



**Xiuyu Li, ACAS, MAAA
Actuary**

August 14, 2017

Marilyn Hamilton
Property & Casualty Associate Commissioner
Texas Department of Insurance
P.O. Box 149104 M/C 104-PC
Austin, TX 78701

RE: Texas Windstorm Insurance Association Annual Rate Filing

Dear Marilyn:

Section 2210.352 of the Texas Insurance Code states that, not later than August 15 of each year, the Texas Windstorm Insurance Association shall file with the Department a proposed manual rate for all types and classes of risks written by the Association.

This filing is made pursuant to Section 2210.352 (a-1) and fulfills all of the requirements of that subsection.

On August 1, 2017, the Board of Directors of the Association voted to file for uniform 5% increases in both its residential and commercial rates, to be effective January 1, 2018. The increases are based on an actuarial review resulting in indications of +30% and +28% for residential and commercial rates, respectively. The complete residential and commercial analyses are attached.

If you or your staff have any questions or comments, please contact John Polak or me.

Respectfully,

A handwritten signature in black ink, appearing to read "Xiuyu Li", written in a cursive style.

Xiuyu Li

Texas Windstorm Insurance Association

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**TEXAS WINDSTORM INSURANCE ASSOCIATION
COMMERCIAL PROPERTY RATE LEVEL REVIEW
2017**

July 2017

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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 12/31/16. 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	+28%
Actual Industry Experience	+25%
Hurricane Simulation Models	+31%

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 47 years of actual insurance industry premiums and losses and 166 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 7% more than the corresponding indication from the prior TWIA commercial rate study. Changes in adjustment factors to bring historical industry premium to TWIA current rate levels, Exposure reduction due to Depop and recent decreasing trend in exposure, 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, including provisions for both the Catastrophe Reserve Trust Fund and the repayment of outstanding pre-event Class 1 public securities. The total funding provision is 20% of TWIA premium. The CRTF provision is necessary to rebuild the fund, which was completely depleted in order to pay losses associated with 2008 hurricanes. The Class 1 securities provision is necessary to repay debt service for outstanding debt issued in 2014.

The provision for reinsurance expense is 17% 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 0.127 is equal to the weighted average of the nine hurricane years included in the analysis. For non-hurricane losses, the indicated ratio of 0.259 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 2007 - 2016 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 12/31/16 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 earned 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 2007 - 2016 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 2007 - 2016 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 47 and 166 years, respectively. The other method is based on hurricane simulation models. The "47/166-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 47-year period is insufficient to measure long-term hurricane intensity.
- A 47-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 47/166-Year Industry Hurricane Experience

In Exhibit 6, Texas insurance industry seacoast dwelling extended coverage experience for the 1970-2016 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 (1983-2016), 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 47 years of loss ratios by separating the 47 years into the twelve hurricane years and thirty-five non-hurricane years. The 35 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 twelve hurricane years. An average hurricane loss ratio for hurricane years is calculated as the average of the twelve hurricane loss ratios: 104.9%.

The 47-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 47-year period is 0.275, while the annual frequency during the most recent 166-year period is 0.380. The 47-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 46-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 166-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 39.9%.

Hurricane Simulation Models

The projected hurricane loss ratio is determined by averaging two different hurricane simulation models: AIR Touchstone v4 and RMS RiskLink v15.0.1. Both models were run using exposure data provided by TWIA as of 12/31/2016. 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
No US Landfall	-	4.7%
Category 0	0.0%	3.1%
Category 1	40.3%	18.0%
Category 2	26.2%	12.7%
Category 3	22.2%	19.9%
Category 4	10.1%	29.9%
Category 5	1.1%	11.8%

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 and Cat 0 events making landfall in TX, neighboring states or Mexico.

As shown in Exhibits 7 and 8, these models yield projected hurricane loss ratios of 43.7% and 43.6%. The average of these loss ratios is 43.7%.

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 and the net cost of reinsurance. The sum of these projected expenses provides for a 22.4% fixed expense ratio. Variable expenses include commission, taxes, and catastrophe trust fund contribution. Subtracting these expenses from 100% yields a variable permissible loss and LAE ratio of 62.0%.

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 20% provision for funding contribution is intended to permit the redevelopment of the catastrophe reserve trust fund and to repay outstanding pre-event public securities debt service in order to reduce the potential for future year surcharges on TWIA and coastal insurance policies and assessments to TWIA members. The 17.0% 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 - 2015. 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
<i>Previous Rate Indication (Combined Method)</i>		+21%
Change in adjust factors to bring industry earned premium to current TWIA rate level	+4%	
Change in reinsurance provision	+1%	
Change brought by depop	+1%	
Change due to all other factors	+1%	
<i>Current Rate Indication (Combined Method)</i>		+28%

These reasons are discussed below:

Change in adjust factors to bring industry earned premium to current TWIA rate level

TWIA updated adjust factors to bring industry earned premium to current TWIA rate level. This change has a 4% impact (increase) on indicated rates.

Change in reinsurance provision

The indicated rate change increased approximately 1% as a result of increases in reinsurance provision. TWIA recent decrease in exposure, including exposure decrease due to Depop, was the main driver of the increase in reinsurance provision.

Change brought by Depop

Loss experience ratio based on hurricane model increased due to Depop. The indicated rate change increased approximately 1% accordingly.

SUMMARY OF EXHIBITS

<u>Exhibit Number</u>	<u>Exhibit Title or Purpose</u>
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 – 46/165-Year Method
7	Hurricane Loss Ratio – AIR Model
8	Hurricane Loss Ratio – RMS Model
9	Texas Hurricanes 1850 - 2015
10	Earned Premium at Present Rates
11	Fixed Expenses and Variable Permissible Loss & LAE Ratios
12	Reconciliation of Premium Data to Annual Statement

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

Hurricane Projection Method	Indicated Loss & LAE Ratio			Fixed Expenses	Total	Permissible LLAE Ratio	Indicated Rate Change	Proposed Rate Change
	Hurricane	Non-Hurricane						
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Using Experience and Models	47.1%	9.8%	22.4%	79.3%	62.0%	+28%	+5.0%	
Using Actual Industry Experience	45.0%	9.8%	22.4%	77.2%	62.0%	+25%		
Using Hurricane Models	49.2%	9.8%	22.4%	81.4%	62.0%	+31%		

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)
2007	1,230,788	0.259	1.654	2,562,976	159,025,079	1.6%
2008	1,127,682	0.259	1.601	2,273,022	166,864,178	1.4%
2009	2,553,456	0.259	1.554	4,995,801	151,657,236	3.3%
2010	7,478,289	0.259	1.573	14,810,056	143,842,171	10.3%
2011	19,314,979	0.259	1.422	34,579,568	132,267,895	26.1%
2012	13,468,741	0.259	1.422	24,113,060	131,009,693	18.4%
2013	7,461,599	0.259	1.387	13,029,690	132,570,611	9.8%
2014	1,057,907	0.259	1.283	1,708,834	123,029,899	1.4%
2015	19,653,854	0.259	1.219	30,163,182	109,483,987	27.6%
2016	2,626,748	0.259	1.137	3,760,145	95,965,211	3.9%
Total	75,974,043			131,996,334	1,345,715,960	9.8%

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)
2007	1,230,788	1.000	1,230,788
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	19,199,780	1.006	19,314,979
2012	13,309,033	1.012	13,468,741
2013	7,351,329	1.015	7,461,599
2014	1,015,266	1.042	1,057,907
2015	17,690,238	1.111	19,653,854
2016	2,055,358	1.278	2,626,748
Total	73,011,219		75,974,043

Notes:

- (2) Exhibit 2, Sheet 3, as of 12/31/16
- (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 12/31/16

Accident Year	Paid Loss Excluding Expense			Total
	(1)	(2)	(3)	
2007		1,230,788	4,379,850	5,610,638
2008		1,127,682	854,530,232	855,657,914
2009		2,553,456	0	2,553,456
2010		7,478,289	0	7,478,289
2011		19,199,780	0	19,199,780
2012		13,309,033	0	13,309,033
2013		7,351,329	0	7,351,329
2014		1,015,266	0	1,015,266
2015		17,690,238	0	17,690,238
2016		2,055,358	0	2,055,358
Total		73,011,219	858,910,082	931,921,301

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 EPPR		
(1)	(2)		
		(3) Current Average Earned Date	7/1/2016
2009 / 4	10,802.24	(4) Current Average Accident Date	7/1/2016
2010 / 4	10,615.87	(5) Prospective Average Earned / Accident Date	1/1/2019
2011 / 4	9,883.01	(6) Premium Trend Length	2.500
2012 / 4	10,246.29	(7) Loss Trend Length	2.500
2013 / 4	10,182.74	(8) Selected Premium Trend	-3.0%
2014 / 4	9,704.50	(9) Selected Loss Trend	2.1%
2015 / 4	9,371.22		
2016 / 4	8,736.55		

Accident Year	Current Premium Trend	Current Loss Trend	Prospective Premium Trend	Prospective Loss Trend	Net Trend Factor
(10)	(11)	(12)	(13)	(14)	(15)
2007	0.809	1.177	0.927	1.053	1.654
2008	0.809	1.139	0.927	1.053	1.601
2009	0.809	1.106	0.927	1.053	1.554
2010	0.823	1.139	0.927	1.053	1.573
2011	0.884	1.106	0.927	1.053	1.422
2012	0.853	1.067	0.927	1.053	1.422
2013	0.858	1.047	0.927	1.053	1.387
2014	0.900	1.016	0.927	1.053	1.283
2015	0.932	1.000	0.927	1.053	1.219
2016	1.000	1.000	0.927	1.053	1.137

Notes:

- (2) Exhibit 3, Sheet 2 (10)
- (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 2016 / 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	<u>Months of Development</u>							
	12 (1)	24 (2)	36 (3)	48 (4)	60 (5)	72 (6)	84 (7)	(8)
2007		1,095	1,225	1,231	1,231	1,231	1,231	1,231
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	7302	7,478
2011		13,360	16,138	18,435	18,758	19119	19,200	
2012		8,512	11,404	13,135	13284	13,309		
2013		6,886	7,243	7338	7,351			
2014		641	875	1,015				
2015		15,923	17,690					
2016		2,055						

Accident Year	<u>Development Factors</u>							
	12 - 24 (1)	24 - 36 (2)	36 - 48 (3)	48 - 60 (4)	60 - 72 (5)	72 - 84 (6)	84 - Ult (7)	(8)
2007		1.118	1.005	1.000	1.000	1.000	1.000	
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		
2012		1.340	1.152	1.011	1.002			
2013		1.052	1.013	1.002				
2014		1.365	1.160					
2015		1.111						
Average		1.445	1.077	1.027	1.004	1.001	1.006	
Avg x hi / lo		1.230	1.088	1.021	1.001	1.001	1.000	
Avg 3 Year		1.176	1.108	1.010	1.007	1.002	1.008	
Avg 5 Year		1.215	1.114	1.021	1.004	1.001	1.006	
Prior		1.150	1.055	1.025	1.003	1.011	1.006	1.000
Selected		1.150	1.066	1.026	1.003	1.006	1.006	1.000
Cumulative		1.278	1.111	1.042	1.015	1.012	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)

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

Premium Trend Analysis
TWIA Commercial Earned Premium at Present Rates

Year / Quarter	Policies In-Force	Annualized		On- Level Factors	Premium at Present Rates		Earned Premium at Present Rates		Exponential Fitted Trends			
		Earned In-Force	Written Premium		Written	Earned	Annualized	Average	All-Year	5-Year	4-Year	3-Year
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
2008 / 2	14,506		29,792,563	1.549	46,153,166	44,275,565						
2008 / 3	15,154		31,242,231	1.549	48,398,920	41,059,467						
2008 / 4	14,627		19,083,062	1.549	29,562,536	39,501,511						
2009 / 1	14,096		22,603,019	1.397	31,570,731	38,216,113	163,052,655					
2009 / 2	13,835	14,512	31,053,698	1.340	41,614,925	38,137,954	156,915,045	10,812.87	10,945.10			
2009 / 3	14,052	14,290	34,969,708	1.340	46,862,754	38,173,532	154,029,110	10,778.62	10,879.75			
2009 / 4	13,862	14,057	22,643,147	1.340	30,343,983	37,318,193	151,845,792	10,802.24	10,814.79			
2010 / 1	13,510	13,888	21,744,008	1.340	29,139,051	37,213,371	150,843,050	10,861.39	10,750.21			
2010 / 2	13,517	13,775	30,585,842	1.340	40,987,953	36,900,257	149,605,353	10,860.64	10,686.02			
2010 / 3	13,796	13,703	30,108,058	1.340	40,347,677	35,646,792	147,078,613	10,733.12	10,622.22			
2010 / 4	13,497	13,626	19,736,772	1.340	26,449,162	34,887,419	144,647,839	10,615.87	10,558.79			
2011 / 1	13,063	13,524	18,748,657	1.276	23,928,565	33,700,193	141,134,661	10,435.77	10,495.74			
2011 / 2	12,873	13,388	28,450,431	1.276	36,310,761	32,174,291	136,408,696	10,189.07	10,433.07			
2011 / 3	13,052	13,214	30,648,240	1.276	39,115,784	32,011,666	132,773,569	10,047.76	10,370.78			
2011 / 4	13,168	13,080	22,169,693	1.276	28,294,770	31,384,818	129,270,968	9,883.01	10,308.85			
2012 / 1	13,081	13,041	23,778,724	1.216	28,903,188	32,493,015	128,063,790	9,819.90	10,247.30	10,430.25		
2012 / 2	12,750	13,028	31,324,576	1.216	38,075,218	33,635,263	129,524,761	9,941.93	10,186.11	10,353.23		
2012 / 3	13,263	13,039	32,445,956	1.216	39,438,262	33,579,270	131,092,365	10,053.77	10,125.29	10,276.78		
2012 / 4	13,030	13,048	22,975,141	1.216	27,926,427	33,988,584	133,696,131	10,246.29	10,064.83	10,200.89		
2013 / 1	12,985	13,019	23,791,092	1.158	27,541,163	33,502,693	134,705,809	10,346.86	10,004.74	10,125.57	10,495.12	
2013 / 2	12,897	13,025	32,041,163	1.158	37,091,651	33,005,741	134,076,287	10,293.47	9,945.00	10,050.80	10,378.17	
2013 / 3	13,143	13,029	34,693,889	1.158	40,162,513	33,297,337	133,794,355	10,269.16	9,885.62	9,976.58	10,262.54	
2013 / 4	13,048	13,016	22,378,480	1.158	25,905,888	32,732,727	132,538,498	10,182.74	9,826.59	9,902.91	10,148.19	
2014 / 1	12,825	12,998	21,228,508	1.103	23,404,430	31,898,568	130,934,373	10,073.23	9,767.91	9,829.79	10,035.11	10,119.49
2014 / 2	12,743	12,959	34,367,766	1.103	37,890,462	31,752,350	129,680,983	10,007.02	9,709.59	9,757.20	9,923.29	9,994.29
2014 / 3	12,507	12,860	28,573,600	1.103	31,502,394	30,333,213	126,716,858	9,853.37	9,651.61	9,685.15	9,812.72	9,870.64
2014 / 4	12,343	12,693	20,472,814	1.103	22,571,277	29,191,400	123,175,532	9,704.50	9,593.98	9,613.63	9,703.39	9,748.53
2015 / 1	12,194	12,526	23,219,646	1.050	24,380,628	29,281,908	120,558,872	9,624.98	9,536.70	9,542.64	9,595.27	9,627.92
2015 / 2	11,845	12,335	31,964,269	1.050	33,562,482	28,502,706	117,309,227	9,510.66	9,479.75	9,472.18	9,488.35	9,508.81
2015 / 3	11,888	12,145	27,061,328	1.050	28,414,394	27,763,747	114,739,760	9,447.59	9,423.15	9,402.23	9,382.63	9,391.16
2015 / 4	11,542	11,967	16,470,691	1.050	17,294,226	26,600,596	112,148,956	9,371.22	9,366.88	9,332.81	9,278.08	9,274.98
2016 / 1	11,294	11,755	21,648,495	1.000	21,648,495	25,472,860	108,339,908	9,216.69	9,310.95	9,263.89	9,174.70	9,160.23
2016 / 2	10,943	11,530	27,892,409	1.000	27,892,409	24,854,199	104,691,401	9,080.31	9,255.36	9,195.48	9,072.47	9,046.90
2016 / 3	10,770	11,277	24,633,459	1.000	24,633,459	23,185,522	100,113,176	8,877.64	9,200.09	9,127.58	8,971.38	8,934.98
2016 / 4	10,285	10,980	14,104,327	1.000	14,104,327	22,415,857	95,928,438	8,736.55	9,145.16	8,993.28	8,871.42	8,824.44
(14) Average Annual Change									-2.4%	-3.0%	-4.4%	-4.9%
(15) Correlation Coefficient									83.0%	74.6%	97.9%	98.3%
(16) Selected Premium Trend												-3.0%

- Notes:
- (2) Provided by TWIA
 - (3) Calculated from (2) using uniform quarterly earning assumption
 - (4) Provided by TWIA
 - (5) Factor to bring written premium to current rate level
 - (6) = (4) * (5) Indexed to 2016 / 4
 - (7) Calculated from (6) using uniform monthly earning assumption
 - (8) = Sum of (7) 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		Residential		Modified CPI	Weighted Average
	Statewide Boeckh	Coastal Boeckh	Statewide Boeckh	Coastal Boeckh		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2007	1.211	1.209	1.164	1.167	1.080	1.177
2008	1.167	1.162	1.144	1.140	1.069	1.139
2009	1.126	1.114	1.122	1.112	1.083	1.106
2010	1.146	1.158	1.116	1.115	1.083	1.139
2011	1.107	1.119	1.102	1.108	1.066	1.106
2012	1.066	1.074	1.073	1.079	1.046	1.067
2013	1.044	1.049	1.043	1.048	1.040	1.047
2014	1.013	1.012	1.009	1.005	1.026	1.016
2015	0.995	0.995	0.990	0.989	1.016	1.000
2016	1.000	1.000	1.000	1.000	1.000	1.000

Factors to Adjust For Prospective Loss Costs

(8) Fitted Trend	2.2%	2.4%	2.3%	2.5%	1.1%	2.1%
(9) Cost Factor	1.057	1.060	1.059	1.064	1.028	1.053

Notes:

- (2) = Exhibit 3, Sheet 3b trended forward to 12/31/2016
- (3) = Exhibit 3, Sheet 3c trended forward to 12/31/2016
- (4) = Residential Exhibit 3, Sheet 3b trended forward to 12/31/2016
- (5) = Residential Exhibit 3, Sheet 3c trended forward to 12/31/2016
- (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 7/1/2016 to 1/1/2019)

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)
3/31/2007	1939.13		
6/30/2007	1964.32		
9/30/2007	1986.91		
12/31/2007	2002.86		
3/31/2008	2017.57		
6/30/2008	2035.39		
9/30/2008	2055.55		
12/31/2008	2078.92	2069.02	2074.55
3/31/2009	2108.32	2081.52	2086.01
6/30/2009	2141.00	2094.02	2097.53
9/30/2009	2157.97	2106.52	2109.12
12/31/2009	2155.18	2119.02	2120.77
3/31/2010	2141.73	2131.51	2132.48
6/30/2010	2124.68	2144.01	2144.26
9/30/2010	2115.34	2156.51	2156.11
12/31/2010	2116.48	2169.01	2168.02
3/31/2011	2127.08	2181.51	2179.99
6/30/2011	2141.50	2194.01	2192.04
9/30/2011	2163.68	2206.51	2204.15
12/31/2011	2192.00	2219.01	2216.32
3/31/2012	2217.77	2231.51	2228.56
6/30/2012	2239.55	2244.01	2240.87
9/30/2012	2258.47	2256.51	2253.25
12/31/2012	2275.37	2269.01	2265.70
3/31/2013	2288.71	2281.51	2278.21
6/30/2013	2300.16	2294.01	2290.80
9/30/2013	2312.55	2306.50	2303.45
12/31/2013	2324.29	2319.00	2316.18
3/31/2014	2338.66	2331.50	2328.97
6/30/2014	2357.74	2344.00	2341.84
9/30/2014	2375.53	2356.50	2354.77
12/31/2014	2394.51	2369.00	2367.78
3/31/2015	2413.17	2381.50	2380.86
6/30/2015	2425.58	2394.00	2394.01
9/30/2015	2434.16	2406.50	2407.24
12/31/2015	2437.78	2419.00	2420.53
3/31/2016	2435.64	2431.50	2433.91
6/30/2016	2430.75	2444.00	2447.35
9/30/2016	2426.85	2456.50	2460.87
12/31/2016	2426.13	2469.00	2474.46
Annual Trend		2.0%	2.2%
R-Squared		0.944	0.943

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)
3/31/2005			
6/30/2005			
9/30/2005			
12/31/2005			
3/31/2006			
6/30/2006			
9/30/2006			
12/31/2006	1930.37	1977.47	1986.34
3/31/2007	1959.70	1990.54	1998.00
6/30/2007	1988.13	2003.61	2009.74
9/30/2007	2013.31	2016.68	2021.54
12/31/2007	2031.76	2029.75	2033.42
3/31/2008	2050.67	2042.82	2045.36
6/30/2008	2068.99	2055.89	2057.37
9/30/2008	2089.34	2068.96	2069.46
12/31/2008	2114.71	2082.03	2081.61
3/31/2009	2145.16	2095.10	2093.84
6/30/2009	2180.12	2108.17	2106.14
9/30/2009	2204.40	2121.24	2118.51
12/31/2009	2204.50	2134.31	2130.95
3/31/2010	2186.90	2147.37	2143.47
6/30/2010	2162.64	2160.44	2156.06
9/30/2010	2138.17	2173.51	2168.72
12/31/2010	2121.49	2186.58	2181.46
3/31/2011	2123.27	2199.65	2194.28
6/30/2011	2135.31	2212.72	2207.17
9/30/2011	2160.02	2225.79	2220.13
12/31/2011	2194.60	2238.86	2233.17
3/31/2012	2222.30	2251.93	2246.29
6/30/2012	2245.64	2265.00	2259.48
9/30/2012	2266.95	2278.07	2272.75
12/31/2012	2288.14	2291.14	2286.10
3/31/2013	2305.89	2304.21	2299.53
6/30/2013	2318.32	2317.28	2313.04
9/30/2013	2329.99	2330.35	2326.62
12/31/2013	2341.89	2343.42	2340.29
3/31/2014	2362.28	2356.49	2354.03
6/30/2014	2386.51	2369.56	2367.86
9/30/2014	2407.30	2382.63	2381.77
12/31/2014	2428.32	2395.70	2395.76
3/31/2015	2443.32	2408.77	2409.83
6/30/2015	2455.44	2421.84	2423.99
9/30/2015	2464.89	2434.91	2438.22
12/31/2015	2470.01	2447.98	2452.54
3/31/2016	2469.65	2461.05	2466.95
6/30/2016	2465.77	2474.12	2481.44
9/30/2016	2460.52	2487.19	2496.02
12/31/2016	2456.69	2500.26	2510.68
Annual Trend		2.1%	2.4%
R-Squared		0.943	0.940

Notes:

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

Rate Level Review

Loss Trend Analysis

Modified Consumer Price Index - External Trend

Calendar Year Ending	Modified CPI	Fitted Trends		5 Years		4 Years		3 Years	
		All Years Linear	Exponential	Linear	Exponential	Linear	Exponential	Linear	Exponential
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
9/30/2006	174.54	175.12	175.26						
12/31/2006	175.48	175.52	175.64						
3/31/2007	176.25	175.91	176.02						
6/30/2007	177.33	176.31	176.40						
9/30/2007	178.34	176.70	176.78						
12/31/2007	179.24	177.10	177.16						
3/31/2008	180.31	177.49	177.54						
6/30/2008	180.58	177.89	177.92						
9/30/2008	181.04	178.28	178.30						
12/31/2008	181.06	178.68	178.68						
3/31/2009	180.55	179.07	179.07						
6/30/2009	180.07	179.47	179.45						
9/30/2009	179.30	179.86	179.84						
12/31/2009	178.80	180.26	180.23						
3/31/2010	178.46	180.65	180.61						
6/30/2010	178.56	181.05	181.00						
9/30/2010	178.59	181.44	181.39						
12/31/2010	178.72	181.84	181.78						
3/31/2011	178.97	182.23	182.17						
6/30/2011	179.61	182.63	182.56						
9/30/2011	180.52	183.02	182.96						
12/31/2011	181.55	183.42	183.35						
3/31/2012	182.78	183.81	183.74	182.92	182.96				
6/30/2012	183.87	184.21	184.14	183.44	183.47				
9/30/2012	184.57	184.60	184.53	183.96	183.98				
12/31/2012	185.03	185.00	184.93	184.48	184.49				
3/31/2013	185.38	185.39	185.33	185.00	185.00	184.62	184.65		
6/30/2013	185.51	185.79	185.73	185.53	185.52	185.18	185.20		
9/30/2013	185.82	186.18	186.13	186.05	186.03	185.74	185.75		
12/31/2013	186.03	186.58	186.53	186.57	186.55	186.30	186.30		
3/31/2014	186.43	186.97	186.93	187.09	187.07	186.86	186.86	186.44	186.46
6/30/2014	186.87	187.37	187.33	187.61	187.59	187.42	187.41	187.07	187.07
9/30/2014	187.59	187.76	187.73	188.13	188.11	187.98	187.97	187.69	187.69
12/31/2014	188.62	188.16	188.13	188.65	188.63	188.54	188.53	188.31	188.31
3/31/2015	189.46	188.55	188.54	189.18	189.15	189.10	189.09	188.94	188.93
6/30/2015	189.59	188.95	188.94	189.70	189.68	189.67	189.65	189.56	189.55
9/30/2015	190.03	189.34	189.35	190.22	190.21	190.23	190.21	190.18	190.17
12/31/2015	190.50	189.74	189.76	190.74	190.73	190.79	190.78	190.81	190.80
3/31/2016	190.95	190.13	190.17	191.26	191.26	191.35	191.34	191.43	191.42
6/30/2016	192.03	190.53	190.57	191.78	191.79	191.91	191.91	192.05	192.05
9/30/2016	192.82	190.92	190.98	192.31	192.33	192.47	192.48	192.68	192.68
12/31/2016	193.56	191.32	191.39	192.83	192.86	193.03	193.06	193.30	193.32
Annual Trend		0.8%	0.9%	1.1%	1.1%	1.2%	1.2%	1.3%	1.3%
R-Squared		0.892	0.893	0.979	0.981	0.979	0.980	0.985	0.985

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	2,594,138	347,235	0.134	H
2009	10,397	2,216	0.213	
2010	18,020	4,278	0.237	
2011	95,292	15,132	0.159	
2012	65,399	15,781	0.241	
2013	71,177	14,103	0.198	
2014	7,254	7,003	0.965	
2015	136,876	39,261	0.287	
2016	32,262	15,110	0.468	
All Years Total	3,640,792	532,947	0.146	
Hurricane Years Total	3,103,725	394,399	0.127	
Non-Hurricane Years				
Total	537,067	138,548	0.258	
10 Year	436,677	112,884	0.259	

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 12/31/16	Development Factor	Indicated Ultimate Loss
(1)	(2)	(3)	(4)
1979			1423
1980			12,911
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			2,594,138
2009			10,397
2010	18,020	1.000	18,020
2011	95,964	0.993	95,292
2012	66,328	0.986	65,399
2013	71,823	0.991	71,177
2014	7,298	0.994	7,254
2015	139,955	0.978	136,876
2016	31,292	1.031	32,262

Notes:

- (2) Exhibit 4, Sheet 3
- (3) Exhibit 4, Sheet 3
- (4) 2010 - 2016: (2) * (3); 1979 - 2009: 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)

Accident Year	<u>Months of Development</u>							
	12 (1)	24 (2)	36 (3)	48 (4)	60 (5)	72 (6)	84 (7)	(8)
2007		16,446	15,813	15,537	15,834	15,867	15,750	15,745
2008		1,902,481	1,774,393	2,273,398	2,384,020	2,680,497	2,632,000	2,594,138
2009		8,267	10,825	10,581	10,732	10,453	10,404	10,397
2010		15,215	18,166	18,173	18,522	18,361	18,267	18,020
2011		94,870	96,967	97,503	96,828	96,263	95,964	
2012		62,722	69,764	67,287	66,724	66,328		
2013		77,204	75,204	72,860	71,823			
2014		6,739	7,854	7,298				
2015		147,927	139,955					
2016		31,292						

Accident Year	<u>Development Factors</u>						
	12 - 24 (1)	24 - 36 (2)	36 - 48 (3)	48 - 60 (4)	60 - 72 (5)	72 - 84 (6)	84 - Ult (7)
2007		0.962	0.983	1.019	1.002	0.993	1.000
2008		0.933	1.281	1.049	1.124	0.982	0.986
2009		1.309	0.977	1.014	0.974	0.995	0.999
2010		1.194	1.000	1.019	0.991	0.995	0.986
2011		1.022	1.006	0.993	0.994	0.997	
2012		1.112	0.964	0.992	0.994		
2013		0.974	0.969	0.986			
2014		1.165	0.929				
2015		0.946					

Average		1.069	1.014	1.010	1.013	0.992	0.993	
Avg x hi / lo		1.054	0.983	1.007	0.995	0.994	0.993	
Avg 3 Year		1.029	0.954	0.990	0.993	0.996	0.990	
Avg 5 Year		1.044	0.974	1.001	1.016	0.992	0.993	
Prior		1.077	0.997	1.007	1.009	0.990	0.996	1.000
Selected		1.054	0.984	1.003	1.005	0.993	0.993	1.000
Cumulative		1.031	0.978	0.994	0.991	0.986	0.993	1.000

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

Accident Year	Incurred ALAE at 12/31/16	Development Factor	Indicated Ultimate ALAE	Incurred ULAE	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		98,314	1.000	98,314	248,921	347,235
2009		223	1.000	223	1,993	2,216
2010		323	1.000	323	3,955	4,278
2011		745	1.011	753	14,379	15,132
2012		917	1.003	920	14,861	15,781
2013		1,089	1.066	1,161	12,942	14,103
2014		1,085	1.134	1,230	5,773	7,003
2015		1,818	1.168	2,123	37,138	39,261
2016		412	1.343	553	14,557	15,110

Notes:

- (2) Exhibit 4, Sheet 5
- (3) Exhibit 4, Sheet 5
- (4) 2007 - 2016: (2) * (3); 1986 - 2006: from TWIA's annual statements
- (5) From TWIA's annual statements
- (6) 1986 - 2016: (4) + (5); prior years from prior TWIA annual statements

Texas Windstorm Insurance Association

Commercial Property - Wind & Hail

Rate Level Review

Incurred ALAE Development Factors

TWIA Schedule P Incurred ALAE (Including IBNR)

Accident Year	<u>Months of Development</u>							
	12 (1)	24 (2)	36 (3)	48 (4)	60 (5)	72 (6)	84 (7)	(8)
2006		704	891	899	879	867	860	860
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	98,314
2009		7,335	359	226	231	223	223	223
2010		391	312	322	316	335	324	323
2011		515	592	609	682	629	745	
2012		516	679	719	632	917		
2013		802	806	715	1,089			
2014		516	493	1,085				
2015		973	1,818					
2016		412						

Accident Year	<u>Development Factors</u>							
	12 - 24 (1)	24 - 36 (2)	36 - 48 (3)	48 - 60 (4)	60 - 72 (5)	72 - 84 (6)	84 - Ult (7)	(8)
2006		1.266	1.009	0.978	0.986	0.992	1.000	
2007		1.168	0.940	0.862	0.991	0.997	1.000	
2008		0.835	0.764	1.046	1.078	0.768	1.064	
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		
2012		1.316	1.059	0.879	1.451			
2013		1.005	0.887	1.523				
2014		0.955	2.201					
2015		1.868						
Average		1.04	1.06	1.05	1.06	0.98	1.01	
Avg x hi / lo		1.06	0.96	1.00	1.02	0.99	1.00	
Avg 3 Year		1.28	1.38	1.17	1.14	1.05	1.02	
Avg 5 Year		1.26	1.24	1.11	1.10	0.98	1.02	
Prior		1.15	1.03	0.99	1.00	0.95	1.01	1.00
Selected		1.15	1.03	1.06	1.06	0.99	1.01	1.00
Cumulative		1.34	1.17	1.13	1.07	1.00	1.01	1.00

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

Basis for Hurricane Loss Ratio	(1)	Indicated Loss Ratio (2)	LAE Factor (3)	Indicated Loss & LAE Ratio (4)
Industry Experience		39.9%	0.127	45.0%
<u>Hurricane Models</u>				
AIR Model		43.7%	0.127	49.2%
RMS Model		43.6%	0.127	49.1%
Average of Models		43.7%	0.127	49.2%

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

1970 - 2016 -- Hurricane Years Only

Accident Year	Earned Premium at Current TWIA Rate Level	Incurred Loss Ratio
(1)	(2)	(3)
1970	55,577,463	41.5%
1971	60,038,383	93.1%
1980	66,707,221	57.6%
1983	39,134,259	311.2%
1986	50,430,098	9.5%
1989	79,920,621	5.7%
1990	67,987,754	82.2%
1999	159,508,009	9.5%
2003	190,748,454	28.2%
2005	240,995,166	219.5%
2007	314,688,066	3.9%
2008	285,330,307	493.4%
<hr/>		
(4)	Simple Average Loss Ratio for Hurricane Years	112.9%
(5)	Selected Non-Hurricane Loss Ratio	8.0%
(6)	Average Hurricane Loss Ratio for Hurricane Years	104.9%
(7)	Historical Hurricane Frequency	
	(a) 47.3-Year (10/1/1969 - 12/31/2016)	0.275 (1 Hurricane Every 3.6 years)
	(b) 166-Year (1/1/1851 - 12/31/2016)	0.380 (1 Hurricane Every 2.6 years)
	Selected Frequency	0.380 (1 Hurricane Every 2.6 years)
(8)	Indicated Hurricane Loss Ratio	39.9%

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

1970 - 2016

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	55,577,463	23,092,142	41.5%	H
1971	13,340,143	20,347,170	60,038,383	55,893,676	93.1%	H
1972	18,906,678	24,314,307	71,744,212	8,704,522	12.1%	
1973	21,737,541	23,257,532	68,625,987	3,837,493	5.6%	
1974	22,348,193	22,844,661	67,407,729	2,193,087	3.3%	
1975	24,396,629	24,958,305	73,644,457	3,943,412	5.4%	
1976	26,795,934	24,109,943	71,141,196	2,218,115	3.1%	
1977	30,910,821	27,119,226	80,020,685	1,898,346	2.4%	
1978	32,709,599	26,415,338	77,943,723	2,535,872	3.3%	
1979	31,306,685	24,514,306	72,334,349	4,535,147	6.3%	
1980	28,751,765	22,607,257	66,707,221	38,431,071	57.6%	H
1981	24,129,384	21,398,588	63,140,802	4,272,728	6.8%	
1982	18,505,004	17,523,231	51,705,788		3.4%	
1983	12,680,397	13,262,706	39,134,259		311.2%	H
1984	12,736,031	14,992,627	44,238,736		8.4%	
1985	15,169,575	16,422,895	48,459,027		4.0%	
1986	21,130,682	17,090,896	50,430,098		9.5%	H
1987	31,114,529	26,771,157	78,993,638		1.5%	
1988	25,065,531	24,117,319	71,162,960		8.7%	
1989	24,167,085	27,085,314	79,920,621		5.7%	H
1990	19,677,404	23,041,233	67,987,754		82.2%	H
1991	21,794,680	25,534,881	75,345,759		63.0%	
1992	23,737,753	26,950,473	79,522,746		1.6%	
1993	21,990,182		64,893,026		5.7%	
1994	16,604,950		49,001,208		11.1%	
1995	32,374,229		95,536,350		24.3%	
1996	55,367,089		163,388,280		2.7%	
1997	53,196,024		156,981,467		4.1%	
1998	53,986,058		161,742,230		15.4%	
1999	52,435,243		159,508,009		9.5%	H
2000	41,739,697		121,504,258		9.0%	
2001	42,330,042		115,814,995		6.2%	
2002	69,156,402		181,051,460		13.6%	
2003	78,368,305		190,748,454		28.2%	H
2004	112,957,791		249,975,592		2.1%	
2005	119,598,806		240,995,166		219.5%	H
2006	148,019,940		274,094,412		2.4%	
2007	186,205,956		314,688,066		3.9%	H
2008	178,666,441		285,330,307		493.4%	H
2009	192,521,245		279,925,890		2.7%	
2010	200,865,967		269,160,396		6.5%	
2011	198,470,816		259,401,357		16.6%	
2012	229,307,067		285,487,298		17.7%	
2013	254,723,177		302,101,688		5.9%	
2014	263,645,584		297,655,865		1.5%	
2015	241,635,788		260,000,108		16.8%	
2016	225,750,977		231,169,000		3.7%	
Total / Average	3,581,904,029		6,525,382,475		35.4%	
Average of Non-Hurricane Years					8.8%	
Average of Non-Hurricane Years Excluding 1991					7.2%	
Selected					8.0%	

Notes: (2) Provided by TDI. 1970 - 1995 are year ending 9/30/xx as of Evaluated as of; 1996 - 2016 are year ending 12/31/xx as of 12/31/16
(3) Provided by TDI (1992 MR = 1992 manual rates)
(4) 1983 - 2016: Sum of Exhibit 6, Sheet 4 - Sheet 7, (5); 1970 - 1982: (3) * 2.951
(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 12/31/16

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

Accident Year	<u>Loss Ratios by Territory / Tier</u>				Weighted Loss Ratio
	Territory 8	Territory 9	Territory 10	Tier 2	
(1)	(2)	(3)	(4)	(5)	(6)
1983	922.5%	4.0%	42.9%	154.6%	311.2%
1984	7.9%	4.0%	10.1%	14.8%	8.4%
1985	3.8%	2.6%	4.5%	8.3%	4.0%
1986	3.0%	1.0%	16.7%	13.0%	9.5%
1987	0.5%	1.7%	2.1%	3.1%	1.5%
1988	12.0%	3.6%	8.5%	5.0%	8.7%
1989	14.0%	1.8%	2.0%	5.7%	5.7%
1990	247.3%	2.6%	9.3%	7.1%	82.2%
1991	22.3%	22.1%	104.9%	4.8%	63.0%
1992	0.8%	1.0%	2.2%	4.0%	1.6%
1993	14.2%	1.8%	1.8%	5.9%	5.7%
1994	0.3%	3.9%	20.6%	8.3%	11.1%
1995	8.1%	10.8%	39.4%	21.6%	24.3%
1996	1.5%	3.0%	3.3%	7.0%	2.7%
1997	5.5%	2.1%	3.8%	9.5%	4.1%
1998	21.7%	14.4%	12.0%	9.5%	15.4%
1999	2.8%	13.2%	12.3%	9.4%	9.5%
2000	2.2%	2.1%	14.5%	61.8%	9.0%
2001	7.4%	3.3%	6.0%	30.2%	6.2%
2002	12.3%	32.9%	7.5%	10.1%	13.6%
2003	2.5%	8.8%	51.4%	32.6%	28.2%
2004	3.0%	0.7%	2.1%	3.3%	2.1%
2005	69.9%	1.7%	397.0%	53.4%	219.5%
2006	2.4%	1.1%	2.7%	6.1%	2.4%
2007	1.7%	1.2%	6.2%	10.4%	3.9%
2008	735.5%	38.3%	507.1%	513.6%	493.4%
2009	2.7%	4.8%	1.7%	10.6%	2.7%
2010	1.6%	4.7%	10.4%	3.6%	6.5%
2011	4.1%	31.2%	19.1%	18.9%	16.6%
2012	16.6%	24.4%	16.1%	10.6%	17.7%
2013	14.3%	4.2%	1.3%	6.8%	5.9%
2014	0.6%	3.8%	1.2%	3.8%	1.5%
2015	12.3%	5.0%	24.0%	12.9%	16.8%
2016	0.9%	8.3%	3.3%	27.1%	3.7%
Average	64.1%	7.9%	40.2%	32.6%	41.7%

TWIA 2016 Written Premium by Territory / Tier

	Territory 8	Territory 9	Territory 10	Tier 2	Total
(7) Amount	123,723,598	71,935,582	196,830,392	4,511,865	397,001,437
(8) % Share	31.16%	18.12%	49.58%	1.14%	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	2.951	2,857,229	26,357,425	922.5%
1984	1,195,339	1,366,667	2.951	4,033,034	318,455	7.9%
1985	2,581,481	2,777,593	2.951	8,196,677	314,878	3.8%
1986	3,013,362	2,349,181	2.951	6,932,433	211,282	3.0%
1987	3,004,153	2,585,122	2.951	7,628,695	37,480	0.5%
1988	2,905,355	2,728,206	2.951	8,050,936	969,836	12.0%
1989	2,825,114	3,015,974	2.951	8,900,139	1,244,199	14.0%
1990	2,303,321	2,474,141	2.951	7,301,190	18,053,460	247.3%
1991	2,203,500	2,080,579	2.951	6,139,789	1,371,244	22.3%
1992	2,352,391	2,012,473	2.951	5,938,808	46,331	0.8%
1993	2,406,016		2.951	7,100,153	1,005,945	14.2%
1994	2,807,090		2.951	8,283,723	28,034	0.3%
1995	2,645,757		2.951	7,807,629	635,625	8.1%
1996	5,519,716		2.951	16,288,682	249,644	1.5%
1997	5,461,636		2.951	16,117,288	886,485	5.5%
1998	6,133,105		2.996	18,374,783	3,994,564	21.7%
1999	6,706,028		3.042	20,399,737	575,316	2.8%
2000	4,997,201		2.911	14,546,852	320,131	2.2%
2001	4,785,262		2.736	13,092,477	962,576	7.4%
2002	8,206,069		2.618	21,483,489	2,632,325	12.3%
2003	8,793,047		2.434	21,402,276	529,845	2.5%
2004	12,425,339		2.213	27,497,275	830,387	3.0%
2005	13,839,253		2.012	27,844,577	19,469,845	69.9%
2006	18,414,310		1.865	34,342,688	812,370	2.4%
2007	24,922,697		1.690	42,119,358	710,669	1.7%
2008	24,989,266		1.597	39,907,858	293,511,649	735.5%
2009	29,437,189		1.454	42,801,673	1,143,669	2.7%
2010	31,794,726		1.340	42,604,933	669,882	1.6%
2011	31,629,084		1.307	41,339,213	1,675,264	4.1%
2012	36,112,703		1.245	44,960,315	7,459,842	16.6%
2013	39,271,559		1.186	46,576,069	6,656,414	14.3%
2014	39,843,494		1.129	44,983,305	258,179	0.6%
2015	37,341,237		1.076	40,179,171	4,950,418	12.3%
2016	36,574,454		1.024	37,452,241	330,280	0.9%
Total	421,779,665			743,484,695	399,223,948	53.7%

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 12/31/16
- (3) Provided by TDI (1992 MR = 1992 manual rates)
- (4) Represents 1/1/98 through 1/1/16 rate changes for TWIA; factors assume uniform earning of written premium and that TWIA premium represents 88.1% of industry data in Tier 1 -- Territory 8
- (5) = (3) * (4) for 1983 - 1992; (2) * (4) for 1993 - 2016
- (6) 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 12/31/16
- (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	2.951	2,422,258	96,051	4.0%
1984	558,639	652,809	2.951	1,926,439	76,481	4.0%
1985	1,235,059	1,383,103	2.951	4,081,537	106,148	2.6%
1986	2,228,911	1,849,840	2.951	5,458,878	56,387	1.0%
1987	2,381,538	2,086,940	2.951	6,158,560	105,275	1.7%
1988	1,796,653	1,719,227	2.951	5,073,439	181,414	3.6%
1989	1,632,453	1,826,430	2.951	5,389,795	98,116	1.8%
1990	1,429,526	1,769,972	2.951	5,223,187	135,678	2.6%
1991	1,390,109	1,555,310	2.951	4,589,720	1,013,636	22.1%
1992	1,571,433	1,629,721	2.951	4,809,307	49,512	1.0%
1993	1,587,772		2.951	4,685,515	86,000	1.8%
1994	2,203,514		2.951	6,502,570	254,088	3.9%
1995	2,669,951		2.951	7,879,025	854,753	10.8%
1996	5,639,923		2.951	16,643,413	502,177	3.0%
1997	3,183,758		2.951	9,395,270	199,390	2.1%
1998	3,613,310		2.996	10,825,477	1,561,275	14.4%
1999	6,808,428		3.042	20,711,238	2,735,082	13.2%
2000	5,167,158		2.911	15,041,597	317,804	2.1%
2001	4,763,324		2.736	13,032,454	431,244	3.3%
2002	8,479,915		2.618	22,200,417	7,300,265	32.9%
2003	9,934,549		2.434	24,180,692	2,122,879	8.8%
2004	14,597,450		2.213	32,304,157	212,644	0.7%
2005	16,137,249		2.012	32,468,145	566,758	1.7%
2006	21,249,313		1.865	39,629,969	434,362	1.1%
2007	27,752,523		1.690	46,901,764	569,351	1.2%
2008	28,031,419		1.597	44,766,176	17,167,413	38.3%
2009	29,995,159		1.454	43,612,961	2,093,422	4.8%
2010	28,445,536		1.340	38,117,018	1,793,326	4.7%
2011	26,027,003		1.307	34,017,293	10,619,019	31.2%
2012	27,751,951		1.245	34,551,179	8,429,788	24.4%
2013	29,363,540		1.186	34,825,158	1,476,267	4.2%
2014	29,179,263		1.129	32,943,388	1,265,032	3.8%
2015	26,869,837		1.076	28,911,945	1,446,993	5.0%
2016	23,223,437		1.024	23,780,799	1,975,371	8.3%
Total	397,645,588			663,060,740	66,333,401	10.0%

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 12/31/16

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

(4) Represents 1/1/98 through 1/1/16 rate changes for TWIA; factors assume uniform earning of written premium and that TWIA premium represents 85.7% of industry data in Tier 1 -- Territory 9

(5) = (3) * (4) for 1983 - 1993; (2) * (4) for 1994 - 2016

(6) 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 12/31/16

(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	2.951	12,215,558	5,242,728	42.9%
1984	4,835,650	5,883,059	2.951	17,360,907	1,759,233	10.1%
1985	3,637,366	3,997,227	2.951	11,795,817	534,724	4.5%
1986	4,787,352	3,948,102	2.951	11,650,849	1,943,819	16.7%
1987	5,996,981	5,352,970	2.951	15,796,614	338,938	2.1%
1988	5,872,305	5,768,621	2.951	17,023,201	1,442,599	8.5%
1989	5,125,436	5,918,163	2.951	17,464,499	349,413	2.0%
1990	3,842,130	4,624,825	2.951	13,647,859	1,263,817	9.3%
1991	4,253,902	4,765,878	2.951	14,064,106	14,752,702	104.9%
1992	4,034,147	4,187,015	2.951	12,355,881	276,158	2.2%
1993	4,540,606		2.951	13,399,328	245,603	1.8%
1994	5,145,260		2.951	15,183,662	3,130,886	20.6%
1995	9,324,050		2.951	27,515,272	10,852,486	39.4%
1996	15,331,047		2.951	45,241,920	1,478,175	3.3%
1997	17,116,368		2.951	50,510,402	1,911,482	3.8%
1998	17,623,413		2.996	52,799,745	6,340,723	12.0%
1999	15,019,386		3.042	45,688,972	5,614,569	12.3%
2000	11,756,138		2.911	34,222,118	4,969,254	14.5%
2001	11,140,104		2.736	30,479,325	1,824,700	6.0%
2002	20,528,832		2.618	53,744,482	4,053,342	7.5%
2003	23,885,668		2.434	58,137,716	29,908,218	51.4%
2004	31,412,192		2.213	69,515,181	1,462,655	2.1%
2005	34,104,704		2.012	68,618,664	272,418,664	397.0%
2006	46,246,638		1.865	86,249,980	2,315,133	2.7%
2007	71,922,575		1.690	121,549,152	7,479,422	6.2%
2008	66,571,361		1.597	106,314,464	539,105,160	507.1%
2009	67,020,313		1.454	97,447,535	1,662,304	1.7%
2010	66,069,137		1.340	88,532,644	9,166,731	10.4%
2011	64,798,121		1.307	84,691,144	16,202,531	19.1%
2012	71,342,920		1.245	88,821,935	14,277,584	16.1%
2013	77,242,978		1.186	91,610,172	1,178,899	1.3%
2014	72,657,555		1.129	82,030,380	994,481	1.2%
2015	64,615,581		1.076	69,526,365	16,688,426	24.0%
2016	58,853,809		1.024	60,266,300	1,972,079	3.3%
Total	990,424,013			1,685,472,149	983,157,638	58.3%

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 12/31/16

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

(4) Represents 1/1/98 through 1/1/16 rate changes for TWIA; factors assume uniform earning of written premium and that TWIA premium represents 73.2% of industry data in Tier 1 -- Territory 10

(5) = (3) * (4) for 1983 - 1993; (2) * (4) for 1994 - 2016

(6) 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 12/31/16

(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	2.951	21,643,201	33,451,768	154.6%
1984	6,146,403	7,090,092	2.951	20,922,861	3,096,573	14.8%
1985	7,715,669	8,264,972	2.951	24,389,932	2,019,280	8.3%
1986	11,101,057	8,943,773	2.951	26,393,074	3,439,343	13.0%
1987	19,731,857	16,746,125	2.951	49,417,815	1,552,595	3.1%
1988	14,491,218	13,901,265	2.951	41,022,633	2,041,063	5.0%
1989	14,584,082	16,324,747	2.951	48,174,328	2,746,147	5.7%
1990	12,102,427	14,172,295	2.951	41,822,443	2,967,816	7.1%
1991	13,947,169	17,133,114	2.951	50,559,819	2,440,246	4.8%
1992	15,779,782	19,121,264	2.951	56,426,850	2,232,412	4.0%
1993	13,455,788		2.951	39,708,030	2,357,383	5.9%
1994	6,449,086		2.951	19,031,253	1,579,205	8.3%
1995	17,734,471		2.951	52,334,424	11,314,057	21.6%
1996	28,876,403		2.951	85,214,265	5,938,855	7.0%
1997	27,434,262		2.951	80,958,507	7,691,121	9.5%
1998	26,616,230		2.996	79,742,225	7,574,576	9.5%
1999	23,901,401		3.042	72,708,062	6,821,707	9.4%
2000	19,819,200		2.911	57,693,691	35,670,537	61.8%
2001	21,641,352		2.736	59,210,739	17,852,673	30.2%
2002	31,941,586		2.618	83,623,072	8,461,924	10.1%
2003	35,755,041		2.434	87,027,770	28,411,179	32.6%
2004	54,522,810		2.213	120,658,979	3,982,223	3.3%
2005	55,697,704		2.012	112,063,780	59,821,556	53.4%
2006	61,057,252		1.865	113,871,775	6,946,289	6.1%
2007	61,608,161		1.690	104,117,792	10,794,322	10.4%
2008	59,074,395		1.597	94,341,809	484,537,384	513.6%
2009	66,068,584		1.454	96,063,721	10,210,849	10.6%
2010	74,556,568		1.340	99,905,801	3,590,571	3.6%
2011	76,016,608		1.307	99,353,707	18,821,937	18.9%
2012	94,099,493		1.245	117,153,869	12,464,282	10.6%
2013	108,845,100		1.186	129,090,289	8,717,240	6.8%
2014	121,965,272		1.129	137,698,792	5,199,544	3.8%
2015	112,809,133		1.076	121,382,627	15,718,909	12.9%
2016	107,099,277		1.024	109,669,660	29,711,703	27.1%
Total	984,565,659			2,553,397,596	860,177,269	33.7%

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 12/31/16

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

(4) Represents 1/1/98 through 1/1/16 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 - 2016

(6) 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 12/31/16

(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 12/31/16	Modeled Loss Cost	Expected Annual Hurricane Loss	
(1)	(2)	(3)	(4)	
Aransas	291,645	4.065	1,185,537	
Brazoria	911,419	2.722	2,480,883	
Calhoun	132,583	3.231	428,376	
Cameron	1,213,098	3.244	3,935,290	
Chambers	66,379	2.378	157,849	
Galveston	2,772,430	7.878	21,841,204	
Harris	94,933	4.864	461,754	
Jefferson	589,288	2.763	1,628,203	
Kenedy	694	1.186	823	
Kleberg	57,012	0.783	44,640	
Matagorda	135,739	2.683	364,188	
Nueces	1,955,572	3.559	6,959,881	
Refugio	17,798	1.867	33,229	
San Patricio	226,300	2.499	565,524	
Willacy	23,375	2.189	51,168	
Total	8,488,265	4.729	40,138,549	4.63839654
(5) 2016 Earned Premium at Present Rates			91,847,918	
(6) Indicated Hurricane Loss Ratio			43.7%	

Notes:

- (2) Provided by TWIA
- (3) Exhibit 7, Sheet 2
- (4) = (2) * (3)
- (5) Exhibit 10, Sheet 1
- (6) = (4) Total / (5) Adjusted for Depop based on data as of Dec31,2016

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

County	TWIA Insured Values (000s) as of 12/31/16	Average Annual Modeled Loss	Provision for Storm Surge	Modeled Loss Cost
(1)	(2)	(3)	(4)	(5)
Aransas	291,645	1,180,757	1.004	4.065
Brazoria	911,419	2,470,829	1.004	2.722
Calhoun	132,583	426,652	1.004	3.231
Cameron	1,213,098	3,920,013	1.004	3.244
Chambers	66,379	157,239	1.004	2.378
Galveston	2,772,430	21,754,964	1.004	7.878
Harris	94,933	459,922	1.004	4.864
Jefferson	589,288	1,621,639	1.004	2.763
Kenedy	694	820	1.004	1.186
Kleberg	57,012	44,476	1.004	0.783
Matagorda	135,739	362,787	1.004	2.683
Nueces	1,955,572	6,932,327	1.004	3.559
Refugio	17,798	33,100	1.004	1.867
San Patricio	226,300	563,382	1.004	2.499
Willacy	23,375	50,956	1.004	2.189
Total	8,488,265	39,979,863	1.004	4.729

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 12/31/16	Modeled Loss Cost	Expected Annual Hurricane Loss
(1)	(2)	(3)	(4)
Aransas	298,144	4.247	1,266,218
Brazoria	907,857	3.396	3,083,082
Calhoun	132,583	5.003	663,313
Cameron	1,213,098	4.821	5,848,345
Chambers	70,525	3.345	235,906
Galveston	2,775,992	6.286	17,449,886
Harris	88,513	4.537	401,583
Jefferson	591,562	3.095	1,830,884
Kenedy	694	2.147	1,490
Kleberg	57,012	1.971	112,371
Matagorda	135,739	3.892	528,296
Nueces	1,955,711	3.955	7,734,837
Refugio	17,798	3.360	59,801
San Patricio	219,661	3.222	707,748
Willacy	23,375	3.546	82,888
Total	8,488,264	4.713	40,006,648
(5) 2016 Earned Premium at Present Rates			91,847,918
(6) Indicated Hurricane Loss Ratio			43.6%

Notes:

- (2) Provided by TWIA
- (3) Exhibit 8, Sheet 2
- (4) = (2) * (3)
- (5) Exhibit 10, Sheet 1
- (6) = (4) Total / (5) Adjusted for Depop based on data as of Dec31,2016

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

County	TWIA Insured Values (000s) as of 12/31/16	Average Annual Modeled Loss	Provision for Storm Surge	Modeled Loss Cost
(1)	(2)	(3)	(4)	(5)
Aransas	298,144	1,243,850	1.018	4.247
Brazoria	907,857	3,028,915	1.018	3.396
Calhoun	132,583	651,568	1.018	5.003
Cameron	1,213,098	5,744,568	1.018	4.821
Chambers	70,525	231,720	1.018	3.345
Galveston	2,775,992	17,142,248	1.018	6.286
Harris	88,513	394,464	1.018	4.537
Jefferson	591,562	1,798,367	1.018	3.095
Kenedy	694	1,464	1.018	2.147
Kleberg	57,012	110,357	1.018	1.971
Matagorda	135,739	518,897	1.018	3.892
Nueces	1,955,711	7,597,398	1.018	3.955
Refugio	17,798	58,748	1.018	3.360
San Patricio	219,661	695,178	1.018	3.222
Willacy	23,375	81,430	1.018	3.546
Total	8,488,264	39,299,172	1.018	4.713

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 - 2016

<u>Landfall</u>			<u>Landfall</u>		
Year	Month	Name	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

Frequency	Date Period	Hurricanes	Period	Annual Frequency
47.3-Year	10/1/1969 - 12/31/2016	13	47.3	0.275
166-Year	1/1/1851 - 12/31/2016	63	166	0.380

Notes:
(1), (2) from NOAA Technical Memorandum NWS TPC-5, updated with actual experience through 2016

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	2.950	31,484,397	31,484,397
1995	12,865,905	2.950	37,954,420	34,719,409
1996	15,640,660	2.950	46,139,947	42,047,184
1997	16,536,186	2.950	48,781,749	47,460,848
1998	16,558,977	3.041	50,355,849	49,568,799
1999	17,394,142	3.041	52,895,586	51,625,718
2000	17,332,561	2.791	48,375,178	50,635,382
2001	17,544,251	2.683	47,071,225	47,723,202
2002	24,013,525	2.556	61,378,570	54,224,898
2003	29,220,514	2.324	67,908,475	64,643,523
2004	31,009,323	2.113	65,522,699	66,715,587
2005	35,740,174	1.920	68,621,134	67,071,917
2006	76,847,840	1.781	136,866,003	102,743,569
2007	110,951,718	1.633	181,184,155	159,025,079
2008	98,036,118	1.556	152,544,200	166,864,178
2009	111,269,573	1.355	150,770,271	151,657,236
2010	102,174,680	1.340	136,914,071	143,842,171
2011	100,017,021	1.276	127,621,719	132,267,895
2012	110,524,397	1.216	134,397,666	131,009,693
2013	112,904,624	1.158	130,743,555	132,570,611
2014	104,642,688	1.102	115,316,242	123,029,899
2015	98,715,934	1.050	103,651,731	109,483,987
2016	88,278,690	1.000	88,278,690	95,965,211
Total	1,358,892,177		2,084,777,532	2,056,380,393

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			Cumulative Rate Level			# Months		Average Rate		Factor to Current Rate Level			
	Applicable Rates			E.O.Y.	B.O.Y.		E.O.Y.	B.O.Y.	E.O.Y.	Level				
(1)	B.O.Y.	(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	4.416
1981	8/1/1980			9/1/1981	1.175			1.132	8.0			4.0	1.161	4.081
1982	9/1/1981			9/1/1982	1.132			1.428	8.0			4.0	1.231	3.849
1983	9/1/1982			10/10/1983	1.428			1.514	9.3			2.7	1.447	3.275
1984	10/10/1983			10/10/1983	1.514			1.514	12.0			0.0	1.514	3.130
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	2.077
1986	11/15/1985			11/15/1985	2.651			2.651	12.0			0.0	2.651	1.787
1987	11/15/1985			7/1/1987	2.651			2.407	6.0			6.0	2.529	1.874
1988	7/1/1987			11/1/1988	2.407			2.075	10.0			2.0	2.352	2.015
1989	11/1/1988			11/1/1988	2.075			2.075	12.0			0.0	2.075	2.284
1990	11/1/1988			3/1/1990	2.075			2.104	2.0			10.0	2.099	2.257
1991	3/1/1990			4/1/1991	2.104			2.083	3.0			9.0	2.088	2.269
1992	1/1/1992			1/1/1992	1.606			1.606	12.0			0.0	1.606	2.950
1993	1/1/1992			10/1/1993	1.606			1.606	9.0			3.0	1.606	2.950
1994	10/1/1993			10/1/1993	1.606			1.606	12.0			0.0	1.606	2.950
1995	10/1/1993			10/1/1993	1.606			1.606	12.0			0.0	1.606	2.950
1996	10/1/1993			10/1/1993	1.606			1.606	12.0			0.0	1.606	2.950
1997	10/1/1993			10/1/1993	1.606			1.606	12.0			0.0	1.606	2.950
1998	1/1/1998			1/1/1998	1.558			1.558	12.0			0.0	1.558	3.041
1999	1/1/1998			1/1/1998	1.558			1.558	12.0			0.0	1.558	3.041
2000	1/1/2000			1/1/2000	1.698			1.698	12.0			0.0	1.698	2.791
2001	1/1/2001			1/1/2001	1.766			1.766	12.0			0.0	1.766	2.683
2002	1/1/2002			1/1/2002	1.854			1.854	12.0			0.0	1.854	2.556
2003	1/1/2003			1/1/2003	2.039			2.039	12.0			0.0	2.039	2.324
2004	1/1/2004			1/1/2004	2.243			2.243	12.0			0.0	2.243	2.113
2005	1/1/2005			1/1/2005	2.468			2.468	12.0			0.0	2.468	1.920
2006	1/1/2006			9/1/2006	2.591			2.798	8.0			4.0	2.660	1.781
2007	1/1/2007			1/1/2007	2.902			2.902	12.0			0.0	2.902	1.633
2008	1/1/2007			2/1/2008	2.902			3.059	1.0			11.0	3.046	1.556
2009	2/1/2008			2/1/2009	3.059			3.536	1.0			11.0	3.496	1.355
2010	2/1/2009			2/1/2009	3.536			3.536	12.0			0.0	3.536	1.340
2011	1/1/2011			1/1/2011	3.713			3.713	12.0			0.0	3.713	1.276
2012	1/1/2012			1/1/2012	3.898			3.898	12.0			0.0	3.898	1.216
2013	1/1/2013			1/1/2013	4.093			4.093	12.0			0.0	4.093	1.158
2014	1/1/2014			1/1/2014	4.298			4.298	12.0			0.0	4.298	1.102
2015	1/1/2015			1/1/2016	4.513			4.513	12.0			0.0	4.513	1.050
2016	1/1/2016			1/1/2017	4.738			4.738	12.0			0.0	4.738	1.000
2017	1/1/2017			1/1/2018	4.738			4.738	12.0			0.0	4.738	1.000
Current				1/1/2015				4.738					4.738	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

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	2014	2015	2016	Selected
(1) Direct Written Premium	\$494,036,010	\$503,824,316	\$487,353,537	
(2) Direct Earned Premium	\$484,048,868	\$501,721,842	\$496,456,941	
(3) Commission				
\$ Amount	79,013,534	80,599,761	77,986,786	
% 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	\$26,497,842	\$27,800,836	\$26,421,698	
Adjustments				
Contribution to Statutory Fund	0	0	0	
Adjusted \$ Amount	26,497,842	27,800,836	26,421,698	
% of DWP	5.4%	5.5%	5.4%	5.4%
(6) Taxes, Licenses & Fees				
\$ Amount	\$9,640,039	\$9,828,083	\$9,626,596	
% of DWP	2.0%	2.0%	2.0%	2.0%
(7) Reinsurance Expense				17.0%
(8) Total Fixed Expenses				22.4%
(9) Total Variable Expenses				18.0%
(10) CRTF Contribution				12.3%
Class 1 Public Security Repayment				7.7%
Total Funding Contribution				20.0%
(11) Permissible Loss & LAE Ratio				62.0%

Notes:

- (1) - (6) From TWIA's Statutory Annual Statements and Insurance Expense Exhibits
- (7) Exhibit 11, Sheet 2
- (8) = (5) + (7)
- (9) = (3) + (4) + (6)
- (10) CRTF contribution selected judgmentally; Class 1 repayment based on projected \$80 million in debt service
- (11) = 100% - (9) - (10)

Texas Windstorm Insurance Association

Commercial Property - Wind & Hail

Rate Level Review

Development of Reinsurer Expense

Using Average of AIR and RMS Hurricane Models

Exhibit 11

Sheet 2

	Net of Depop
(1) 2017 - 2018 Reinsurance Premium	104,987,562
(2a) Average Annual Loss by Reinsurance Layer (AIR) 100% of \$2100M XS \$2800M	30,500,000
Total	30,500,000
(2b) Average Annual Loss by Reinsurance Layer (RMS) 100% of \$2100M XS \$2800M	24,456,000
Total	24,456,000
(2c) Selected Total Average Annual Loss	27,478,000
(3) Annual Exposure Growth	-5.6%
(4) Prospective Average Annual Loss	26,071,198
(5) Net Cost of Reinsurance	76,309,244
(6) TWIA 2016 Earned Premium at Present Rates	512,167,917
(7) 2017 - 2018 TWIA Prospective Earned Premium at Present Rates	449,620,773
(8) Indicated Reinsurance Expense %	17.0%

Notes:

(1) From TWIA reinsurance contract effective 6/1/2017 through 5/31/2018

(2a) Provided by Guy Carpenter, based on AIR model using TWIA exposures as of 12/31/2016 and adjusted for ALAE

(2b) Provided by Guy Carpenter, based on RMS model using TWIA exposures as of 12/31/2016 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) = Sum of (2a) * [(3) ^ 0.917]

(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 * [(3) ^ 1.417] (projected premium growth from 7/1/2016 to 12/1/2017)

(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			Schedule P	
	Commercial & Farm	Residential	Total	Direct & Assumed Paid Loss	Difference
(1)	(2)	(3)	(4)	(5)	(6)
2007	5,610,638	10,190,834	15,801,472	15,745,000	56,472
2008	855,657,914	1,709,009,025	2,564,666,939	2,562,629,000	2,037,939
2009	2,553,456	8,464,333	11,017,789	10,388,000	629,789
2010	7,478,289	10,958,718	18,437,007	18,005,000	432,007
2011	19,199,780	76,706,911	95,906,691	95,797,000	109,691
2012	13,309,033	52,317,525	65,626,558	65,575,000	51,558
2013	7,351,329	63,485,384	70,836,713	70,793,000	43,713
2014	1,015,266	6,034,872	7,050,138	7,002,000	48,138
2015	17,690,238	119,382,501	137,072,739	137,152,000	(79,261)
2016	2,055,358	22,569,370	24,624,728	24,610,000	14,728
Total	931,921,301	2,079,119,473	3,011,040,774	3,007,696,000	3,344,774

Notes:

- (2), (3) Provided by TWIA, as of 12/31/2016
- (4) = (2) + (3)
- (5) Based on TWIA 2016 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 (1)	Residential (3)	Total (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	-
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 12/31/2016
- (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

Table	Coinsurance	Rate Table A			Rate Table C		
		Current	Proposed	Change	Current	Proposed	Change
1 Frame (F)	50%	--	--		--	--	
	80%	1.702	1.787	4.994%	1.365	1.433	4.982%
	100%	1.686	1.770	4.982%	1.346	1.413	4.978%
2 Brick (M)	50%	--	--		--	--	
	80%	1.775	1.863	4.958%	1.446	1.518	4.979%
	100%	1.371	1.439	4.960%	1.102	1.157	4.991%
3	50%	--	--		--	--	
	80%	1.446	1.518	4.979%	1.155	1.212	4.935%
	100%	1.224	1.285	4.984%	0.953	1.000	4.932%
(HC)	50%	2.106	2.211	4.986%	--	--	
	80%	1.304	1.369	4.985%	1.034	1.085	4.932%
	100%	1.245	1.307	4.980%	1.020	1.071	5.000%
4 (WR)	50%	0.841	0.883	4.994%	--	--	
	80%	0.527	0.553	4.934%	0.413	0.433	4.843%
	100%	0.492	0.516	4.878%	0.406	0.426	4.926%
(SWR)	50%	1.048	1.100	4.962%	--	--	
	80%	0.642	0.674	4.984%	0.516	0.541	4.845%
	100%	0.621	0.652	4.992%	0.501	0.526	4.990%
5 Brick	50%	--	--		--	--	
	80%	1.215	1.275	4.938%	0.601	0.631	4.992%
	100%	--	--		--	--	
5A Frame	50%	--	--		--	--	
	80%	1.460	1.533	5.000%	0.732	0.768	4.918%
	100%	--	--		--	--	
5B Brick Veneer	50%	--	--		--	--	
	80%	1.215	1.275	4.938%	0.601	0.631	4.992%
	100%	--	--		--	--	
7	50%	--	--		--	--	
	80%	4.139	4.345	4.977%	3.291	3.455	4.983%
	100%	3.558	3.735	4.975%	2.839	2.980	4.967%
8	50%	--	--		--	--	
	80%	4.933	5.179	4.987%	3.951	4.148	4.986%
	100%	4.139	4.345	4.977%	3.310	3.475	4.985%
9	50%	--	--		--	--	
	80%	5.907	6.202	4.994%	4.727	4.963	4.993%
	100%	4.841	5.083	4.999%	3.878	4.071	4.977%
10	50%	--	--		--	--	
	80%	7.089	7.443	4.994%	5.674	5.957	4.988%
	100%	5.907	6.202	4.994%	4.727	4.963	4.993%
11	50%	--	--		--	--	
	80%	9.202	9.662	4.999%	7.379	7.747	4.987%
	100%	7.788	8.177	4.995%	6.224	6.535	4.997%
12	50%	--	--		--	--	
	80%	13.511	14.186	4.996%	10.790	11.329	4.995%
	100%	11.362	11.930	4.999%	9.090	9.544	4.994%
13	50%	--	--		--	--	
	80%	18.415	19.335	4.996%	14.734	15.470	4.995%
	100%	15.508	16.283	4.997%	12.411	13.031	4.996%
14	50%	--	--		--	--	
	80%	36.544	38.371	4.999%	29.241	30.703	5.000%
	100%	30.683	32.217	5.000%	24.541	25.768	5.000%

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

<u>Rate Table B</u>				
Table	Coinsurance	Current	Proposed	Change
1 Frame (F)	50%	--	--	
	80%	1.010	1.060	4.950%
	100%	0.999	1.048	4.905%
2 Brick (M)	50%	--	--	
	80%	1.062	1.115	4.991%
	100%	0.807	0.847	4.957%
3	50%	--	--	
	80%	0.855	0.897	4.912%
	100%	0.715	0.750	4.895%
(HC)	50%	1.245	1.307	4.980%
	80%	0.781	0.820	4.994%
	100%	0.743	0.780	4.980%
4 (WR)	50%	0.492	0.516	4.878%
	80%	0.308	0.323	4.870%
	100%	0.298	0.312	4.698%
(SWR)	50%	0.621	0.652	4.992%
	80%	0.390	0.409	4.872%
	100%	0.376	0.394	4.787%

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

Table	Coinsurance	<u>Territory 1</u>			<u>Territories 8, 9, 10</u>		
		Current	Proposed	Change	Current	Proposed	Change
15	80%	3.524	3.700	4.994%	3.897	4.091	4.978%
21	80%	4.221	4.432	4.999%	4.663	4.896	4.997%
22	80%	3.943	4.140	4.996%	4.347	4.564	4.992%
23	80%	2.999	3.148	4.968%	3.316	3.481	4.976%
24	80%	3.000	3.150	5.000%	3.316	3.481	4.976%

Territorial Multipliers for Barns and Outbuildings

Construction	<u>Territory 1</u>			<u>Territories 8, 9, 10</u>		
	Current	Proposed	Change	Current	Proposed	Change
Frame	5.799	6.088	4.984%	6.400	6.720	5.000%
Brick Veneer	5.949	6.246	4.992%	6.575	6.903	4.989%
Brick	4.972	5.220	4.988%	5.494	5.768	4.987%

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

**TEXAS WINDSTORM INSURANCE ASSOCIATION
RESIDENTIAL PROPERTY RATE LEVEL REVIEW
2017**

July 2017

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INTRODUCTION

The Texas Windstorm Insurance Association (TWIA) has completed studies sufficient to support rate level indications for its residential 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 residential 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 12/31/16. 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 residential wind/hail coverage. The actual costs of providing residential 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 residential 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	+30%
Actual Industry Experience	+21%
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 51 years of actual insurance industry premiums and losses and 166 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 4% more than the corresponding indication from the prior TWIA residential rate study. Increase in reinsurance provision, Exposure reduction due to Depop and recent decreasing trend in exposure, introduction of actual losses experience from 2016 were the main drivers of the increase in rate indication.

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, including provisions for both the Catastrophe Reserve Trust Fund and the repayment of outstanding pre-event Class 1 public securities. The total funding provision is 20% of TWIA premium. The CRTF provision is necessary to rebuild the fund, which was completely depleted in order to pay losses associated with 2008 hurricanes. The Class 1 securities provision is necessary to repay debt service for outstanding debt issued in 2014.

The provision for reinsurance expense is 17% 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 residential 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 industry and TWIA earned premium is adjusted to TWIA's current rate level. 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 TWIA rates. Industry earned premium was provided by TDI/TICO. Historical TWIA written premium is adjusted to the current rate level and adjusted to an earned basis based on a uniform monthly earning assumption.

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 0.127 is equal to the weighted average of the nine hurricane years included in the analysis. For non-hurricane losses, the indicated ratio of 0.259 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 these loss ratios is described in the following two 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 TWIA non-hurricane loss for accident years 2007 - 2016 to the earned premium at current TWIA rates for the same years. The indicated ultimate non-hurricane loss for each year is based on actual TWIA paid loss as of

12/31/16, 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 the current average of all available years and prior selections. 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 earned 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 2007 - 2016 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 2007 - 2016 accident period. This method gives greater weight to more recent years due to TWIA's growth. Given the greater credibility normally associated with more recent experience and the potentially significant change in TWIA's residential book of business due to the growth, this weighting may be more appropriate than a non-weighted average across all years.

The all-territory indicated loss and LAE ratio is then calculated as the weighted average of the territory loss and LAE ratios. TWIA 2016 written premium is used in the weighted average calculation.

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 51 and 166 years, respectively. The other method is based on hurricane simulation models. The “51/166-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 51-year period is insufficient to measure long-term hurricane intensity.
- A 51-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 residential 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 double-counting or understatement of expected future losses resulting from the use of 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 51/166-Year Industry Hurricane Experience

In Exhibit 6, Texas insurance industry seacoast dwelling extended coverage experience for the 1966 - 2016 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 - 2016), 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 51 years of loss ratios by separating the 51 years into the thirteen hurricane years and thirty-eight non-hurricane years. The 38 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 thirteen hurricane years. An average hurricane loss ratio for hurricane years is calculated as the average of the thirteen hurricane loss ratios: 89.4%.

The 51-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 51-year period is 0.275, while the annual frequency during the most recent 166-year period is 0.380. The 51-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 51-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 166-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 34.0%.

Hurricane Simulation Models

This projected hurricane loss ratio is determined based on the average result of two different hurricane simulation models. The models are AIR Touchstone v4 and RMS RiskLink v15.0.1. Both models were run using exposure data provided by TWIA as of 12/31/2016. 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
No US Landfall	-	4.7%
Category 0	0.0%	3.1%
Category 1	40.3%	18.0%
Category 2	26.2%	12.7%
Category 3	22.2%	19.9%
Category 4	10.1%	29.9%
Category 5	1.1%	11.8%

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 and Cat 0 events making landfall in TX, neighboring states or Mexico.

As shown in Exhibits 7 and 8, these models yield projected hurricane loss ratios of 46.4% and 40.9%. The average of these loss ratios is 43.65%.

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 and the net cost of reinsurance. The sum of these projected expenses provides for a 22.4% fixed expense ratio. Variable expenses include commission, taxes, and catastrophe trust fund contribution. Subtracting these expenses from 100% yields a variable permissible loss and LAE ratio of 62.0%.

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 20% provision for funding contribution is intended to permit the redevelopment of the catastrophe reserve trust fund and to repay outstanding pre-event public securities debt service in order to reduce the potential for future year surcharges on TWIA and coastal insurance policies and assessments to TWIA members. The 17% 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 variable 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 shows a reconciliation of the premium data provided by TWIA to TWIA's annual statement data. This reconciliation shows the differences between the two data sources. 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 4% 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
<i>Previous Rate Indication (Combined Method)</i>		+26%
Change in Reinsurance Provision	+1%	
Change in Experience Period	+1%	
Change brought by Depop	+1%	
Change due to all other factors	+1%	
<i>Current Rate Indication (Combined Method)</i>		+30%

These reasons are discussed below:

Change in reinsurance provision

The indicated rate change increased approximately 1% as a result of increases in reinsurance provision. TWIA recent decrease in exposure, including exposure decrease due to Depop, was the main driver of the increase in reinsurance provision.

Change in Experience Period

The indicated rate change increased approximately 1% as a result of the inclusion of actual experience from 2016.

Change brought by Depop

Loss experience ratio based on hurricane model increased due to Depop. The indicated rate change increased approximately 1% accordingly.

SUMMARY OF EXHIBITS

<u>Exhibit Number</u>	<u>Exhibit Title or Purpose</u>
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 – 51/165-Year Method
7	Hurricane Loss Ratio – AIR Model
8	Hurricane Loss Ratio – RMS Model
9	Texas Hurricanes 1899 – 2015
10	Earned Premium at Present Rates
11	Fixed Expenses and Variable Permissible Loss & LAE Ratios
12	Reconciliation of Premium Data to Annual Statement.

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

Hurricane Projection Method (1)	Indicated Loss & LAE Ratio			Fixed Expenses (4)	Total (5)	Permissible LLAE Ratio (6)	Indicated Rate Change (7)	Proposed Rate Change (8)
	Hurricane (2)	Non-Hurricane (3)						
Using Experience and Models	43.8%	14.5%		22.4%	80.7%	62.0%	+30%	+5.0%
Using Actual Industry Experience	38.3%	14.5%		22.4%	75.2%	62.0%	+21%	
Using Hurricane Models	49.2%	14.5%		22.4%	86.1%	62.0%	+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
Residential Property - Wind & Hail
Rate Level Review
 Projected Ultimate Non-Hurricane Loss & LAE Ratio
 All Territory Weighted Average

Territory	2016 Written Premium		Indicated Non-Hurricane Loss & LAE Ratio
	Amount	Share	
(1)	(2)	(3)	(4)
Tier 1 - Territory 8	123,723,598	31.2%	12.0%
Tier 1 - Territory 9	71,935,582	18.1%	15.8%
Tier 1 - Territory 10	196,830,392	49.6%	15.6%
Tier 2	4,511,865	1.1%	11.1%
Total / Average	397,001,437	100.0%	14.5%

Notes:

- (2) TWIA data
- (3) = (2) / (2) Total
- (4) Exhibit 2, Sheet 2a - Sheet 2d

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review

Projected Ultimate Non-Hurricane Loss & LAE Ratio based on TWIA experience
Tier 1 -- Territory 8 (Galveston County)

Accident Year Ending 9/30/xx	Ultimate Non-Hurricane Loss	LAE Factor	Net Trend Factor	Projected Non-Hurricane Loss & LAE	Earned Premium at Current TWIA Rate Level	Indicated Non-Hurricane Loss & LAE Ratio
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2007	1,295,331	0.259	1.214	1,979,818	96,784,322	2.0%
2008	433,109	0.259	1.188	647,798	113,960,957	0.6%
2009	3,441,772	0.259	1.166	5,052,501	115,392,440	4.4%
2010	1,265,986	0.259	1.175	1,872,805	118,764,316	1.6%
2011	1,277,552	0.259	1.174	1,888,306	120,651,913	1.6%
2012	10,709,318	0.259	1.128	15,208,859	122,775,989	12.4%
2013	55,445,982	0.259	1.091	76,158,882	125,644,555	60.6%
2014	527,157	0.259	1.055	700,194	128,250,844	0.5%
2015	19,260,144	0.259	1.037	25,145,717	130,452,998	19.3%
2016	11,781,954	0.259	1.054	15,634,488	127,078,007	12.3%
Total	105,438,305			144,289,368	1,199,756,341	12.0%

Notes:

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

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review

Projected Ultimate Non-Hurricane Loss & LAE Ratio based on TWIA experience
Tier 1 -- Territory 9 (Nueces County)

Accident Year Ending 9/30/xx	Ultimate Non-Hurricane Loss	LAE Factor	Net Trend Factor	Projected Non-Hurricane Loss & LAE	Earned Premium at Current TWIA Rate Level	Indicated Non-Hurricane Loss & LAE Ratio
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2007	488,076	0.259	1.214	745,988	44,456,556	1.7%
2008	480,548	0.259	1.188	718,752	60,012,875	1.2%
2009	536,746	0.259	1.166	787,940	62,770,234	1.3%
2010	3,449,002	0.259	1.175	5,102,195	65,748,014	7.8%
2011	18,968,485	0.259	1.174	28,036,673	66,082,975	42.4%
2012	20,771,024	0.259	1.128	29,498,011	67,039,309	44.0%
2013	6,336,277	0.259	1.091	8,703,314	68,108,276	12.8%
2014	1,703,464	0.259	1.055	2,262,618	70,979,937	3.2%
2015	10,385,607	0.259	1.037	13,559,272	73,949,414	18.3%
2016	10,217,659	0.259	1.054	13,558,690	73,036,658	18.6%
Total	73,336,888			102,973,453	652,184,248	15.8%

Notes:

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

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review

Projected Ultimate Non-Hurricane Loss & LAE Ratio based on TWIA experience
Tier 1 -- Territory 10 (Other Tier 1)

Accident Year Ending 9/30/xx	Ultimate Non-Hurricane Loss	LAE Factor	Net Trend Factor	Projected Non-Hurricane Loss & LAE	Earned Premium at Current TWIA Rate Level	Indicated Non-Hurricane Loss & LAE Ratio
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2007	3,251,580	0.259	1.214	4,969,799	96,121,098	5.2%
2008	1,390,642	0.259	1.188	2,079,972	153,984,482	1.4%
2009	1,976,152	0.259	1.166	2,900,979	166,359,144	1.7%
2010	6,670,646	0.259	1.175	9,868,053	176,510,556	5.6%
2011	56,158,241	0.259	1.174	83,005,587	183,841,618	45.2%
2012	19,063,770	0.259	1.128	27,073,451	199,257,913	13.6%
2013	4,953,285	0.259	1.091	6,803,679	205,424,546	3.3%
2014	2,946,595	0.259	1.055	3,913,800	211,435,033	1.9%
2015	95,604,492	0.259	1.037	124,819,599	215,872,714	57.8%
2016	13,252,755	0.259	1.054	17,586,220	206,062,228	8.5%
Total	205,268,158			283,021,139	1,814,869,332	15.6%

Notes:

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

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review

Projected Ultimate Non-Hurricane Loss & LAE Ratio based on TWIA experience
Tier 2 -- (Territories 1 and 11)

Accident Year Ending 9/30/xx	Ultimate Non-Hurricane Loss	LAE Factor	Net Trend Factor	Projected Non-Hurricane Loss & LAE	Earned Premium at Current TWIA Rate Level	Indicated Non-Hurricane Loss & LAE Ratio
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2007	65,115	0.259	1.214	99,523	2,630,384	3.8%
2008	486,202	0.259	1.188	727,208	3,006,324	24.2%
2009	551,702	0.259	1.166	809,895	3,166,363	25.6%
2010	183,055	0.259	1.175	270,798	3,434,692	7.9%
2011	54,436	0.259	1.174	80,460	3,693,748	2.2%
2012	261,105	0.259	1.128	370,809	4,101,506	9.0%
2013	515,831	0.259	1.091	708,529	4,355,905	16.3%
2014	32,378	0.259	1.055	43,006	4,428,922	1.0%
2015	358,673	0.259	1.037	468,277	4,522,798	10.4%
2016	472,446	0.259	1.054	626,929	4,548,935	13.8%
Total	2,980,943			4,205,434	37,889,577	11.1%

Notes:

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

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review

Projected Ultimate Non-Hurricane Loss
Tier 1 -- Territory 8 (Galveston County)

Accident Year	TWIA Non-Hurricane Paid Loss	Development Factor	Ultimate Non-Hurricane Loss
(1)	(2)	(3)	(4)
2007	1,295,331	1.000	1,295,331
2008	433,109	1.000	433,109
2009	3,441,772	1.000	3,441,772
2010	1,264,721	1.001	1,265,986
2011	1,276,276	1.001	1,277,552
2012	10,634,874	1.007	10,709,318
2013	54,040,918	1.026	55,445,982
2014	500,624	1.053	527,157
2015	17,335,863	1.111	19,260,144
2016	10,061,447	1.171	11,781,954
Total	100,284,935		105,438,305

Notes:

- (2) Exhibit 2, Sheet 4a, as of 12/31/16
- (3) Exhibit 3, Sheet 1
- (4) = (2) * (3)

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review

Projected Ultimate Non-Hurricane Loss
Tier 1 -- Territory 9 (Nueces County)

Accident Year	TWIA Non-Hurricane Paid Loss	Development Factor	Ultimate Non-Hurricane Loss
(1)	(2)	(3)	(4)
2007	488,076	1.000	488,076
2008	480,548	1.000	480,548
2009	536,746	1.000	536,746
2010	3,445,556	1.001	3,449,002
2011	18,949,535	1.001	18,968,485
2012	20,626,638	1.007	20,771,024
2013	6,175,709	1.026	6,336,277
2014	1,617,725	1.053	1,703,464
2015	9,347,981	1.111	10,385,607
2016	8,725,584	1.171	10,217,659
Total	70,394,098		73,336,888

Notes:

- (2) Exhibit 2, Sheet 4b, as of 12/31/16
- (3) Exhibit 3, Sheet 1
- (4) = (2) * (3)

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review

Projected Ultimate Non-Hurricane Loss
Tier 1 -- Territory 10 (Other Tier 1)

Accident Year	TWIA Non-Hurricane Paid Loss	Development Factor	Ultimate Non-Hurricane Loss
(1)	(2)	(3)	(4)
2007	3,251,580	1.000	3,251,580
2008	1,390,642	1.000	1,390,642
2009	1,976,152	1.000	1,976,152
2010	6,663,982	1.001	6,670,646
2011	56,102,139	1.001	56,158,241
2012	18,931,251	1.007	19,063,770
2013	4,827,763	1.026	4,953,285
2014	2,798,286	1.053	2,946,595
2015	86,052,648	1.111	95,604,492
2016	11,317,468	1.171	13,252,755
Total	193,311,911		205,268,158

Notes:

- (2) Exhibit 2, Sheet 4c, as of 12/31/16
- (3) Exhibit 3, Sheet 1
- (4) = (2) * (3)

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review

Projected Ultimate Non-Hurricane Loss
Tier 2 -- (Territories 1 and 11)

Accident Year	TWIA Non-Hurricane Paid Loss	Development Factor	Ultimate Non-Hurricane Loss
(1)	(2)	(3)	(4)
2007	65,115	1.000	65,115
2008	486,202	1.000	486,202
2009	551,702	1.000	551,702
2010	182,872	1.001	183,055
2011	54,382	1.001	54,436
2012	259,290	1.007	261,105
2013	502,759	1.026	515,831
2014	30,748	1.053	32,378
2015	322,838	1.111	358,673
2016	403,455	1.171	472,446
Total	2,859,363		2,980,943

Notes:

- (2) Exhibit 2, Sheet 4d, as of 12/31/16
- (3) Exhibit 3, Sheet 1
- (4) = (2) * (3)

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review

Summary of TWIA Historical Paid Loss as of 12/31/16
Tier 1 -- Territory 8 (Galveston County)

Accident Year	Paid Loss Excluding Expense			Total
	(1)	(2)	(3)	
2007		1,295,331	1,281,713	2,577,044
2008		433,109	1,047,798,983	1,048,232,092
2009		3,441,772	0	3,441,772
2010		1,264,721	0	1,264,721
2011		1,276,276	0	1,276,276
2012		10,634,874	0	10,634,874
2013		54,040,918	0	54,040,918
2014		500,624	0	500,624
2015		17,335,863	0	17,335,863
2016		10,061,447	0	10,061,447
Total		100,284,935	1,049,080,696	1,149,365,631

Notes:

- (2) Provided by TDI. Accident years ending 9/30/xx
- (4) = (2) + (3)

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review

Summary of TWIA Historical Paid Loss as of 12/31/16
Tier 1 -- Territory 9 (Nueces County)

Accident Year	Paid Loss Excluding Expense			Total
	(1)	(2)	(3)	
2007		488,076	0	488,076
2008		480,548	746,099	1,226,647
2009		536,746	0	536,746
2010		3,445,556	187,854	3,633,410
2011		18,949,535	0	18,949,535
2012		20,626,638	0	20,626,638
2013		6,175,709	0	6,175,709
2014		1,617,725	0	1,617,725
2015		9,347,981	0	9,347,981
2016		8,725,584	0	8,725,584
Total		70,394,098	933,953	71,328,051

Notes:

(2) Provided by TDI. Accident years ending 9/30/xx

(4) = (2) + (3)

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review

Summary of TWIA Historical Paid Loss as of 12/31/16
Tier 1 -- Territory 10 (Other Tier 1)

Accident Year	Paid Loss Excluding Expense			Total
	(1)	(2)	(3)	
2007		3,251,580	4,745,263	7,996,843
2008		1,390,642	626,576,179	627,966,821
2009		1,976,152	0	1,976,152
2010		6,663,982	1,063,585	7,727,567
2011		56,102,139	0	56,102,139
2012		18,931,251	0	18,931,251
2013		4,827,763	0	4,827,763
2014		2,798,286	0	2,798,286
2015		86,052,648	0	86,052,648
2016		11,317,468	0	11,317,468
Total		193,311,911	632,385,027	825,696,938

Notes:

(2) Provided by TDI. Accident years ending 9/30/xx
(4) = (2) + (3)

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review

Summary of TWIA Historical Paid Loss as of 12/31/16
Tier 2 -- (Territories 1 and 11)

Accident Year	Paid Loss Excluding Expense			Total
	(1)	(2)	(3)	
2007		65,115	0	65,115
2008		486,202	36,454,055	36,940,257
2009		551,702	0	551,702
2010		182,872	0	182,872
2011		54,382	0	54,382
2012		259,290	0	259,290
2013		502,759	0	502,759
2014		30,748	0	30,748
2015		322,838	0	322,838
2016		403,455	0	403,455
Total		2,859,363	36,454,055	39,313,418

Notes:

- (2) Provided by TDI. Accident years ending 9/30/xx
- (4) = (2) + (3)

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

Year / Quarter	Average EPPR		
(1)	(2)	(3) Current Average Earned Date	7/1/2016
2008 / 3	1,656.64	(4) Current Average Accident Date	7/1/2016
2009 / 3	1,667.32	(5) Prospective Average Earned / Accident Date	1/1/2019
2010 / 3	1,674.88	(6) Premium Trend Length	2.500
2011 / 3	1,643.06	(7) Loss Trend Length	2.500
2012 / 3	1,631.15	(8) Selected Premium Trend	0.3%
2013 / 3	1,626.49	(9) Selected Loss Trend	2.2%
2014 / 3	1,633.36		
2015 / 3	1,657.98		
2016 / 3	1,647.21		

Accident Year	Current Premium Trend	Current Loss Trend	Prospective Premium Trend	Prospective Loss Trend	Net Trend Factor
(10)	(11)	(12)	(13)	(14)	(15)
2007	0.994	1.153	1.008	1.056	1.214
2008	0.994	1.128	1.008	1.056	1.188
2009	0.994	1.107	1.008	1.056	1.166
2010	0.988	1.108	1.008	1.056	1.175
2011	0.983	1.102	1.008	1.056	1.174
2012	1.003	1.080	1.008	1.056	1.128
2013	1.010	1.052	1.008	1.056	1.091
2014	1.013	1.020	1.008	1.056	1.055
2015	1.008	0.999	1.008	1.056	1.037
2016	0.994	1.000	1.008	1.056	1.054

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 2016 / 3
- (12) Exhibit 3, Sheet 3a
- (13) = [1 + (8)] ^ (6)
- (14) = [1 + (9)] ^ (7)
- (15) = [(12) * (14)] / [(11) * (13)]

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review

Paid Loss Development Factors
Statewide Industry Extended Coverage Dwelling Paid Loss

Accident Year	<u>Months of Development</u>									
	15 (1)	27 (2)	39 (3)	51 (4)	63 (5)	75 (6)	87 (7)	99 (8)	111 (9)	111 (10)
2007		53,874	59,731	61,175	61,738	61,853	61,978	61,980	61,987	61,991
2008		435,381	557,638	625,922	688,372	756,380	774,976	775,409	776,862	777,393
2009		114,845	136,583	139,262	140,625	140,941	141,037	141,064	141,075	
2010		63,706	70,824	72,510	73,282	73,407	73,508	73,529		
2011		137,269	154,006	156,583	157,456	157,929	157,995			
2012		162,844	196,788	232,373	242,523	245,227				
2013		124,050	143,359	151,995	154,464					
2014		151,510	178,253	187,520						
2015		173,851	201,229							
2016		481,329								

Accident Year	<u>Development Factors</u>									
	15 - 27 (1)	27 - 39 (2)	39 - 51 (3)	51 - 63 (4)	63 - 75 (5)	75 - 87 (6)	87 - 99 (7)	99 - 111 (8)	111 - Ult (9)	111 - Ult (10)
2007		1.109	1.024	1.009	1.002	1.002	1.000	1.000	1.000	
2008		1.281	1.122	1.100	1.099	1.025	1.001	1.002	1.001	
2009		1.189	1.020	1.010	1.002	1.001	1.000	1.000		
2010		1.112	1.024	1.011	1.002	1.001	1.000			
2011		1.122	1.017	1.006	1.003	1.000				
2012		1.208	1.181	1.044	1.011					
2013		1.156	1.060	1.016						
2014		1.177	1.052							
2015		1.157								
Average		1.168	1.062	1.028	1.020	1.006	1.000	1.001	1.000	
Avg 5 Year		1.164	1.067	1.017	1.023	1.006	1.000	1.001	1.000	
Prior		1.155	1.048	1.024	1.019	1.005	1.000	1.000	1.000	1.000
Selected		1.162	1.055	1.026	1.019	1.006	1.000	1.001	1.000	1.000
Cumulative		1.171	1.111	1.053	1.026	1.007	1.001	1.001	1.000	1.000

Notes:

Provided by TICO. Accident years ending 9/30/xx

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review

Premium Trend Analysis
TWIA Residential Earned Premium at Present Rates

Year / Quarter	Policies In-Force	Annualized		On- Level Factors	Premium at Present Rates		Earned Premium at Present Rates		Exponential Fitted Trends			
		Earned In-Force	Written Premium		Written	Earned	Annualized	Average	All-Year	5-Year	4-Year	3-Year
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
2007 / 2	168,519		57,350,584	1.628	93,385,760	64,340,769						
2007 / 3	192,867		66,527,259	1.628	108,328,428	74,254,358						
2007 / 4	201,251		42,163,238	1.628	68,655,727	81,437,278						
2008 / 1	204,043		43,832,934	1.542	67,573,972	83,711,949	303,744,354					
2008 / 2	207,335	196,522	66,980,816	1.505	100,801,265	85,463,379	324,866,964	1,653	1,660			
2008 / 3	214,272	204,050	77,031,715	1.505	115,927,139	87,424,118	338,036,724	1,657	1,659			
2008 / 4	212,579	208,141	45,080,525	1.505	67,842,918	88,094,796	344,694,241	1,656	1,659			
2009 / 1	212,647	210,633	50,763,754	1.387	70,403,519	88,347,087	349,329,380	1,658	1,658			
2009 / 2	213,310	212,455	78,391,153	1.340	105,051,642	89,159,316	353,025,316	1,662	1,657			
2009 / 3	214,655	213,250	86,982,474	1.340	116,564,834	89,955,516	355,556,714	1,667	1,656			
2009 / 4	214,900	213,588	53,397,678	1.340	71,557,996	90,363,034	357,824,953	1,675	1,656			
2010 / 1	215,154	214,191	51,746,756	1.340	69,345,602	90,596,276	360,074,141	1,681	1,655			
2010 / 2	218,549	215,160	80,793,027	1.340	108,270,383	90,896,817	361,811,642	1,682	1,654			
2010 / 3	225,655	217,190	89,416,071	1.340	119,826,087	91,910,709	363,766,835	1,675	1,654			
2010 / 4	227,923	220,192	56,161,068	1.340	75,261,202	92,748,880	366,152,680	1,663	1,653			
2011 / 1	228,987	223,549	57,881,338	1.276	73,872,884	93,730,194	369,286,599	1,652	1,652	1,619		
2011 / 2	230,887	226,821	89,007,352	1.276	113,598,443	94,834,207	373,223,989	1,645	1,652	1,621		
2011 / 3	237,411	229,833	96,550,629	1.276	123,225,788	96,316,281	377,629,562	1,643	1,651	1,622		
2011 / 4	241,392	232,986	64,054,917	1.276	81,752,110	97,178,172	382,058,854	1,640	1,650	1,624		
2012 / 1	244,498	236,608	66,349,304	1.216	80,647,994	98,734,948	387,063,608	1,636	1,650	1,625	1,616	
2012 / 2	243,404	240,112	93,958,788	1.216	114,207,494	100,105,180	392,334,582	1,634	1,649	1,627	1,618	
2012 / 3	252,609	243,576	109,190,884	1.216	132,722,202	101,289,735	397,308,036	1,631	1,648	1,628	1,620	
2012 / 4	252,764	246,897	66,296,749	1.216	80,584,113	102,446,289	402,576,153	1,631	1,648	1,630	1,622	
2013 / 1	252,059	249,264	69,081,474	1.158	79,970,441	102,227,665	406,068,869	1,629	1,647	1,631	1,624	1,624
2013 / 2	251,745	251,252	105,962,690	1.158	122,665,059	102,820,636	408,784,325	1,627	1,646	1,633	1,627	1,626
2013 / 3	252,644	252,299	108,283,025	1.158	125,351,137	102,866,228	410,360,817	1,626	1,646	1,634	1,629	1,628
2013 / 4	256,918	252,822	77,510,892	1.158	89,728,546	103,570,292	411,484,820	1,628	1,645	1,636	1,631	1,631
2014 / 1	256,609	253,910	74,559,339	1.103	82,201,671	104,659,836	413,916,992	1,630	1,644	1,637	1,633	1,633
2014 / 2	252,210	254,537	107,999,495	1.103	119,069,443	105,207,684	416,304,040	1,636	1,644	1,639	1,635	1,635
2014 / 3	258,434	255,319	124,332,077	1.103	137,076,115	103,590,340	417,028,153	1,633	1,643	1,640	1,638	1,637
2014 / 4	262,181	256,701	82,443,007	1.103	90,893,415	106,833,129	420,290,990	1,637	1,642	1,642	1,640	1,640
2015 / 1	263,030	258,161	81,801,817	1.050	85,891,908	107,650,502	423,281,656	1,640	1,642	1,643	1,642	1,642
2015 / 2	261,783	260,160	120,035,667	1.050	126,037,450	108,156,650	426,230,622	1,638	1,641	1,645	1,644	1,644
2015 / 3	261,230	261,707	122,991,322	1.050	129,140,888	111,263,346	433,903,628	1,658	1,640	1,646	1,646	1,647
2015 / 4	260,677	261,868	83,141,040	1.050	87,298,092	107,486,413	434,556,911	1,659	1,640	1,648	1,649	1,649
2016 / 1	257,538	260,994	80,986,386	1.000	80,986,386	106,332,767	433,239,176	1,660	1,639	1,649	1,651	1,651
2016 / 2	253,172	259,231	121,534,318	1.000	121,534,318	105,856,135	430,938,662	1,662	1,638	1,651	1,653	1,653
2016 / 3	249,400	256,676	118,862,368	1.000	118,862,368	103,123,791	422,799,106	1,647	1,638	1,652	1,655	1,656
2016 / 4	244,061	253,120	77,691,775	1.000	77,691,775	100,890,013	416,202,706	1,644	1,637	1,654	1,658	1,658
(14) Average Annual Change									-0.2%	0.4%	0.5%	0.6%
(15) Correlation Coefficient									18.0%	17.4%	56.8%	68.7%
(16) Selected Premium Trend												0.3%

Notes: (2) Provided by TWIA (9) = (8) / (3)
(3) Calculated from (2) using uniform quarterly earning assumption (10) - (13) = (9) fitted to an exponential distribution
(4) Provided by TWIA (14) Fitted average annual change
(5) Cumulative effect of annual rate changes (15) Evaluates the predictability of the fitted curve
(6) = (4) * (5) Indexed to 2016 / 4 (16) Selected based on judgment
(7) Calculated from (6) using uniform quarterly earning assumption
(8) = Sum of (7) for prior 4 quarters

Texas Windstorm Insurance Association

Residential Property - Wind & Hail

Rate Level Review

Loss Trend Analysis

Summary of Indices and Calculation of Prospective Loss Costs

Calendar Year	Statewide	Coastal	Modified	Weighted
Ending	Boeckh	Boeckh	CPI	Average
9/30/xx	(1)	(2)	(3)	(4)
	(1)	(2)	(3)	(4)
2007	1.172	1.177	1.081	1.153
2008	1.151	1.149	1.065	1.128
2009	1.126	1.118	1.075	1.107
2010	1.122	1.117	1.080	1.108
2011	1.109	1.113	1.068	1.102
2012	1.085	1.092	1.045	1.080
2013	1.052	1.057	1.038	1.052
2014	1.019	1.017	1.028	1.020
2015	0.994	0.993	1.015	0.999
2016	1.000	1.000	1.000	1.000

Factors to Adjust For Prospective Loss Costs

(6) Fitted Trend	2.3%	2.5%	1.1%	2.2%
(7) Cost Factor	1.065	1.070	1.031	1.062

Notes:

- (2) = Exhibit 3, Sheet 3b trended forward to 9/30/2016
- (3) = Exhibit 3, Sheet 3c trended forward to 9/30/2016
- (4) = Exhibit 3, Sheet 3d
- (5) = 25% CPI and 75% Boeckh (most appropriate available by year)
- (6) = (2) - (5) fitted to an exponential curve using 5 years' data
- (7) = $[1 + (6)]^{2.75}$ (trended from 4/1/2016 to 1/1/2019)

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review

Loss Trend Analysis

Boeckh Residential Construction Index Trend (Statewide)

Calendar Year Ending	Texas Statewide Index	Fitted Trends		5 Years		4 Years		3 Years	
		All Years Linear	Exponential	Linear	Exponential	Linear	Exponential	Linear	Exponential
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
3/31/2007	1923.66	1923.02	1929.81						
6/30/2007	1945.15	1933.44	1939.26						
9/30/2007	1962.77	1943.86	1948.76						
12/31/2007	1973.20	1954.27	1958.30						
3/31/2008	1982.41	1964.69	1967.89						
6/30/2008	1990.80	1975.11	1977.53						
9/30/2008	1998.73	1985.53	1987.21						
12/31/2008	2006.58	1995.95	1996.94						
3/31/2009	2017.74	2006.37	2006.72						
6/30/2009	2034.78	2016.79	2016.55						
9/30/2009	2043.22	2027.21	2026.43						
12/31/2009	2046.48	2037.63	2036.35						
3/31/2010	2047.16	2048.05	2046.32						
6/30/2010	2046.06	2058.46	2056.34						
9/30/2010	2050.43	2068.88	2066.42						
12/31/2010	2057.86	2079.30	2076.53						
3/31/2011	2065.01	2089.72	2086.70						
6/30/2011	2070.12	2100.14	2096.92						
9/30/2011	2075.68	2110.56	2107.19						
12/31/2011	2083.08	2120.98	2117.51						
3/31/2012	2092.60	2131.40	2127.88	2110.58	2111.72				
6/30/2012	2103.60	2141.82	2138.30	2123.29	2123.87				
9/30/2012	2121.39	2152.24	2148.77	2136.00	2136.09				
12/31/2012	2139.89	2162.66	2159.30	2148.71	2148.38				
3/31/2013	2155.38	2173.07	2169.87	2161.42	2160.74	2179.08	2179.32		
6/30/2013	2172.48	2183.49	2180.50	2174.13	2173.17	2189.94	2189.89		
9/30/2013	2188.26	2193.91	2191.18	2186.84	2185.67	2200.81	2200.52		
12/31/2013	2202.59	2204.33	2201.91	2199.55	2198.24	2211.67	2211.20		
3/31/2014	2219.60	2214.75	2212.69	2212.27	2210.89	2222.54	2221.93	2248.03	2247.88
6/30/2014	2238.93	2225.17	2223.53	2224.98	2223.61	2233.41	2232.71	2255.22	2255.00
9/30/2014	2257.35	2235.59	2234.42	2237.69	2236.40	2244.27	2243.55	2262.40	2262.14
12/31/2014	2275.49	2246.01	2245.36	2250.40	2249.27	2255.14	2254.44	2269.58	2269.31
3/31/2015	2293.52	2256.43	2256.35	2263.11	2262.21	2266.00	2265.38	2276.76	2276.49
6/30/2015	2307.48	2266.85	2267.40	2275.82	2275.23	2276.87	2276.37	2283.95	2283.71
9/30/2015	2315.94	2277.26	2278.51	2288.53	2288.32	2287.74	2287.42	2291.13	2290.94
12/31/2015	2319.83	2287.68	2289.67	2301.24	2301.48	2298.60	2298.52	2298.31	2298.20
3/31/2016	2316.36	2298.10	2300.88	2313.95	2314.72	2309.47	2309.68	2305.49	2305.47
6/30/2016	2308.33	2308.52	2312.15	2326.66	2328.04	2320.33	2320.88	2312.68	2312.78
9/30/2016	2301.17	2318.94	2323.47	2339.37	2341.43	2331.20	2332.15	2319.86	2320.10
12/31/2016	2296.45	2329.36	2334.85	2352.08	2354.91	2342.07	2343.46	2327.04	2327.45
Annual Trend		1.8%	2.0%	2.2%	2.3%	1.9%	2.0%	1.2%	1.3%
R-Squared		0.964	0.969	0.913	0.911	0.837	0.836	0.623	0.623

Notes:

- (2) = Average Index for Austin, Corpus Christi, Dallas, El Paso, Fort Worth, Houston, Odessa, and San Antonio
- (3) - (10) = (2) fitted to linear and exponential distributions

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review

Loss Trend Analysis
 Boeckh Residential Construction Index Trend (Coastal)

Calendar Year Ending	Texas Coastal Index	Fitted Trends		5 Years		4 Years		3 Years	
		All Years Linear	Exponential	Linear	Exponential	Linear	Exponential	Linear	Exponential
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
3/31/2007	1925.97	1934.13	1940.87						
6/30/2007	1947.53	1944.53	1950.31						
9/30/2007	1966.27	1954.93	1959.79						
12/31/2007	1977.64	1965.33	1969.32						
3/31/2008	1991.21	1975.73	1978.89						
6/30/2008	2002.80	1986.13	1988.51						
9/30/2008	2013.23	1996.53	1998.18						
12/31/2008	2024.37	2006.92	2007.89						
3/31/2009	2036.37	2017.32	2017.66						
6/30/2009	2055.55	2027.72	2027.46						
9/30/2009	2068.58	2038.12	2037.32						
12/31/2009	2075.34	2048.52	2047.23						
3/31/2010	2075.01	2058.92	2057.18						
6/30/2010	2072.68	2069.32	2067.18						
9/30/2010	2070.90	2079.72	2077.23						
12/31/2010	2070.54	2090.12	2087.33						
3/31/2011	2073.35	2100.52	2097.48						
6/30/2011	2074.41	2110.92	2107.67						
9/30/2011	2078.04	2121.32	2117.92						
12/31/2011	2083.41	2131.72	2128.22						
3/31/2012	2089.91	2142.12	2138.56	2109.02	2110.26				
6/30/2012	2099.29	2152.52	2148.96	2122.78	2123.37				
9/30/2012	2118.77	2162.91	2159.41	2136.53	2136.55				
12/31/2012	2139.83	2173.31	2169.91	2150.28	2149.82				
3/31/2013	2157.69	2183.71	2180.46	2164.03	2163.17	2184.43	2184.60		
6/30/2013	2175.59	2194.11	2191.06	2177.79	2176.61	2196.05	2195.90		
9/30/2013	2189.58	2204.51	2201.71	2191.54	2190.12	2207.68	2207.26		
12/31/2013	2203.33	2214.91	2212.41	2205.29	2203.72	2219.30	2218.69		
3/31/2014	2227.66	2225.31	2223.17	2219.04	2217.41	2230.92	2230.17	2263.37	2263.15
6/30/2014	2252.59	2235.71	2233.98	2232.80	2231.18	2242.55	2241.70	2270.33	2270.05
9/30/2014	2274.95	2246.11	2244.84	2246.55	2245.03	2254.17	2253.30	2277.28	2276.98
12/31/2014	2296.72	2256.51	2255.75	2260.30	2258.98	2265.79	2264.96	2284.24	2283.93
3/31/2015	2310.53	2266.91	2266.72	2274.05	2273.00	2277.41	2276.68	2291.19	2290.90
6/30/2015	2322.48	2277.31	2277.74	2287.81	2287.12	2289.04	2288.46	2298.14	2297.89
9/30/2015	2330.34	2287.71	2288.81	2301.56	2301.32	2300.66	2300.30	2305.10	2304.91
12/31/2015	2333.21	2298.11	2299.94	2315.31	2315.61	2312.28	2312.21	2312.05	2311.94
3/31/2016	2328.60	2308.51	2311.12	2329.06	2329.99	2323.91	2324.17	2319.01	2319.00
6/30/2016	2320.74	2318.90	2322.36	2342.82	2344.46	2335.53	2336.19	2325.96	2326.08
9/30/2016	2313.53	2329.30	2333.65	2356.57	2359.02	2347.15	2348.28	2332.92	2333.18
12/31/2016	2308.10	2339.70	2345.00	2370.32	2373.67	2358.78	2360.43	2339.87	2340.30
Annual Trend		1.8%	2.0%	2.3%	2.5%	2.0%	2.1%	1.2%	1.2%
R-Squared		0.946	0.951	0.901	0.899	0.811	0.810	0.566	0.566

Notes:

- (2) = Average Index for Corpus Christi and Houston
- (5) - (10) = (2) fitted to linear and exponential distributions

Rate Level Review

Loss Trend Analysis

Modified Consumer Price Index - External Trend

Calendar Year Ending	Modified CPI	Fitted Trends		5 Years		4 Years		3 Years	
		All Years Linear	Exponential	Linear	Exponential	Linear	Exponential	Linear	Exponential
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
9/30/2006	174.54	175.12	175.26						
12/31/2006	175.48	175.52	175.64						
3/31/2007	176.25	175.91	176.02						
6/30/2007	177.33	176.31	176.40						
9/30/2007	178.34	176.70	176.78						
12/31/2007	179.24	177.10	177.16						
3/31/2008	180.31	177.49	177.54						
6/30/2008	180.58	177.89	177.92						
9/30/2008	181.04	178.28	178.30						
12/31/2008	181.06	178.68	178.68						
3/31/2009	180.55	179.07	179.07						
6/30/2009	180.07	179.47	179.45						
9/30/2009	179.30	179.86	179.84						
12/31/2009	178.80	180.26	180.23						
3/31/2010	178.46	180.65	180.61						
6/30/2010	178.56	181.05	181.00						
9/30/2010	178.59	181.44	181.39						
12/31/2010	178.72	181.84	181.78						
3/31/2011	178.97	182.23	182.17						
6/30/2011	179.61	182.63	182.56						
9/30/2011	180.52	183.02	182.96						
12/31/2011	181.55	183.42	183.35						
3/31/2012	182.78	183.81	183.74	182.92	182.96				
6/30/2012	183.87	184.21	184.14	183.44	183.47				
9/30/2012	184.57	184.60	184.53	183.96	183.98				
12/31/2012	185.03	185.00	184.93	184.48	184.49				
3/31/2013	185.38	185.39	185.33	185.00	185.00	184.62	184.65		
6/30/2013	185.51	185.79	185.73	185.53	185.52	185.18	185.20		
9/30/2013	185.82	186.18	186.13	186.05	186.03	185.74	185.75		
12/31/2013	186.03	186.58	186.53	186.57	186.55	186.30	186.30		
3/31/2014	186.43	186.97	186.93	187.09	187.07	186.86	186.86	186.44	186.46
6/30/2014	186.87	187.37	187.33	187.61	187.59	187.42	187.41	187.07	187.07
9/30/2014	187.59	187.76	187.73	188.13	188.11	187.98	187.97	187.69	187.69
12/31/2014	188.62	188.16	188.13	188.65	188.63	188.54	188.53	188.31	188.31
3/31/2015	189.46	188.55	188.54	189.18	189.15	189.10	189.09	188.94	188.93
6/30/2015	189.59	188.95	188.94	189.70	189.68	189.67	189.65	189.56	189.55
9/30/2015	190.03	189.34	189.35	190.22	190.21	190.23	190.21	190.18	190.17
12/31/2015	190.50	189.74	189.76	190.74	190.73	190.79	190.78	190.81	190.80
3/31/2016	190.95	190.13	190.17	191.26	191.26	191.35	191.34	191.43	191.42
6/30/2016	192.03	190.53	190.57	191.78	191.79	191.91	191.91	192.05	192.05
9/30/2016	192.82	190.92	190.98	192.31	192.33	192.47	192.48	192.68	192.68
12/31/2016	193.56	191.32	191.39	192.83	192.86	193.03	193.06	193.30	193.32
Annual Trend		0.8%	0.9%	1.1%	1.1%	1.2%	1.2%	1.3%	1.3%
R-Squared		0.892	0.893	0.979	0.981	0.979	0.980	0.985	0.985

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
Residential 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	2,594,138	347,235	0.134	H
2009	10,397	2,216	0.213	
2010	18,020	4,278	0.237	
2011	95,292	15,132	0.159	
2012	65,399	15,781	0.241	
2013	71,177	14,103	0.198	
2014	7,254	7,003	0.965	
2015	136,876	39,261	0.287	
2016	32,262	15,110	0.468	
<hr/>				
All Years Total	3,640,792	532,947	0.146	
Hurricane Years Total	3,103,725	394,399	0.127	
Non-Hurricane Years				
Total	537,067	138,548	0.258	
10 Year	436,677	112,884	0.259	

Notes:

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

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

Accident Year	Incurred Loss at 12/31/16	Development Factor	Indicated Ultimate Loss
(1)	(2)	(3)	(4)
1979			1,423
1980			12,911
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			2,594,138
2009			10,397
2010	18,020	1.000	18,020
2011	95,964	0.993	95,292
2012	66,328	0.986	65,399
2013	71,823	0.991	71,177
2014	7,298	0.994	7,254
2015	139,955	0.978	136,876
2016	31,292	1.031	32,262

Notes:

- (2) Exhibit 4, Sheet 3
- (3) Exhibit 4, Sheet 3
- (4) 2010 - 2016: (2) * (3); 1979 - 2009: from prior TWIA annual statements

Texas Windstorm Insurance Association

Residential Property - Wind & Hail

Rate Level Review

Incurred Loss Development Factors

TWIA Schedule P Incurred Loss (Including IBNR)

Accident Year	<u>Months of Development</u>							
	12 (1)	24 (2)	36 (3)	48 (4)	60 (5)	72 (6)	84 (7)	(8)
2007		16,446	15,813	15,537	15,834	15,867	15,750	15,745
2008		1,902,481	1,774,393	2,273,398	2,384,020	2,680,497	2,632,000	2,594,138
2009		8,267	10,825	10,581	10,732	10,453	10,404	10,397
2010		15,215	18,166	18,173	18,522	18,361	18,267	18,020
2011		94,870	96,967	97,503	96,828	96,263	95,964	
2012		62,722	69,764	67,287	66,724	66,328		
2013		77,204	75,204	72,860	71,823			
2014		6,739	7,854	7,298				
2015		147,927	139,955					
2016		31,292						

Accident Year	<u>Development Factors</u>							
	12 - 24 (1)	24 - 36 (2)	36 - 48 (3)	48 - 60 (4)	60 - 72 (5)	72 - 84 (6)	84 - Ult (7)	(8)
2007		0.962	0.983	1.019	1.002	0.993	1.000	
2008		0.933	1.281	1.049	1.124	0.982	0.986	
2009		1.309	0.977	1.014	0.974	0.995	0.999	
2010		1.194	1.000	1.019	0.991	0.995	0.986	
2011		1.022	1.006	0.993	0.994	0.997		
2012		1.112	0.964	0.992	0.994			
2013		0.974	0.969	0.986				
2014		1.165	0.929					
2015		0.946						

Average		1.069	1.014	1.010	1.013	0.992	0.993	
Avg x hi / lo		1.054	0.983	1.007	0.995	0.994	0.993	
Avg 3 Year		1.029	0.954	0.990	0.993	0.996	0.990	
Avg 5 Year		1.044	0.974	1.001	1.016	0.992	0.993	
Prior		1.077	0.997	1.007	1.009	0.990	0.996	1.000
Selected		1.054	0.984	1.003	1.005	0.993	0.993	1.000
Cumulative		1.031	0.978	0.994	0.991	0.986	0.993	1.000

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

Accident Year	Incurred ALAE at 12/31/16	Development Factor	Indicated Ultimate ALAE	Incurred ULAE	Incurred LAE	
(1)	(2)	(3)	(4)	(5)	(6)	
1980					1,318	
1981					543	
1982					565	
1983					9,127	
1984					324	
1985					297	
1986					505	
1987					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		98,314	1.000	98,314	248,921	347,235
2009		223	1.000	223	1,993	2,216
2010		323	1.000	323	3,955	4,278
2011		745	1.011	753	14,379	15,132
2012		917	1.003	920	14,861	15,781
2013		1,089	1.066	1,161	12,942	14,103
2014		1,085	1.134	1,230	5,773	7,003
2015		1,818	1.168	2,123	37,138	39,261
2016		412	1.343	553	14,557	15,110

Notes:

- (2) Exhibit 4, Sheet 5
- (3) Exhibit 4, Sheet 5
- (4) 2007 - 2016: (2) * (3); 1980 - 2006: from TWIA's annual statements
- (5) From TWIA's annual statements
- (6) 1980 - 2016: (4) + (5); prior years from prior TWIA annual statements

Texas Windstorm Insurance Association

Residential Property - Wind & Hail

Rate Level Review

Incurred ALAE Development Factors

TWIA Schedule P Incurred ALAE (Including IBNR)

Accident Year	<u>Months of Development</u>							
	12 (1)	24 (2)	36 (3)	48 (4)	60 (5)	72 (6)	84 (7)	(8)
2006		704	891	899	879	867	860	860
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	98,314
2009		7,335	359	226	231	223	223	223
2010		391	312	322	316	335	324	323
2011		515	592	609	682	629	745	
2012		516	679	719	632	917		
2013		802	806	715	1,089			
2014		516	493	1,085				
2015		973	1,818					
2016		412						

Accident Year	<u>Development Factors</u>						
	12 - 24 (1)	24 - 36 (2)	36 - 48 (3)	48 - 60 (4)	60 - 72 (5)	72 - 84 (6)	84 - Ult (7)
2006		1.266	1.009	0.978	0.986	0.992	1.000
2007		1.168	0.940	0.862	0.991	0.997	1.000
2008		0.835	0.764	1.046	1.078	0.768	1.064
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	
2012		1.316	1.059	0.879	1.451		
2013		1.005	0.887	1.523			
2014		0.955	2.201				
2015		1.868					

Average		1.041	1.061	1.051	1.065	0.985	1.012	
Avg x hi / lo		1.062	0.960	1.004	1.016	0.989	1.000	
Avg 3 Year		1.276	1.382	1.174	1.144	1.051	1.020	
Avg 5 Year		1.259	1.242	1.105	1.095	0.983	1.012	
Prior		1.150	1.030	0.987	0.996	0.952	1.009	1.000
Selected		1.150	1.030	1.064	1.063	0.992	1.011	1.000
Cumulative		1.343	1.168	1.134	1.066	1.003	1.011	1.000

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

Basis for Hurricane Loss Ratio	(1)	Indicated Loss Ratio (2)	LAE Factor (3)	Indicated Loss & LAE Ratio (4)
Industry Experience		34.0%	0.127	38.3%
<u>Hurricane Models</u>				
AIR Model		46.4%	0.127	52.3%
RMS Model		40.9%	0.127	46.1%
Average of Models		43.7%	0.127	49.2%

Notes:

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

Texas Windstorm Insurance Association

Residential Property - Wind & Hail

Rate Level Review

Industry Experience -- Residential Extended Coverage

1966 - 2016 -- Hurricane Years Only

Accident Year	Earned Premium at Current TWIA Rate Level	Incurred Loss Ratio
(1)	(2)	(3)
1968	32,352,963	34.5%
1970	33,003,457	63.0%
1971	32,889,747	69.1%
1980	55,862,175	74.8%
1983	71,735,293	421.8%
1986	91,389,990	10.5%
1989	104,030,471	7.4%
1990	100,637,414	17.2%
1999	176,998,167	9.1%
2003	215,117,367	22.4%
2005	236,824,522	123.8%
2007	366,317,087	5.6%
2008	454,891,658	431.9%
(4) Simple Average Loss Ratio for Hurricane Years		99.3%
(5) Selected Non-Hurricane Loss Ratio		9.9%
(6) Average Hurricane Loss Ratio for Hurricane Years		89.4%
(7) Historical Hurricane Frequency		
(a) 51-Year (1/1/1966 - 12/31/2016)		0.275 (1 Hurricane Every 3.6 years)
(a) 166-Year (1/1/1851 - 12/31/2016)		0.380 (1 Hurricane Every 2.6 years)
Selected Frequency		0.380 (1 Hurricane Every 2.6 years)
(8) Indicated Hurricane Loss Ratio		34.0%

Notes:

- (2) Exhibit 6, Sheet 2. Accident years ending 9/30/xx
- (3) Exhibit 6, Sheet 2. 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

Residential Property - Wind & Hail

Rate Level Review

Industry Experience -- Residential Extended Coverage

1966 - 2016

Accident Year	Earned Premium	Earned Premium at CMR	Earned Premium at Current TWIA Rate Level	Incurred Losses	Incurred Loss Ratio	Hurricane Indicator
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1966		13,011,528	32,424,728	1,178,131	3.6%	
1967		13,130,860	32,722,103	663,024	2.0%	
1968		12,982,730	32,352,963	11,171,683	34.5%	H
1969		12,499,176	31,147,947	3,218,757	10.3%	
1970		13,243,763	33,003,457	20,786,468	63.0%	H
1971	10,640,335	13,198,133	32,889,747	22,731,206	69.1%	H
1972	12,302,040	13,902,740	34,645,628	2,242,093	6.5%	
1973	12,935,382	12,724,690	31,709,927	4,933,261	15.6%	
1974	12,794,652	11,637,700	29,001,148	2,293,219	7.9%	
1975	13,633,616	12,392,309	30,881,634	3,062,897	9.9%	
1976	17,088,846	13,884,831	34,600,999	1,522,489	4.4%	
1977	23,643,216	17,474,220	43,545,756	972,383	2.2%	
1978	28,157,329	19,320,941	48,147,785	1,449,823	3.0%	
1979	32,867,536	21,563,567	53,736,409	3,940,899	7.3%	
1980	32,179,994	22,416,603	55,862,175		74.8%	H
1981	30,817,037	29,693,419	73,996,000		3.2%	
1982	28,140,159	32,398,474	80,736,997		2.3%	
1983	28,786,234	39,817,626	71,735,293		421.8%	H
1984	20,078,668	34,626,400	50,036,041		13.3%	
1985	30,043,452	53,801,222	74,868,282		5.7%	
1986	36,673,352		91,389,990		10.5%	
1987	41,598,709		103,663,983		2.6%	
1988	45,044,392		112,250,622		11.0%	
1989	41,745,774		104,030,471		7.4%	H
1990	40,384,195		100,637,414		17.2%	H
1991	46,237,137		115,222,945		75.7%	
1992	44,512,572		110,925,332		6.8%	
1993	50,741,120		126,446,871		10.6%	
1994	57,584,585		143,500,786		5.2%	
1995	60,740,049		151,364,204		7.3%	
1996	71,865,572		179,089,006		3.7%	
1997	79,154,547		197,253,131		4.7%	
1998	80,238,260		199,953,742		20.5%	
1999	71,026,552		176,998,167		9.1%	H
2000	75,114,174		187,184,521		5.4%	
2001	74,726,401		162,168,113		7.7%	
2002	86,289,350		165,438,639		17.8%	
2003	112,200,741		215,117,367		22.4%	H
2004	123,050,217		224,959,088		1.8%	
2005	135,380,924		236,824,522		123.8%	H
2006	154,699,767		269,969,890		2.2%	
2007	219,914,305		366,317,087		5.6%	H
2008	289,558,186		454,891,658		431.9%	H
2009	327,305,758		467,176,186		1.9%	
2010	355,219,215		476,156,422		4.0%	
2011	370,875,863		484,864,269		20.3%	
2012	406,981,851		506,740,156		14.2%	
2013	440,952,159		522,963,005		16.8%	
2014	477,983,216		540,000,298		2.4%	
2015	517,590,913		557,009,741		26.2%	
2016	542,353,053		556,071,875		8.1%	
Total / Average	5,269,498,352	413,720,932	8,658,552,646		32.7%	
Average of Non-Hurricane Years Selected					9.9%	
					9.9%	

Notes: (2), (3) Provided by TDI. Accident years ending 9/30/xx as of 12/31/2016

(4) 1983 - 2016: Sum of Exhibit 6, Sheet 4 - Sheet 7, (4); 1966 - 1982: (3) * 2.5

(5) Provided by TDI. Accident years ending 9/30/xx as of 12/31/2010

(6) 1983 - 2016: Exhibit 6, Sheet 3; 1966 - 1981: (5) / (4)

(7) "H" indicates occurrence of hurricane(s) during the time period (years ending 9/30/xx)

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

Accident Year	<u>Loss Ratios by Territory / Tier</u>				Weighted Loss Ratio
	Territory 8	Territory 9	Territory 10	Tier 2	
(1)	(2)	(3)	(4)	(5)	(6)
1983	1105.0%	6.5%	149.6%	152.5%	421.8%
1984	3.3%	6.1%	21.8%	34.8%	13.3%
1985	1.8%	7.5%	7.3%	11.6%	5.7%
1986	1.1%	2.6%	19.2%	12.7%	10.5%
1987	0.6%	3.7%	3.3%	6.7%	2.6%
1988	5.1%	6.3%	16.6%	6.7%	11.0%
1989	5.7%	6.0%	8.7%	16.1%	7.4%
1990	30.3%	10.9%	11.1%	22.4%	17.2%
1991	61.4%	13.5%	108.7%	16.2%	75.7%
1992	1.2%	12.0%	8.1%	18.4%	6.8%
1993	13.1%	11.6%	8.4%	22.5%	10.6%
1994	2.4%	6.0%	6.7%	8.0%	5.2%
1995	3.0%	9.0%	9.0%	23.6%	7.3%
1996	1.4%	5.0%	4.6%	9.5%	3.7%
1997	1.8%	4.2%	6.6%	8.0%	4.7%
1998	18.5%	10.4%	25.6%	9.8%	20.5%
1999	2.1%	17.9%	10.2%	10.2%	9.1%
2000	0.8%	2.3%	9.3%	10.5%	5.4%
2001	5.7%	8.2%	8.3%	28.7%	7.7%
2002	25.6%	6.1%	17.3%	11.1%	17.8%
2003	5.4%	8.6%	38.3%	10.8%	22.4%
2004	1.3%	2.0%	2.0%	4.1%	1.8%
2005	53.7%	2.9%	213.8%	39.0%	123.8%
2006	1.1%	1.8%	2.9%	5.1%	2.2%
2007	2.8%	1.7%	8.7%	5.2%	5.6%
2008	729.4%	2.3%	401.4%	439.3%	431.9%
2009	3.0%	0.9%	1.4%	9.9%	1.9%
2010	1.2%	5.9%	5.0%	11.4%	4.0%
2011	1.1%	28.4%	29.8%	6.3%	20.3%
2012	8.7%	30.4%	10.0%	88.5%	14.2%
2013	42.8%	9.6%	3.0%	20.6%	16.8%
2014	0.5%	2.6%	3.1%	18.5%	2.4%
2015	13.3%	12.7%	39.1%	36.0%	26.2%
2016	8.1%	12.3%	6.1%	33.2%	8.1%
Average	63.6%	8.2%	36.0%	34.3%	39.6%

TWIA 2016 Written Premium by Territory / Tier

	Territory 8	Territory 9	Territory 10	Tier 2	Total
(7) Amount	123,723,598	71,935,582	196,830,392	4,511,865	397,001,437
(8) % Share	31.2%	18.1%	49.6%	1.1%	100.0%

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

Residential Property - Wind & Hail

Rate Level Review

Industry Experience -- Residential Extended Coverage

Tier 1 -- Territory 8 (Galveston County)

Accident Year	Earned Premium	Factor to TWIA Rate Level	Earned Premium at Current TWIA Rate Level	Incurred Loss	Incurred Loss Ratio
(1)	(2)	(3)	(4)	(5)	(6)
1983	4,317,605	2.492	10,759,472	118,889,570	1105.0%
1984	3,512,853	2.492	8,754,030	292,543	3.3%
1985	6,066,870	2.492	15,118,640	265,705	1.8%
1986	6,846,710	2.492	17,062,001	187,218	1.1%
1987	7,738,740	2.492	19,284,940	111,242	0.6%
1988	8,043,378	2.492	20,044,098	1,026,666	5.1%
1989	8,149,957	2.492	20,309,693	1,163,813	5.7%
1990	7,816,199	2.492	19,477,968	5,908,943	30.3%
1991	8,645,208	2.492	21,543,858	13,225,287	61.4%
1992	5,826,467	2.492	14,519,556	180,484	1.2%
1993	5,825,916	2.492	14,518,183	1,900,088	13.1%
1994	6,996,874	2.492	17,436,210	420,038	2.4%
1995	8,737,576	2.492	21,774,039	644,169	3.0%
1996	11,652,672	2.492	29,038,459	406,004	1.4%
1997	12,573,252	2.492	31,332,544	573,343	1.8%
1998	13,838,930	2.492	34,486,614	6,371,206	18.5%
1999	14,103,814	2.492	35,146,704	742,130	2.1%
2000	15,784,218	2.492	39,334,271	324,948	0.8%
2001	17,776,666	1.917	34,082,392	1,947,817	5.7%
2002	20,514,469	1.917	39,331,457	10,059,284	25.6%
2003	25,868,450	1.917	49,596,400	2,672,918	5.4%
2004	30,357,860	1.828	55,499,914	731,759	1.3%
2005	36,780,457	1.749	64,340,779	34,527,644	53.7%
2006	43,562,211	1.745	76,021,351	813,430	1.1%
2007	59,282,257	1.666	98,748,027	2,757,645	2.8%
2008	73,789,694	1.571	115,922,526	845,510,367	729.4%
2009	81,999,709	1.427	117,041,361	3,567,563	3.0%
2010	89,665,314	1.340	120,192,583	1,451,547	1.2%
2011	93,230,854	1.307	121,885,284	1,328,761	1.1%
2012	99,629,727	1.245	124,050,700	10,756,644	8.7%
2013	107,104,250	1.186	127,024,121	54,326,033	42.8%
2014	114,784,032	1.130	129,676,962	696,708	0.5%
2015	122,782,147	1.076	132,133,023	17,601,122	13.3%
2016	127,023,977	1.025	130,237,049	10,505,057	8.1%
Total	1,300,629,313		1,925,725,209	1,151,887,696	59.8%

Notes:

- (2) Provided by TDI. Accident years ending 9/30/xx as of 12/31/2016
- (3) 1998 and prior judgementally selected; 1999 - 2016 based on TWIA on-level factors
- (4) = (2) * (3)
- (5) Provided by TDI. Accident years ending 9/30/xx as of 12/31/2016
- (6) = (5) / (4)

Texas Windstorm Insurance Association

Residential Property - Wind & Hail

Rate Level Review

Industry Experience -- Residential Extended Coverage

Tier 1 -- Territory 9 (Nueces County)

Accident Year	Earned Premium	Factor to TWIA Rate Level	Earned Premium at Current TWIA Rate Level	Incurred Loss	Incurred Loss Ratio
(1)	(2)	(3)	(4)	(5)	(6)
1983	2,331,938	2.492	5,811,189	377,010	6.5%
1984	1,632,317	2.492	4,067,734	249,086	6.1%
1985	2,505,564	2.492	6,243,865	467,721	7.5%
1986	2,977,992	2.492	7,421,156	189,449	2.6%
1987	3,639,667	2.492	9,070,050	335,212	3.7%
1988	3,971,251	2.492	9,896,357	626,491	6.3%
1989	3,702,536	2.492	9,226,720	550,215	6.0%
1990	3,519,306	2.492	8,770,111	955,271	10.9%
1991	4,065,190	2.492	10,130,453	1,367,254	13.5%
1992	3,907,712	2.492	9,738,018	1,170,578	12.0%
1993	4,552,395	2.492	11,344,568	1,312,776	11.6%
1994	5,710,806	2.492	14,231,329	856,369	6.0%
1995	6,908,552	2.492	17,216,112	1,552,987	9.0%
1996	8,568,168	2.492	21,351,875	1,061,115	5.0%
1997	8,425,344	2.492	20,995,957	882,561	4.2%
1998	8,803,621	2.492	21,938,624	2,289,890	10.4%
1999	8,465,256	2.492	21,095,418	3,778,386	17.9%
2000	8,437,094	2.492	21,025,238	485,581	2.3%
2001	8,894,552	1.917	17,053,119	1,394,445	8.2%
2002	10,534,795	1.917	20,197,882	1,227,528	6.1%
2003	13,881,847	1.917	26,615,033	2,295,803	8.6%
2004	15,458,506	1.828	28,261,075	569,877	2.0%
2005	17,471,646	1.749	30,563,495	872,451	2.9%
2006	19,888,512	1.745	34,707,870	621,501	1.8%
2007	29,704,042	1.666	49,478,810	833,793	1.7%
2008	40,565,108	1.571	63,727,189	1,468,028	2.3%
2009	46,363,445	1.427	66,176,341	615,469	0.9%
2010	51,529,115	1.340	69,072,612	4,059,049	5.9%
2011	52,931,755	1.307	69,200,288	19,683,778	28.4%
2012	56,334,273	1.245	70,142,780	21,320,203	30.4%
2013	60,101,696	1.186	71,279,759	6,823,109	9.6%
2014	65,642,137	1.130	74,159,034	1,912,302	2.6%
2015	72,124,194	1.076	77,617,048	9,876,231	12.7%
2016	76,444,422	1.025	78,378,084	9,619,546	12.3%
Total	729,994,754		1,076,205,193	101,701,065	9.4%

Notes:

- (2) Provided by TDI. Accident years ending 9/30/xx as of 12/31/2016
- (3) 1998 and prior judgementally selected; 1999 - 2016 based on TWIA on-level factors
- (4) = (2) * (3)
- (5) Provided by TDI. Accident years ending 9/30/xx as of 12/31/2016
- (6) = (5) / (4)

Texas Windstorm Insurance Association

Residential Property - Wind & Hail

Rate Level Review

Industry Experience -- Residential Extended Coverage

Tier 1 -- Territory 10 (Other Tier 1)

Accident Year	Earned Premium	Factor to TWIA Rate Level	Earned Premium at Current TWIA Rate Level	Incurred Loss	Incurred Loss Ratio
(1)	(2)	(3)	(4)	(5)	(6)
1983	5,888,781	2.492	14,674,842	21,953,626	149.6%
1984	3,924,651	2.492	9,780,230	2,135,063	21.8%
1985	5,808,825	2.492	14,475,592	1,055,065	7.3%
1986	6,993,722	2.492	17,428,355	3,338,312	19.2%
1987	7,677,374	2.492	19,132,016	634,637	3.3%
1988	8,284,768	2.492	20,645,642	3,434,130	16.6%
1989	7,733,295	2.492	19,271,371	1,670,422	8.7%
1990	7,568,146	2.492	18,859,820	2,095,151	11.1%
1991	8,287,605	2.492	20,652,712	22,444,044	108.7%
1992	8,059,407	2.492	20,084,042	1,625,108	8.1%
1993	8,448,603	2.492	21,053,919	1,776,572	8.4%
1994	9,743,293	2.492	24,280,286	1,637,915	6.7%
1995	10,745,995	2.492	26,779,020	2,416,675	9.0%
1996	13,294,968	2.492	33,131,060	1,520,229	4.6%
1997	15,708,220	2.492	39,144,884	2,569,544	6.6%
1998	16,168,136	2.492	40,290,995	10,312,506	25.6%
1999	14,452,667	2.492	36,016,046	3,655,754	10.2%
2000	14,453,385	2.492	36,017,835	3,332,580	9.3%
2001	15,173,521	1.917	29,091,500	2,426,814	8.3%
2002	17,843,905	1.917	34,211,306	5,925,066	17.3%
2003	23,423,208	1.917	44,908,249	17,213,668	38.3%
2004	27,306,202	1.828	49,920,906	990,613	2.0%
2005	31,012,304	1.749	54,250,435	115,989,785	213.8%
2006	36,545,725	1.745	63,776,730	1,842,548	2.9%
2007	69,945,120	1.666	116,509,440	10,105,722	8.7%
2008	110,187,567	1.571	173,103,049	694,895,675	401.4%
2009	128,275,387	1.427	183,092,428	2,523,368	1.4%
2010	143,236,007	1.340	192,001,845	9,656,553	5.0%
2011	151,387,931	1.307	197,916,893	59,051,325	29.8%
2012	170,159,709	1.245	211,868,803	21,151,088	10.0%
2013	183,495,510	1.186	217,623,072	6,530,059	3.0%
2014	197,640,983	1.130	223,284,388	6,985,306	3.1%
2015	212,322,383	1.076	228,492,488	89,443,867	39.1%
2016	218,840,950	1.025	224,376,532	13,703,863	6.1%
Total	1,910,038,253	69	2,676,146,733	1,146,042,653	42.8%

Notes:

- (2) Provided by TDI. Accident years ending 9/30/xx as of 12/31/2016
- (3) 1998 and prior judgementally selected; 1999 - 2016 based on TWIA on-level factors
- (4) = (2) * (3)
- (5) Provided by TDI. Accident years ending 9/30/xx as of 12/31/2016
- (6) = (5) / (4)

Texas Windstorm Insurance Association

Residential Property - Wind & Hail

Rate Level Review

Industry Experience -- Residential Extended Coverage

Tier 2 -- (Territories 1 and 11)

Accident Year	Earned Premium	Factor to TWIA Rate Level	Earned Premium at Current TWIA Rate Level	Incurred Loss	Incurred Loss Ratio
(1)	(2)	(3)	(4)	(5)	(6)
1983	16,247,909	2.492	40,489,789	61,752,490	152.5%
1984	11,008,847	2.492	27,434,047	9,535,536	34.8%
1985	15,662,193	2.492	39,030,185	4,532,749	11.6%
1986	19,854,927	2.492	49,478,478	6,306,903	12.7%
1987	22,542,928	2.492	56,176,977	3,739,010	6.7%
1988	24,744,994	2.492	61,664,525	4,139,098	6.7%
1989	22,159,987	2.492	55,222,688	8,884,751	16.1%
1990	21,480,544	2.492	53,529,516	11,997,188	22.4%
1991	25,239,134	2.492	62,895,922	10,178,608	16.2%
1992	26,718,987	2.492	66,583,716	12,221,034	18.4%
1993	31,914,206	2.492	79,530,201	17,910,197	22.5%
1994	35,133,612	2.492	87,552,961	6,968,697	8.0%
1995	34,347,927	2.492	85,595,034	20,240,594	23.6%
1996	38,349,764	2.492	95,567,612	9,046,495	9.5%
1997	42,447,731	2.492	105,779,746	8,514,675	8.0%
1998	41,427,572	2.492	103,237,509	10,127,907	9.8%
1999	34,004,815	2.492	84,739,999	8,680,187	10.2%
2000	36,439,477	2.492	90,807,177	9,518,422	10.5%
2001	32,881,662	2.492	81,941,102	23,547,404	28.7%
2002	37,396,181	1.917	71,697,994	7,950,367	11.1%
2003	49,027,236	1.917	93,997,685	10,177,909	10.8%
2004	49,927,649	1.828	91,277,193	3,738,542	4.1%
2005	50,116,517	1.749	87,669,812	34,201,898	39.0%
2006	54,703,319	1.745	95,463,938	4,909,932	5.1%
2007	60,982,886	1.666	101,580,810	5,242,698	5.2%
2008	65,015,817	1.571	102,138,894	448,723,172	439.3%
2009	70,667,217	1.427	100,866,056	9,952,501	9.9%
2010	70,788,779	1.340	94,889,382	10,826,541	11.4%
2011	73,325,323	1.307	95,861,803	5,992,356	6.3%
2012	80,858,142	1.245	100,677,874	89,089,970	88.5%
2013	90,250,703	1.186	107,036,053	22,010,975	20.6%
2014	99,916,064	1.130	112,879,914	20,858,109	18.5%
2015	110,362,189	1.076	118,767,182	42,709,241	36.0%
2016	120,043,704	1.025	123,080,210	40,898,980	33.2%
Total	1,615,988,942		2,825,141,982	1,005,125,136	35.6%

Notes:

- (2) Provided by TDI. Accident years ending 9/30/xx as of 12/31/2016
- (3) 1998 and prior judgementally selected; 1999 - 2016 based on TWIA on-level factors
- (4) = (2) * (3)
- (5) Provided by TDI. Accident years ending 9/30/xx as of 12/31/2016
- (6) = (5) / (4)

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

County	TWIA Insured Values (000s) as of 12/31/16	Modeled Loss Cost	Expected Annual Hurricane Loss
(1)	(2)	(3)	(4)
Aransas	1,981,127	2.769	5,485,741
Brazoria	13,220,470	1.634	21,602,248
Calhoun	915,163	3.242	2,966,958
Cameron	3,267,225	1.491	4,871,432
Chambers	1,572,938	1.673	2,631,525
Galveston	21,250,791	3.853	81,879,298
Harris	1,453,569	3.913	5,687,815
Jefferson	8,005,875	1.981	15,859,638
Kenedy	6,572	1.095	7,196
Kleberg	230,050	1.011	232,581
Matagorda	1,264,593	2.805	3,547,183
Nueces	12,204,561	2.597	31,695,245
Refugio	90,556	1.653	149,689
San Patricio	2,278,203	2.007	4,572,353
Willacy	95,832	1.831	175,468
Total	67,837,525	2.754	181,364,370
(5) 2016 Earned Premium at Present Rates			390,825,871
(6) Indicated Hurricane Loss Ratio			46.4%

Notes:

- (2) Provided by TWIA
- (3) Exhibit 7, Sheet 2
- (4) = (2) * (3)
- (5) Exhibit 10, Sheet 2
- (6) = (4) Total / (5) Adjusted for Depop based on data as of Dec31,2016

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

County	TWIA Insured Values (000s) as of 12/31/16	Average Annual Modeled Loss	Provision for Storm Surge	Modeled Loss Cost
(1)	(2)	(3)	(4)	(5)
Aransas	1,981,127	5,464,659	1.004	2.769
Brazoria	13,220,470	21,520,928	1.004	1.634
Calhoun	915,163	2,955,381	1.004	3.242
Cameron	3,267,225	4,852,801	1.004	1.491
Chambers	1,572,938	2,620,260	1.004	1.673
Galveston	21,250,791	81,558,399	1.004	3.853
Harris	1,453,569	5,664,949	1.004	3.913
Jefferson	8,005,875	15,798,210	1.004	1.981
Kenedy	6,572	7,167	1.004	1.095
Kleberg	230,050	231,555	1.004	1.011
Matagorda	1,264,593	3,533,518	1.004	2.805
Nueces	12,204,561	31,568,526	1.004	2.597
Refugio	90,556	149,122	1.004	1.653
San Patricio	2,278,203	4,554,327	1.004	2.007
Willacy	95,832	174,805	1.004	1.831
Total	67,837,525	180,654,607	1.004	2.674

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
Residential Property - Wind & Hail
Rate Level Review
Hurricane Loss Ratio -- RMS Model

County	TWIA Insured Values (000s) as of 12/31/16	Modeled Loss Cost	Expected Annual Hurricane Loss
(1)	(2)	(3)	(4)
Aransas	2,079,415	2.578	5,360,732
Brazoria	13,132,402	1.684	22,114,965
Calhoun	932,291	3.850	3,589,320
Cameron	3,267,436	1.866	6,097,036
Chambers	1,812,326	1.703	3,086,391
Galveston	21,326,881	3.089	65,878,735
Harris	1,180,399	3.006	3,548,279
Jefferson	8,049,157	1.941	15,623,414
Kenedy	6,572	2.495	16,397
Kleberg	230,050	1.539	354,047
Matagorda	1,250,519	2.904	3,631,507
Nueces	12,204,830	2.108	25,727,782
Refugio	89,980	2.348	211,273
San Patricio	2,179,646	2.000	4,359,292
Willacy	95,621	2.536	242,495
Total	67,837,525	2.356	159,841,665
(5) 2016 Earned Premium at Present Rates			390,825,871
(6) Indicated Hurricane Loss Ratio			40.9%

Notes:

- (2) Provided by TWIA
- (3) Exhibit 8, Sheet 2
- (4) = (2) * (3)
- (5) Exhibit 10, Sheet 2
- (6) = (4) Total / (5) Adjusted for Depop based on data as of Dec31,2016

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

County	TWIA Insured Values (000s) as of 12/31/16	Average Annual Modeled Loss	Provision for Storm Surge	Modeled Loss Cost
(1)	(2)	(3)	(4)	(5)
Aransas	2,079,415	5,265,392	1.018	2.578
Brazoria	13,132,402	21,724,983	1.018	1.684
Calhoun	932,291	3,525,452	1.018	3.850
Cameron	3,267,436	5,987,873	1.018	1.866
Chambers	1,812,326	3,032,454	1.018	1.703
Galveston	21,326,881	64,705,598	1.018	3.089
Harris	1,180,399	3,485,034	1.018	3.006
Jefferson	8,049,157	15,343,322	1.018	1.941
Kenedy	6,572	16,109	1.018	2.495
Kleberg	230,050	347,728	1.018	1.539
Matagorda	1,250,519	3,567,256	1.018	2.904
Nueces	12,204,830	25,276,860	1.018	2.108
Refugio	89,980	207,569	1.018	2.348
San Patricio	2,179,646	4,281,807	1.018	2.000
Willacy	95,621	238,164	1.018	2.536
Total	67,837,525	157,005,601	1.018	2.356

Notes:

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

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review
Texas Hurricanes 1850 - 2016

<u>Landfall</u>			<u>Landfall</u>		
Year	Month	Name	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

Frequency	Date Period	Hurricanes	Period	Annual Frequency
51-Year	1/1/1966 - 12/31/2016	14	51	0.275
166-Year	1/1/1851 - 12/31/2016	63	166	0.380

Notes:
(1), (2) from NOAA Technical Memorandum NWS TPC-5, updated through 2007

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review

Calculation of TWIA Earned Premium at Present Rate Level
Tier 1 -- Territory 8 (Galveston County)

Year	TWIA Earned Premium	Factor to Current Rate Level	Earned Premium at Current Rate Level
(1)	(2)	(3)	(4)
2007	58,103,369	1.666	96,784,322
2008	72,541,071	1.571	113,960,957
2009	80,844,468	1.427	115,392,440
2010	88,599,807	1.340	118,764,316
2011	92,287,441	1.307	120,651,913
2012	98,605,959	1.245	122,775,989
2013	105,941,027	1.186	125,644,555
2014	113,521,698	1.130	128,250,844
2015	121,221,015	1.076	130,452,998
2016	123,942,872	1.025	127,078,007
Total	955,608,727		1,199,756,341

Notes:

- (2) Provided by TWIA
- (3) Provided by TWIA
- (4) = (2) * (3)

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review

Calculation of TWIA Earned Premium at Present Rate Level
 Tier 1 -- Territory 9 (Nueces County)

Year	TWIA Earned Premium	Factor to Current Rate Level	Earned Premium at Current Rate Level
(1)	(2)	(3)	(4)
2007	26,688,989	1.666	44,456,556
2008	38,200,787	1.571	60,012,875
2009	43,977,111	1.427	62,770,234
2010	49,048,919	1.340	65,748,014
2011	50,547,302	1.307	66,082,975
2012	53,841,760	1.245	67,039,309
2013	57,427,564	1.186	68,108,276
2014	62,828,148	1.130	70,979,937
2015	68,716,114	1.076	73,949,414
2016	71,234,774	1.025	73,036,658
Total	522,511,468		652,184,248

Notes:

- (2) Provided by TWIA
- (3) Provided by TWIA
- (4) = (2) * (3)

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review

Calculation of TWIA Earned Premium at Present Rate Level
Tier 1 -- Territory 10 (Other Tier 1)

Year	TWIA Earned Premium	Factor to Current Rate Level	Earned Premium at Current Rate Level
(1)	(2)	(3)	(4)
2007	57,705,210	1.666	96,121,098
2008	98,017,773	1.571	153,984,482
2009	116,551,972	1.427	166,359,144
2010	131,679,293	1.340	176,510,556
2011	140,621,661	1.307	183,841,618
2012	160,031,435	1.245	199,257,913
2013	173,209,952	1.186	205,424,546
2014	187,152,484	1.130	211,435,033
2015	200,595,693	1.076	215,872,714
2016	200,978,477	1.025	206,062,228
Total	1,466,543,950		1,814,869,332

Notes:

- (2) Provided by TWIA
- (3) Provided by TWIA
- (4) = (2) * (3)

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review

Calculation of TWIA Earned Premium at Present Rate Level
Tier 2 -- (Territories 1 and 11)

Year	TWIA Earned Premium	Factor to Current Rate Level	Earned Premium at Current Rate Level
(1)	(2)	(3)	(4)
2007	1,579,121	1.666	2,630,384
2008	1,913,655	1.571	3,006,324
2009	2,218,368	1.427	3,166,363
2010	2,562,327	1.340	3,434,692
2011	2,825,372	1.307	3,693,748
2012	3,294,072	1.245	4,101,506
2013	3,672,814	1.186	4,355,905
2014	3,920,276	1.130	4,428,922
2015	4,202,726	1.076	4,522,798
2016	4,436,708	1.025	4,548,935
Total	30,625,439		37,889,577

Notes:

- (2) Provided by TWIA
- (3) Provided by TWIA
- (4) = (2) * (3)

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review

Calculation of TWIA Earned Premium at Present Rate Level

Year	Earned Premium at Current Manual Rates	Factor to Current Rate Level	Earned Premium at Current Rate Level
(1)	(2)	(3)	(4)
2007	165,328,751	1.666	275,392,482
2008	219,412,771	1.571	344,694,241
2009	250,693,788	1.427	357,824,953
2010	273,154,916	1.340	366,152,680
2011	292,239,327	1.307	382,058,854
2012	323,323,869	1.245	402,576,153
2013	346,955,938	1.186	411,484,820
2014	372,022,089	1.130	420,290,990
2015	403,803,905	1.076	434,556,911
2016	405,934,590	1.025	416,202,706
Total	3,052,869,944		3,811,234,790

Notes:

- (2) Provided by TWIA
- (3) Based on historical rate changes
- (4) = (2) * (3)

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review

Fixed Expenses and Variable Permissible Loss & LAE Ratios

Expense Category	2014	2015	2016	Selected
(1) Direct Written Premium	\$494,036,010	\$503,824,316	\$487,353,537	
(2) Direct Earned Premium	484,048,868	501,721,842	496,456,941	
(3) Commission				
\$ Amount	79,013,534	80,599,761	77,986,786	
% 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	\$26,497,842	\$27,800,836	\$26,421,698	
Adjustments				
Contribution to Statutory Fund	0	0	0	
Adjusted \$ Amount	26,497,842	27,800,836	26,421,698	
% of DWP	5.4%	5.5%	5.4%	5.4%
(6) Taxes, Licenses & Fees				
\$ Amount	\$9,640,039	\$9,828,083	\$9,626,596	
% of DWP	2.0%	2.0%	2.0%	2.0%
(7) Reinsurance Expense				17.0%
(8) Total Fixed Expenses				22.4%
(9) Total Variable Expenses				18.0%
(10) CRTF Contribution				12.3%
Class 1 Public Security Repayment				7.7%
Total Funding Contribution				20.0%
(11) Permissible Loss & LAE Ratio				62.0%

Notes:

- (1) - (6) From TWIA's Statutory Annual Statements and Insurance Expense Exhibits
- (7) Exhibit 11, Sheet 2
- (8) = (5) + (7)
- (9) = (3) + (4) + (6)
- (10) CRTF contribution selected judgmentally; Class 1 repayment based on projected \$80 million in debt service
- (11) = 100% - (9) - (10)

Texas Windstorm Insurance Association**Residential Property - Wind & Hail****Rate Level Review**

Development of Reinsurer Expense

Using Average of AIR and RMS Hurricane Models

Exhibit 11

Sheet 2

(1) 2017 - 2018 Reinsurance Premium	104,987,562
(2a) Average Annual Loss by Reinsurance Layer (AIR) 100% of \$2100M XS \$2800M	30,500,000
Total	30,500,000
(2b) Average Annual Loss by Reinsurance Layer (RMS) 100% of \$2100M XS \$2800M	24,456,000
Total	24,456,000
(2c) Selected Total Average Annual Loss	27,478,000
(3) Annual Exposure Growth	-5.6%
(4) Prospective Average Annual Loss	26,071,198
(5) Net Cost of Reinsurance	76,309,244
(6) TWIA 2016 Earned Premium at Present Rates	512,167,917
(7) 2017 - 2018 TWIA Prospective Earned Premium at Present Rates	449,620,773
(8) Indicated Reinsurance Expense %	17.0%

Notes:

(1) From TWIA reinsurance contract effective 6/1/2017 through 5/31/2018

(2a) Provided by Guy Carpenter, based on AIR model using TWIA exposures as of 12/31/2016 and adjusted for ALAE

(2b) Provided by Guy Carpenter, based on RMS model using TWIA exposures as of 12/31/2016 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) = Sum of (2a) * [(3) ^ 0.917]

(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 * [(3) ^ 1.417] (projected premium growth from 7/1/2016 to 12/1/2017)

(8) = (5) / (7)

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

Calendar Year	TWIA Provided Written Premium			Annual Statement Gross	
	Commercial	Residential	Total	Written Premium	Difference
(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	-
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 12/31/2016
- (4) = (2) + (3)
- (5) Based on TWIA Annual Statements
- (6) = (4) - (5)

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review

Current and Proposed Rates

Territorial Multipliers for Dwellings

Construction	Territory 1			Territories 8, 9, 10		
	Current	Proposed	Change	Current	Proposed	Change
Frame	2.699	2.833	4.965%	4.244	4.456	4.995%
Brick Veneer	2.772	2.910	4.978%	4.429	4.650	4.990%
Brick	2.300	2.415	5.000%	3.677	3.860	4.977%

Territorial Multipliers for Personal Property

Construction	Territory 1			Territories 8, 9, 10		
	Current	Proposed	Change	Current	Proposed	Change
Frame	2.764	2.902	4.993%	4.348	4.565	4.991%
Brick Veneer	2.663	2.796	4.994%	4.363	4.581	4.997%
Brick	2.251	2.363	4.976%	3.591	3.770	4.985%

Territorial Multipliers for Farm and Ranch Dwellings

Construction	Territory 1			Territories 8, 9, 10		
	Current	Proposed	Change	Current	Proposed	Change
Frame	2.699	2.833	4.965%	4.244	4.456	4.995%
Brick Veneer	2.772	2.910	4.978%	4.429	4.650	4.990%
Brick	2.300	2.415	5.000%	3.677	3.860	4.977%

Territorial Multipliers for Farm and Ranch Personal Property

Construction	Territory 1			Territories 8, 9, 10		
	Current	Proposed	Change	Current	Proposed	Change
Frame	2.764	2.902	4.993%	4.348	4.565	4.991%
Brick Veneer	2.663	2.796	4.994%	4.363	4.581	4.997%
Brick	2.251	2.363	4.976%	3.591	3.770	4.985%

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