485	5.2%
1998	6,133,105		3.145	19,288,615	3,994,564	20.7%
1999	6,706,028		3.194	21,419,053	575,316	2.7%
2000	4,997,201		3.057	15,276,443	320,131	2.1%
2001	4,785,262		2.873	13,748,058	962,576	7.0%
2002	8,206,069		2.749	22,558,484	2,632,325	11.7%
2003	8,793,047		2.556	22,475,028	529,845	2.4%
2004	12,425,339		2.323	28,864,062	830,387	2.9%
2005	13,839,253		2.112	29,228,502	19,469,845	66.6%
2006	18,414,310		1.958	36,055,219	812,370	2.3%
2007	24,924,710		1.774	44,216,436	710,669	1.6%
2008	24,970,117		1.676	41,849,916	293,310,706	700.9%
2009	29,393,792		1.527	44,884,320	1,140,669	2.5%
2010	31,745,722		1.407	44,666,231	669,882	1.5%
2011	31,297,427		1.373	42,971,367	1,675,264	3.9%
2012	35,126,562		1.307	45,910,417	8,709,842	19.0%
2013	37,686,611		1.245	46,919,831	6,670,061	14.2%
2014	38,322,954		1.186	45,451,023	258,179	0.6%
2015	36,836,812		1.129	41,588,761	5,017,267	12.1%
2016	36,218,384		1.076	38,970,981	327,833	0.8%
2017	32,909,097		1.050	34,554,552	23,386,065	67.7%
Total	485,869,898			808,529,864	423,734,120	52.4%

Notes:

(2) Provided by TDI. 1983 - 1995 are year ending 9/30/xx as of 12/31/99; 1996 - 2016 are year ending 12/31/xx as of 12/31/17
(3) Provided by TDI (1992 MR = 1992 manual rates)
(4) Represents 1/1/98 through 1/1/18 rate changes for TWIA; factors assume uniform earning of written premium and that TWIA premium represents 89.4% of industry data in Tier 1 -- Territory 8
(5) = (3) * (4) for 1983 - 1992; (2) * (4) for 1993 - 2017
(6) Provided by TDI. 1983 - 1995 are year ending 9/30/xx as of 12/31/99; 1996 - 2017 are year ending 12/31/xx as of 12/31/17 2017 incurred loss was developed, LDF of 1.264 was judgementally selected
(7) = (6) / (5)

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Industry Experience -- Commercial Extended Coverage
Tier 1 -- Territory 9 (Nueces County)

Accident Year	Earned Premium	Earned Premium at 1992 MR	TWIA Factor to Current Rate Level	Earned Premium at Current Rates	Incurred Loss	Incurred Loss Ratio
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1983	745,985	820,826	3.098	2,542,919	96,051	3.8%
1984	558,639	652,809	3.098	2,022,402	76,481	3.8%
1985	1,235,059	1,383,103	3.098	4,284,853	106,148	2.5%
1986	2,228,911	1,849,840	3.098	5,730,804	56,387	1.0%
1987	2,381,538	2,086,940	3.098	6,465,340	105,275	1.6%
1988	1,796,653	1,719,227	3.098	5,326,165	181,414	3.4%
1989	1,632,453	1,826,430	3.098	5,658,280	98,116	1.7%
1990	1,429,526	1,769,972	3.098	5,483,373	135,678	2.5%
1991	1,390,109	1,555,310	3.098	4,818,350	1,013,636	21.0%
1992	1,571,433	1,629,721	3.098	5,048,876	49,512	1.0%
1993	1,587,772		3.098	4,918,918	86,000	1.7%
1994	2,203,514		3.098	6,826,486	254,088	3.7%
1995	2,669,951		3.098	8,271,508	854,753	10.3%
1996	5,639,923		3.098	17,472,481	502,177	2.9%
1997	3,183,758		3.098	9,863,282	199,390	2.0%
1998	3,613,310		3.145	11,363,860	1,561,275	13.7%
1999	6,808,428		3.194	21,746,119	2,735,082	12.6%
2000	5,167,158		3.057	15,796,002	317,804	2.0%
2001	4,763,324		2.873	13,685,030	431,244	3.2%
2002	8,479,915		2.749	23,311,286	7,300,265	31.3%
2003	9,934,549		2.556	25,392,707	2,122,879	8.4%
2004	14,597,450		2.323	33,909,876	212,644	0.6%
2005	16,137,249		2.112	34,081,870	566,758	1.7%
2006	21,249,313		1.958	41,606,155	434,362	1.0%
2007	27,752,523		1.774	49,232,976	27,752,523	56.4%
2008	27,990,909		1.676	46,912,763	17,103,924	36.5%
2009	29,917,824		1.527	45,684,517	1,483,310	3.2%
2010	28,336,727		1.407	39,869,775	1,719,175	4.3%
2011	25,574,903		1.373	35,114,342	5,511,149	15.7%
2012	26,818,601		1.307	35,051,912	4,047,349	11.5%
2013	28,318,909		1.245	35,257,042	461,485	1.3%
2014	28,244,104		1.186	33,497,507	915,157	2.7%
2015	26,797,641		1.129	30,254,537	1,470,307	4.9%
2016	22,880,276		1.076	24,619,177	1,899,362	7.7%
2017	19,508,528		1.050	20,483,954	193,874,745	946.5%
Total	413,146,865			711,605,444	275,735,905	38.7%

Notes:

(2) Provided by TDI. 1983 - 1995 are year ending 9/30/xx as of 12/31/99; 1996 - 2017 are year ending 12/31/xx as of 12/31/17
(3) Provided by TDI (1992 MR = 1992 manual rates)
(4) Represents 1/1/98 through 1/1/18 rate changes for TWIA; factors assume uniform earning of written premium and that TWIA premium represents 87.0% of industry data in Tier 1 -- Territory 9
(5) = (3) * (4) for 1983 - 1993; (2) * (4) for 1994 - 2017
(6) Provided by TDI. 1983 - 1995 are year ending 9/30/xx as of 12/31/99; 1996 - 2017 are year ending 12/31/xx as of 12/31/17 2017 incurred loss was developed, LDF of 1.264 was judgementally selected
(7) = (6) / (5)

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Industry Experience -- Commercial Extended Coverage
Tier 1 -- Territory 10 (Other Tier 1)

Accident Year	Earned Premium	Earned Premium at 1992 MR	TWIA Factor to Current Rate Level	Earned Premium at Current Rates	Incurred Loss	Incurred Loss Ratio
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1983	3,769,988	4,139,464	3.098	12,824,059	5,242,728	40.9%
1984	4,835,650	5,883,059	3.098	18,225,717	1,759,233	9.7%
1985	3,637,366	3,997,227	3.098	12,383,409	534,724	4.3%
1986	4,787,352	3,948,102	3.098	12,231,220	1,943,819	15.9%
1987	5,996,981	5,352,970	3.098	16,583,501	338,938	2.0%
1988	5,872,305	5,768,621	3.098	17,871,188	1,442,599	8.1%
1989	5,125,436	5,918,163	3.098	18,334,469	349,413	1.9%
1990	3,842,130	4,624,825	3.098	14,327,708	1,263,817	8.8%
1991	4,253,902	4,765,878	3.098	14,764,690	14,752,702	99.9%
1992	4,034,147	4,187,015	3.098	12,971,372	276,158	2.1%
1993	4,540,606		3.098	14,066,797	245,603	1.7%
1994	5,145,260		3.098	15,940,015	3,130,886	19.6%
1995	9,324,050		3.098	28,885,907	10,852,486	37.6%
1996	15,331,047		3.098	47,495,584	1,478,175	3.1%
1997	17,116,368		3.098	53,026,508	1,911,482	3.6%
1998	17,623,413		3.145	55,425,634	6,340,723	11.4%
1999	15,019,386		3.194	47,971,919	5,614,569	11.7%
2000	11,756,138		3.057	35,938,514	4,969,254	13.8%
2001	11,140,104		2.873	32,005,519	1,824,700	5.7%
2002	20,528,832		2.749	56,433,759	4,053,342	7.2%
2003	23,885,668		2.556	61,051,767	29,908,218	49.0%
2004	31,412,192		2.323	72,970,522	1,462,655	2.0%
2005	34,104,704		2.112	72,029,135	272,418,664	378.2%
2006	46,246,638		1.958	90,550,917	2,315,133	2.6%
2007	71,922,575		1.774	127,590,648	7,479,422	5.9%
2008	66,558,177		1.676	111,551,505	538,764,477	483.0%
2009	66,997,408		1.527	102,305,042	1,612,898	1.6%
2010	66,042,453		1.407	92,921,731	9,147,018	9.8%
2011	63,757,966		1.373	87,539,687	16,289,637	18.6%
2012	68,901,083		1.307	90,053,715	14,431,231	16.0%
2013	73,800,100		1.245	91,881,125	1,168,702	1.3%
2014	68,981,910		1.186	81,812,545	1,037,568	1.3%
2015	63,212,781		1.129	71,367,230	16,703,454	23.4%
2016	57,909,564		1.076	62,310,691	2,456,801	3.9%
2017	46,916,477		1.050	49,262,301	218,401,222	443.3%
Total	1,024,330,157			1,802,906,050	1,201,922,451	66.7%

Notes:

(2) Provided by TDI. 1983 - 1995 are year ending 9/30/xx as of 12/31/99; 1996 - 2017 are year ending 12/31/xx as of 12/31/17
(3) Provided by TDI (1992 MR = 1992 manual rates)
(4) Represents 1/1/98 through 1/1/18 rate changes for TWIA; factors assume uniform earning of written premium and that TWIA premium represents 74.0% of industry data in Tier 1 -- Territory 10
(5) = (3) * (4) for 1983 - 1993; (2) * (4) for 1994 - 2017
(6) Provided by TDI. 1983 - 1995 are year ending 9/30/xx as of 12/31/99; 1996 - 2017 are year ending 12/31/xx as of 12/31/17 2017 incurred loss was developed, LDF of 1.264 was judgementally selected
(7) = (6) / (5)

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Industry Experience -- Commercial Extended Coverage
Tier 2 (Territories 1 and 11)

AY Ending	Earned Premium	Earned Premium at 1992 MR	TWIA Factor to Current Rate Level	Earned Premium at Current Rates	Incurred Loss	Incurred Loss Ratio
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1983	7,250,559	7,334,192	3.098	22,721,327	33,451,768	147.2%
1984	6,146,403	7,090,092	3.098	21,965,105	3,096,573	14.1%
1985	7,715,669	8,264,972	3.098	25,604,883	2,019,280	7.9%
1986	11,101,057	8,943,773	3.098	27,707,809	3,439,343	12.4%
1987	19,731,857	16,746,125	3.098	51,879,495	1,552,595	3.0%
1988	14,491,218	13,901,265	3.098	43,066,119	2,041,063	4.7%
1989	14,584,082	16,324,747	3.098	50,574,066	2,746,147	5.4%
1990	12,102,427	14,172,295	3.098	43,905,770	2,967,816	6.8%
1991	13,947,169	17,133,114	3.098	53,078,387	2,440,246	4.6%
1992	15,779,782	19,121,264	3.098	59,237,676	2,232,412	3.8%
1993	13,455,788		3.098	41,686,031	2,357,383	5.7%
1994	6,449,086		3.098	19,979,268	1,579,205	7.9%
1995	17,734,471		3.098	54,941,391	11,314,057	20.6%
1996	28,876,403		3.098	89,459,096	5,938,855	6.6%
1997	27,434,262		3.098	84,991,344	7,691,121	9.0%
1998	26,616,230		3.145	83,708,043	7,574,576	9.0%
1999	23,901,401		3.194	76,341,075	6,821,707	8.9%
2000	19,819,200		3.057	60,587,294	35,670,537	58.9%
2001	21,641,352		2.873	62,175,604	17,852,673	28.7%
2002	31,941,586		2.749	87,807,420	8,461,924	9.6%
2003	35,755,041		2.556	91,389,885	28,411,179	31.1%
2004	54,522,810		2.323	126,656,488	3,982,223	3.1%
2005	55,697,704		2.112	117,633,551	59,821,556	50.9%
2006	61,057,252		1.958	119,550,099	6,946,289	5.8%
2007	61,608,161		1.774	109,292,878	10,794,322	9.9%
2008	58,154,456		1.676	97,466,868	477,796,637	490.2%
2009	64,960,882		1.527	99,195,267	10,145,475	10.2%
2010	73,475,997		1.407	103,380,728	3,593,882	3.5%
2011	70,734,296		1.373	97,118,188	18,761,553	19.3%
2012	77,733,879		1.307	101,598,180	11,188,913	11.0%
2013	89,869,661		1.245	111,887,728	8,325,263	7.4%
2014	104,811,172		1.186	124,306,050	5,581,198	4.5%
2015	106,281,224		1.129	119,991,502	16,240,796	13.5%
2016	99,480,107		1.076	107,040,595	32,544,370	30.4%
2017	91,567,463		1.050	96,145,836	138,181,261	143.7%
Total	1,446,430,107			2,684,071,047	993,564,198	37.0%

Notes:

(2) Provided by TDI. 1983 - 1995 are year ending 9/30/xx as of 12/31/99; 1996 - 2016 are year ending 12/31/xx as of 12/31/17

(3) Provided by TDI (1992 MR = 1992 manual rates)

(4) Represents 1/1/98 through 1/1/18 rate changes for TWIA; factors assume uniform earning of written premium and that TWIA premium represents 1.0% of industry data in Tier 2

(5) = (3) * (4) for 1983 - 1992; (2) * (4) for 1993 - 2017

(6) Provided by TDI. 1983 - 1995 are year ending 9/30/xx as of 12/31/99; 1996 - 2017 are year ending 12/31/xx as of 12/31/17
2017 incurred loss was developed, LDF of 1.264 was judgementally selected

(7) = (6) / (5)

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Hurricane Loss Ratio -- AIR Model

County	TWIA Insured Values (000s) as of 11/30/17	Modeled Loss Cost	Expected Annual Hurricane Loss
(1)	(2)	(3)	(4)
Aransas	281,327	3.815	1,073,263
Brazoria	645,050	2.782	1,794,529
Calhoun	110,388	3.153	348,053
Cameron	1,031,030	3.279	3,380,747
Chambers	69,226	2.370	164,066
Galveston	2,586,192	8.439	21,824,874
Harris	63,082	5.014	316,293
Jefferson	458,311	2.729	1,250,731
Kenedy	694	1.194	829
Kleberg	49,448	0.793	39,212
Matagorda	100,614	3.119	313,815
Nueces	1,729,145	3.513	6,074,486
Refugio	12,498	1.467	18,335
San Patricio	162,709	2.353	382,854
Willacy	17,905	2.526	45,228
Total	7,317,619	5.060	37,027,315
(5) Inforce-Premium as of Nov 30, 2017 at Present Rates			71,600,722
(6) Indicated Hurricane Loss Ratio			51.7%

Notes:
(2) Provided by TWIA
(3) Exhibit 7, Sheet 2
(4) = (2) * (3)
(5) Provided by TWIA
(6) = (4) Total / (5)

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
AIR Simulated Hurricane Results

County	TWIA Insured Values (000s) as of 11/30/17	Average Annual Modeled Loss	Provision for Storm Surge	Modeled Loss Cost
(1)	(2)	(3)	(4)	(5)
Aransas	281,327	1,069,119	1.004	3.815
Brazoria	645,050	1,787,080	1.004	2.782
Calhoun	110,388	346,627	1.004	3.153
Cameron	1,031,030	3,367,294	1.004	3.279
Chambers	69,226	163,401	1.004	2.370
Galveston	2,586,192	21,736,877	1.004	8.439
Harris	63,082	315,017	1.004	5.014
Jefferson	458,311	1,245,768	1.004	2.729
Kenedy	694	825	1.004	1.194
Kleberg	49,448	39,065	1.004	0.793
Matagorda	100,614	312,555	1.004	3.119
Nueces	1,729,145	6,050,249	1.004	3.513
Refugio	12,498	18,258	1.004	1.467
San Patricio	162,709	381,305	1.004	2.353
Willacy	17,905	45,043	1.004	2.526
Total	7,317,619	36,878,483	1.004	5.060

Notes:
(2) Provided by TWIA and Geo-coded by AIR
(3) Provided by AIR
(4) = 10% of modeled storm surge increase, estimated to be 4.0%
(5) = (3) / (2) * (4)

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Hurricane Loss Ratio -- RMS Model

County	TWIA Insured Values (000s) as of 11/30/17	Modeled Loss Cost	Expected Annual Hurricane Loss
(1)	(2)	(3)	(4)
Aransas	281,327	3.899	1,096,894
Brazoria	645,050	3.353	2,162,853
Calhoun	110,388	4.920	543,109
Cameron	1,031,030	4.954	5,107,723
Chambers	69,226	3.101	214,670
Galveston	2,586,192	6.252	16,168,872
Harris	63,082	4.386	276,678
Jefferson	458,311	2.994	1,372,183
Kenedy	694	2.048	1,421
Kleberg	49,448	1.894	93,655
Matagorda	100,614	4.261	428,716
Nueces	1,729,145	3.894	6,733,291
Refugio	12,498	3.056	38,194
San Patricio	162,709	3.151	512,696
Willacy	17,905	4.009	71,781
Total	7,317,619	4.759	34,822,736
(5) Inforce-Premium as of Nov 30, 2017 at Present Rates			71,600,722
(6) Indicated Hurricane Loss Ratio			48.6%

Notes:
(2) Provided by TWIA
(3) Exhibit 8, Sheet 2
(4) = (2) * (3)
(5) Provided by TWIA
(6) = (4) Total / (5)

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
RMS Simulated Hurricane Results

County	TWIA Insured Values (000s) as of 11/30/17	Average Annual Modeled Loss	Provision for Storm Surge	Modeled Loss Cost
(1)	(2)	(3)	(4)	(5)
Aransas	281,327	1,077,452	1.018	3.899
Brazoria	645,050	2,124,434	1.018	3.353
Calhoun	110,388	533,548	1.018	4.920
Cameron	1,031,030	5,017,335	1.018	4.954
Chambers	69,226	210,901	1.018	3.101
Galveston	2,586,192	15,883,977	1.018	6.252
Harris	63,082	271,803	1.018	4.386
Jefferson	458,311	1,347,832	1.018	2.994
Kenedy	694	1,396	1.018	2.048
Kleberg	49,448	91,975	1.018	1.894
Matagorda	100,614	421,143	1.018	4.261
Nueces	1,729,145	6,614,311	1.018	3.894
Refugio	12,498	37,516	1.018	3.056
San Patricio	162,709	503,687	1.018	3.151
Willacy	17,905	70,520	1.018	4.009
Total	7,317,619	34,207,830	1.018	4.759

Notes:
(2) Provided by TWIA and Geo-coded by RMS
(3) Provided by RMS Excluding Storm Surge
(4) = 10% of modeled storm surge increase, estimated to be 18.0%
(5) = (3) / (2) * (4)

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Texas Hurricanes 1850 - 2017

Exhibit 9

Landfall Year	Month	Name	Landfall Year	Month	Name
	(1)	(2)		(1)	(2)
1851	Jun		1929	Jun	
1854	Jun		1932	Aug	"Freeport"
1854	Sep	"Matagorda"	1933	Aug	
1865	Sep	"Sabine River-Lake Calcasieu"	1933	Sep	
1866	Jul		1934	Jul	
1867	Oct	"Galveston"	1936	Jun	
1869	Aug	"Lower Texas Coast"	1940	Aug	
1875	Sep		1941	Sep	
1879	Aug		1942	Aug	
1880	Aug		1942	Aug	
1882	Sep		1943	Jul	
1886	Jun		1945	Aug	
1886	Aug	"Indianola"	1947	Aug	
1886	Sep		1949	Oct	
1886	Oct		1957	Jun	Audrey
1887	Sep		1959	Jul	Debra
1888	Jun		1961	Sep	Carla
1891	Jul		1963	Sep	Cindy
1895	Aug		1967	Sep	Beulah
1897	Sep		1970	Aug	Celia
1900	Sep	"Galveston"	1971	Sep	Fern
1909	Jun		1980	Aug	Allen
1909	Jul	"Velasco"	1983	Aug	Alicia
1909	Aug		1986	Jun	Bonnie
1910	Sep		1989	Aug	Chantal
1912	Oct		1989	Oct	Jerry
1913	Jun		1999	Aug	Bret
1915	Aug	"Galveston"	2003	Jul	Claudette
1916	Aug		2005	Sep	Rita
1919	Sep		2007	Sep	Humberto
1921	Jun		2008	Jul	Dolly
			2008	Sep	Ike
			2017	Aug	Harvey

Frequency	Date Period	Hurricanes	Period	Annual Frequency
52.0-Year	1/1/1966 - 12/31/2017	15	52.0	0.288
167-Year	1/1/1851 - 12/31/2017	64	167	0.383

Notes:
(1), (2) from NOAA Technical Memorandum NWS TPC-5, updated with actual experience through 2017

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Calculation of Earned Premium at Present Rate Level

Year	TWIA Written Premium	Factor to Current Rate Level	Written Premium at Current Rate Level	Earned Premium at Current Rate Level
(1)	(2)	(3)	(4)	(5)
1994	10,672,677	3.098	33,063,953	33,063,953
1995	12,865,905	3.098	39,858,574	36,461,264
1996	15,640,660	3.098	48,454,765	44,156,670
1997	16,536,186	3.098	51,229,104	49,841,935
1998	16,558,977	3.193	52,872,814	52,050,959
1999	17,394,142	3.193	55,539,496	54,206,155
2000	17,332,561	2.930	50,784,404	53,161,950
2001	17,544,251	2.817	49,422,155	50,103,280
2002	24,013,525	2.684	64,452,301	56,937,228
2003	29,220,514	2.440	71,298,054	67,875,178
2004	31,009,323	2.218	68,778,678	70,038,366
2005	35,740,174	2.016	72,052,191	70,415,435
2006	76,847,840	1.870	143,705,461	107,878,826
2007	110,951,718	1.714	190,171,245	166,938,353
2008	98,036,118	1.633	160,092,981	175,132,113
2009	111,269,573	1.423	158,336,602	159,214,792
2010	102,174,680	1.407	143,759,774	151,048,188
2011	100,017,021	1.340	134,022,808	138,891,291
2012	110,524,397	1.276	141,029,130	137,525,969
2013	112,904,624	1.216	137,292,023	139,160,577
2014	104,642,688	1.158	121,176,233	129,234,128
2015	98,715,934	1.102	108,784,959	114,980,596
2016	88,278,690	1.050	92,692,625	100,738,792
2017	70,749,081	1.050	74,286,535	83,489,580
Total	1,429,641,258		2,263,156,865	2,242,545,578

Notes:

(2) Provided by TWIA

(3) Exhibit 10, Sheet 2

(4) = (2) * (3) (calculated on a monthly basis)

(5) Calculated from (4), using annual uniform earning assumption for 2002 and prior and monthly for 2003 and after

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Calculation of On-Level Premium Factors

Year	Rate Level in Effect Applicable Rates B.O.Y.			E.O.Y.	Cumulative Rate Level B.O.Y.			E.O.Y.	# Months B.O.Y.			E.O.Y.	Average Rate Level	Factor to Current Rate Level
(1)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1980	Prior			8/1/1980	1.000			1.175	7.0			5.0	1.073	4.637
1981	8/1/1980			9/1/1981	1.175			1.132	8.0			4.0	1.161	4.285
1982	9/1/1981			9/1/1982	1.132			1.428	8.0			4.0	1.231	4.042
1983	9/1/1982			10/10/1983	1.428			1.514	9.3			2.7	1.447	3.438
1984	10/10/1983			10/10/1983	1.514			1.514	12.0			0.0	1.514	3.286
1985	10/10/1983	3/1/1985	3/15/1985	11/15/1985	1.514	1.892	2.428	2.651	2.0	0.5	8.0	1.5	2.281	2.181
1986	11/15/1985			11/15/1985	2.651			2.651	12.0			0.0	2.651	1.877
1987	11/15/1985			7/1/1987	2.651			2.407	6.0			6.0	2.529	1.967
1988	7/1/1987			11/1/1988	2.407			2.075	10.0			2.0	2.352	2.115
1989	11/1/1988			11/1/1988	2.075			2.075	12.0			0.0	2.075	2.398
1990	11/1/1988			3/1/1990	2.075			2.104	2.0			10.0	2.099	2.370
1991	3/1/1990			4/1/1991	2.104			2.083	3.0			9.0	2.088	2.383
1992	1/1/1992			1/1/1992	1.606			1.606	12.0			0.0	1.606	3.098
1993	1/1/1992			10/1/1993	1.606			1.606	9.0			3.0	1.606	3.098
1994	10/1/1993			10/1/1993	1.606			1.606	12.0			0.0	1.606	3.098
1995	10/1/1993			10/1/1993	1.606			1.606	12.0			0.0	1.606	3.098
1996	10/1/1993			10/1/1993	1.606			1.606	12.0			0.0	1.606	3.098
1997	10/1/1993			10/1/1993	1.606			1.606	12.0			0.0	1.606	3.098
1998	1/1/1998			1/1/1998	1.558			1.558	12.0			0.0	1.558	3.193
1999	1/1/1998			1/1/1998	1.558			1.558	12.0			0.0	1.558	3.193
2000	1/1/2000			1/1/2000	1.698			1.698	12.0			0.0	1.698	2.930
2001	1/1/2001			1/1/2001	1.766			1.766	12.0			0.0	1.766	2.817
2002	1/1/2002			1/1/2002	1.854			1.854	12.0			0.0	1.854	2.684
2003	1/1/2003			1/1/2003	2.039			2.039	12.0			0.0	2.039	2.440
2004	1/1/2004			1/1/2004	2.243			2.243	12.0			0.0	2.243	2.218
2005	1/1/2005			1/1/2005	2.468			2.468	12.0			0.0	2.468	2.016
2006	1/1/2006			9/1/2006	2.591			2.798	8.0			4.0	2.660	1.870
2007	1/1/2007			1/1/2007	2.902			2.902	12.0			0.0	2.902	1.714
2008	1/1/2007			2/1/2008	2.902			3.059	1.0			11.0	3.046	1.633
2009	2/1/2008			2/1/2009	3.059			3.536	1.0			11.0	3.496	1.423
2010	2/1/2009			2/1/2009	3.536			3.536	12.0			0.0	3.536	1.407
2011	1/1/2011			1/1/2011	3.713			3.713	12.0			0.0	3.713	1.340
2012	1/1/2012			1/1/2012	3.898			3.898	12.0			0.0	3.898	1.276
2013	1/1/2013			1/1/2013	4.093			4.093	12.0			0.0	4.093	1.216
2014	1/1/2014			1/1/2014	4.298			4.298	12.0			0.0	4.298	1.158
2015	1/1/2015			1/1/2016	4.513			4.513	12.0			0.0	4.513	1.102
2016	1/1/2016			1/1/2017	4.738			4.738	12.0			0.0	4.738	1.050
2017	1/1/2017			1/1/2018	4.738			4.738	12.0			0.0	4.738	1.050
2018	1/1/2018			1/1/2019	4.975			4.975	12.0			0.0	4.975	1.000
Current								4.975					4.975	1.000

Notes:

(1) - (4) Rates in effect and beginning and end of year (B.O.Y. and E.O.Y.)
For each year except 1985, 2006, and 2008 the B.O.Y. and E.O.Y. rates are the only rates applicable
For 1985, there were two additional rate changes
For 2006, there was one additional rate change
For 2008, the rate change took effect mid-year

(5) - (8) Based on Exhibit 10, Sheet 3

(9) - (12) Number of months that each of the rates were effective

(13) = Weighted average of (5) - (8) using (9) - (12) as weights

(14) = Current (13) / (13)

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
History of Rate Level Changes

Effective Date	Rate Change	Cumulative Rate Level
(1)	(2)	(3)
Prior		1.000
8/1/80	17.5%	1.175
9/1/81	-3.7%	1.132
9/1/82	26.2%	1.428
10/10/83	6.0%	1.514
3/1/85	25.0%	1.892
3/15/85	28.3%	2.428
11/15/85	9.2%	2.651
7/1/87	-9.2%	2.407
11/1/88	-13.8%	2.075
3/1/90	1.4%	2.104
4/1/91	-1.0%	2.083
1/1/92	-22.9%	1.606
10/1/93	0.0%	1.606
1/1/98	-3.0%	1.558
1/1/00	9.0%	1.698
1/1/01	4.0%	1.766
1/1/02	5.0%	1.854
1/1/03	10.0%	2.039
1/1/04	10.0%	2.243
1/1/05	10.0%	2.468
1/1/06	5.0%	2.591
9/1/06	8.0%	2.798
1/1/07	3.7%	2.902
2/1/08	5.4%	3.059
2/1/09	15.6%	3.536
1/1/11	5.0%	3.713
1/1/12	5.0%	3.898
1/1/13	5.0%	4.093
1/1/14	5.0%	4.298
1/1/15	5.0%	4.513
1/1/16	5.0%	4.738
1/1/17	0.0%	4.738
1/1/18	5.0%	4.975

Notes:

(2) Provided by TWIA, excludes 1/1/92 refund on in-force policies
(3) = Cumulation of (2)

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Fixed Expenses and Permissible Loss & LAE Ratios

	Expense Category	2015	2016	2017	Selected
(1)	Direct Written Premium	$503,824,316	$487,353,537	$423,074,138	
(2)	Direct Earned Premium	$501,721,842	$496,456,941	$451,347,130	
(3)	Commission				
	$ Amount	80,599,761	77,986,786	67,661,211	
	% of DWP	16.0%	16.0%	16.0%	16.0%
(4)	Other Acquisition				
	$ Amount	$0	$0	$0	
	% of DWP	0.0%	0.0%	0.0%	0.0%
(5)	General Expense				
	Unadjusted $ Amount	$27,800,836	$26,421,698	$26,359,831	
	Adjustments				
	Contribution to Statutory Fund	0	0	0	
	Adjusted $ Amount	27,800,836	26,421,698	26,359,831	
	% of DWP	5.5%	5.4%	6.2%	5.7%
(6)	Taxes, Licenses & Fees				
	$ Amount	$9,828,083	$9,626,596	$8,281,293	
	% of DWP	2.0%	2.0%	2.0%	2.0%
(7)	Reinsurance Expense				16.0%
(8)	Outstanding Class 1 Public Security Repayment				18.6%
(9)	Total Fixed Expenses				40.3%
(10)	Total Variable Expenses				18.0%
(11)	CRTF Contribution & UW Contingency & Uncertainty				5.0%
(12)	Permissible Loss & LAE Ratio				77.0%

Notes:
(1) - (6) From TWIA's Statutory Annual Statements and Insurance Expense Exhibits
(7) Exhibit 11, Sheet 2
(8) Outstanding Class 1 Public Security Repayment issued in 2015, Security depleted due to Hurricane Harvey
(9) = (5) + (7) + (8)
(10) = (3) + (4) + (6)
(11) CRTF contribution selected judgmentally; Class 1 repayment based on projected $80 million in debt service
(12) = 100% - (10) - (11)

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Development of Reinsurer Expense
Using Average of AIR and RMS Hurricane Models

		Net of Depop
(1)	2018 - 2019 Reinsurance Premium	106,196,289
(2a)	Average Annual Loss by Reinsurance Layer (AIR)	
	100% of $2600M XS $2000M	44,540,000
	Total	44,540,000
(2b)	Average Annual Loss by Reinsurance Layer (RMS)	
	100% of $2600M XS $2000M	25,040,000
	Total	25,040,000
(2c)	Selected Total Average Annual Loss	34,790,000
(3)	Annual Exposure Growth	-5.0%
(4)	Prospective Average Annual Loss	33,050,500
(5)	Net Cost of Reinsurance	69,014,477
(6)	TWIA 2017 Earned Premium at Present Rates	478,732,034
(7)	2018 - 2019 TWIA Prospective Earned Premium at Present Rates	431,390,335
(8)	Indicated Reinsurance Expense %	16.0%

Notes:
(1) From TWIA reinsurance contract effective 6/1/2018 through 5/31/2019
(2a) Provided by Guy Carpenter, based on AIR model using TWIA exposures as of 11/30/2017 and adjusted for ALAE
(2b) Provided by Guy Carpenter, based on RMS model using TWIA exposures as of 11/30/2017 and adjusted for ALAE
(2c) Selected equal to the average of the modeled average annual losses
(3) Selected based on projections communicated to reinsurers
(4) = (2c) * [(1+ (3)) ^ 1.000]
(5) = (1) - (4)
(6) = Commercial Exhibit 10, Sheet 1 + Residential Exhibit 10, Sheet 2, calendar year ending 12/31/xx
(7) = (6) adjusted for premium trend * [(1+ (3)) ^ 1.417] (projected premium growth from 7/1/2017 to 12/1/2018)
(8) = (5) / (7)

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Reconciliation of Paid Loss Data to Schedule P

Accident Year	TWIA Provided Paid Loss Commercial & Farm	Residential	Total	Schedule P Direct & Assumed Paid Loss	Difference
(1)	(2)	(3)	(4)	(5)	(6)
2008	855,757,914	1,709,024,474	2,564,782,388	2,562,744,000	2,038,388
2009	2,553,456	8,479,585	11,033,041	10,403,000	630,041
2010	7,478,289	10,958,718	18,437,007	18,005,000	432,007
2011	19,217,587	76,980,633	96,198,220	96,089,000	109,220
2012	14,459,642	52,332,695	66,792,337	66,741,000	51,337
2013	7,351,329	63,503,334	70,854,663	70,811,000	43,663
2014	1,056,281	6,111,672	7,167,953	7,120,000	47,953
2015	17,779,952	119,744,438	137,524,390	137,604,000	(79,610)
2016	2,478,702	25,692,778	28,171,480	28,144,000	27,480
2017	279,298,924	667,119,688	946,418,612	946,303,000	115,612
Total	1,207,432,076	2,739,948,015	3,947,380,091	3,943,964,000	3,416,091

Notes:
(2), (3) Provided by TWIA, as of 12/31/2017
(4) = (2) + (3)
(5) Based on TWIA 2017 Annual Statement
(6) = (4) - (5)

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Reconciliation of Premium Data to Annual Statement

Calendar Year	TWIA Provided Written Premium			Annual Statement Gross Written Premium	Difference
	Commercial	Residential	Total		
(1)	(2)	(3)	(4)	(5)	(6)
1994	10,672,677	15,758,330	26,431,007	26,510,501	(79,494)
1995	12,865,905	19,259,265	32,125,170	32,419,287	(294,117)
1996	15,640,660	24,504,127	40,144,787	40,358,575	(213,788)
1997	16,536,186	25,783,455	42,319,641	42,462,844	(143,203)
1998	16,558,977	27,833,800	44,392,777	44,410,914	(18,137)
1999	17,394,142	27,168,992	44,563,134	44,581,218	(18,084)
2000	17,332,561	29,762,296	47,094,857	48,012,426	(917,569)
2001	17,544,251	36,220,623	53,764,874	54,630,727	(865,853)
2002	24,013,525	48,856,422	72,869,947	72,967,831	(97,884)
2003	29,220,514	58,573,191	87,793,705	87,987,279	(193,574)
2004	31,009,323	71,292,702	102,302,025	102,384,351	(82,326)
2005	35,740,174	78,094,458	113,834,632	113,927,701	(93,069)
2006	76,847,840	119,658,576	196,506,416	196,833,235	(326,819)
2007	110,951,718	203,561,196	314,512,914	315,139,307	(626,393)
2008	98,036,118	232,925,990	330,962,108	331,057,645	(95,537)
2009	111,269,573	269,535,059	380,804,632	382,342,402	(1,537,770)
2010	102,174,680	278,116,922	380,291,602	385,549,582	(5,257,980)
2011	100,017,021	307,494,236	407,511,257	403,748,164	3,763,093
2012	110,524,397	335,795,725	446,320,122	443,479,701	2,840,421
2013	112,904,624	360,838,081	473,742,705	472,739,474	1,003,231
2014	104,642,688	389,333,918	493,976,606	494,036,010	(59,404)
2015	98,715,934	407,969,846	506,685,780	503,824,316	2,861,464
2016	88,278,690	399,074,847	487,353,537	487,353,537	-
2017	70,749,081	352,368,052	423,117,133	423,074,138	42,995
Total	1,358,892,177	3,767,412,057	5,126,304,234	5,126,757,027	-452,793

Notes:

(2), (3) Provided by TWIA, as of 12/31/2017
(4) = (2) + (3)
(5) Based on TWIA Annual Statements
(6) = (4) - (5)

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Current and Proposed Rates
Rate Tables A and C

		Rate Table A			Rate Table C		
Table	Coinsurance	Current	Proposed	Change	Current	Proposed	Change
	50%	--	--		--	--	
1	80%	1.787	1.965	9.961%	1.433	1.576	9.979%
Frame (F)	100%	1.770	1.947	10.000%	1.413	1.554	9.979%
	50%	--	--		--	--	
2	80%	1.863	2.049	9.984%	1.518	1.669	9.947%
Brick (M)	100%	1.439	1.582	9.937%	1.157	1.272	9.939%
	50%	--	--		--	--	
3	80%	1.518	1.669	9.947%	1.212	1.333	9.983%
	100%	1.285	1.413	9.961%	1.000	1.100	10.000%
	50%	2.211	2.432	9.995%	--	--	
	80%	1.369	1.505	9.934%	1.085	1.193	9.954%
(HC)	100%	1.307	1.437	9.946%	1.071	1.178	9.991%
	50%	0.883	0.971	9.966%	--	--	
4	80%	0.553	0.608	9.946%	0.433	0.476	9.931%
(WR)	100%	0.516	0.567	9.884%	0.426	0.468	9.859%
	50%	1.100	1.210	10.000%	--	--	
	80%	0.674	0.741	9.941%	0.541	0.595	9.982%
(SWR)	100%	0.652	0.717	9.969%	0.526	0.578	9.886%
	50%	--	--		--	--	
5	80%	1.275	1.402	9.961%	0.631	0.694	9.984%
Brick	100%	--	--		--	--	
	50%	--	--		--	--	
5A	80%	1.533	1.686	9.980%	0.768	0.844	9.896%
Frame	100%	--	--		--	--	
	50%	--	--		--	--	
5B	80%	1.275	1.402	9.961%	0.631	0.694	9.984%
Brick Veneer	100%	--	--		--	--	
	50%	--	--		--	--	
7	80%	4.345	4.779	9.988%	3.455	3.800	9.986%
	100%	3.735	4.108	9.987%	2.980	3.278	10.000%
	50%	--	--		--	--	
8	80%	5.179	5.696	9.983%	4.148	4.562	9.981%
	100%	4.345	4.779	9.988%	3.475	3.822	9.986%
	50%	--	--		--	--	
9	80%	6.202	6.822	9.997%	4.963	5.459	9.994%
	100%	5.083	5.591	9.994%	4.071	4.478	9.998%
	50%	--	--		--	--	
10	80%	7.443	8.187	9.996%	5.957	6.552	9.988%
	100%	6.202	6.822	9.997%	4.963	5.459	9.994%
	50%	--	--		--	--	
11	80%	9.662	10.628	9.998%	7.747	8.521	9.991%
	100%	8.177	8.994	9.991%	6.535	7.188	9.992%
	50%	--	--		--	--	
12	80%	14.186	15.604	9.996%	11.329	12.461	9.992%
	100%	11.930	13.123	10.000%	9.544	10.498	9.996%
	50%	--	--		--	--	
13	80%	19.335	21.268	9.997%	15.470	17.017	10.000%
	100%	16.283	17.911	9.998%	13.031	14.334	9.999%
	50%	--	--		--	--	
14	80%	38.371	42.208	10.000%	30.703	33.773	9.999%
	100%	32.217	35.438	9.998%	25.768	28.344	9.997%
	50%	--	--		--	--	
20	80%	8.820	9.702	10.000%	8.820	9.702	10.000%
	100%	8.820	9.702	10.000%	8.820	9.702	10.000%

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Current and Proposed Rates
Rate Table B

		Rate Table B		
Table	Coinsurance	Current	Proposed	Change
	50%	--	--	
1	80%	1.060	1.166	10.000%
Frame (F)	100%	1.048	1.152	9.924%
	50%	--	--	
2	80%	1.115	1.226	9 955%
Brick (M)	100%	0.847	0.931	9.917%
	50%	--	--	
3	80%	0.897	0.986	9.922%
	100%	0.750	0.825	10.000%
	50%	1.307	1.437	9.946%
	80%	0.820	0.902	10.000%
(HC)	100%	0.780	0.858	10.000%
	50%	0.516	0.567	9.884%
4	80%	0.323	0.355	9.907%
(WR)	100%	0.312	0.343	9.936%
	50%	0.652	0.717	9.969%
	80%	0.409	0.449	9.780%
(SWR)	100%	0.394	0.433	9.898%

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Current and Proposed Rates
Miscellaneous Farm Property and Barns and Outbuildings

Territorial Multipliers for Miscellaneous Farm Property

		Territory 1			Territories 8, 9, 10		
Table	Coinsurance	Current	Proposed	Change	Current	Proposed	Change
15	80%	3.700	4.070	10.000%	4.091	4.500	9.998%
21	80%	4.432	4.875	9.995%	4.896	5.385	9.988%
22	80%	4.140	4.554	10.000%	4.564	5.020	9.991%
23	80%	3.148	3.462	9.975%	3.481	3.829	9.997%
24	80%	3.150	3.465	10.000%	3.481	3.829	9.997%

Territorial Multipliers for Barns and Outbuildings

	Territory 1			Territories 8, 9, 10		
Construction	Current	Proposed	Change	Current	Proposed	Change
Frame	6.088	6.696	9.987%	6.720	7.392	10.000%
Brick Veneer	6.246	6.870	9.990%	6.903	7.593	9.996%
Brick	5.220	5.742	10.000%	5.768	6.344	9.986%

Modified EC Rates are calculated by multiplying promulgated base rates by a 130% flex factor and the appropriate territorial multiplier
All interim calculations are rounded down where applicable