P-0820-08

Xiuyu Li, ACAS, MAAA
Senior Actuary
Manager of Actuarial Analysis

August 11, 2020

Mrs. J'ne Elizabeth Byckovski
Chief Actuary
Texas Department of Insurance
333 Guadalupe Street
Austin, TX 78714-9104

RE: Texas Windstorm Insurance Association Annual Rate Filing

Dear J'ne:

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.

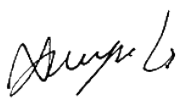
This filing is made pursuant to Section 2210.352 (a-1) and fulfills all of the requirements of that subsection.

On August 4, 2020, the Board of Directors of the Association voted to file for uniform 0% changes in both its residential and commercial rates. The most current actuarial review results in indications of +44% and +49% for residential and commercial rates, respectively. The complete residential and commercial analyses are attached.

On August 4, 2020, the Board directed its Actuarial & Underwriting Committee to make a recommendation regarding a subsequent rate filing upon the completion of an independent study of TWIA's rate adequacy. The independent study is being performed by the actuarial consulting firm Willis Towers Watson and expected to be completed by the end of August of 2020.

If you or your staff have any questions or comments, please contact Jerry Fadden or me.

Respectfully,



Xiuyu Li

TEXAS WINDSTORM INSURANCE ASSOCIATION
COMMERCIAL PROPERTY RATE LEVEL REVIEW
July 19, 2020

Prepared by: Xiuyu Li, ACAS, MAAA
Date: July 19, 2020

TABLE OF CONTENTS

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, methods, assumptions, data and results of this analysis.

DISTRIBUTION AND USE

This report was prepared for internal use by the management of TWIA and for the Board of Directors 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. 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 model developed by Applied Insurance Research (AIR) and one model developed by Risk Management Solutions (RMS). Both models utilized TWIA exposure data as of 11/30/2019. 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 Board decision subject to the approval requirements of the Texas Department of Insurance.

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 loss 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	+49%
Actual Industry Experience	+44%
AIR Hurricane Simulation Models	+57%
RMS Hurricane Simulation Models	+51%

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 rely on a long-term view of event frequency 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. This traditional method is well recognized as having its limits. For instance, historical results are not representative of future events in many areas, given that exposures change over time (i.e. property values, population movement, building codes and construction techniques, topography, etc.). Furthermore, on-leveling historical hurricane losses and premiums is very challenging due to lack of historical data. 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 54 years of actual insurance industry premiums and losses and 169 years of actual hurricane experience. Severe hurricanes are so relatively infrequent that this limited number of years of actual industry experience may not represent the scope of potential occurrences. Also, the distribution of insured properties has changed dramatically over time with the increased population and building values along the Gulf Coast. The alternate method incorporates the results of hurricane simulation models and 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 1% less than the corresponding indication from the prior TWIA commercial rate study.

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

4. The indicated rate changes presented in this report reflect a separate provision for contributions to funding and uncertainties in pricing hurricanes. The total funding and contingency provision is assumed to be equal to 5% of TWIA premium.

The provision for debt service of 19.7% represents the projected cost of debt service on the Series 2014 Class 1 Pre-Event Bonds. As of June 30, 2018, the available proceeds of the Series 2014 Pre-event Class 1 securities were used to pay claims associated with Hurricanes Harvey.

The provision for reinsurance expense is 19.5% 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 0.151 is equal to the weighted average of the 10 hurricane years included in the analysis. For non-hurricane losses, the indicated ratio of 0.244 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 2010 - 2019 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 12/31/19 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 is more appropriate than an average that excludes 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 based on the expected prospective inflation level. The net trend factor is equal to a loss trend offset by a premium trend. The loss trend is calculated using industry-wide construction cost and consumer price indices. Premium trend is derived from historical changes in average written premium at present rates. Both premiums and losses are trended to current levels by applying the actual historical changes in the appropriate data. Future premium and loss trends are selected based on all available and relevant data. The selected trends are estimates of the future trend between the current and prospective earned and accident dates, and they are not used to trend historical experience to current premium and loss levels.

The resulting loss and LAE ratios for each accident year from 2010 - 2019 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 2010 - 2019 accident period. Given the great variability among individual accident years, weighted average across the most recent 10 years has been selected to achieve both high stability and credibility.

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 50 and 169 years, respectively. The other method is based on hurricane simulation models. The "50/169-year" method is utilized because, until recently, the Texas Insurance Code required 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 50-year period is insufficient to measure long-term hurricane intensity.
- A 50-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 50/169-Year Industry Hurricane Experience

In Exhibit 6, the reported Texas insurance industry seacoast dwelling extended coverage premium and loss experience for the period 1970 through 2019 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 (1983-2019), these loss ratios are adjusted to TWIA's rate level.

A projected hurricane loss ratio is developed from these 50 years of loss ratios by separating the 50 years into the 12 hurricane years and 38 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 12 hurricane years. An average per-hurricane loss ratio for hurricane years is calculated as the average of the 14 hurricane loss ratios: 124.5%.

The 50-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 50-year period is 0.280, while the annual frequency during the most recent 169-year period is 0.379. The 50-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 50-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 for hurricane frequency in order to obtain the most credible result. The selected hurricane frequency is therefore set equal to the 169-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 47.2%.

Hurricane Simulation Models

The projected hurricane loss ratio is determined by averaging two different hurricane simulation models. The model versions utilized are AIR Touchstone v7 and RMS RiskLink v18.1. Both models were run using exposure data provided by TWIA as of 11/30/2019. 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 9,774 unique events, respectively, with the following distribution of intensity ratings:

Saffir-Simpson Category	AIR	RMS
Category 0	12.8%	45.2%
Category 1	36.3%	17.0%
Category 2	22.9%	13.1%
Category 3	19.0%	13.9%
Category 4	8.3%	9.9%
Category 5	0.8%	0.8%

Events shown as Category 0 include events with no U.S. landfall, Category 0 events making landfall or bypass in TX, and events making landfall or bypass in neighboring states or Mexico.

As shown in Exhibits 7 and 8, these models yield projected hurricane loss ratios of 56.0% and 51.9%. The average of these loss ratios is 54.0%.

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, Class 1 public security interest and principal repayment and the net cost of reinsurance (after modeled recoveries). The sum of these projected expenses provides for a 47.7% fixed expense ratio.

Variable expenses include commission, taxes, and projected contributions to the Catastrophe Reserve Trust Fund (CRTF). Subtracting these expenses from 100% yields a permissible loss and LAE ratio of 77.1%.

As stated above, the expenses include a provision for an annual contribution to the CRTF, repayment of Class 1 public securities, and the projected net cost of TWIA's purchasing of reinsurance. The 19.5% 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, coastal policyholders and TWIA insurance members. Furthermore, TWIA's purchasing of reinsurance help TWIA fulfills its statutory funding obligations.

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, 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.

Differences between the ratemaking paid loss data and the annual statement data for all accident years were reviewed, considered explainable and therefore deemed not significant.

The written premium reconciliation shows the differences between the ratemaking written premium data and the annual statement data for calendar years 1994 - 2019. 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 1% less than the comparable indication based on the prior (July 2019) study. The reasons for lower indications are summarized in the following table.

Reconciliation of Current vs. Prior Indications

Rate Indication/Reason for Change	Impact of Change	Rate Indication
Previous Rate Indication (Combined Method)		**+50%**
Slight Changes in multiple factors	-1%	
Current Rate Indication (Combined Method)		**+49%**

Noteworthy changes compared to prior analysis are discussed below:

Changes in modeled hurricane loss ratios and industry experience hurricane loss ratios

The average of the two modeled hurricane loss ratios increased by 2.4%, which is offset by an increase of 2.6% in industry experience hurricane lass ratios.

The increase of 2.4% in modeled hurricane loss ratios reflects both hurricane model version changes and TWIA exposure changes observed in the coastal area. Since December 2016, TWIA commercial policies decreased to 6,605 from 10,285 in June 2020. By its statutory design, as a residual market insurer, TWIA is unavoidably subject to adverse selections, the cumulative impact (+10%, commercial and residential combined) of the adverse selection starting from 2015 is expected to be fully reflected in TWIA modeled hurricane loss ratios, but not in industry experience-based loss ratios.

Changes in outstanding bond repayment provision, reinsurance provision and general expense provision

The outstanding class 1 public securities were issued in 2014 and had been depleted from paying for claims associated with Hurricane Harvey. Due to a recent bond redemption, TWIA's annual principal and interest payment reduced to $68.9 million from $80.3 million. Consequently, outstanding class 1 public security repayment provision dropped to 19.7% from 25.1% (-5.4%). Meanwhile, reinsurance provision increased to 19.5% from 16.6% (+2.9%) and general expense provision rose to 8.5% from 6.2% (+2.3%). Collectively those three provisions add up to a fixed expense provision of 47.7%, which is -0.2% less compared to 2019 rate analysis.

SUMMARY OF EXHIBITS

Exhibit Number	Exhibit Title or Purpose
1	Summary of Indicated Rate Change
2	Projected Ultimate Non-Hurricane Loss & LAE Ratio
3	Paid Loss Development Factors and Premium and Loss Trend Analysis
4	Development of LAE Factor
5	Summary of Indicated Hurricane Loss & LAE Ratios
6	Development of Hurricane Loss Ratio – 50/169-Year Method
7	Hurricane Loss Ratio – AIR Model
8	Hurricane Loss Ratio – RMS Model
9	Texas Hurricanes 1850 - 2019
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
Commerial Property - Wind & Hail
Rate Level Review

Table of Contents

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

Exhibit 1

	Indicated Loss & LAE Ratio					
Hurricane Projection Method	Hurricane	Non-Hurricane	Fixed Expenses	Total	Permissible LLAE Ratio	Indicated Rate Change
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Using Experience and Models	58.2%	9.0%	47.7%	114.9%	77.1%	+49%
Using Actual Industry Experience	54.3%	9.0%	47.7%	111.0%	77.1%	+44%
Using AIR Models	64.5%	9.0%	47.7%	121.2%	77.1%	+57%
Using RMS Models	59.7%	9.0%	47.7%	116.4%	77.1%	+51%
Average of AIR and RMS Models	62.1%	9.0%	47.7%	118.8%	77.1%	54%

Notes:
(2) Exhibit 5
(3) Exhibit 2, Sheet 1
(4) Exhibit 11
(5) = (2) + (3) + (4)
(6) Exhibit 11
(7) = (5) / (6) - 1
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)
2010	7,478,289	0.244	1.138	10,586,804	151,048,188	7.0%
2011	19,217,587	0.244	1.108	26,488,599	138,891,291	19.1%
2012	14,459,642	0.244	1.092	19,642,672	137,525,969	14.3%
2013	7,351,329	0.244	1.113	10,178,444	139,160,577	7.3%
2014	1,062,618	0.244	1.089	1,439,546	129,234,128	1.1%
2015	19,073,037	0.244	1.068	25,340,284	114,980,596	22.0%
2016	2,666,610	0.244	1.065	3,532,885	100,738,792	3.5%
2017	2,090,058	0.244	1.040	2,704,033	83,489,580	3.2%
2018	213,516	0.244	0.997	264,817	69,991,684	0.4%
2019	1,107,015	0.244	1.027	1,414,309	62,410,281	2.3%
Total	74,719,701			101,592,393	1,127,471,086	9.0%

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)
2010	7,478,289	1.000	7,478,289
2011	19,217,587	1.000	19,217,587
2012	14,459,642	1.000	14,459,642
2013	7,351,329	1.000	7,351,329
2014	1,056,281	1.006	1,062,618
2015	18,644,220	1.023	19,073,037
2016	2,596,505	1.027	2,666,610
2017	1,979,222	1.056	2,090,058
2018	186,803	1.143	213,516
2019	806,862	1.372	1,107,015
Total	73,776,739		74,719,701

Notes:
(2) Exhibit 2, Sheet 3, as of 12/31/19
(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 12/31/19

Accident Year	Paid Loss Excluding Expense Non-Hurricane	Hurricane	Total
(1)	(2)	(3)	(4)
2010	7,478,289	0	7,478,289
2011	19,217,587	0	19,217,587
2012	14,459,642	0	14,459,642
2013	7,351,329	0	7,351,329
2014	1,056,281	0	1,056,281
2015	18,644,220	0	18,644,220
2016	2,596,505	0	2,596,505
2017	1,979,222	435,211,700	437,190,922
2018	186,803	0	186,803
2019	806,862	0	806,862
Total	73,776,739	435,211,700	508,988,439

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

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

Year / Quarter	Average Writen premium Per house year At present rates
(1)	(2)
2010 / 4	3,986.26
2011 / 4	4,002.39
2012 / 4	4,097.53
2013 / 4	4,252.75
2014 / 4	4,282.15
2015 / 4	4,264.40
2016 / 4	4,252.60
2017 / 4	4,215.24
2018 / 4	4,176.71
2019 / 4	4,382.63

(3)	Current Average Earned Date	7/1/2019
(4)	Current Average Accident Date	7/1/2019
(5)	Prospective Average Earned / Accident Date	1/1/2022
(6)	Premium Trend Length	2.500
(7)	Loss Trend Length	2.500
(8)	Selected Premium Trend	0.6%
(9)	Selected Loss Trend	1.7%

Accident Year	Current Premium Trend	Current Loss Trend	Prospective Premium Trend	Prospective Loss Trend	Net Trend Factor
(10)	(11)	(12)	(13)	(14)	(15)
2010	1.099	1.218	1.016	1.043	1.138
2011	1.095	1.181	1.016	1.043	1.108
2012	1.070	1.137	1.016	1.043	1.092
2013	1.031	1.117	1.016	1.043	1.113
2014	1.023	1.085	1.016	1.043	1.089
2015	1.028	1.069	1.016	1.043	1.068
2016	1.031	1.069	1.016	1.043	1.065
2017	1.040	1.053	1.016	1.043	1.040
2018	1.049	1.019	1.016	1.043	0.997
2019	1.000	1.000	1.016	1.043	1.027

Notes:

(2) Exhibit 3, Sheet 2 (7)
(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 2019 / 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

Months of Development

Accident Year	12	24	36	48	60	72	84
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2010	4,489	6,162	6,783	7,280	7,280	7,302	7,478
2011	13,360	16,138	18,435	18,758	19,119	19,200	19,218
2012	8,512	11,404	13,135	13,284	13,309	14,460	14,460
2013	6,886	7,243	7,338	7,351	7,351	7,351	7,351
2014	641	875	1,015	1,056	1,056	1,056	
2015	15,923	17,690	17,780	18,644	18,644		
2016	2,055	2,479	2,584	2,597			
2017	1,599	1,963	1,979				
2018	165	187					
2019	807						

Development Factors

Accident Year	12 - 24	24 - 36	36 - 48	48 - 60	60 - 72	72 - 84	84 - Ult
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2011	1.373	1.101	1.073	1.000	1.003	1.024	
2012	1.208	1.142	1.018	1.019	1.004	1.001	
2013	1.340	1.152	1.011	1.002	1.086	1.000	
2014	1.052	1.013	1.002	1.000	1.000	1.000	
2015	1.365	1.160	1.040	1.000	1.000		
2016	1.111	1.005	1.049	1.000			
2017	1.206	1.042	1.005				
2018	1.228	1.008					
2019	1.133						
Average	1.224	1.078	1.028	1.004	1.019	1.006	
Avg x hi / lo	1.227	1.076	1.025	1.000	1.002	1.000	
Avg 3 Year	1.189	1.019	1.031	1.000	1.029	1.000	
Avg 5 Year	1.209	1.046	1.021	1.004	1.019	1.006	
Prior	1.200	1.086	1.029	1.003	1.016	1.006	1.000
Selected	1.200	1.082	1.028	1.003	1.017	1.006	1.000
Cumulative	1.372	1.143	1.056	1.027	1.023	1.006	1.000

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

Texas Windstorm Insurance Association Exhibit 3
Commercial Property - Wind & Hail Sheet 2
Rate Level Review
Premium Trend Analysis
TWIA Commercial Earned Premium at Present Rates

Year / Quarter	Exposure Written	Written Premium	On-Level Factors	Written Premium at Present Rates Written	Average Written Premium at Present Rates Quarterly	Average Written Premium at Present Rates Four Quarter Ending	Exponential Fitted Trends All-Year	5-Year	4-Year	3-Year
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2010 / 1	7,811	23,376,688	1.407	32,893,348	4,211					
2010 / 2	10,820	34,131,354	1.407	48,026,243	4,439					
2010 / 3	11,668	31,767,550	1.407	44,700,133	3,831					
2010 / 4	8,548	20,776,517	1.407	29,234,646	3,420	3,986				
2011 / 1	6,214	19,850,492	1.340	26,601,558	4,281	3,988	4,037			
2011 / 2	9,658	29,228,333	1.340	39,168,762	4,056	3,871	4,046			
2011 / 3	10,928	31,567,447	1.340	42,303,398	3,871	3,884	4,055			
2011 / 4	7,912	23,026,165	1.340	30,857,263	3,900	4,002	4,063			
2012 / 1	7,909	24,771,378	1.276	31,615,253	3,997	3,954	4,072			
2012 / 2	9,232	32,088,566	1.276	40,954,045	4,436	4,050	4,081			
2012 / 3	10,836	32,876,434	1.276	41,959,587	3,872	4,051	4,090			
2012 / 4	7,698	24,799,106	1.276	31,650,642	4,112	4,098	4,099			
2013 / 1	7,144	24,974,712	1.216	30,356,919	4,249	4,151	4,107			
2013 / 2	9,194	32,706,056	1.216	39,754,415	4,324	4,121	4,116			
2013 / 3	10,002	35,220,808	1.216	42,811,112	4,280	4,247	4,125			
2013 / 4	7,133	24,211,988	1.216	29,429,823	4,126	4,253	4,134			
2014 / 1	6,329	23,028,882	1.158	26,658,810	4,212	4,246	4,143			
2014 / 2	8,964	35,219,745	1.158	40,771,257	4,548	4,307	4,152			
2014 / 3	8,292	29,887,118	1.158	34,598,075	4,172	4,280	4,161			
2014 / 4	6,088	21,627,063	1.158	25,036,029	4,112	4,282	4,170			
2015 / 1	6,464	24,808,373	1.103	27,351,231	4,231	4,286	4,179	4,249.13		
2015 / 2	7,870	33,339,199	1.103	36,756,467	4,670	4,309	4,188	4,250.25		
2015 / 3	7,657	28,055,666	1.103	30,931,372	4,040	4,276	4,197	4,251.37		
2015 / 4	4,802	17,430,504	1.103	19,217,131	4,002	4,264	4,206	4,252.49		
2016 / 1	5,512	22,487,925	1.050	23,612,321	4,284	4,277	4,215	4,253.62	4,215.12	
2016 / 2	6,522	28,623,450	1.050	30,054,623	4,608	4,239	4,224	4,254.74	4,220.25	
2016 / 3	6,507	25,417,054	1.050	26,687,907	4,101	4,266	4,233	4,255.86	4,225.39	
2016 / 4	4,047	14,955,154	1.050	15,702,912	3,880	4,253	4,242	4,256.99	4,230.54	
2017 / 1	4,263	17,482,209	1.050	18,356,319	4,306	4,255	4,251	4,258.11	4,235.69	4,178.67
2017 / 2	5,717	25,224,489	1.050	26,485,713	4,633	4,248	4,260	4,259.23	4,240.84	4,191.95
2017 / 3	5,172	19,050,031	1.050	20,002,533	3,867	4,195	4,270	4,260.36	4,246.01	4,205.27
2017 / 4	3,489	13,077,837	1.050	13,731,729	3,936	4,215	4,279	4,261.48	4,251.18	4,218.63
2018 / 1	3,663	15,807,970	1.000	15,807,970	4,316	4,214	4,288	4,262.61	4,256.35	4,232.04
2018 / 2	5,108	22,862,777	1.000	22,862,777	4,476	4,154	4,297	4,263.73	4,261.53	4,245.49
2018 / 3	4,612	17,927,115	1.000	17,927,115	3,887	4,168	4,306	4,264.86	4,266.72	4,258.98
2018 / 4	3,109	12,284,401	1.000	12,284,401	3,951	4,177	4,316	4,265.98	4,271.92	4,272.51
2019 / 1	2,933	14,759,154	1.000	14,759,154	5,032	4,304	4,325	4,267.11	4,277.12	4,286.09
2019 / 2	4,431	20,959,587	1.000	20,959,587	4,730	4,371	4,334	4,268.24	4,282.32	4,299.71
2019 / 3	3,993	14,943,999	1.000	14,943,999	3,743	4,351	4,344	4,269.36	4,287.54	4,313.37
2019 / 4	2,966	12,109,737	1.000	12,109,737	4,083	4,383	4,353	4,270.49	4,292.76	4,327.08
(14) Average Annual Change							0.9%	0.1%	0.5%	1.3%
(15) Correlation Coefficient							26.3%	1.1%	12.6%	36.4%
(16) Selected Premium Trend										0.6%

Notes:
(2) Provided by TWIA
(3) Provided by TWIA
(4) Factor to bring written premium to current rate level
(5) = (3) * (4)
(6) = (5) / (2)
(7) annualized average written premium
(8) - (11) fitted to an exponential distribution
(14) Fitted average annual change
(15) Evaluates the predictability of the fitted curve
(16) Selected based on judgment

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

Calendar Year Ending 12/31/xx	Commercial Statewide Boeckh	Commercial Coastal Boeckh	Residential Statewide Boeckh	Residential Coastal Boeckh	Modified CPI	Weighted Average
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2010	1.236	1.250	1.199	1.209	1.121	1.218
2011	1.193	1.207	1.184	1.202	1.104	1.181
2012	1.149	1.155	1.153	1.170	1.083	1.137
2013	1.127	1.130	1.120	1.136	1.077	1.117
2014	1.096	1.093	1.084	1.090	1.062	1.085
2015	1.077	1.075	1.063	1.073	1.052	1.069
2016	1.082	1.080	1.074	1.085	1.035	1.069
2017	1.057	1.060	1.052	1.061	1.032	1.053
2018	1.015	1.018	1.011	1.015	1.021	1.019
2019	1.000	1.000	1.000	1.000	1.000	1.000
Factors to Adjust For Prospective Loss Costs						
(8) Fitted Trend	2.0%	1.9%	1.7%	1.9%	1.1%	1.7%
(9) Cost Factor	1.051	1.048	1.044	1.049	1.028	1.043

Notes:
(2) = Exhibit 3, Sheet 3b trended forward to 12/31/2019
(3) = Exhibit 3, Sheet 3c trended forward to 12/31/2019
(4) = Residential Exhibit 3, Sheet 3b trended forward to 12/31/2019
(5) = Residential Exhibit 3, Sheet 3c trended forward to 12/31/2019
(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 7/1/2019 to 1/1/2022)

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)
3/31/2010	2174.05		
6/30/2010	2151.73		
9/30/2010	2138.05		
12/31/2010	2135.73		
3/31/2011	2144.86		
6/30/2011	2159.12		
9/30/2011	2182.25		
12/31/2011	2212.90	2241.89	2246.73
3/31/2012	2240.48	2253.90	2257.84
6/30/2012	2263.10	2265.90	2269.00
9/30/2012	2282.01	2277.91	2280.22
12/31/2012	2298.24	2289.91	2291.49
3/31/2013	2310.88	2301.92	2302.81
6/30/2013	2321.18	2313.92	2314.20
9/30/2013	2332.17	2325.93	2325.64
12/31/2013	2342.58	2337.93	2337.13
3/31/2014	2355.26	2349.94	2348.69
6/30/2014	2373.47	2361.94	2360.30
9/30/2014	2390.56	2373.95	2371.97
12/31/2014	2409.00	2385.95	2383.69
3/31/2015	2427.52	2397.96	2395.47
6/30/2015	2439.22	2409.96	2407.32
9/30/2015	2447.29	2421.97	2419.22
12/31/2015	2450.95	2433.97	2431.17
3/31/2016	2448.94	2445.98	2443.19
6/30/2016	2444.56	2457.99	2455.27
9/30/2016	2440.90	2469.99	2467.41
12/31/2016	2440.56	2482.00	2479.60
3/31/2017	2446.89	2494.00	2491.86
6/30/2017	2460.32	2506.01	2504.18
9/30/2017	2478.57	2518.01	2516.56
12/31/2017	2496.25	2530.02	2529.00
3/31/2018	2515.35	2542.02	2541.50
6/30/2018	2538.61	2554.03	2554.06
9/30/2018	2566.72	2566.03	2566.69
12/31/2018	2599.91	2578.04	2579.38
3/31/2019	2625.41	2590.04	2592.13
6/30/2019	2639.39	2602.05	2604.94
9/30/2019	2642.43	2614.05	2617.82
12/31/2019	2639.56	2626.06	2630.76
Annual Trend		1.8%	2.0%
R-Squared		0.956	0.958

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)
3/31/2008			
6/30/2008			
9/30/2008			
12/31/2008			
3/31/2009			
6/30/2009			
9/30/2009			
12/31/2009	2253.49	2152.21	2160.16
3/31/2010	2230.60	2165.19	2171.86
6/30/2010	2198.60	2178.18	2183.62
9/30/2010	2167.19	2191.16	2195.45
12/31/2010	2144.34	2204.14	2207.34
3/31/2011	2143.28	2217.12	2219.30
6/30/2011	2155.06	2230.11	2231.32
9/30/2011	2181.54	2243.09	2243.41
12/31/2011	2220.60	2256.07	2255.56
3/31/2012	2252.16	2269.05	2267.78
6/30/2012	2277.36	2282.04	2280.07
9/30/2012	2299.43	2295.02	2292.42
12/31/2012	2320.37	2308.00	2304.84
3/31/2013	2337.98	2320.99	2317.32
6/30/2013	2349.49	2333.97	2329.88
9/30/2013	2359.78	2346.95	2342.50
12/31/2013	2370.49	2359.93	2355.19
3/31/2014	2388.19	2372.92	2367.94
6/30/2014	2411.34	2385.90	2380.77
9/30/2014	2431.12	2398.88	2393.67
12/31/2014	2450.88	2411.86	2406.64
3/31/2015	2465.88	2424.85	2419.67
6/30/2015	2477.55	2437.83	2432.78
9/30/2015	2486.84	2450.81	2445.96
12/31/2015	2492.85	2463.80	2459.21
3/31/2016	2493.63	2476.78	2472.53
6/30/2016	2490.89	2489.76	2485.92
9/30/2016	2485.91	2502.74	2499.39
12/31/2016	2482.14	2515.73	2512.93
3/31/2017	2484.26	2528.71	2526.54
6/30/2017	2494.82	2541.69	2540.23
9/30/2017	2509.93	2554.67	2553.99
12/31/2017	2528.31	2567.66	2567.83
3/31/2018	2547.16	2580.64	2581.74
6/30/2018	2569.79	2593.62	2595.72
9/30/2018	2597.57	2606.61	2609.78
12/31/2018	2632.34	2619.59	2623.92
3/31/2019	2661.80	2632.57	2638.13
6/30/2019	2677.57	2645.55	2652.43
9/30/2019	2684.16	2658.54	2666.79
12/31/2019	2679.79	2671.52	2681.24
Annual Trend		2.0%	1.9%
R-Squared		0.942	0.937

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

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

		Fitted Trends							
Calendar Year	Modified	All Years		5 Years		4 Years		3 Years	
Ending	CPI	Linear	Exponential	Linear	Exponential	Linear	Exponential	Linear	Exponential
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
9/30/2009	179.30	177.20	177.41						
12/31/2009	178.80	177.74	177.91						
3/31/2010	178.46	178.28	178.42						
6/30/2010	178.56	178.81	178.93						
9/30/2010	178.59	179.35	179.44						
12/31/2010	178.72	179.88	179.95						
3/31/2011	178.97	180.42	180.47						
6/30/2011	179.61	180.96	180.98						
9/30/2011	180.52	181.49	181.50						
12/31/2011	181.55	182.03	182.01						
3/31/2012	182.78	182.56	182.53						
6/30/2012	183.87	183.10	183.05						
9/30/2012	184.57	183.64	183.58						
12/31/2012	185.03	184.17	184.10						
3/31/2013	185.38	184.71	184.63						
6/30/2013	185.51	185.24	185.15						
9/30/2013	185.82	185.78	185.68						
12/31/2013	186.03	186.31	186.21						
3/31/2014	186.43	186.85	186.74						
6/30/2014	186.87	187.39	187.27						
9/30/2014	187.59	187.92	187.81						
12/31/2014	188.62	188.46	188.34						
3/31/2015	189.46	188.99	188.88	189.11	189.16				
6/30/2015	189.59	189.53	189.42	189.64	189.67				
9/30/2015	190.03	190.07	189.96	190.17	190.19				
12/31/2015	190.50	190.60	190.50	190.69	190.70				
3/31/2016	190.95	191.14	191.05	191.22	191.22	191.21	191.24		
6/30/2016	192.03	191.67	191.59	191.75	191.74	191.74	191.76		
9/30/2016	192.82	192.21	192.14	192.27	192.26	192.27	192.28		
12/31/2016	193.56	192.75	192.69	192.80	192.78	192.80	192.80		
3/31/2017	193.86	193.28	193.24	193.33	193.31	193.33	193.32	192.86	192.89
6/30/2017	194.07	193.82	193.79	193.86	193.83	193.85	193.85	193.45	193.47
9/30/2017	194.20	194.35	194.34	194.38	194.36	194.38	194.37	194.05	194.05
12/31/2017	194.18	194.89	194.90	194.91	194.89	194.91	194.90	194.64	194.64
3/31/2018	194.71	195.42	195.45	195.44	195.42	195.44	195.42	195.23	195.23
6/30/2018	195.24	195.96	196.01	195.97	195.95	195.97	195.95	195.83	195.82
9/30/2018	195.63	196.50	196.57	196.49	196.48	196.50	196.48	196.42	196.41
12/31/2018	196.26	197.03	197.13	197.02	197.01	197.03	197.02	197.01	197.00
3/31/2019	197.08	197.57	197.69	197.55	197.55	197.56	197.55	197.60	197.59
6/30/2019	198.20	198.10	198.26	198.08	198.09	198.09	198.09	198.20	198.19
9/30/2019	199.66	198.64	198.82	198.60	198.62	198.62	198.62	198.79	198.79
12/31/2019	200.38	199.18	199.39	199.13	199.16	199.14	199.16	199.38	199.39
Annual Trend		1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.2%	1.2%
R-Squared		0.987	0.987	0.962	0.963	0.930	0.932	0.902	0.905

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	4,276	1,110	0.260	
2007	15,745	4,941	0.314	H
2008	2,583,017	346,615	0.134	H
2009	18,005	2,219	0.123	
2010	96,089	4,274	0.044	
2011	67,497	15,111	0.224	
2012	70,825	15,832	0.224	
2013	70,825	13,827	0.195	
2014	6,991	6,804	0.973	
2015	138,385	39,918	0.288	
2016	28,152	15,445	0.549	
2017	1,445,037	289,745	0.201	H
2018	11,956	6,800	0.569	
2019	18,010	8,445	0.469	
All Years Total	5,153,297	837,863	0.163	
Hurricane Years Total	4,537,641	683,524	0.151	
Non-Hurricane Years				
Total	615,656	154,339	0.251	
10 Year	526,735	128,675	0.244	

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 12/31/19	Development Factor	Indicated Ultimate Loss
(1)	(2)	(3)	(4)
1980			12911
1981			2,512
1982			796
1983			148,999
1984			999
1985			512
1986			881
1987			1,897
1988			1,160
1989			12,296
1990			335
1991			1,217
1992			489
1993			3,375
1994			679
1995			2,977
1996			1,166
1997			2,964
1998			22,401
1999			8,773
2000			6,227
2001			24,605
2002			5,167
2003			155,001
2004			5,167
2005			154,981
2006			4,276
2007			15,745
2008			2,583,017
2009			18,005
2010			96,089
2011			67,497
2012	67,497	1.000	70,825
2013	70,825	1.000	70,825
2014	7,012	0.997	6,991
2015	138,801	0.997	138,385
2016	28,523	0.987	28,152
2017	1,445,588	1.000	1,445,037
2018	12,326	0.970	11,956
2019	18,155	0.992	18,010

Notes:

(2) Exhibit 4, Sheet 3

(3) Exhibit 4, Sheet 3

(4) 2012 - 2019: (2) * (3); 1980 - 2011: from prior TWIA annual statements

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

Months of Development

Accident Year	12	24	36	48	60	72	84
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2010	15,215	18,166	18,173	18,522	18,361	18,267	18,005
2011	94,870	96,967	97,503	96,828	96,263	95,964	96,089
2012	62,722	69,764	67,287	66,724	66,328	67,658	67,497
2013	77,204	75,204	72,860	71,823	71,286	71,068	70,825
2014	6,739	7,854	7,298	7,261	7,068	7,012	
2015	147,927	139,955	140,459	139,777	138,801		
2016	31,292	29,612	28,908	28,523			
2017	1,278,467	1,373,877	1,445,588				
2018	13,197	12,326					
2019	18,155						

Development Factors

Accident Year	12 - 24	24 - 36	36 - 48	48 - 60	60 - 72	72 - 84	84 - Ult
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2010	1.194	1.000	1.019	0.991	0.995	0.986	
2011	1.022	1.006	0.993	0.994	0.997	1.001	
2012	1.112	0.964	0.992	0.994	1.020	0.998	
2013	0.974	0.969	0.986	0.993	0.997	0.997	
2014	1.165	0.929	0.995	0.973	0.992		
2015	0.946	1.004	0.995	0.993			
2016	0.946	0.976	0.987				
2017	1.075	1.052					
2018	0.934						
Average	1.041	0.988	0.995	0.990	1.000	0.995	
Avg x hi / lo	1.034	0.987	0.992	0.993	0.996	0.997	
Avg 3 Year	0.985	1.011	0.992	0.986	1.003	0.999	
Avg 5 Year	1.013	0.986	0.991	0.989	1.000	0.995	
Prior	1.041	0.977	0.996	0.990	1.000	0.997	1.000
Selected	1.023	0.990	0.993	0.990	1.000	0.997	1.000
Cumulative	0.992	0.970	0.980	0.987	0.997	0.997	1.000

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

Accident Year	Incurred ALAE at 12/31/19	Development Factor	Indicated Ultimate DCC	Incurred AAO	Incurred LAE
(1)	(2)	(3)	(4)	(5)	(6)
1980					1318
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	2,452	4,941
2008	99,668	1.000	99,668	246,947	346,615
2009	223	1.000	223	1,996	2,219
2010	323	1.000	323	3,951	4,274
2011	725	1.000	725	14,386	15,111
2012	871	1.000	871	14,961	15,832
2013	901	1.000	901	12,926	13,827
2014	1,028	0.981	1,008	5,796	6,804
2015	2,944	0.973	2,865	37,053	39,918
2016	571	0.981	560	14,885	15,445
2017	21,865	1.063	23,242	266,503	289,745
2018	361	1.169	422	6,378	6,800
2019	48	1.403	67	8,378	8,445

Notes:

(2) Exhibit 4, Sheet 5
(3) Exhibit 4, Sheet 5
(4) 2008 - 2019: (2) * (3); 1986 - 2007: from TWIA's annual statements
(5) From TWIA's annual statements
(6) 1986 - 2019: (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 DCC (Including IBNR)

Months of Development

Accident Year	12	24	36	48	60	72	84
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2009	7,335	359	226	231	223	223	223
2010	391	312	322	316	335	324	323
2011	515	592	609	682	629	745	725
2012	516	679	719	632	917	880	871
2013	802	806	715	1,089	991	971	901
2014	516	493	1,085	1,266	1,077	1,028	
2015	973	1,818	2,355	2,749	2,944		
2016	412	678	746	571			
2017	891	16,490	21,865				
2018	301	361					
2019	48						

Development Factors

Accident Year	12 - 24	24 - 36	36 - 48	48 - 60	60 - 72	72 - 84	84 - Ult
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
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	0.973	
2012	1.316	1.059	0.879	1.451	0.960	0.990	
2013	1.005	0.887	1.523	0.910	0.980	0.928	
2014	0.955	2.201	1.167	0.851	0.955		
2015	1.868	1.295	1.167	1.071			
2016	1.646	1.100	0.765				
2017	18.507	1.326					
2018	1.199						
Average	2.85	1.17	1.08	1.03	1.01	0.98	
Avg x hi / lo	1.24	1.10	1.06	0.99	0.98	0.99	
Avg 3 Year	7.12	1.24	1.03	0.94	0.96	0.96	
Avg 5 Year	4.84	1.36	1.10	1.04	1.01	0.97	
Prior	1.15	1.03	1.15	1.04	1.00	1.01	1.00
Selected	1.20	1.10	1.08	1.01	0.99	0.98	1.00
Cumulative	1.40	1.17	1.06	0.98	0.97	0.98	1.00

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

Exhibit 5

Basis for Hurricane Loss Ratio	Indicated Loss Ratio	LAE Factor	Indicated Loss & LAE Ratio
(1)	(2)	(3)	(4)
Industry Experience	47.2%	0.151	54.3%
Hurricane Models			
AIR Model	56.0%	0.151	64.5%
RMS Model	51.9%	0.151	59.7%
Average of Models	54.0%	0.151	62.2%

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 - 2019 -- Hurricane Years Only

Accident Year	Earned Premium at Current TWIA Rate Level	Number of Hurricanes During the Year	Hurricane Year Incurred Loss Ratio	Per Hurricane Loss Ratio
	(1)	(2)	(3)	(4)
1970	50,792,436	1	45.5%	35.2%
1971	54,869,287	1	101.9%	91.6%
1980	60,963,960	1	63.0%	52.7%
1983	35,764,935	1	419.6%	409.3%
1986	46,088,241	1	8.7%	0.0%
1989	73,039,734	2	7.4%	0.0%
1999	167,481,109	1	8.3%	0.0%
2003	191,179,435	1	22.8%	12.5%
2005	253,206,423	1	172.4%	162.1%
2007	329,330,446	1	15.0%	4.7%
2008	298,516,833	2	473.2%	231.5%
2017	194,491,878	1	504.7%	494.4%
Simple Average Loss Ratio Per Hurricane Year			153.5%	124.5%

(5)	Selected Non-Hurricane Loss Ratio	10.3%	
(6) a	Average Hurricane Loss Ratio Per Hurricane	124.5%	
(6) b	Selected Avg Hurricane Loss Ratio Per Hurricane	124.5%	
(7)	Historical Hurricane Frequency		
	(a) 50.0-Year (1/1/1970 - 12/31/2019)	0.280	(1 Hurricane Every 3.6 years)
	(b) 169-Year (1/1/1851 - 12/31/2019)	0.379	(1 Hurricane Every 2.6 years)
	Selected Frequency	0.379	(1 Hurricane Every 2.6 years)
(8)	Indicated Hurricane Loss Ratio	47.2%	

Notes:
(1) 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) = MAX((3)-(5),0)/(2)
(5) Exhibit 6, Sheet 2
(6) a = Average of (4)
(6) b = Selected
(7) Exhibit 9
(8) = (6) b * (7) Selected

Texas Windstorm Insurance Association
Commercial Property - Wind & Hail
Rate Level Review
Industry Experience -- Commercial Extended Coverage
1970 - 2019

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	50,792,436	23,092,142	45.5%	H
1971	13,340,143	20,347,170	54,869,287	55,893,676	101.9%	H
1972	18,906,678	24,314,307	65,567,284	8,704,522	13.3%	
1973	21,737,541	23,257,532	62,717,527	3,837,493	6.1%	
1974	22,348,193	22,844,661	61,604,157	2,193,087	3.6%	
1975	24,396,629	24,958,305	67,303,925	3,943,412	5.9%	
1976	26,795,934	24,109,943	65,016,185	2,218,115	3.4%	
1977	30,910,821	27,119,226	73,131,182	1,898,346	2.6%	
1978	32,709,599	26,415,338	71,233,039	2,535,872	3.6%	
1979	31,306,685	24,514,306	66,106,613	4,535,147	6.9%	
1980	28,751,765	22,607,257	60,963,960	38,431,071	63.0%	H
1981	24,129,384	21,398,588	57,704,598	4,272,728	7.4%	
1982	18,505,004	17,523,231	47,254,099		3.4%	
1983	12,680,397	13,262,706	35,764,935		419.6%	H
1984	12,736,031	14,992,627	40,429,934		8.7%	
1985	15,169,575	16,422,895	44,286,873		4.2%	
1986	21,130,682	17,090,896	46,088,241		8.7%	H
1987	31,114,529	26,771,157	72,192,559		1.5%	
1988	25,065,531	24,117,319	65,036,076		9.7%	
1989	24,167,085	27,085,314	73,039,734		7.4%	H
1990	19,677,404	23,041,233	62,134,244		111.6%	
1991	21,794,680	25,534,881	68,858,751		59.0%	
1992	23,737,753	26,950,473	72,676,113		1.5%	
1993	21,990,182		68,130,740		6.4%	
1994	16,604,950		51,446,028		8.5%	
1995	32,374,229		100,302,951		19.9%	
1996	55,367,089		171,540,222		2.4%	
1997	53,196,024		164,813,754		3.9%	
1998	53,986,058		169,808,593		15.6%	
1999	52,435,243		167,481,109		8.3%	H
2000	41,739,697		127,577,928		7.0%	
2001	42,330,042		121,608,678		5.8%	
2002	69,156,402		190,103,989		14.1%	
2003	78,368,305		191,179,435		22.8%	H
2004	112,957,791		263,371,782		2.1%	
2005	119,598,806		253,206,423		172.4%	H
2006	148,019,940		285,101,407		2.2%	
2007	186,207,969		329,330,446		15.0%	H
2008	177,673,659		298,516,833		473.2%	H
2009	185,204,697		282,175,185		2.7%	
2010	193,721,394		272,686,040		3.9%	
2011	186,576,207		256,414,633		15.6%	
2012	203,887,603		266,479,799		18.6%	
2013	224,921,677		280,098,115		7.0%	
2014	235,022,975		279,057,495		1.2%	
2015	227,324,155		256,838,491		14.8%	
2016	210,615,830		226,599,831		3.9%	
2017	185,230,360		194,491,878		504.7%	H
2018	186,441,993		190,978,966		1.5%	
2019	184,576,503		184,576,503		3.4%	
Total / Average	3,997,516,033		7,028,689,005		45.1%	
Average of Non-Hurricane Years					10.9%	
Average of Non-Hurricane Years Excluding 1991					9.6%	
Selected					10.3%	

Notes: (2) Provided by TDI. 1983 - 1995 are year ending 9/30/xx as of 12/31/99; 1996 - 2019 are year ending 12/31/xx as of 12/31/19
(3) Provided by TDI (1992 MR = 1992 manual rates)
(4) 1993 - 2019: Sum of Exhibit 6, Sheet 4 - 7, (5); 1970 - 1992: (3) * 2.697,1992 on-level factor to bring industry premium to TWIA curr't rate lvl
(5) Provided by TDI. 1970 - 1982 are year ending 9/30/xx as of 12/31/99; 1983 - 2019 are year ending 12/31/xx as of 12/31/19
(6) 1983 - 2019: Exhibit 6, Sheet 3; 1970 - 1982: (5) / (4)
(7) "H" indicates occurrence of hurricane(s) during the time period (years ending 12/31/xx)

Texas Windstorm Insurance Association Exhibit 6
Commercial Property - Wind & Hail Sheet 3
Rate Level Review
Industry Experience -- Commercial Extended Coverage

Loss Ratios by Territory / Tier

Accident Year	Territory 8	Territory 9	Territory 10	Tier 2	Weighted Loss Ratio	Devel't Wtd Loss Ratio
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1983	1009.5%	4.3%	47.0%	169.1%	419.6%	419.6%
1984	8.6%	4.3%	11.1%	16.2%	8.7%	8.7%
1985	4.2%	2.8%	5.0%	9.1%	4.2%	4.2%
1986	3.3%	1.1%	18.3%	14.3%	8.7%	8.7%
1987	0.5%	1.9%	2.3%	3.4%	1.5%	1.5%
1988	13.2%	3.9%	9.3%	5.4%	9.7%	9.7%
1989	15.3%	2.0%	2.2%	6.2%	7.4%	7.4%
1990	270.6%	2.8%	10.1%	7.8%	111.6%	111.6%
1991	24.4%	24.2%	114.8%	5.3%	59.0%	59.0%
1992	0.9%	1.1%	2.4%	4.3%	1.5%	1.5%
1993	13.5%	1.7%	1.7%	5.7%	6.4%	6.4%
1994	0.3%	3.7%	19.6%	7.9%	8.5%	8.5%
1995	7.8%	10.3%	37.6%	20.6%	19.9%	19.9%
1996	1.5%	2.9%	3.1%	6.6%	2.4%	2.4%
1997	5.2%	2.0%	3.6%	9.0%	3.9%	3.9%
1998	20.7%	13.7%	11.4%	9.0%	15.6%	15.6%
1999	2.7%	12.6%	11.7%	8.9%	8.3%	8.3%
2000	2.1%	2.0%	13.8%	58.9%	7.0%	7.0%
2001	7.0%	3.2%	5.7%	28.7%	5.8%	5.8%
2002	11.7%	31.3%	7.2%	9.6%	14.1%	14.1%
2003	2.5%	8.8%	51.3%	32.6%	22.8%	22.8%
2004	2.9%	0.6%	2.0%	3.1%	2.1%	2.1%
2005	66.6%	1.7%	377.9%	50.8%	172.4%	172.4%
2006	2.3%	1.1%	2.6%	5.9%	2.2%	2.2%
2007	1.6%	56.5%	5.9%	9.9%	15.0%	15.0%
2008	699.1%	36.4%	481.8%	489.0%	473.2%	473.2%
2009	2.5%	4.7%	1.6%	9.6%	2.7%	2.7%
2010	1.5%	4.6%	6.1%	3.4%	3.9%	3.9%
2011	3.9%	30.9%	19.2%	19.1%	15.6%	15.6%
2012	19.0%	24.2%	15.3%	10.9%	18.6%	18.6%
2013	14.2%	4.3%	1.2%	7.3%	7.0%	7.0%
2014	0.6%	2.4%	1.1%	4.6%	1.2%	1.2%
2015	12.1%	4.5%	22.5%	14.4%	14.5%	14.8%
2016	0.9%	8.2%	3.8%	32.2%	3.8%	3.9%
2017	81.5%	1243.3%	469.1%	133.8%	477.9%	504.7%
2018	0.7%	1.2%	1.8%	12.9%	1.3%	1.5%
2019	1.1%	0.9%	4.3%	28.0%	2.5%	3.4%
Average	63.1%	42.3%	48.8%	34.4%	53.0%	53.8%

TWIA 2019 Written Premium by Territory / Tier

		Territory 8	Territory 9	Territory 10	Tier 2	Total
(8)	Amount	23,347,170	12,542,546	22,695,795	420,408	59,005,919
(9)	% Share	39.57%	21.26%	38.46%	0.71%	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 (9)
(7) = (6) * loss development factors from Exhibit 2.2
(8) Provided by TWIA
(9) = (8) / (8) Total

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

Accident Year	Earned Premium	Earned Premium at 1992 MR	TWIA Factor to Current Rate Level	Earned Premium at Current Rates	Incurred Loss	Incurred Loss Ratio
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1983	913,865	968,224	3.647	2,610,966	26,357,425	1009.5%
1984	1,195,339	1,366,667	3.344	3,685,429	318,455	8.6%
1985	2,581,481	2,777,593	2.742	7,490,209	314,878	4.2%
1986	3,013,362	2,349,181	1.952	6,334,929	211,282	3.3%
1987	3,004,153	2,585,122	1.899	6,971,181	37,480	0.5%
1988	2,905,355	2,728,206	2.045	7,357,029	969,836	13.2%
1989	2,825,114	3,015,974	2.272	8,133,040	1,244,199	15.3%
1990	2,303,321	2,474,141	2.386	6,671,903	18,053,460	270.6%
1991	2,203,500	2,080,579	2.372	5,610,603	1,371,244	24.4%
1992	2,352,391	2,012,473	2.697	5,426,944	46,331	0.9%
1993	2,406,016		3.098	7,454,402	1,005,945	13.5%
1994	2,807,090		3.098	8,697,023	28,034	0.3%
1995	2,645,757		3.098	8,197,175	635,625	7.8%
1996	5,519,716		3.098	17,101,374	249,644	1.5%
1997	5,461,636		3.098	16,921,429	886,485	5.2%
1998	6,133,105		3.145	19,291,165	3,994,564	20.7%
1999	6,706,028		3.194	21,419,430	575,316	2.7%
2000	4,997,201		3.057	15,274,010	320,131	2.1%
2001	4,785,262		2.873	13,747,432	962,576	7.0%
2002	8,206,069		2.749	22,557,658	2,632,325	11.7%
2003	8,793,047		2.439	21,450,633	529,845	2.5%
2004	12,425,339		2.332	28,970,854	830,387	2.9%
2005	13,839,253		2.114	29,255,465	19,469,845	66.6%
2006	18,414,310		1.940	35,721,811	812,370	2.3%
2007	24,924,710		1.769	44,082,248	710,669	1.6%
2008	24,970,117		1.680	41,953,322	293,310,706	699.1%
2009	29,363,002		1.524	44,737,043	1,140,669	2.5%
2010	31,708,901		1.408	44,634,072	669,882	1.5%
2011	31,271,334		1.374	42,976,689	1,675,264	3.9%
2012	35,124,210		1.307	45,907,119	8,709,842	19.0%
2013	37,650,973		1.245	46,887,284	6,670,061	14.2%
2014	38,263,554		1.187	45,432,714	258,179	0.6%
2015	36,780,958		1.130	41,556,366	5,012,267	12.1%
2016	36,187,907		1.076	38,934,270	331,694	0.9%
2017	32,595,075		1.050	34,224,829	27,903,575	81.5%
2018	33,178,454		1.024	33,985,835	245,785	0.7%
2019	33,603,360		1.000	33,603,360	378,013	1.1%
Total	552,060,265			865,267,244	428,874,288	49.6%

Notes:

(2) Provided by TDI. 1983 - 1995 are year ending 9/30/xx as of 12/31/99; 1996 - 2019 are year ending 12/31/xx as of 12/31/19
(3) Provided by TDI (1992 MR = 1992 manual rates)
(4) Represents 8/1/80 through 6/30/20 rate changes for TWIA; factors assume uniform earning of written premium and that TWIA premium represents 86.8% of industry data in Tier 1 -- Territory 8
(5) = (3) * 2.697 for 1983 - 1992; (2) * (4) for 1993 - 2019
(6) Provided by TDI. 1983 - 1995 are year ending 9/30/xx as of 12/31/99; 1996 - 2009 are year ending 12/31/xx as of 12/31/17 2010 - 2019 are year ending 12/31/xx as of 12/31/2019; 2008 IKE incurred loss was adjusted down by $99,433,917
(7) = (6) / (5)

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

Accident Year	Earned Premium	Earned Premium at 1992 MR	TWIA Factor to Current Rate Level	Earned Premium at Current Rates	Incurred Loss	Incurred Loss Ratio
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1983	745,985	820,826	3.647	2,213,484	96,051	4.3%
1984	558,639	652,809	3.344	1,760,400	76,481	4.3%
1985	1,235,059	1,383,103	2.742	3,729,751	106,148	2.8%
1986	2,228,911	1,849,840	1.952	4,988,379	56,387	1.1%
1987	2,381,538	2,086,940	1.899	5,627,756	105,275	1.9%
1988	1,796,653	1,719,227	2.045	4,636,161	181,414	3.9%
1989	1,632,453	1,826,430	2.272	4,925,251	98,116	2.0%
1990	1,429,526	1,769,972	2.386	4,773,003	135,678	2.8%
1991	1,390,109	1,555,310	2.372	4,194,134	1,013,636	24.2%
1992	1,571,433	1,629,721	2.697	4,394,794	49,512	1.1%
1993	1,587,772		3.098	4,919,290	86,000	1.7%
1994	2,203,514		3.098	6,827,003	254,088	3.7%
1995	2,669,951		3.098	8,272,134	854,753	10.3%
1996	5,639,923		3.098	17,473,804	502,177	2.9%
1997	3,183,758		3.098	9,864,029	199,390	2.0%
1998	3,613,310		3.145	11,365,362	1,561,275	13.7%
1999	6,808,428		3.194	21,746,501	2,735,082	12.6%
2000	5,167,158		3.057	15,793,486	317,804	2.0%
2001	4,763,324		2.873	13,684,407	431,244	3.2%
2002	8,479,915		2.749	23,310,433	7,300,265	31.3%
2003	9,934,549		2.439	24,235,327	2,122,879	8.8%
2004	14,597,450		2.332	34,035,336	212,644	0.6%
2005	16,137,249		2.114	34,113,310	566,758	1.7%
2006	21,249,313		1.940	41,221,416	434,362	1.1%
2007	27,752,523		1.769	49,083,564	27,752,523	56.5%
2008	27,990,909		1.680	47,028,679	17,103,924	36.4%
2009	29,085,395		1.524	44,314,085	2,074,340	4.7%
2010	27,439,364		1.408	38,624,188	1,768,194	4.6%
2011	24,767,582		1.374	34,038,480	10,534,288	30.9%
2012	26,074,384		1.307	34,079,054	8,260,210	24.2%
2013	27,625,026		1.245	34,401,832	1,473,733	4.3%
2014	27,425,810		1.187	32,564,382	766,708	2.4%
2015	26,008,254		1.130	29,385,002	1,316,614	4.5%
2016	22,181,835		1.076	23,865,253	1,964,437	8.2%
2017	18,821,527		1.050	19,762,603	245,701,770	1243.3%
2018	18,223,401		1.024	18,666,858	227,247	1.2%
2019	16,527,733		1.000	16,527,733	145,415	0.9%
Total	440,929,663			730,446,664	338,586,822	46.4%

Notes:

(2) Provided by TDI. 1983 - 1995 are year ending 9/30/xx as of 12/31/99; 1996 - 2019 are year ending 1/0/xx as of 12/31/19
(3) Provided by TDI (1992 MR = 1992 manual rates)
(4) Represents 8/1/80 through 6/30/20 rate changes for TWIA; factors assume uniform earning of written premium and that TWIA premium represents 88.3% of industry data in Tier 1 -- Territory 9
(5) = (3) * (4) for 1983 - 1992; (2) * (4) for 1993 - 2019
(6) Provided by TDI. 1983 - 1995 are year ending 9/30/xx as of 12/31/99; 1996 - 2008 are year ending 12/31/xx as of 12/31/17 2009 - 2019 are year ending 12/31/xx as of 12/31/2019
(7) = (6) / (5)

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

Accident Year	Earned Premium	Earned Premium at 1992 MR	TWIA Factor to Current Rate Level	Earned Premium at Current Rates	Incurred Loss	Incurred Loss Ratio
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1983	3,769,988	4,139,464	3.647	11,162,704	5,242,728	47.0%
1984	4,835,650	5,883,059	3.344	15,864,577	1,759,233	11.1%
1985	3,637,366	3,997,227	2.742	10,779,140	534,724	5.0%
1986	4,787,352	3,948,102	1.952	10,646,667	1,943,819	18.3%
1987	5,996,981	5,352,970	1.899	14,435,110	338,938	2.3%
1988	5,872,305	5,768,621	2.045	15,555,978	1,442,599	9.3%
1989	5,125,436	5,918,163	2.272	15,959,241	349,413	2.2%
1990	3,842,130	4,624,825	2.386	12,471,555	1,263,817	10.1%
1991	4,253,902	4,765,878	2.372	12,851,926	14,752,702	114.8%
1992	4,034,147	4,187,015	2.697	11,290,933	276,158	2.4%
1993	4,540,606		3.098	14,067,862	245,603	1.7%
1994	5,145,260		3.098	15,941,222	3,130,886	19.6%
1995	9,324,050		3.098	28,888,093	10,852,486	37.6%
1996	15,331,047		3.098	47,499,178	1,478,175	3.1%
1997	17,116,368		3.098	53,030,521	1,911,482	3.6%
1998	17,623,413		3.145	55,432,959	6,340,723	11.4%
1999	15,019,386		3.194	47,972,762	5,614,569	11.7%
2000	11,756,138		3.057	35,932,789	4,969,254	13.8%
2001	11,140,104		2.873	32,004,063	1,824,700	5.7%
2002	20,528,832		2.749	56,431,693	4,053,342	7.2%
2003	23,885,668		2.439	58,269,073	29,908,218	51.3%
2004	31,412,192		2.332	73,240,499	1,462,655	2.0%
2005	34,104,704		2.114	72,095,581	272,418,664	377.9%
2006	46,246,638		1.940	89,713,579	2,315,133	2.6%
2007	71,922,575		1.769	127,203,437	7,479,422	5.9%
2008	66,558,177		1.680	111,827,135	538,764,477	481.8%
2009	64,583,344		1.524	98,398,245	1,576,316	1.6%
2010	63,606,679		1.408	89,534,011	5,423,427	6.1%
2011	61,404,245		1.374	84,388,825	16,202,722	19.2%
2012	66,325,367		1.307	86,686,832	13,234,958	15.3%
2013	71,511,184		1.245	89,053,879	1,105,363	1.2%
2014	66,744,325		1.187	79,249,716	907,091	1.1%
2015	61,005,719		1.130	68,926,317	15,485,267	22.5%
2016	55,725,487		1.076	59,954,591	2,286,047	3.8%
2017	45,240,268		1.050	47,502,281	222,840,240	469.1%
2018	43,463,740		1.024	44,521,409	793,873	1.8%
2019	42,528,330		1.000	42,528,330	1,844,735	4.3%
Total	1,089,949,103			1,841,312,713	1,202,373,959	65.3%

Notes:

(2) Provided by TDI. 1983 - 1995 are year ending 9/30/xx as of 12/31/99; 1996 - 2019 are year ending 12/31/xx as of 12/31/19
(3) Provided by TDI (1992 MR = 1992 manual rates)
(4) Represents 8/1/80 through 6/30/20 rate changes for TWIA; factors assume uniform earning of written premium and that TWIA premium represents 72.4% of industry data in Tier 1 -- Territory 10
(5) = (3) * (4) for 1983 - 1992; (2) * (4) for 1993 - 2019
(6) Provided by TDI. 1983 - 1995 are year ending 9/30/xx as of 12/31/99; 1996 - 2008 are year ending 12/31/xx as of 12/31/17
2009 - 2019 are year ending 12/31/xx as of 12/31/2019
(7) = (6) / (5)

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

AY Ending	Earned Premium	Earned Premium at 1992 MR	TWIA Factor to Current Rate Level	Earned Premium at Current Rates	Incurred Loss	Incurred Loss Ratio
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1983	7,250,559	7,334,192	3.647	19,777,782	33,451,768	169.1%
1984	6,146,403	7,090,092	3.344	19,119,528	3,096,573	16.2%
1985	7,715,669	8,264,972	2.742	22,287,774	2,019,280	9.1%
1986	11,101,057	8,943,773	1.952	24,118,265	3,439,343	14.3%
1987	19,731,857	16,746,125	1.899	45,158,513	1,552,595	3.4%
1988	14,491,218	13,901,265	2.045	37,486,908	2,041,063	5.4%
1989	14,584,082	16,324,747	2.272	44,022,202	2,746,147	6.2%
1990	12,102,427	14,172,295	2.386	38,217,783	2,967,816	7.8%
1991	13,947,169	17,133,114	2.372	46,202,088	2,440,246	5.3%
1992	15,779,782	19,121,264	2.697	51,563,442	2,232,412	4.3%
1993	13,455,788		3.098	41,689,186	2,357,383	5.7%
1994	6,449,086		3.098	19,980,780	1,579,205	7.9%
1995	17,734,471		3.098	54,945,549	11,314,057	20.6%
1996	28,876,403		3.098	89,465,866	5,938,855	6.6%
1997	27,434,262		3.098	84,997,775	7,691,121	9.0%
1998	26,616,230		3.145	83,719,107	7,574,576	9.0%
1999	23,901,401		3.194	76,342,416	6,821,707	8.9%
2000	19,819,200		3.057	60,577,643	35,670,537	58.9%
2001	21,641,352		2.873	62,172,776	17,852,673	28.7%
2002	31,941,586		2.749	87,804,205	8,461,924	9.6%
2003	35,755,041		2.439	87,224,402	28,411,179	32.6%
2004	54,522,810		2.332	127,125,093	3,982,223	3.1%
2005	55,697,704		2.114	117,742,067	59,821,556	50.8%
2006	61,057,252		1.940	118,444,601	6,946,289	5.9%
2007	61,608,161		1.769	108,961,197	10,794,322	9.9%
2008	58,154,456		1.680	97,707,697	477,796,637	489.0%
2009	62,172,956		1.524	94,725,812	9,127,735	9.6%
2010	70,966,450		1.408	99,893,769	3,378,802	3.4%
2011	69,133,046		1.374	95,010,639	18,130,744	19.1%
2012	76,363,642		1.307	99,806,794	10,920,824	10.9%
2013	88,134,494		1.245	109,755,120	8,026,884	7.3%
2014	102,589,286		1.187	121,810,683	5,642,475	4.6%
2015	103,529,224		1.130	116,970,806	16,863,405	14.4%
2016	96,520,601		1.076	103,845,717	33,421,153	32.2%
2017	88,573,490		1.050	93,002,165	124,480,881	133.8%
2018	91,576,398		1.024	93,804,864	12,086,495	12.9%
2019	91,917,080		1.000	91,917,080	25,743,583	28.0%
Total	1,608,992,093			2,787,398,092	1,016,824,468	36.5%

Notes:

(2) Provided by TDI. 1983 - 1995 are year ending 9/30/xx as of 12/31/99; 1996 - 2019 are year ending 12/31/xx as of 12/31/19
(3) Provided by TDI (1992 MR = 1992 manual rates)
(4) Represents 8/1/80 through 6/30/20 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 - 2019
(6) Provided by TDI. 1983 - 1995 are year ending 9/30/xx as of 12/31/99; 1996 - 2008 are year ending 12/31/xx as of 12/31/17
2009 - 2019 are year ending 12/31/xx as of 12/31/2019
(7) = (6) / (5)

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

County	TWIA Insured Values (000s) as of 11/30/19	Modeled Loss Cost	Expected Annual Hurricane Loss
(1)	(2)	(3)	(4)
Aransas	214,790	3.590	771,096
Brazoria	407,860	3.080	1,256,209
Calhoun	106,660	3.152	336,192
Cameron	940,171	3.326	3,127,009
Chambers	54,565	2.515	137,231
Galveston	2,266,405	8.682	19,676,928
Harris	34,538	5.952	205,570
Jefferson	330,152	2.763	912,210
Kenedy	694	1.287	893
Kleberg	13,597	1.160	15,773
Matagorda	81,017	2.988	242,079
Nueces	1,434,990	3.708	5,320,943
Refugio	23,556	1.489	35,075
San Patricio	109,129	2.462	268,676
Willacy	13,589	2.552	34,679
Total	6,031,713	5.362	32,340,563
(5) Inforce-Premium as of 11/30/19 at Present Rates			57,743,025
(6) Indicated Hurricane Loss Ratio			56.0%

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

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

County	TWIA Insured Values (000s) as of 11/30/19	Average Annual Modeled Loss	Provision for Storm Surge	Modeled Loss Cost
(1)	(2)	(3)	(4)	(5)
Aransas	214,790	768,015	1.004	3.590
Brazoria	407,860	1,251,300	1.004	3.080
Calhoun	106,660	334,880	1.004	3.152
Cameron	940,171	3,114,923	1.004	3.326
Chambers	54,565	136,702	1.004	2.515
Galveston	2,266,405	19,598,002	1.004	8.682
Harris	34,538	204,760	1.004	5.952
Jefferson	330,152	908,703	1.004	2.763
Kenedy	694	890	1.004	1.287
Kleberg	13,597	15,713	1.004	1.160
Matagorda	81,017	241,129	1.004	2.988
Nueces	1,434,990	5,299,838	1.004	3.708
Refugio	23,556	34,929	1.004	1.489
San Patricio	109,129	267,643	1.004	2.462
Willacy	13,589	34,544	1.004	2.552
Total	6,031,713	32,211,972	1.004	5.362

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

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

County	TWIA Insured Values (000s) as of 11/30/19	Modeled Loss Cost	Expected Annual Hurricane Loss
(1)	(2)	(3)	(4)
Aransas	214,790	3.914	840,688
Brazoria	407,860	3.637	1,483,387
Calhoun	106,660	4.671	498,209
Cameron	940,171	5.001	4,701,795
Chambers	54,565	3.166	172,753
Galveston	2,266,405	6.390	14,482,328
Harris	34,538	5.101	176,178
Jefferson	330,152	2.842	938,292
Kenedy	694	2.417	1,677
Kleberg	13,597	2.046	27,819
Matagorda	81,017	4.019	325,607
Nueces	1,434,990	4.079	5,853,324
Refugio	23,556	2.746	64,685
San Patricio	109,129	3.407	371,803
Willacy	13,589	4.030	54,764
Total	6,031,713	4.973	29,993,309
(5) Inforce-Premium as of 11/30/19 at Present Rates			57,743,025
(6) Indicated Hurricane Loss Ratio			51.9%

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

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

County	TWIA Insured Values (000s) as of 11/30/19	Average Annual Modeled Loss	Provision for Storm Surge	Modeled Loss Cost
(1)	(2)	(3)	(4)	(5)
Aransas	214,790	825,864	1.018	3.914
Brazoria	407,860	1,457,235	1.018	3.637
Calhoun	106,660	489,386	1.018	4.671
Cameron	940,171	4,618,466	1.018	5.001
Chambers	54,565	169,691	1.018	3.166
Galveston	2,266,405	14,226,702	1.018	6.390
Harris	34,538	173,080	1.018	5.101
Jefferson	330,152	921,853	1.018	2.842
Kenedy	694	1,647	1.018	2.417
Kleberg	13,597	27,325	1.018	2.046
Matagorda	81,017	319,860	1.018	4.019
Nueces	1,434,990	5,750,449	1.018	4.079
Refugio	23,556	63,532	1.018	2.746
San Patricio	109,129	365,239	1.018	3.407
Willacy	13,589	53,800	1.018	4.030
Total	6,031,713	29,464,129	1.018	4.973

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 - 2019

Exhibit 9

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

Frequency	Date Period	Hurricanes	Period	Annual Frequency
50.0-Year	1/1/1970 - 12/31/2019	14	50	0.280
169-Year	1/1/1851 - 12/31/2019	64	169	0.379

Notes:
(1), (2) from NOAA Technical Memorandum NWS-NHC-6, updated with actual experience through 2019

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

Year	TWIA Written Premium	Factor to Current Rate Level	Written Premium at Current Rate Level	Earned Premium at Current Rate Level
(1)	(2)	(3)	(4)	(5)
1994	10,672,677	3.098	33,063,953	33,063,953
1995	12,865,905	3.098	39,858,574	36,461,264
1996	15,640,660	3.098	48,454,765	44,156,670
1997	16,536,186	3.098	51,229,104	49,841,935
1998	16,558,977	3.193	52,872,814	52,050,959
1999	17,394,142	3.193	55,539,496	54,206,155
2000	17,332,561	2.930	50,784,404	53,161,950
2001	17,544,251	2.817	49,422,155	50,103,280
2002	24,013,525	2.684	64,452,301	56,937,228
2003	29,220,514	2.440	71,298,054	67,875,178
2004	31,009,323	2.218	68,778,678	70,038,366
2005	35,740,174	2.016	72,052,191	70,415,435
2006	76,847,840	1.870	143,705,461	107,878,826
2007	110,951,718	1.714	190,171,245	166,938,353
2008	98,036,118	1.633	160,092,981	175,132,113
2009	111,269,573	1.423	158,336,602	159,214,792
2010	102,174,680	1.407	143,759,774	151,048,188
2011	100,017,021	1.340	134,022,808	138,891,291
2012	110,524,397	1.276	141,029,130	137,525,969
2013	112,904,624	1.216	137,292,023	139,160,577
2014	104,642,688	1.158	121,176,233	129,234,128
2015	98,715,934	1.102	108,784,959	114,980,596
2016	88,278,690	1.050	92,692,625	100,738,792
2017	70,749,081	1.050	74,286,535	83,489,580
2018	65,696,833	1.000	65,696,833	69,991,684
2019	59,123,729	1.000	59,123,729	62,410,281
Total	1,554,461,820		2,387,977,427	2,374,947,543

Notes:

(2) Provided by TWIA

(3) Exhibit 10, Sheet 2

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

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

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

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

Notes:

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

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

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

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

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

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

Effective Date	Rate Change	Cumulative Rate Level
(1)	(2)	(3)
Prior		1.000
8/1/80	17.5%	1.175
9/1/81	-3.7%	1.132
9/1/82	26.2%	1.428
10/10/83	6.0%	1.514
3/1/85	25.0%	1.892
3/15/85	28.3%	2.428
11/15/85	9.2%	2.651
7/1/87	-9.2%	2.407
11/1/88	-13.8%	2.075
3/1/90	1.4%	2.104
4/1/91	-1.0%	2.083
1/1/92	-22.9%	1.606
10/1/93	0.0%	1.606
1/1/98	-3.0%	1.558
1/1/00	9.0%	1.698
1/1/01	4.0%	1.766
1/1/02	5.0%	1.854
1/1/03	10.0%	2.039
1/1/04	10.0%	2.243
1/1/05	10.0%	2.468
1/1/06	5.0%	2.591
9/1/06	8.0%	2.798
1/1/07	3.7%	2.902
2/1/08	5.4%	3.059
2/1/09	15.6%	3.536
1/1/11	5.0%	3.713
1/1/12	5.0%	3.898
1/1/13	5.0%	4.093
1/1/14	5.0%	4.298
1/1/15	5.0%	4.513
1/1/16	5.0%	4.738
1/1/17	0.0%	4.738
1/1/18	5.0%	4.975
1/1/19	0.0%	4.975

Notes:

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

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

	Expense Category	2017	2018	2019	Selected
(1)	Direct Written Premium	$423,074,138	$395,551,679	$372,016,601	
(2)	Direct Earned Premium	$451,347,130	$409,954,258	$381,571,182	
(3)	Commission				
	$ Amount	67,661,211	63,280,811	59,474,929	
	% 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	$26,359,831	$30,687,177	$31,461,936	
	Adjustments				
	Contribution to Statutory Fund	0	0	0	
	Adjusted $ Amount	26,359,831	30,687,177	31,461,936	
	% of DEP	5.8%	7.5%	8.2%	8.5%
(6)	Taxes, Licenses & Fees				
	$ Amount	$8,281,293	$7,590,295	$7,024,246	
	% of DWP	2.0%	1.9%	1.9%	1.9%
(7)	Reinsurance Expense				19.5%
(8)	Outstanding Class 1 Public Security Repayment				19.7%
(9)	Total Fixed Expenses				47.7%
(10)	Total Variable Expenses				17.9%
(11)	CRTF Contribution & UW Contingency & Uncertainty				5.0%
(12)	Permissible Loss, LAE, and Fixed Expense Ratio				77.1%

Notes:
(1) - (6) From TWIA's Statutory Annual Statements and Insurance Expense Exhibits
(7) Exhibit 11, Sheet 2
(8) Outstanding Class 1 Public Security issued in 2014, Security depleted due to Hurricane Harvey;
0.197= Annual principal and interest payment $68.9M/Prospective written premium at present rate$350.03M
$350.03M = TWIA 2019 written premium $372,016,601*(1-3%)^2; 3% from Exhibit 11, sheet 2, (3)
(9) = (5) + (7) + (8)
(10) = (3) + (4) + (6)
(11) CRTF contribution selected judgmentally; Class 1 repayment based on projected $80 million in debt service
(12) = 100% - (10) - (11)

Texas Windstorm Insurance Association Exhibit 11
Commercial Property - Wind & Hail Sheet 2
Rate Level Review
Development of Reinsurer Expense
Using Average of AIR and RMS Hurricane Models

		Net of Depop
(1)	2020 - 2021 Reinsurance Premium	102,066,436
(2a)	Average Annual Loss by Reinsurance Layer (AIR)	
	100% of $2100M XS $2100M	34,140,093
	Total	34,140,093
(2b)	Average Annual Loss by Reinsurance Layer (RMS)	
	100% of $2100M XS $2100M	19,828,158
	Total	19,828,158
(2c)	Selected Total Average Annual Loss	26,984,126
(3)	Annual Exposure Growth	-3.0%
(4)	Prospective Average Annual Loss	26,174,602
(5)	Net Cost of Reinsurance	71,965,644
(6)	TWIA 2019 Earned Premium at Present Rates	384,669,667
(7)	2020 - 2021 TWIA Prospective Earned Premium at Present Rates	368,420,247
(8)	Indicated Reinsurance Expense %	19.5%

Notes:

(1) From TWIA reinsurance contract effective 6/1/2020 through 5/31/2021
(2a) Provided by Guy Carpenter, based on AIR model using TWIA exposures as of 11/30/2019
(2b) Provided by Guy Carpenter, based on RMS model using TWIA exposures as of 11/30/2019
(2c) Selected equal to the average of the modeled average annual losses
(3) Selected based on projections communicated to reinsurers
(4) = (2c) * [(1+ (3)) ^ 1.000](projected exposure growth from 11/30/2019 to 12/1/2020)
(5) = (1) - (4)*1.15,1.15 is the loading for loss adjustment factor
(6) = Commercial Exhibit 10, Sheet 1 + Residential Exhibit 10, Sheet 2, calendar year ending 12/31/2019
(7) = (6) adjusted for exposure growth trend * [(1+ (3)) ^ 1.417] (projected exposure growth from 7/1/2019 to 12/1/2020)
(8) = (5) / (7)

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

Accident Year	TWIA Provided Paid Loss Commercial & Farm	Residential	Total	Schedule P Direct & Assumed Paid Loss	Difference
(1)	(2)	(3)	(4)	(5)	(6)
2008	857,250,899	1,709,067,474	2,566,318,373	2,562,744,000	3,574,373
2009	2,553,456	8,479,585	11,033,041	10,403,000	630,041
2010	7,478,289	10,958,718	18,437,007	18,005,000	432,007
2011	19,217,587	76,980,633	96,198,220	96,089,000	109,220
2012	14,459,642	52,332,695	66,792,337	66,741,000	51,337
2013	7,351,329	63,503,334	70,854,663	70,811,000	43,663
2014	1,056,281	6,114,172	7,170,453	7,002,000	168,453
2015	18,644,220	119,859,509	138,503,729	138,583,000	(79,271)
2016	2,596,505	25,889,298	28,485,803	28,409,000	76,803
2017	437,190,922	901,238,563	1,338,429,485	1,338,484,000	(54,515)
2018	186,803	11,649,295	11,836,098	11,663,000	173,098
2019	806,862	12,384,305	13,191,167	12,936,000	255,167
Total	1,367,985,933	2,986,073,276	4,354,059,209	4,361,870,000	5,125,209

Notes:

(2), (3) Provided by TWIA, as of 12/31/2019
(4) = (2) + (3)
(5) Based on TWIA 2019 Annual Statement
(6) = (4) - (5)

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

Calendar Year	TWIA Provided Written Premium			Annual Statement Gross Written Premium	Difference
	Commercial	Residential	Total		
(1)	(2)	(3)	(4)	(5)	(6)
1994	10,672,677	15,758,330	26,431,007	26,510,501	(79,494)
1995	12,865,905	19,259,265	32,125,170	32,419,287	(294,117)
1996	15,640,660	24,504,127	40,144,787	40,358,575	(213,788)
1997	16,536,186	25,783,455	42,319,641	42,462,844	(143,203)
1998	16,558,977	27,833,800	44,392,777	44,410,914	(18,137)
1999	17,394,142	27,168,992	44,563,134	44,581,218	(18,084)
2000	17,332,561	29,762,296	47,094,857	48,012,426	(917,569)
2001	17,544,251	36,220,623	53,764,874	54,630,727	(865,853)
2002	24,013,525	48,856,422	72,869,947	72,967,831	(97,884)
2003	29,220,514	58,573,191	87,793,705	87,987,279	(193,574)
2004	31,009,323	71,292,702	102,302,025	102,384,351	(82,326)
2005	35,740,174	78,094,458	113,834,632	113,927,701	(93,069)
2006	76,847,840	119,658,576	196,506,416	196,833,235	(326,819)
2007	110,951,718	203,561,196	314,512,914	315,139,307	(626,393)
2008	98,036,118	232,925,990	330,962,108	331,057,645	(95,537)
2009	111,269,573	269,535,059	380,804,632	382,342,402	(1,537,770)
2010	102,174,680	278,116,922	380,291,602	385,549,582	(5,257,980)
2011	100,017,021	307,494,236	407,511,257	403,748,164	3,763,093
2012	110,524,397	335,795,725	446,320,122	443,479,701	2,840,421
2013	112,904,624	360,838,081	473,742,705	472,739,474	1,003,231
2014	104,642,688	389,333,918	493,976,606	494,036,010	(59,404)
2015	98,715,934	407,969,846	506,685,780	503,824,316	2,861,464
2016	88,278,690	399,074,847	487,353,537	487,353,537	-
2017	70,749,081	352,368,052	423,117,133	423,074,138	42,995
2018	65,696,833	331,676,957	397,373,790	395,551,679	1,822,111
2019	59,123,729	314,907,159	374,030,888	372,016,601	2,014,287
Total	1,554,461,820	4,766,364,225	6,320,826,045	6,317,399,445	3,426,600

Notes:

(2), (3) Provided by TWIA, as of 12/31/2019
(4) = (2) + (3)
(5) Based on TWIA Annual Statements
(6) = (4) - (5)

TEXAS WINDSTORM INSURANCE ASSOCIATION
RESIDENTIAL PROPERTY RATE LEVEL REVIEW
July 19, 2020

Prepared by: Xiuyu Li, ACAS, MAAA
Date: July 19, 2020

TABLE OF CONTENTS

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, methods, assumptions, data and results of this analysis.

DISTRIBUTION AND USE

This report was prepared for internal use by the management of TWIA and for the Board of Directors 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. 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 model developed by Applied Insurance Research (AIR) and one model developed by Risk Management Solutions (RMS). Both models utilized TWIA exposure data as of 11/30/2019. 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 Board decision subject to the approval requirements of the Texas Department of Insurance.

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 loss 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	+44%
Actual Industry Experience	+36%
AIR Hurricane Simulation Models	+59%
RMS Hurricane Simulation Models	+45%

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 rely on a long-term view of event frequency 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. This traditional method is well recognized as having its limits. For instance, historical results are not representative of future events in many areas, given that exposures change over time (i.e. property values, population movement, building codes and construction techniques, topography, etc.). Furthermore, on-leveling historical hurricane losses and premiums is very challenging due to lack of historical data. 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 54 years of actual insurance industry premiums and losses and 169 years of actual hurricane experience. Severe hurricanes are so relatively infrequent that this limited number of years of actual industry experience may not represent the scope of potential occurrences. Also, the distribution of insured properties has changed dramatically over time with the increased population and building values along the Gulf Coast. The alternate method incorporates the results of hurricane simulation models and 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 2% more than the corresponding indication from the prior TWIA residential rate study. Changes in modeled loss ratios are the primary reasons for the increase.

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

4. The indicated rate changes presented in this report reflect a separate provision for contributions to funding and uncertainties in pricing hurricanes. The total funding and contingency provision is assumed to be equal to 5% of TWIA premium.

The provision for debt service of 19.7% represents the projected cost of debt service on the Series 2014 Class 1 Pre-Event Bonds. As of June 30, 2018, the available proceeds of the Series 2014 Pre-event Class 1 securities were used to pay claims associated with Hurricanes Harvey.

The provision for reinsurance expense is 19.5% 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 earned premium and TWIA earned premium are 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 is 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 0.151 is equal to the weighted average of the 10 hurricane years included in the analysis. For non-hurricane losses, the indicated ratio of 0.244 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 2009 - 2019 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 12/31/19, 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 is more appropriate than an average that excludes 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 based on the expected prospective inflation level. The net trend factor is equal to a loss trend offset by a premium trend. The loss trend is calculated using industry-wide construction cost and consumer price indices. Premium trend is derived from historical changes in average written premium at present rates. Both premiums and losses are trended to current levels by applying the actual historical changes in the appropriate data. Future premium and loss trends are selected based on all available and relevant data. The selected trends are estimates of the future trend between the current and prospective earned and accident dates, and they are not used to trend historical experience to current premium and loss levels.

The resulting loss and LAE ratios for each accident year from 2010 - 2019 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 2010 - 2019 accident period. Given the great variability among individual accident years, a weighted average across the most recent 10 years has been selected to achieve both high stability and credibility.

The all-territory indicated loss and LAE ratio is then calculated as the weighted average of the individual territory loss and LAE ratios. TWIA 2019 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 54 and 169 years, respectively. The other method is based on hurricane simulation models. The "54/169-year" method is utilized because, until recently, the Texas Insurance Code required 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 54-year period is insufficient to measure long-term hurricane intensity.
- A 54-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 54/169-Year Industry Hurricane Experience
In Exhibit 6, the reported Texas insurance industry seacoast dwelling extended coverage premium and loss experience for the period 1966 through 2019 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 - 2019), these loss ratios are adjusted to TWIA's rate level.

A projected hurricane loss ratio is developed from these 54 years of loss ratios by separating the 54 years into the 13 hurricane years and 41 non-hurricane years. The 41 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 per hurricane loss ratio for hurricane years is calculated as the average of the 15 hurricane loss ratios: 97.3%.

The 54-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 54-year period is 0.278, while the annual frequency during the most recent 169-year period is 0.379. The 54-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 54-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 169-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 36.9%.

Hurricane Simulation Models

The projected hurricane loss ratio is determined by averaging two different hurricane simulation models. The model versions utilized are AIR Touchstone v7 and RMS RiskLink v18.1. Both models were run using exposure data provided by TWIA as of 11/30/2019. 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 9,774 unique events, respectively, with the following distribution of intensity ratings:

Saffir-Simpson Category	AIR	RMS
Category 0	12.8%	45.2%
Category 1	36.3%	17.0%
Category 2	22.9%	13.1%
Category 3	19.0%	13.9%
Category 4	8.3%	9.9%
Category 5	0.8%	0.8%

Events shown as Category 0 include events with no U.S. landfall, Category 0 events making landfall or bypass in TX, and events making landfall or bypass in neighboring states or Mexico.

As shown in Exhibits 7 and 8, these models yield projected hurricane loss ratios of 52.6% and 43.2%. The average of these loss ratios is 47.9%.

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, Class 1 public security interest and principal repayment and the net cost of reinsurance (after modeled recoveries). The sum of these projected expenses provides for a 47.7% fixed expense ratio. Variable expenses include commission, taxes, and projected contributions to the Catastrophe Reserve Trust Fund (CRTF). Subtracting these expenses from 100% yields a permissible loss and LAE ratio of 77.1%.

As stated above, the expenses include a provision for an annual contribution to the CRTF, repayment of Class 1 public securities, and the projected net cost of TWIA's purchasing of reinsurance. The 19.5% 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, coastal policyholders and TWIA insurance members. Furthermore, TWIA's purchasing of reinsurance help TWIA fulfills its statutory funding obligations.

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 2% more than the comparable indication based on the prior (July 2019) study. The reasons for higher indications are summarized in the following table.

Reconciliation of Current vs. Prior Indications

Rate Indication/Reason for Change	Impact of Change	Rate Indication
Previous Rate Indication (Combined Method)		**+42%**
Change in modeled loss ratio	+2%	
Change due to all other factors	+0%	
Current Rate Indication (Combined Method)		**+44%**

These reasons are discussed below:

Change in modeled loss ratio

The increase of 3.2% in modeled hurricane loss ratios reflects both hurricane model version changes and TWIA exposure changes observed in the coastal area. Since December 2016, TWIA residential policies decreased to 178,869 from 244,061 in June 2020. By its statutory design, as a residual market insurer, TWIA is unavoidably subject to adverse selections, the cumulative impact (+10%, commercial and residential combined) of the adverse selection starting from 2015 is expected to be fully reflected in TWIA modeled hurricane loss ratios, but not in industry experience-based loss ratios.

Changes in outstanding bond repayment provision, reinsurance provision and general expense provision

The outstanding class 1 public securities were issued in 2014 and had been depleted from paying for claims associated with Hurricane Harvey. Due to a recent bond redemption, TWIA's annual principal and interest payment reduced to $68.9 million from $80.3 million. Consequently, outstanding class 1 public security repayment provision dropped to 19.7% from 25.1% (-5.4%). Meanwhile, reinsurance provision increased to 19.5% from 16.6% (+2.9%) and general expense provision rose to 8.5% from 6.2% (+2.3%). Collectively those three provisions add up to a fixed expense provision of 47.7%, which is -0.2% less compared to 2019 rate analysis.

SUMMARY OF EXHIBITS

Exhibit Number	Exhibit Title or Purpose
1	Summary of Indicated Rate Change
2	Projected Ultimate Non-Hurricane Loss & LAE Ratio
3	Paid Loss Development Factors and Premium and Loss Trend Analysis
4	Development of LAE Factor
5	Summary of Indicated Hurricane Loss & LAE Ratios
6	Development of Hurricane Loss Ratio – 54/169-Year Method
7	Hurricane Loss Ratio – AIR Model
8	Hurricane Loss Ratio – RMS Model
9	Texas Hurricanes 1850 – 2019
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
2020 Rate Level Review

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

Table of Contents

Texas Windstorm Insurance Association Exhibit 1
Residential Property - Wind & Hail
Rate Level Review
Summary of Indicated Rate Change
By Method for Projecting Hurricane Loss & LAE

	Indicated Loss & LAE Ratio					Indicated	Proposed
Hurricane Projection Method	Hurricane	Non-Hurricane	Fixed Expenses	Total	Permissible LLAE Ratio	Rate Change	Rate Change
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Using Experience and Models	48.9%	14.6%	47.7%	111.2%	77.1%	+44%	
Using Actual Industry Experience	42.6%	14.6%	47.7%	104.9%	77.1%	+36%	
Using AIR Models	60.5%	14.6%	47.7%	122.8%	77.1%	+59%	
Using RMS Models	49.7%	14.6%	47.7%	112.0%	77.1%	+45%	
Average of AIR and RMS Models	55.1%	14.6%	47.7%	117.4%	77.1%	52%	

Notes:
(2) Exhibit 5
(3) Exhibit 2, Sheet 1
(4) Exhibit 11, Sheet 1
(5) = (2) + (3) + (4)
(6) Exhibit 11, Sheet 1
(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

	2019 Written Premium		Indicated Non-Hurricane
Territory	Amount	Share	Loss & LAE Ratio
(1)	(2)	(3)	(4)
Tier 1 - Territory 8	108,030,247	34.4%	11.7%
Tier 1 - Territory 9	58,233,887	18.5%	16.0%
Tier 1 - Territory 10	143,774,114	45.7%	16.1%
Tier 2	4,354,003	1.4%	15.0%
Total / Average	314,392,251	100.0%	14.6%

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)
2010	1,264,721	0.244	1.182	1,859,656	124,702,532	1.5%
2011	1,277,401	0.244	1.176	1,868,766	126,684,509	1.5%
2012	10,634,874	0.244	1.144	15,134,872	128,914,788	11.7%
2013	54,058,418	0.244	1.136	76,394,491	131,926,783	57.9%
2014	521,145	0.244	1.112	720,914	134,663,386	0.5%
2015	17,519,760	0.244	1.099	23,952,245	136,975,647	17.5%
2016	11,163,138	0.244	1.104	15,331,186	133,431,908	11.5%
2017	2,766,773	0.244	1.084	3,730,982	126,682,785	2.9%
2018	2,487,007	0.244	1.054	3,260,904	115,596,430	2.8%
2019	4,341,537	0.244	1.040	5,616,907	109,182,096	5.1%
Total	106,034,774			147,870,923	1,268,760,864	11.7%

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)
2010	3,445,556	0.244	1.182	5,066,373	69,035,414	7.3%
2011	19,199,535	0.244	1.176	28,087,845	69,387,124	40.5%
2012	20,626,638	0.244	1.144	29,354,511	70,391,274	41.7%
2013	6,175,709	0.244	1.136	8,727,413	71,513,690	12.2%
2014	1,619,343	0.244	1.112	2,240,083	74,528,934	3.0%
2015	9,460,973	0.244	1.099	12,934,626	77,646,885	16.7%
2016	9,692,684	0.244	1.104	13,311,700	76,688,491	17.4%
2017	7,927,026	0.244	1.084	10,689,563	72,582,595	14.7%
2018	1,208,339	0.244	1.054	1,584,345	65,531,943	2.4%
2019	835,159	0.244	1.040	1,080,495	59,870,593	1.8%
Total	80,190,962			113,076,954	707,176,943	16.0%

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)
2010	6,663,982	0.244	1.182	9,798,772	185,336,084	5.3%
2011	56,124,736	0.244	1.176	82,107,346	193,033,699	42.5%
2012	18,946,421	0.244	1.144	26,963,334	209,220,809	12.9%
2013	4,828,213	0.244	1.136	6,823,153	215,695,773	3.2%
2014	2,847,431	0.244	1.112	3,938,931	222,006,785	1.8%
2015	86,781,698	0.244	1.099	118,644,119	226,666,349	52.3%
2016	12,381,551	0.244	1.104	17,004,525	216,365,340	7.9%
2017	22,613,538	0.244	1.084	30,494,266	197,982,407	15.4%
2018	7,281,085	0.244	1.054	9,546,784	171,091,403	5.6%
2019	11,065,237	0.244	1.040	14,315,761	151,980,115	9.4%
Total	229,533,892			319,636,991	1,989,378,764	16.1%

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)

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)
2010	182,872	0.244	1.182	268,896	3,606,426	7.5%
2011	54,382	0.244	1.176	79,558	3,878,435	2.1%
2012	259,290	0.244	1.144	369,005	4,306,581	8.6%
2013	502,759	0.244	1.136	710,491	4,573,701	15.5%
2014	30,779	0.244	1.112	42,577	4,650,368	0.9%
2015	324,452	0.244	1.099	443,576	4,748,938	9.3%
2016	454,485	0.244	1.104	624,179	4,776,381	13.1%
2017	499,885	0.244	1.084	674,093	4,657,598	14.5%
2018	309,004	0.244	1.054	405,159	4,410,916	9.2%
2019	2,293,712	0.244	1.040	2,967,513	4,296,061	69.1%
Total	4,911,620			6,585,047	43,905,405	15.0%

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)
2010	1,264,721	1.000	1,264,721
2011	1,277,401	1.000	1,277,401
2012	10,634,874	1.000	10,634,874
2013	54,058,418	1.000	54,058,418
2014	520,624	1.001	521,145
2015	17,432,597	1.005	17,519,760
2016	10,965,754	1.018	11,163,138
2017	2,662,919	1.039	2,766,773
2018	2,271,239	1.095	2,487,007
2019	3,407,800	1.274	4,341,537
Total	104,496,347		106,034,774

Notes:
(2) Exhibit 2, Sheet 4a, as of 12/31/19
(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)
2010	3,445,556	1.000	3,445,556
2011	19,199,535	1.000	19,199,535
2012	20,626,638	1.000	20,626,638
2013	6,175,709	1.000	6,175,709
2014	1,617,725	1.001	1,619,343
2015	9,413,903	1.005	9,460,973
2016	9,521,301	1.018	9,692,684
2017	7,629,476	1.039	7,927,026
2018	1,103,506	1.095	1,208,339
2019	655,541	1.274	835,159
Total	79,388,890		80,190,962

Notes:
(2) Exhibit 2, Sheet 4b, as of 12/31/19
(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)
2010	6,663,982	1.000	6,663,982
2011	56,124,736	1.000	56,124,736
2012	18,946,421	1.000	18,946,421
2013	4,828,213	1.000	4,828,213
2014	2,844,586	1.001	2,847,431
2015	86,349,948	1.005	86,781,698
2016	12,162,624	1.018	12,381,551
2017	21,764,714	1.039	22,613,538
2018	6,649,393	1.095	7,281,085
2019	8,685,429	1.274	11,065,237
Total	225,020,046		229,533,892

Notes:
(2) Exhibit 2, Sheet 4c, as of 12/31/19
(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)

Accident Year	TWIA Non-Hurricane Paid Loss	Development Factor	Ultimate Non-Hurricane Loss
(1)	(2)	(3)	(4)
2010	182,872	1.000	182,872
2011	54,382	1.000	54,382
2012	259,290	1.000	259,290
2013	502,759	1.000	502,759
2014	30,748	1.001	30,779
2015	322,838	1.005	324,452
2016	446,449	1.018	454,485
2017	481,121	1.039	499,885
2018	282,195	1.095	309,004
2019	1,800,402	1.274	2,293,712
Total	4,363,056		4,911,620

Notes:

(2) Exhibit 2, Sheet 4d, as of 12/31/19
(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 12/31/19
Tier 1 -- Territory 8 (Galveston County)

Accident Year	Paid Loss Excluding Expense: Non-Hurricane	Hurricane	Total
(1)	(2)	(3)	(4)
2010	1,264,721	0	1,264,721
2011	1,277,401	0	1,277,401
2012	10,634,874	0	10,634,874
2013	54,058,418	0	54,058,418
2014	520,624	0	520,624
2015	17,432,597	0	17,432,597
2016	10,965,754	0	10,965,754
2017	2,662,919	33,808,487	36,471,406
2018	2,271,239	0	2,271,239
2019	3,407,800	0	3,407,800
Total	104,496,347	33,808,487	138,304,834

Notes:
(2),(3) 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 12/31/19
Tier 1 -- Territory 9 (Nueces County)

Accident Year	Paid Loss Excluding Expense: Non-Hurricane	Hurricane	Total
(1)	(2)	(3)	(4)
2010	3,445,556	187,854	3,633,410
2011	19,199,535	0	19,199,535
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	9,413,903	0	9,413,903
2016	9,521,301	0	9,521,301
2017	7,629,476	240,658,023	248,287,499
2018	1,103,506	0	1,103,506
2019	655,541	0	655,541
Total	79,388,890	240,845,877	320,234,767

Notes:
(2),(3) 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 12/31/19
Tier 1 -- Territory 10 (Other Tier 1)

Accident Year	Paid Loss Excluding Expense Non-Hurricane	Hurricane	Total
(1)	(2)	(3)	(4)
2010	6,663,982	1,063,585	7,727,567
2011	56,124,736	0	56,124,736
2012	18,946,421	0	18,946,421
2013	4,828,213	0	4,828,213
2014	2,844,586	0	2,844,586
2015	86,349,948	0	86,349,948
2016	12,162,624	0	12,162,624
2017	21,764,714	607,746,813	629,511,527
2018	6,649,393	0	6,649,393
2019	8,685,429	0	8,685,429
Total	225,020,046	608,810,398	833,830,444

Notes:
(2) (3) 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 12/31/19
Tier 2 -- (Territories 1)

Accident Year	Paid Loss Excluding Expense Non-Hurricane	Hurricane	Total
(1)	(2)	(3)	(4)
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	446,449	0	446,449
2017	481,121	3,233,870	3,714,991
2018	282,195	0	282,195
2019	1,800,402	0	1,800,402
Total	4,363,056	3,233,870	7,596,926

Notes:
(2) (3) 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 Writen premium Per house year At present rates
(1)	(2)
2011 / 3	1,611.18
2012 / 3	1,600.24
2013 / 3	1,631.23
2014 / 3	1,649.95
2015 / 3	1,664.45
2016 / 3	1,667.78
2017 / 3	1,656.10
2018 / 3	1,660.23
2019 / 3	1,686.68

(3)	Current Average Earned Date	7/1/2019
(4)	Current Average Accident Date	7/1/2019
(5)	Prospective Average Earned / Accident Date	1/1/2022
(6)	Premium Trend Length	2.500
(7)	Loss Trend Length	2.500
(8)	Selected Premium Trend	0.1%
(9)	Selected Loss Trend	1.7%

Accident Year	Current Premium Trend	Current Loss Trend	Prospective Premium Trend	Prospective Loss Trend	Net Trend Factor
(10)	(11)	(12)	(13)	(14)	(15)
2010	1.047	1.189	1.003	1.043	1.182
2011	1.047	1.183	1.003	1.043	1.176
2012	1.054	1.159	1.003	1.043	1.144
2013	1.034	1.129	1.003	1.043	1.136
2014	1.022	1.093	1.003	1.043	1.112
2015	1.013	1.071	1.003	1.043	1.099
2016	1.011	1.073	1.003	1.043	1.104
2017	1.018	1.061	1.003	1.043	1.084
2018	1.016	1.029	1.003	1.043	1.054
2019	1.000	1.000	1.003	1.043	1.040

Notes:

(2) Exhibit 3, Sheet 2 (6)
(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 2019 / 3
(12) Exhibit 3, Sheet 3a
(13) = [1 + (8)] ^ (6)
(14) = [1 + (9)] ^ (7)
(15) = [(12) * (14)] / [(11) * (13)]

Texas Windstorm Insurance Association Exhibit 3
Residential Property - Wind & Hail Sheet 1
Rate Level Review
Paid Loss Development Factors
Statewide Industry Extended Coverage Dwelling Paid Loss

Months of Development

Accident Year	15	27	39	51	63	75	87	99	111
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2010	63,706	70,824	72,510	73,282	73,407	73,508	73,530	73,536	73,536
2011	137,269	154,006	156,583	157,456	157,929	157,995	158,032	158,046	158,071
2012	162,844	196,788	232,373	242,523	245,227	246,785	247,419	247,577	
2013	124,050	143,359	151,995	154,466	156,218	156,541	156,580		
2014	151,510	178,253	187,490	191,068	191,825	192,297			
2015	173,851	200,069	206,343	208,327	209,063				
2016	486,124	553,332	561,570	563,807					
2017	634,033	775,472	803,355						
2018	181,011	216,648							
2019	272,311								

Development Factors

Accident Year	15 - 27	27 - 39	39 - 51	51 - 63	63 - 75	75 - 87	87 - 99	99 - 111	111 - Ult
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2010	1.112	1.024	1.011	1.002	1.001	1.000	1.000	1.000	
2011	1.122	1.017	1.006	1.003	1.000	1.000	1.000	1.000	
2012	1.208	1.181	1.044	1.011	1.006	1.003	1.001		
2013	1.156	1.060	1.016	1.011	1.002	1.000			
2014	1.177	1.052	1.019	1.004	1.002				
2015	1.151	1.031	1.010	1.004					
2016	1.138	1.015	1.004						
2017	1.223	1.036							
2018	1.197								
Average	1.165	1.052	1.016	1.006	1.003	1.001	1.000	1.000	
Avg 5 Year	1.177	1.039	1.019	1.007	1.003	1.001	1.000	1.000	
Prior	1.162	1.055	1.026	1.019	1.006	1.000	1.001	1.000	1.000
Selected	1.163	1.053	1.021	1.012	1.004	1.001	1.000	1.000	1.000
Selected Cumulative	1.274	1.095	1.039	1.018	1.005	1.001	1.000	1.000	1.000

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

Texas Windstorm Insurance Association Exhibit 3
Residential Property - Wind & Hail Sheet 1
Rate Level Review
Incurred Loss Development Factors
Statewide Industry Extended Coverage Dwelling Incurred Loss

Months of Development

Accident Year	15	27	39	51	63	75	87	99	111
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2010	66,045	71,578	72,984	73,568	73,599	73,573	73,530	73,536	73,536
2011	143,685	155,082	157,261	157,739	158,014	157,995	158,050	158,046	158,071
2012	170,023	203,480	240,439	246,180	247,027	247,422	247,520	247,580	
2013	127,453	147,009	154,930	155,922	156,569	156,577	156,580		
2014	157,426	183,366	190,278	191,866	192,056	192,336			
2015	183,266	204,239	208,541	209,008	209,163				
2016	498,092	556,120	562,298	563,958					
2017	665,247	791,814	816,622						
2018	186,500	217,813							
2019	279,622								

Development Factors

Accident Year	15 - 27	27 - 39	39 - 51	51 - 63	63 - 75	75 - 87	87 - 99	99 - 111	111 - Ult
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2010	1.084	1.020	1.008	1.000	1.000	0.999	1.000	1.000	1.000
2011	1.079	1.014	1.003	1.002	1.000	1.000	1.000	1.000	
2012	1.197	1.182	1.024	1.003	1.002	1.000	1.000		
2013	1.153	1.054	1.006	1.004	1.000	1.000			
2014	1.165	1.038	1.008	1.001	1.001				
2015	1.114	1.021	1.002	1.001					
2016	1.117	1.011	1.003						
2017	1.190	1.031							
2018	1.168								
Average	1.141	1.046	1.008	1.002	1.001	1.000	1.000	1.000	1.000
Avg 5 Year	1.151	1.031	1.009	1.002	1.001	1.000	1.000	1.000	
Prior	1.163	1.052	1.021	1.012	1.004	1.001	1.000	1.000	1.000
Selected	1.152	1.049	1.015	1.007	1.002	1.000	1.000	1.000	1.000
Selected Cumulative	1.238	1.075	1.024	1.009	1.002	1.000	1.000	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	Exposure Written	Written Premium	On-Level Factors	Written Premium at Present Rates	Average Written Premium at Present Rates Quarterly	Average Written Premium at Present Rates Four Quarter Ending	Exponential Fitted Trends All-Year	5-Year	4-Year	3-Year
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2010 / 2	72,174	82,603,320	1.407	116,231,166	1,610					
2010 / 3	80,037	91,866,506	1.407	129,265,399	1,615					
2010 / 4	50,797	58,863,267	1.407	82,826,528	1,631					
2011 / 1	49,776	59,951,748	1.340	80,341,076	1,614	1,617	1607.7			
2011 / 2	75,601	90,742,856	1.340	121,604,106	1,608	1,616	1609.4			
2011 / 3	82,435	99,110,457	1.340	132,817,491	1,611	1,615	1611.1			
2011 / 4	54,497	66,729,933	1.340	89,424,492	1,641	1,617	1612.8			
2012 / 1	54,769	68,658,174	1.276	87,627,162	1,600	1,614	1614.5			
2012 / 2	77,155	96,214,511	1.276	122,796,806	1,592	1,609	1616.2			
2012 / 3	89,431	112,131,482	1.276	143,111,343	1,600	1,606	1617.9			
2012 / 4	54,952	70,018,382	1.276	89,363,170	1,626	1,603	1619.6			
2013 / 1	54,742	71,740,155	1.216	87,200,607	1,593	1,602	1621.2			
2013 / 2	82,182	108,632,729	1.216	132,043,761	1,607	1,606	1622.9			
2013 / 3	83,114	111,540,208	1.216	135,577,820	1,631	1,615	1624.6			
2013 / 4	60,544	81,734,680	1.216	99,349,014	1,641	1,619	1626.3			
2014 / 1	55,592	77,867,785	1.158	90,141,695	1,621	1,624	1628.0			
2014 / 2	79,155	111,616,003	1.158	129,209,475	1,632	1,632	1629.7			
2014 / 3	89,874	128,096,479	1.158	148,287,687	1,650	1,638	1631.5			
2014 / 4	60,646	86,711,448	1.158	100,379,340	1,655	1,641	1633.2			
2015 / 1	57,651	85,327,979	1.103	94,074,097	1,632	1,643	1634.9	1650.5		
2015 / 2	82,158	122,581,230	1.103	135,145,806	1,645	1,646	1636.6	1650.8		
2015 / 3	84,402	127,421,809	1.103	140,482,544	1,664	1,650	1638.3	1651.2		
2015 / 4	57,308	87,342,988	1.103	96,295,644	1,680	1,655	1640.0	1651.6		
2016 / 1	54,113	84,557,230	1.050	88,785,092	1,641	1,657	1641.7	1652.0	1655.2	
2016 / 2	79,991	125,845,764	1.050	132,138,052	1,652	1,659	1643.4	1652.3	1655.2	
2016 / 3	77,932	123,784,247	1.050	129,973,459	1,668	1,660	1645.2	1652.7	1655.3	
2016 / 4	51,030	81,959,449	1.050	86,057,421	1,686	1,661	1646.9	1653.1	1655.3	
2017 / 1	50,991	79,037,984	1.050	82,989,883	1,628	1,659	1648.6	1653.4	1655.3	1648.9
2017 / 2	73,614	114,547,681	1.050	120,275,065	1,634	1,654	1650.3	1653.8	1655.3	1649.8
2017 / 3	68,864	108,614,623	1.050	114,045,354	1,656	1,650	1652.1	1654.2	1655.3	1650.7
2017 / 4	45,960	73,697,340	1.050	77,382,207	1,684	1,648	1653.8	1654.6	1655.4	1651.7
2018 / 1	44,101	71,679,332	1.000	71,679,332	1,625	1,649	1655.5	1654.9	1655.4	1652.6
2018 / 2	63,851	104,163,394	1.000	104,163,394	1,631	1,649	1657.3	1655.3	1655.4	1653.5
2018 / 3	61,408	101,951,681	1.000	101,951,681	1,660	1,650	1659.0	1655.7	1655.4	1654.4
2018 / 4	40,418	68,300,637	1.000	68,300,637	1,690	1,650	1660.7	1656.0	1655.4	1655.4
2019 / 1	39,758	65,036,872	1.000	65,036,872	1,636	1,652	1662.5	1656.4	1655.4	1656.3
2019 / 2	60,805	99,948,528	1.000	99,948,528	1,644	1,656	1664.2	1656.8	1655.5	1657.2
2019 / 3	57,547	97,063,357	1.000	97,063,357	1,687	1,664	1665.9	1657.2	1655.5	1658.2
2019 / 4	38,375	65,697,652	1.000	65,697,652	1,712	1,668	1667.7	1657.5	1655.5	1659.1
(14) Average Annual Change							0.4%	0.1%	0.0%	0.2%
(15) Correlation Coefficient							75.6%	11.3%	0.0%	26.4%
(16) Selected Premium Trend										0.1%

Notes:
(2) Provided by TWIA
(3) Provided by TWIA
(4) Cumulative effect of annual rate changes
(5) = (3) * (4)
(6) = (5) / (2)
(7) annualized average written premium
(8) - (11) = (6) 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
Residential Property - Wind & Hail
Rate Level Review
Loss Trend Analysis
Summary of Indices and Calculation of Prospective Loss Costs

Calendar Year Ending 9/30/xx	Statewide Boeckh	Coastal Boeckh	Modified CPI	Weighted Average
(1)	(2)	(3)	(4)	(5)
2010	1.204	1.212	1.118	1.189
2011	1.189	1.208	1.106	1.183
2012	1.164	1.185	1.082	1.159
2013	1.128	1.147	1.074	1.129
2014	1.094	1.103	1.064	1.093
2015	1.066	1.077	1.051	1.071
2016	1.073	1.085	1.035	1.073
2017	1.061	1.072	1.028	1.061
2018	1.023	1.032	1.021	1.029
2019	1.000	1.000	1.000	1.000
Factors to Adjust For Prospective Loss Costs				
(6) Fitted Trend	1.7%	1.9%	1.1%	1.7%
(7) Cost Factor	1.047	1.053	1.031	1.047

Notes:
(2) = Exhibit 3, Sheet 3b trended forward to 9/30/2019
(3) = Exhibit 3, Sheet 3c trended forward to 9/30/2019
(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 4/1/2019 to 1/1/2022)

Texas Windstorm Insurance Association Exhibit 3
Residential Property - Wind & Hail Sheet 3b
Rate Level Review
Loss Trend Analysis
Boeckh Residential Construction Index Trend (Statewide)

Calendar Year Ending	Texas Statewide Index	Fitted Trends All Years Linear	All Years Exponential	5 Years Linear	5 Years Exponential	4 Years Linear	4 Years Exponential	3 Years Linear	3 Years Exponential
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
3/31/2010	2047.26	2025.39	2031.85						
6/30/2010	2046.15	2036.74	2042.17						
9/30/2010	2050.53	2048.10	2052.55						
12/31/2010	2057.95	2059.45	2062.97						
3/31/2011	2065.10	2070.81	2073.45						
6/30/2011	2070.21	2082.16	2083.99						
9/30/2011	2075.77	2093.52	2094.57						
12/31/2011	2083.16	2104.88	2105.21						
3/31/2012	2092.69	2116.23	2115.90						
6/30/2012	2103.68	2127.59	2126.65						
9/30/2012	2121.46	2138.94	2137.46						
12/31/2012	2139.97	2150.30	2148.31						
3/31/2013	2155.46	2161.65	2159.23						
6/30/2013	2172.56	2173.01	2170.19						
9/30/2013	2188.33	2184.37	2181.22						
12/31/2013	2202.66	2195.72	2192.30						
3/31/2014	2219.67	2207.08	2203.43						
6/30/2014	2239.01	2218.43	2214.63						
9/30/2014	2257.42	2229.79	2225.88						
12/31/2014	2275.56	2241.14	2237.18						
3/31/2015	2293.59	2252.50	2248.55	2263.67	2265.51				
6/30/2015	2307.55	2263.85	2259.97	2273.85	2275.22				
9/30/2015	2316.02	2275.21	2271.45	2284.04	2284.98				
12/31/2015	2319.90	2286.57	2282.99	2294.22	2294.78				
3/31/2016	2316.44	2297.92	2294.58	2304.40	2304.62	2269.92	2271.59		
6/30/2016	2308.41	2309.28	2306.24	2314.59	2314.51	2283.69	2284.76		
9/30/2016	2301.26	2320.63	2317.96	2324.77	2324.44	2297.46	2298.01		
12/31/2016	2296.54	2331.99	2329.73	2334.95	2334.41	2311.23	2311.34		
3/31/2017	2299.40	2343.34	2341.56	2345.14	2344.42	2325.00	2324.74	2297.47	2298.43
6/30/2017	2309.77	2354.70	2353.46	2355.32	2354.47	2338.77	2338.22	2315.33	2315.68
9/30/2017	2326.30	2366.05	2365.41	2365.50	2364.57	2352.54	2351.77	2333.20	2333.05
12/31/2017	2343.81	2377.41	2377.43	2375.69	2374.71	2366.31	2365.41	2351.06	2350.55
3/31/2018	2363.74	2388.77	2389.51	2385.87	2384.90	2380.09	2379.12	2368.92	2368.19
6/30/2018	2386.99	2400.12	2401.64	2396.05	2395.13	2393.86	2392.92	2386.78	2385.95
9/30/2018	2413.52	2411.48	2413.84	2406.24	2405.40	2407.63	2406.79	2404.64	2403.85
12/31/2018	2441.12	2422.83	2426.11	2416.42	2415.72	2421.40	2420.75	2422.51	2421.89
3/31/2019	2459.13	2434.19	2438.43	2426.60	2426.08	2435.17	2434.78	2440.37	2440.05
6/30/2019	2468.96	2445.54	2450.82	2436.79	2436.49	2448.94	2448.90	2458.23	2458.36
9/30/2019	2469.01	2456.90	2463.26	2446.97	2446.94	2462.71	2463.10	2476.09	2476.80
12/31/2019	2466.82	2468.25	2475.78	2457.15	2457.43	2476.48	2477.38	2493.96	2495.38
Annual Trend		1.8%	2.0%	1.7%	1.7%	2.2%	2.3%	2.9%	3.0%
R-Squared		0.967	0.967	0.806	0.808	0.895	0.896	0.961	0.961

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 Exhibit 3
Residential Property - Wind & Hail Sheet 3c
Rate Level Review
Loss Trend Analysis
Boeckh Residential Construction Index Trend (Coastal)

Calendar Year Ending	Texas Coastal Index	Fitted Trends All Years Linear	All Years Exponential	5 Years Linear	5 Years Exponential	4 Years Linear	4 Years Exponential	3 Years Linear	3 Years Exponential
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
3/31/2010	2075.10	2028.38	2035.95						
6/30/2010	2072.76	2040.30	2046.71						
9/30/2010	2070.98	2052.21	2057.53						
12/31/2010	2070.61	2064.13	2068.41						
3/31/2011	2073.42	2076.05	2079.34						
6/30/2011	2074.47	2087.97	2090.34						
9/30/2011	2078.09	2099.89	2101.39						
12/31/2011	2083.46	2111.81	2112.49						
3/31/2012	2089.96	2123.73	2123.66						
6/30/2012	2099.33	2135.64	2134.89						
9/30/2012	2118.82	2147.56	2146.18						
12/31/2012	2139.88	2159.48	2157.52						
3/31/2013	2157.74	2171.40	2168.93						
6/30/2013	2175.63	2183.32	2180.39						
9/30/2013	2189.62	2195.24	2191.92						
12/31/2013	2203.37	2207.15	2203.51						
3/31/2014	2227.71	2219.07	2215.16						
6/30/2014	2252.63	2230.99	2226.87						
9/30/2014	2275.00	2242.91	2238.64						
12/31/2014	2296.77	2254.83	2250.47						
3/31/2015	2310.58	2266.75	2262.37	2270.81	2273.22				
6/30/2015	2322.52	2278.66	2274.33	2282.34	2284.14				
9/30/2015	2330.38	2290.58	2286.35	2293.86	2295.12				
12/31/2015	2333.26	2302.50	2298.44	2305.39	2306.15				
3/31/2016	2328.65	2314.42	2310.59	2316.91	2317.24	2275.62	2277.89		
6/30/2016	2320.80	2326.34	2322.81	2328.44	2328.37	2291.45	2292.93		
9/30/2016	2313.59	2338.26	2335.09	2339.97	2339.56	2307.28	2308.06		
12/31/2016	2308.17	2350.18	2347.43	2351.49	2350.81	2323.11	2323.30		
3/31/2017	2311.24	2362.09	2359.84	2363.02	2362.11	2338.94	2338.63	2305.74	2307.14
6/30/2017	2323.79	2374.01	2372.32	2374.54	2373.46	2354.77	2354.07	2326.48	2327.04
9/30/2017	2340.80	2385.93	2384.86	2386.07	2384.87	2370.59	2369.61	2347.23	2347.12
12/31/2017	2360.09	2397.85	2397.46	2397.60	2396.33	2386.42	2385.25	2367.98	2367.36
3/31/2018	2380.33	2409.77	2410.14	2409.12	2407.84	2402.25	2400.99	2388.73	2387.79
6/30/2018	2404.16	2421.69	2422.88	2420.65	2419.42	2418.08	2416.84	2409.48	2408.38
9/30/2018	2433.32	2433.60	2435.69	2432.17	2431.05	2433.91	2432.79	2430.22	2429.16
12/31/2018	2467.60	2445.52	2448.56	2443.70	2442.73	2449.74	2448.85	2450.97	2450.11
3/31/2019	2494.19	2457.44	2461.51	2455.22	2454.47	2465.57	2465.01	2471.72	2471.25
6/30/2019	2508.16	2469.36	2474.52	2466.75	2466.27	2481.40	2481.28	2492.47	2492.57
9/30/2019	2510.44	2481.28	2487.60	2478.28	2478.12	2497.22	2497.66	2513.21	2514.07
12/31/2019	2504.07	2493.20	2500.75	2489.80	2490.03	2513.05	2514.14	2533.96	2535.76
Annual Trend		1.9%	2.1%	1.9%	1.9%	2.5%	2.7%	3.3%	3.5%
R-Squared		0.955	0.957	0.794	0.796	0.895	0.896	0.966	0.966

Notes:
(2) = Average Index for Corpus Christi and Houston
(3) - (10) = (2) fitted to linear and exponential distributions

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

Exhibit 3
Sheet 3d

		Fitted Trends							
Calendar Year	Modified	All Years		5 Years		4 Years		3 Years	
Ending	CPI	Linear	Exponential	Linear	Exponential	Linear	Exponential	Linear	Exponential
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
9/30/2009	179.30	177.20	177.41						
12/31/2009	178.80	177.74	177.91						
3/31/2010	178.46	178.28	178.42						
6/30/2010	178.56	178.81	178.93						
9/30/2010	178.59	179.35	179.44						
12/31/2010	178.72	179.88	179.95						
3/31/2011	178.97	180.42	180.47						
6/30/2011	179.61	180.96	180.98						
9/30/2011	180.52	181.49	181.50						
12/31/2011	181.55	182.03	182.01						
3/31/2012	182.78	182.56	182.53						
6/30/2012	183.87	183.10	183.05						
9/30/2012	184.57	183.64	183.58						
12/31/2012	185.03	184.17	184.10						
3/31/2013	185.38	184.71	184.63						
6/30/2013	185.51	185.24	185.15						
9/30/2013	185.82	185.78	185.68						
12/31/2013	186.03	186.31	186.21						
3/31/2014	186.43	186.85	186.74						
6/30/2014	186.87	187.39	187.27						
9/30/2014	187.59	187.92	187.81						
12/31/2014	188.62	188.46	188.34						
3/31/2015	189.46	188.99	188.88	189.11	189.16				
6/30/2015	189.59	189.53	189.42	189.64	189.67				
9/30/2015	190.03	190.07	189.96	190.17	190.19				
12/31/2015	190.50	190.60	190.50	190.69	190.70				
3/31/2016	190.95	191.14	191.05	191.22	191.22	191.21	191.24		
6/30/2016	192.03	191.67	191.59	191.75	191.74	191.74	191.76		
9/30/2016	192.82	192.21	192.14	192.27	192.26	192.27	192.28		
12/31/2016	193.56	192.75	192.69	192.80	192.78	192.80	192.80		
3/31/2017	193.86	193.28	193.24	193.33	193.31	193.33	193.32	192.86	192.89
6/30/2017	194.07	193.82	193.79	193.86	193.83	193.85	193.85	193.45	193.47
9/30/2017	194.20	194.35	194.34	194.38	194.36	194.38	194.37	194.05	194.05
12/31/2017	194.18	194.89	194.90	194.91	194.89	194.91	194.90	194.64	194.64
3/31/2018	194.71	195.42	195.45	195.44	195.42	195.44	195.42	195.23	195.23
6/30/2018	195.24	195.96	196.01	195.97	195.95	195.97	195.95	195.83	195.82
9/30/2018	195.63	196.50	196.57	196.49	196.48	196.50	196.48	196.42	196.41
12/31/2018	196.26	197.03	197.13	197.02	197.01	197.03	197.02	197.01	197.00
3/31/2019	197.08	197.57	197.69	197.55	197.55	197.56	197.55	197.60	197.59
6/30/2019	198.20	198.10	198.26	198.08	198.09	198.09	198.09	198.20	198.19
9/30/2019	199.66	198.64	198.82	198.60	198.62	198.62	198.62	198.79	198.79
12/31/2019	200.38	199.18	199.39	199.13	199.16	199.14	199.16	199.38	199.39
Annual Trend		1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.2%	1.2%
R-Squared		0.987	0.987	0.962	0.963	0.930	0.932	0.902	0.905

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	4,276	1,110	0.260	
2007	15,745	4,941	0.314	H
2008	2,583,017	346,615	0.134	H
2009	18,005	2,219	0.123	
2010	96,089	4,274	0.044	
2011	67,497	15,111	0.224	
2012	70,825	15,832	0.224	
2013	70,825	13,827	0.195	
2014	6,991	6,804	0.973	
2015	138,385	39,918	0.288	
2016	28,152	15,445	0.549	
2017	1,445,037	289,745	0.201	H
2018	11,956	6,800	0.569	
2019	18,010	8,445	0.469	
All Years Total	5,153,297	837,863	0.163	
Hurricane Years Total	4,537,641	683,524	0.151	
Non-Hurricane Years				
Total	615,656	154,339	0.251	
10 Year	526,735	128,675	0.244	

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 12/31/19	Development Factor	Indicated Ultimate Loss
(1)	(2)	(3)	(4)
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			4,276
2007			15,745
2008			2,583,017
2009			18,005
2010			96,089
2011			67,497
2012	67,497	1.000	70,825
2013	70,825	1.000	70,825
2014	7,012	0.997	6,991
2015	138,801	0.997	138,385
2016	28,523	0.987	28,152
2017	1,445,588	1.000	1,445,037
2018	12,326	0.970	11,956
2019	18,155	0.992	18,010

Notes:

(2) Exhibit 4, Sheet 3
(3) Exhibit 4, Sheet 3
(4) 2012 - 2019: (2) * (3); 1980 - 2011: 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)

Months of Development

Accident Year	12	24	36	48	60	72	84
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2010	15,215	18,166	18,173	18,522	18,361	18,267	18,005
2011	94,870	96,967	97,503	96,828	96,263	95,964	96,089
2012	62,722	69,764	67,287	66,724	66,328	67,658	67,497
2013	77,204	75,204	72,860	71,823	71,286	71,068	70,825
2014	6,739	7,854	7,298	7,261	7,068	7,012	
2015	147,927	139,955	140,459	139,777	138,801		
2016	31,292	29,612	28,908	28,523			
2017	1,278,467	1,373,877	1,445,588				
2018	13,197	12,326					
2019	18,155						

Development Factors

Accident Year	12 - 24	24 - 36	36 - 48	48 - 60	60 - 72	72 - 84	84 - Ult
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2010	1.194	1.000	1.019	0.991	0.995	0.986	
2011	1.022	1.006	0.993	0.994	0.997	1.001	
2012	1.112	0.964	0.992	0.994	1.020	0.998	
2013	0.974	0.969	0.986	0.993	0.997	0.997	
2014	1.165	0.929	0.995	0.973	0.992		
2015	0.946	1.004	0.995	0.993			
2016	0.946	0.976	0.987				
2017	1.075	1.052					
2018	0.934						
Average	1.041	0.988	0.995	0.990	1.000	0.995	
Avg x hi / lo	1.034	0.987	0.992	0.993	0.996	0.997	
Avg 3 Year	0.985	1.011	0.992	0.986	1.003	0.999	
Avg 5 Year	1.013	0.986	0.991	0.989	1.000	0.995	
Prior	1.041	0.977	0.996	0.990	1.000	0.997	1.000
Selected	1.023	0.990	0.993	0.990	1.000	0.997	1.000
Cumulative	0.992	0.970	0.980	0.987	0.997	0.997	1.000

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

Accident Year	Incurred ALAE at 12/31/19	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	2,452	4,941
2008		99,668	1.000	99,668	246,947	346,615
2009		223	1.000	223	1,996	2,219
2010		323	1.000	323	3,951	4,274
2011		725	1.000	725	14,386	15,111
2012		871	1.000	871	14,961	15,832
2013		901	1.000	901	12,926	13,827
2014		1,028	0.981	1,008	5,796	6,804
2015		2,944	0.973	2,865	37,053	39,918
2016		571	0.981	560	14,885	15,445
2017		21,865	1.063	23,242	266,503	289,745
2018		361	1.169	422	6,378	6,800
2019		48	1.403	67	8,378	8,445

Notes:

(2) Exhibit 4, Sheet 5
(3) Exhibit 4, Sheet 5
(4) 2008 - 2019: (2) * (3); 1986 - 2007: from TWIA's annual statements
(5) From TWIA's annual statements
(6) 1986 - 2019: (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)

Months of Development

Accident Year	12	24	36	48	60	72	84
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2009	7,335	359	226	231	223	223	223
2010	391	312	322	316	335	324	323
2011	515	592	609	682	629	745	725
2012	516	679	719	632	917	880	871
2013	802	806	715	1,089	991	971	901
2014	516	493	1,085	1,266	1,077	1,028	
2015	973	1,818	2,355	2,749	2,944		
2016	412	678	746	571			
2017	891	16,490	21,865				
2018	301	361					
2019	48						

Development Factors

Accident Year	12 - 24	24 - 36	36 - 48	48 - 60	60 - 72	72 - 84	84 - Ult
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
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	0.973	
2012	1.316	1.059	0.879	1.451	0.960	0.990	
2013	1.005	0.887	1.523	0.910	0.980	0.928	
2014	0.955	2.201	1.167	0.851	0.955		
2015	1.868	1.295	1.167	1.071			
2016	1.646	1.100	0.765				
2017	18.507	1.326					
2018	1.199						
Average	2.85	1.17	1.08	1.03	1.01	0.98	
Avg x hi / lo	1.24	1.10	1.06	0.99	0.98	0.99	
Avg 3 Year	7.12	1.24	1.03	0.94	0.96	0.96	
Avg 5 Year	4.84	1.36	1.10	1.04	1.01	0.98	
Prior	1.15	1.03	1.15	1.04	1.00	1.01	1.00
Selected	1.20	1.10	1.08	1.01	0.99	0.98	1.00
Cumulative	1.40	1.17	1.06	0.98	0.97	0.98	1.00

Texas Windstorm Insurance Association Exhibit 5
Residential Property - Wind & Hail
Rate Level Review
Summary of Indicated Hurricane Loss & LAE Ratios

Basis for Hurricane Loss Ratio	Indicated Loss Ratio	LAE Factor	Indicated Loss & LAE Ratio
(1)	(2)	(3)	(4)
Industry Experience	37.0%	0.151	42.6%
Hurricane Models			
AIR Model	52.6%	0.151	60.5%
RMS Model	43.2%	0.151	49.7%
Average of Models	47.9%	0.151	55.1%

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 - 2019 -- Hurricane Years Only

Accident Year	Earned Premium at Current TWIA Rate Level	Number of Hurricanes During the Year	Hurricane Year Incurred Loss Ratio	Per Hurricane Loss Ratio
	(1)	(2)	(3)	(4)
1968	27,851,584	1	40.1%	29.6%
1970	28,411,573	1	73.2%	62.7%
1971	28,313,684	1	80.3%	69.8%
1980	48,089,878	1	74.8%	64.3%
1983	61,754,514	1	524.8%	514.3%
1986	78,674,586	1	11.4%	0.9%
1989	94,668,450	2	8.0%	0.0%
1999	175,094,688	1	8.9%	0.0%
2003	225,873,236	1	20.1%	9.6%
2005	248,665,748	1	111.6%	101.1%
2007	384,632,941	1	5.1%	0.0%
2008	477,636,241	2	419.9%	204.7%
2017	559,948,822	1	223.9%	213.4%
Simple Average Loss Ratio for Hurricane Years			130.2%	97.7%

(5)	Selected Non-Hurricane Loss Ratio	10.5%	
(6) a	Average Hurricane Loss Ratio per Hurricane	97.7%	
(6) b	Selected Average Hurricane Loss Ratio Per Hurricane	97.7%	
(7)	Historical Hurricane Frequency		
	(a) 54-Year (1/1/1966 - 12/31/2019)	0.278	(1 Hurricane Every 3.6 years)
	(a) 169-Year (1/1/1851 - 12/31/2019)	0.379	(1 Hurricane Every 2.6 years)
	Selected Frequency	0.379	(1 Hurricane Every 2.6 years)
(8)	Indicated Hurricane Loss Ratio	37.0%	

Notes:
(1) Exhibit 6, Sheet 2. Accident years ending 9/30/xx
(3) Exhibit 6, Sheet 2. Accident years ending 9/30/xx
(4) = MAX((3)-(5),0)/(2)
(5) Exhibit 6, Sheet 2
(6) a= Average of (4)
(6) b = Selected
(7) Exhibit 9
(8) = (6) b * (7) Selected

Texas Windstorm Insurance Association
Residential Property - Wind & Hail
Rate Level Review
Industry Experience -- Residential Extended Coverage
1966 - 2019

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	27,913,364	1,178,131	4.2%	
1967		13,130,860	28,169,364	663,024	2.4%	
1968		12,982,730	27,851,584	11,171,683	40.1%	H
1969		12,499,176	26,814,226	3,218,757	12.0%	
1970		13,243,763	28,411,573	20,786,468	73.2%	H
1971	10,640,335	13,198,133	28,313,684	22,731,206	80.3%	H
1972	12,302,040	13,902,740	29,825,263	2,242,093	7.5%	
1973	12,935,382	12,724,690	27,298,016	4,933,261	18.1%	
1974	12,794,652	11,637,700	24,966,119	2,293,219	9.2%	
1975	13,633,616	12,392,309	26,584,966	3,062,897	11.5%	
1976	17,088,846	13,884,831	29,786,843	1,522,489	5.1%	
1977	23,643,216	17,474,220	37,487,085	972,383	2.6%	
1978	28,157,329	19,320,941	41,448,818	1,449,823	3.5%	
1979	32,867,536	21,563,567	46,259,877	3,940,899	8.5%	
1980	32,179,994	22,416,603	48,089,878		74.8%	H
1981	30,817,037	29,693,419	63,700,682		3.2%	
1982	28,140,159	32,398,474	69,503,781		2.3%	
1983	28,786,234		61,754,514		524.8%	H
1984	20,078,668		43,074,354		14.8%	
1985	30,043,452		64,451,601		6.4%	
1986	36,673,352		78,674,586		11.4%	H
1987	41,598,709		89,240,856		2.9%	
1988	45,044,392		99,314,293		12.0%	
1989	41,745,774		94,668,450		8.0%	H
1990	40,384,195		90,182,909		19.9%	
1991	46,237,137		90,400,844		93.7%	
1992	44,512,572		107,296,089		6.8%	
1993	50,741,120		168,782,896		8.1%	
1994	57,584,585		169,445,141		4.3%	
1995	60,740,049		158,871,316		6.8%	
1996	71,865,572		169,174,051		3.9%	
1997	79,154,547		186,332,552		4.7%	
1998	80,238,260		188,694,953		21.3%	
1999	71,026,552		175,094,688		8.9%	H
2000	75,114,174		186,657,904		5.1%	
2001	74,726,401		163,169,890		6.8%	
2002	86,289,350		173,710,570		17.2%	
2003	112,200,741		225,873,236		20.1%	H
2004	123,050,217		236,207,042		1.7%	
2005	135,380,924		248,665,748		111.6%	H
2006	154,699,767		283,468,384		2.0%	
2007	219,914,305		384,632,941		5.1%	H
2008	289,558,186		477,636,241		419.9%	H
2009	327,305,758		490,534,995		1.9%	
2010	355,219,215		499,964,244		3.8%	
2011	370,875,863		509,107,482		18.5%	
2012	406,981,851		532,077,164		13.7%	
2013	440,952,159		549,111,155		17.2%	
2014	477,983,216		567,000,312		2.3%	
2015	517,579,765		584,847,630		24.3%	
2016	541,982,800		583,476,869		8.7%	
2017	533,284,592		559,948,822		223.9%	H
2018	516,732,311		529,931,693		3.8%	
2019	509,619,292		509,619,292		6.7%	
Total / Average	7,371,106,199	246,350,566	10,859,586,519		37.6%	
Average of Non-Hurricane Years					10.5%	
Selected					10.5%	

Notes: (2), (3) Provided by TDI. Accident years ending 9/30/xx as of 12/31/2019
(4) 1983 - 2019: Sum of Exhibit 6, Sheet 4 - Sheet 7, (4); 1966 - 1982: (3) * 2.1
(5) Provided by TDI. Accident years ending 9/30/xx as of 12/31/2010
(6) 1983 - 2019: Exhibit 6, Sheet 3; 1966 - 1982: (5) / (4)
(7) "H" indicates occurrence of hurricane(s) during the time period (years ending 9/30/xx)

Industry Experience -- Residential Extended Coverage

Loss Ratios by Territory / Tier

Accident Year	Territory 8	Territory 9	Territory 10	Tier 2	Weighted Loss Ratio	Wtd Devel'd Loss Ratio
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1983	1283.6%	7.5%	173.8%	177.2%	524.8%	524.8%
1984	3.9%	7.1%	25.4%	40.4%	14.8%	14.8%
1985	2.0%	8.7%	8.5%	13.5%	6.4%	6.4%
1986	1.3%	3.0%	22.3%	14.8%	11.4%	11.4%
1987	0.7%	4.3%	3.9%	7.7%	2.9%	2.9%
1988	5.8%	7.2%	18.8%	7.6%	12.0%	12.0%
1989	6.3%	6.6%	9.5%	17.7%	8.0%	8.0%
1990	33.9%	12.2%	12.4%	25.0%	19.9%	19.9%
1991	78.2%	17.2%	138.5%	20.6%	93.7%	93.7%
1992	1.3%	12.4%	8.4%	19.0%	6.8%	6.8%
1993	9.8%	8.7%	6.3%	16.9%	8.1%	8.1%
1994	2.0%	5.1%	5.7%	6.7%	4.3%	4.3%
1995	2.8%	8.6%	8.6%	22.5%	6.8%	6.8%
1996	1.5%	5.3%	4.9%	10.0%	3.9%	3.9%
1997	1.9%	4.4%	6.9%	8.5%	4.7%	4.7%
1998	19.6%	11.1%	27.1%	10.4%	21.3%	21.3%
1999	2.1%	18.1%	10.3%	10.4%	8.9%	8.9%
2000	0.8%	2.3%	9.3%	10.5%	5.1%	5.1%
2001	5.0%	7.2%	7.3%	32.8%	6.8%	6.8%
2002	24.4%	5.8%	16.5%	10.6%	17.2%	17.2%
2003	5.1%	8.2%	36.5%	10.3%	20.1%	20.1%
2004	1.3%	1.9%	1.9%	3.9%	1.7%	1.7%
2005	51.1%	2.7%	203.6%	37.2%	111.6%	111.6%
2006	1.0%	1.7%	2.8%	4.9%	2.0%	2.0%
2007	2.7%	1.6%	8.3%	4.9%	5.1%	5.1%
2008	694.6%	2.2%	382.2%	418.4%	419.9%	419.9%
2009	2.9%	0.9%	1.3%	9.4%	1.9%	1.9%
2010	1.2%	5.6%	4.8%	10.9%	3.8%	3.8%
2011	1.0%	27.3%	28.4%	6.0%	18.5%	18.5%
2012	8.3%	28.9%	9.5%	85.0%	13.7%	13.7%
2013	40.7%	9.1%	2.8%	19.6%	17.2%	17.2%
2014	0.5%	2.5%	3.1%	17.7%	2.3%	2.3%
2015	12.7%	12.2%	37.5%	35.1%	24.3%	24.3%
2016	8.3%	12.7%	6.4%	35.8%	8.6%	8.7%
2017	30.9%	339.8%	315.9%	60.2%	218.7%	223.9%
2018	2.4%	2.2%	4.6%	10.4%	3.5%	3.8%
2019	4.1%	1.6%	7.3%	26.8%	5.4%	6.7%
Average	63.7%	16.9%	42.7%	34.6%	45.0%	45.2%

TWIA 2019 Written Premium by Territory / Tier

		Territory 8	Territory 9	Territory 10	Tier 2	Total
(8)	Amount	108,030,247	58,233,887	143,774,114	4,354,003	314,392,251
(9)	% Share	34.4%	18.5%	45.7%	1.4%	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 (9)
(7) = (6) * loss development factors from Exhibit 3.1b
(8) Provided by TWIA
(9) = (8) / (8) 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	2.145	9,262,469	118,889,570	1283.6%
1984	3,512,853	2.145	7,536,051	292,543	3.9%
1985	6,066,870	2.145	13,015,132	265,705	2.0%
1986	6,846,710	2.145	14,688,106	187,218	1.3%
1987	7,738,740	2.145	16,601,760	111,242	0.7%
1988	8,043,378	2.205	17,734,115	1,026,666	5.8%
1989	8,149,957	2.268	18,481,961	1,163,813	6.3%
1990	7,816,199	2.233	17,454,540	5,908,943	33.9%
1991	8,645,208	1.955	16,902,736	13,225,287	78.2%
1992	5,826,467	2.410	14,044,506	180,484	1.3%
1993	5,825,916	3.326	19,379,055	1,900,088	9.8%
1994	6,996,874	2.943	20,588,605	420,038	2.0%
1995	8,737,576	2.616	22,853,953	644,169	2.8%
1996	11,652,672	2.354	27,430,795	406,004	1.5%
1997	12,573,252	2.354	29,597,872	573,343	1.9%
1998	13,838,930	2.352	32,544,777	6,371,206	19.6%
1999	14,103,814	2.465	34,768,730	742,130	2.1%
2000	15,784,218	2.485	39,223,609	324,948	0.8%
2001	17,776,666	2.184	38,816,490	1,947,817	5.0%
2002	20,514,469	2.013	41,298,029	10,059,284	24.4%
2003	25,868,450	2.013	52,076,220	2,672,918	5.1%
2004	30,357,860	1.920	58,274,910	731,759	1.3%
2005	36,780,457	1.837	67,557,818	34,527,644	51.1%
2006	43,562,211	1.832	79,822,419	813,430	1.0%
2007	59,282,257	1.749	103,685,428	2,757,645	2.7%
2008	73,789,694	1.650	121,718,652	845,466,768	694.6%
2009	81,999,709	1.499	122,893,429	3,581,024	2.9%
2010	89,665,314	1.407	126,202,213	1,451,547	1.2%
2011	93,230,854	1.373	127,979,548	1,329,886	1.0%
2012	99,629,727	1.307	130,253,235	10,756,644	8.3%
2013	107,104,250	1.245	133,375,327	54,316,145	40.7%
2014	114,784,032	1.186	136,160,810	691,708	0.5%
2015	122,782,019	1.130	138,739,529	17,655,480	12.7%
2016	127,007,324	1.077	136,730,973	11,291,643	8.3%
2017	126,002,753	1.050	132,302,891	40,819,572	30.9%
2018	122,707,170	1.026	125,841,595	2,980,015	2.4%
2019	121,969,675	1.000	121,969,675	4,945,341	4.1%
Total	1,671,292,130		2,367,807,963	1,201,429,667	50.7%

Notes:
(2) Provided by TDI. Accident years ending 9/30/xx as of 12/31/2019
(3) 1987 and prior judgementally selected; 1988 - 2019 based on TWIA on-level factors
(4) = (2) * (3)
(5) Provided by TDI. Accidn't yrs ending 9/30/xx as of 12/31/2019; 2008 IKE incurred loss was adjusted down by $206,858,309 to incorporate the statutory limitations on litigation cost that House Bill 3 provides
(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	2.145	5,002,659	377,010	7.5%
1984	1,632,317	2.145	3,501,776	249,086	7.1%
1985	2,505,564	2.145	5,375,135	467,721	8.7%
1986	2,977,992	2.145	6,388,625	189,449	3.0%
1987	3,639,667	2.145	7,808,103	335,212	4.3%
1988	3,971,251	2.205	8,755,851	626,491	7.2%
1989	3,702,536	2.268	8,396,379	550,215	6.6%
1990	3,519,306	2.233	7,859,046	955,271	12.2%
1991	4,065,190	1.955	7,948,083	1,367,254	17.2%
1992	3,907,712	2.410	9,419,410	1,170,578	12.4%
1993	4,552,395	3.326	15,142,873	1,312,776	8.7%
1994	5,710,806	2.943	16,804,295	856,369	5.1%
1995	6,908,552	2.616	18,069,967	1,552,987	8.6%
1996	8,568,168	2.354	20,169,765	1,061,115	5.3%
1997	8,425,344	2.354	19,833,553	882,561	4.4%
1998	8,803,621	2.352	20,703,327	2,289,890	11.1%
1999	8,465,256	2.465	20,868,552	3,778,386	18.1%
2000	8,437,094	2.485	20,966,087	485,581	2.3%
2001	8,894,552	2.184	19,421,824	1,394,445	7.2%
2002	10,534,795	2.013	21,207,776	1,227,528	5.8%
2003	13,881,847	2.013	27,945,784	2,295,803	8.2%
2004	15,458,506	1.920	29,674,129	569,877	1.9%
2005	17,471,646	1.837	32,091,670	872,451	2.7%
2006	19,888,512	1.832	36,443,263	621,501	1.7%
2007	29,704,042	1.749	51,952,751	833,793	1.6%
2008	40,565,108	1.650	66,913,548	1,468,028	2.2%
2009	46,363,445	1.499	69,485,158	615,469	0.9%
2010	51,529,115	1.407	72,526,243	4,059,049	5.6%
2011	52,931,755	1.373	72,660,303	19,843,778	27.3%
2012	56,334,273	1.307	73,649,919	21,286,940	28.9%
2013	60,101,696	1.245	74,843,747	6,825,640	9.1%
2014	65,642,137	1.186	77,866,986	1,913,725	2.5%
2015	72,124,134	1.130	81,497,832	9,916,873	12.2%
2016	76,436,084	1.077	82,288,012	10,418,298	12.7%
2017	77,008,517	1.050	80,858,943	274,719,455	339.8%
2018	77,031,486	1.026	78,999,174	1,701,043	2.2%
2019	76,490,369	1.000	76,490,369	1,230,125	1.6%
Total	960,516,727		1,349,830,916	380,321,773	28.2%

Notes:

(2) Provided by TDI. Accident years ending 9/30/xx as of 12/31/2019
(3) 1987 and prior judgementally selected; 1988 - 2019 based on TWIA on-level factors
(4) = (2) * (3)
(5) Provided by TDI. Accidn't yrs ending 9/30/xx as of 12/31/2019
(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	2.145	12,633,081	21,953,626	173.8%
1984	3,924,651	2.145	8,419,473	2,135,063	25.4%
1985	5,808,825	2.145	12,461,553	1,055,065	8.5%
1986	6,993,722	2.145	15,003,488	3,338,312	22.3%
1987	7,677,374	2.145	16,470,113	634,637	3.9%
1988	8,284,768	2.205	18,266,334	3,434,130	18.8%
1989	7,733,295	2.268	17,537,081	1,670,422	9.5%
1990	7,568,146	2.233	16,900,607	2,095,151	12.4%
1991	8,287,605	1.955	16,203,566	22,444,044	138.5%
1992	8,059,407	2.410	19,426,934	1,625,108	8.4%
1993	8,448,603	3.326	28,103,041	1,776,572	6.3%
1994	9,743,293	2.943	28,670,063	1,637,915	5.7%
1995	10,745,995	2.616	28,107,161	2,416,675	8.6%
1996	13,294,968	2.354	31,296,817	1,520,229	4.9%
1997	15,708,220	2.354	36,977,695	2,569,544	6.9%
1998	16,168,136	2.352	38,022,331	10,312,506	27.1%
1999	14,452,667	2.465	35,628,721	3,655,754	10.3%
2000	14,453,385	2.485	35,916,504	3,332,580	9.3%
2001	15,173,521	2.184	33,132,357	2,426,814	7.3%
2002	17,843,905	2.013	35,921,871	5,925,066	16.5%
2003	23,423,208	2.013	47,153,662	17,213,668	36.5%
2004	27,306,202	1.920	52,416,951	990,613	1.9%
2005	31,012,304	1.837	56,962,957	115,989,785	203.6%
2006	36,545,725	1.832	66,965,567	1,842,548	2.8%
2007	69,945,120	1.749	122,334,912	10,105,722	8.3%
2008	110,187,567	1.650	181,758,202	694,640,836	382.2%
2009	128,275,387	1.499	192,247,050	2,522,159	1.3%
2010	143,236,007	1.407	201,601,937	9,656,553	4.8%
2011	151,387,931	1.373	207,812,737	59,069,922	28.4%
2012	170,159,709	1.307	222,462,243	21,183,482	9.5%
2013	183,495,510	1.245	228,504,225	6,488,552	2.8%
2014	197,640,983	1.186	234,448,607	7,237,896	3.1%
2015	212,320,998	1.130	239,915,547	89,978,392	37.5%
2016	218,795,204	1.077	235,546,111	15,012,404	6.4%
2017	212,533,686	1.050	223,160,370	705,069,821	315.9%
2018	201,509,514	1.026	206,656,862	9,481,014	4.6%
2019	194,394,581	1.000	194,394,581	14,185,711	7.3%
Total	2,518,428,904		3,399,441,314	1,876,628,291	55.2%

Notes:
(2) Provided by TDI. Accident years ending 9/30/xx as of 12/31/2019
(3) 1987 and prior judgementally selected; 1988 - 2019 based on TWIA on-level factors
(4) = (2) * (3)
(5) Provided by TDI. Accidn't yrs ending 9/30/xx as of 12/31/2019
(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	2.145	34,856,305	61,752,490	177.2%
1984	11,008,847	2.145	23,617,053	9,535,536	40.4%
1985	15,662,193	2.145	33,599,781	4,532,749	13.5%
1986	19,854,927	2.145	42,594,367	6,306,903	14.8%
1987	22,542,928	2.145	48,360,880	3,739,010	7.7%
1988	24,744,994	2.205	54,557,993	4,139,098	7.6%
1989	22,159,987	2.268	50,253,028	8,884,751	17.7%
1990	21,480,544	2.233	47,968,715	11,997,188	25.0%
1991	25,239,134	1.955	49,346,460	10,178,608	20.6%
1992	26,718,987	2.410	64,405,238	12,221,034	19.0%
1993	31,914,206	3.326	106,157,928	17,910,197	16.9%
1994	35,133,612	2.943	103,382,178	6,968,697	6.7%
1995	34,347,927	2.616	89,840,236	20,240,594	22.5%
1996	38,349,764	2.354	90,276,675	9,046,495	10.0%
1997	42,447,731	2.354	99,923,431	8,514,675	8.5%
1998	41,427,572	2.352	97,424,518	10,127,907	10.4%
1999	34,004,815	2.465	83,828,685	8,680,187	10.4%
2000	36,439,477	2.485	90,551,704	9,518,422	10.5%
2001	32,881,662	2.184	71,799,219	23,547,404	32.8%
2002	37,396,181	2.013	75,282,893	7,950,367	10.6%
2003	49,027,236	2.013	98,697,570	10,177,909	10.3%
2004	49,927,649	1.920	95,841,052	3,738,542	3.9%
2005	50,116,517	1.837	92,053,303	34,201,898	37.2%
2006	54,703,319	1.832	100,237,135	4,909,932	4.9%
2007	60,982,886	1.749	106,659,850	5,242,698	4.9%
2008	65,015,817	1.650	107,245,838	448,708,416	418.4%
2009	70,667,217	1.499	105,909,359	9,952,501	9.4%
2010	70,788,779	1.407	99,633,851	10,829,031	10.9%
2011	73,325,323	1.373	100,654,894	5,992,356	6.0%
2012	80,858,142	1.307	105,711,768	89,891,814	85.0%
2013	90,250,703	1.245	112,387,856	22,062,101	19.6%
2014	99,916,064	1.186	118,523,910	20,950,951	17.7%
2015	110,352,614	1.130	124,694,722	43,749,835	35.1%
2016	119,744,188	1.077	128,911,773	46,199,850	35.8%
2017	117,739,636	1.050	123,626,618	74,392,945	60.2%
2018	115,484,141	1.026	118,434,062	12,269,364	10.4%
2019	116,764,667	1.000	116,764,667	31,309,739	26.8%
Total	1,965,668,294		3,214,015,515	1,130,372,194	35.2%

Notes:
(2) Provided by TDI. Accident years ending 9/30/xx as of 12/31/2019
(3) 1987 and prior judgementally selected; 1988 - 2019 based on TWIA on-level factors
(4) = (2) * (3)
(5) Provided by TDI. Accidn't yrs ending 9/30/xx as of 12/31/2019
(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 11/30/19	Modeled Loss Cost	Expected Annual Hurricane Loss
(1)	(2)	(3)	(4)
Aransas	1,560,360	2.699	4,211,412
Brazoria	9,623,822	1.818	17,496,108
Calhoun	884,611	3.232	2,859,063
Cameron	2,184,121	1.835	4,007,862
Chambers	1,407,119	1.761	2,477,937
Galveston	18,526,442	4.371	80,979,078
Harris	1,104,156	4.410	4,869,328
Jefferson	6,147,764	2.135	13,125,476
Kenedy	5,642	1.083	6,110
Kleberg	185,682	0.981	182,154
Matagorda	1,085,936	2.870	3,116,636
Nueces	10,223,620	2.701	27,613,998
Refugio	74,314	1.618	120,240
San Patricio	1,622,088	2.057	3,336,635
Willacy	76,748	2.186	167,771
Total	54,712,425	3.098	164,569,808
(5) Inforce-Premium as of 11/30/19 at Present Rates			312,674,278
(6) Indicated Hurricane Loss Ratio			52.6%

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

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

County	TWIA Insured Values (000s) as of 11/30/19	Average Annual Modeled Loss	Provision for Storm Surge	Modeled Loss Cost
(1)	(2)	(3)	(4)	(5)
Aransas	1,560,360	4,195,184	1.004	2.699
Brazoria	9,623,822	17,422,331	1.004	1.818
Calhoun	884,611	2,847,688	1.004	3.232
Cameron	2,184,121	3,992,197	1.004	1.835
Chambers	1,407,119	2,468,157	1.004	1.761
Galveston	18,526,442	80,652,773	1.004	4.371
Harris	1,104,156	4,849,825	1.004	4.410
Jefferson	6,147,764	13,072,112	1.004	2.135
Kenedy	5,642	6,086	1.004	1.083
Kleberg	185,682	181,406	1.004	0.981
Matagorda	1,085,936	3,103,721	1.004	2.870
Nueces	10,223,620	27,506,251	1.004	2.701
Refugio	74,314	119,729	1.004	1.618
San Patricio	1,622,088	3,323,670	1.004	2.057
Willacy	76,748	167,096	1.004	2.186
Total	54,712,425	163,908,226	1.004	3.008

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 11/30/19	Modeled Loss Cost	Expected Annual Hurricane Loss
(1)	(2)	(3)	(4)
Aransas	1,560,360	2.417	3,771,390
Brazoria	9,623,822	1.753	16,870,560
Calhoun	884,611	3.624	3,205,830
Cameron	2,184,121	2.087	4,558,261
Chambers	1,407,119	1.674	2,355,517
Galveston	18,526,442	3.276	60,692,624
Harris	1,104,156	2.920	3,224,136
Jefferson	6,147,764	1.892	11,631,569
Kenedy	5,642	2.303	12,994
Kleberg	185,682	1.469	272,767
Matagorda	1,085,936	2.874	3,120,980
Nueces	10,223,620	2.112	21,592,285
Refugio	74,314	2.378	176,719
San Patricio	1,622,088	1.995	3,236,066
Willacy	76,748	2.882	221,188
Total	54,712,425	2.466	134,942,886
(5) Inforce-Premium as of 11/30/19 at Present Rates			312,674,278
(6) Indicated Hurricane Loss Ratio			43.2%

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

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

County	TWIA Insured Values (000s) as of 11/30/19	Average Annual Modeled Loss	Provision for Storm Surge	Modeled Loss Cost
(1)	(2)	(3)	(4)	(5)
Aransas	1,560,360	3,705,013	1.018	2.417
Brazoria	9,623,822	16,568,400	1.018	1.753
Calhoun	884,611	3,148,799	1.018	3.624
Cameron	2,184,121	4,478,722	1.018	2.087
Chambers	1,407,119	2,314,527	1.018	1.674
Galveston	18,526,442	59,618,675	1.018	3.276
Harris	1,104,156	3,166,744	1.018	2.920
Jefferson	6,147,764	11,425,895	1.018	1.892
Kenedy	5,642	12,762	1.018	2.303
Kleberg	185,682	267,952	1.018	1.469
Matagorda	1,085,936	3,066,293	1.018	2.874
Nueces	10,223,620	21,208,047	1.018	2.112
Refugio	74,314	173,582	1.018	2.378
San Patricio	1,622,088	3,179,005	1.018	1.995
Willacy	76,748	217,298	1.018	2.882
Total	54,712,425	132,551,714	1.018	2.466

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 - 2019

Exhibit 9

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

Frequency	Date Period	Hurricanes	Period	Annual Frequency
54-Year	1/1/1966 - 12/31/2019	15	54	0.278
169-Year	1/1/1851 - 12/31/2019	64	169	0.379

Notes:
(1), (2) from NOAA Technical Memorandum NWS-NHC-6, updated with actual experience through 2019

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)
2009	80,844,468	1.499	121,162,062
2010	88,599,807	1.407	124,702,532
2011	92,287,441	1.373	126,684,509
2012	98,605,959	1.307	128,914,788
2013	105,941,027	1.245	131,926,783
2014	113,521,698	1.186	134,663,386
2015	121,221,015	1.130	136,975,647
2016	123,942,872	1.077	133,431,908
2017	120,650,271	1.050	126,682,785
2018	112,717,188	1.026	115,596,430
2019	109,182,096	1.000	109,182,096
Total	1,167,513,842		1,389,922,926

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)
2009	43,977,111	1.499	65,908,745
2010	49,048,919	1.407	69,035,414
2011	50,547,302	1.373	69,387,124
2012	53,841,760	1.307	70,391,274
2013	57,427,564	1.245	71,513,690
2014	62,828,148	1.186	74,528,934
2015	68,716,114	1.130	77,646,885
2016	71,234,774	1.077	76,688,491
2017	69,126,281	1.050	72,582,595
2018	63,899,693	1.026	65,531,943
2019	59,870,593	1.000	59,870,593
Total	650,518,259		773,085,688

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)
2009	116,551,972	1.499	174,677,101
2010	131,679,293	1.407	185,336,084
2011	140,621,661	1.373	193,033,699
2012	160,031,435	1.307	209,220,809
2013	173,209,952	1.245	215,695,773
2014	187,152,484	1.186	222,006,785
2015	200,595,693	1.130	226,666,349
2016	200,978,477	1.077	216,365,340
2017	188,554,673	1.050	197,982,407
2018	166,829,909	1.026	171,091,403
2019	151,980,115	1.000	151,980,115
Total	1,818,185,664		2,164,055,865

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)
2009	2,218,368	1.499	3,324,681
2010	2,562,327	1.407	3,606,426
2011	2,825,372	1.373	3,878,435
2012	3,294,072	1.307	4,306,581
2013	3,672,814	1.245	4,573,701
2014	3,920,276	1.186	4,650,368
2015	4,202,726	1.130	4,748,938
2016	4,436,708	1.077	4,776,381
2017	4,435,808	1.050	4,657,598
2018	4,301,050	1.026	4,410,916
2019	4,296,061	1.000	4,296,061
Total	40,165,582		47,230,086

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 Manual Rates	Factor to Current Rate Level	Earned Premium at Current Rate Level
(1)	(2)	(3)	(4)
2008	219,412,771	1.650	361,928,954
2009	250,693,788	1.499	375,716,200
2010	273,154,916	1.407	384,460,314
2011	292,239,327	1.373	401,161,797
2012	323,323,869	1.307	422,704,960
2013	346,955,938	1.245	432,059,062
2014	372,022,089	1.186	441,305,539
2015	403,803,905	1.130	456,284,757
2016	405,934,590	1.077	437,012,842
2017	376,421,384	1.050	395,242,454
2018	341,468,875	1.026	350,191,338
2019	322,259,386	1.000	322,259,386
Total	3,927,690,838		4,780,327,602

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	2017	2018	2019	Selected
(1)	Direct Written Premium	$423,074,138	$395,551,679	$372,016,601	
(2)	Direct Earned Premium	451,347,130	409,954,258	381,571,182	
(3)	Commission				
	$ Amount	67,661,211	63,280,811	59,474,929	
	% 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	$26,359,831	$30,687,177	$31,461,936	
	Adjustments				
	Contribution to Statutory Fund	0	0	0	
	Adjusted $ Amount	26,359,831	30,687,177	31,461,936	
	% of DWP	6.2%	7.8%	8.5%	8.5%
(6)	Taxes, Licenses & Fees				
	$ Amount	$8,281,293	$7,590,295	$7,024,246	
	% of DWP	2.0%	1.9%	1.9%	1.9%
(7)	Reinsurance Expense				19.5%
(8)	Outstanding Class 1 Public Security Repayment				19.7%
(9)	Total Fixed Expenses				47.7%
(10)	Total Variable Expenses				17.9%
(11)	CRTF Contribution & UW Contingency & Uncertainty				5.0%
(12)	Permissible Loss, LAE and Fixed Expense Ratio				77.1%

Notes:
(1) - (6) From TWIA's Statutory Annual Statements and Insurance Expense Exhibits
(7) Exhibit 11, Sheet 2
(8) Outstanding Class 1 Public Security issued in 2014, Security depleted due to Hurricane Harvey;
0.197= Annual principal and interest payment $68.9M/Prospective written premium at present rate$350.03M
$350.03M = TWIA 2019 written premium $372,016,601*(1-3%)^2; 3% from Exhibit 11, sheet 2, (3)
(9) = (5) + (7) + (8)
(10) = (3) + (4) + (6)
(11) CRTF contribution selected judgmentally; Class 1 repayment based on projected $80 million in debt service
(12) = 100% - (10) - (11)

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

(1)	2020 - 2021 Reinsurance Premium	102,066,436
(2a)	Average Annual Loss by Reinsurance Layer (AIR)	
	100% of $2100M XS $2100M	34,140,093
	Total	34,140,093
(2b)	Average Annual Loss by Reinsurance Layer (RMS)	
	100% of $2100M XS $2100M	19,828,158
	Total	19,828,158
(2c)	Selected Total Average Annual Loss	26,984,126
(3)	Annual Exposure Growth	-3.0%
(4)	Prospective Average Annual Loss	26,174,602
(5)	Net Cost of Reinsurance	71,965,644
(6)	TWIA 2019 Earned Premium at Present Rates	412,601,619
(7)	2020 - 2021 TWIA Prospective Earned Premium at Present Rates	368,420,247
(8)	Indicated Reinsurance Expense %	19.5%

Notes:
(1) From TWIA reinsurance contract effective 6/1/2020 through 5/31/2021
(2a) Provided by Guy Carpenter, based on AIR model using TWIA exposures as of 11/30/2019 and adjusted for ALAE
(2b) Provided by Guy Carpenter, based on RMS model using TWIA exposures as of 11/30/2019 and adjusted for ALAE
(2c) Selected equal to the average of the modeled average annual losses
(3) Selected based on projections communicated to reinsurers
(4) = (2c) * [(1+ (3)) ^ 1.000](projected exposure growth from 11/30/2019 to 12/1/2020)
(5) = (1) - (4)*1.15,1.15 is the loading for loss adjustment factor
(6) = Commercial Exhibit 10, Sheet 1 + Residential Exhibit 10, Sheet 2, calendar year ending 12/31/19
(7) = (6) adjusted for exposure growth trend * [(1+ (3)) ^ 1.417] (projected exposure growth from 7/1/2019 to 12/1/2020)
(8) = (5) / (7)

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

Exhibit 12

Calendar Year	TWIA Provided Written Premium			Annual Statement Gross Written Premium	Difference
	Commercial	Residential	Total		
(1)	(2)	(3)	(4)	(5)	(6)
1994	10,672,677	15,758,330	26,431,007	26,510,501	(79,494)
1995	12,865,905	19,259,265	32,125,170	32,419,287	(294,117)
1996	15,640,660	24,504,127	40,144,787	40,358,575	(213,788)
1997	16,536,186	25,783,455	42,319,641	42,462,844	(143,203)
1998	16,558,977	27,833,800	44,392,777	44,410,914	(18,137)
1999	17,394,142	27,168,992	44,563,134	44,581,218	(18,084)
2000	17,332,561	29,762,296	47,094,857	48,012,426	(917,569)
2001	17,544,251	36,220,623	53,764,874	54,630,727	(865,853)
2002	24,013,525	48,856,422	72,869,947	72,967,831	(97,884)
2003	29,220,514	58,573,191	87,793,705	87,987,279	(193,574)
2004	31,009,323	71,292,702	102,302,025	102,384,351	(82,326)
2005	35,740,174	78,094,458	113,834,632	113,927,701	(93,069)
2006	76,847,840	119,658,576	196,506,416	196,833,235	(326,819)
2007	110,951,718	203,561,196	314,512,914	315,139,307	(626,393)
2008	98,036,118	232,925,990	330,962,108	331,057,645	(95,537)
2009	111,269,573	269,535,059	380,804,632	382,342,402	(1,537,770)
2010	102,174,680	278,116,922	380,291,602	385,549,582	(5,257,980)
2011	100,017,021	307,494,236	407,511,257	403,748,164	3,763,093
2012	110,524,397	335,795,725	446,320,122	443,479,701	2,840,421
2013	112,904,624	360,838,081	473,742,705	472,739,474	1,003,231
2014	104,642,688	389,333,918	493,976,606	494,036,010	(59,404)
2015	98,715,934	407,969,846	506,685,780	503,824,316	2,861,464
2016	88,278,690	399,074,847	487,353,537	487,353,537	-
2017	70,749,081	352,368,052	423,117,133	423,074,138	42,995
2018	65,696,833	331,676,957	397,373,790	395,551,679	1,822,111
2019	59,123,729	314,907,159	374,030,888	372,016,601	2,014,287
Total	1,554,461,820	4,766,364,225	6,320,826,045	6,317,399,445	3,426,600

Notes:

(2), (3) Provided by TWIA, as of 12/31/2019
(4) = (2) + (3)
(5) Based on TWIA Annual Statements
(6) = (4) - (5)