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Texas Windstorm  
Insurance Association

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August 15, 2016

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

RE: Texas Windstorm Insurance Association Annual Rate Filing

Dear Marilyn:

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

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

On August 2, 2016, 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 +26% and +21% for residential and commercial rates, respectively. The complete residential and commercial analyses are attached.

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

Respectfully,

A handwritten signature in black ink, appearing to read 'JCM', is written over a light blue horizontal line.

James C. Murphy

**Texas Windstorm Insurance Association**

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**TEXAS WINDSTORM INSURANCE ASSOCIATION  
RESIDENTIAL PROPERTY RATE LEVEL REVIEW  
2016**

July 2016

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## **INTRODUCTION**

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

## **DISTRIBUTION AND USE**

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

## **RELIANCE UPON DATA**

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

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

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

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

We also used the results of two different hurricane simulation models -- one prepared by Applied Insurance Research (AIR) and one model prepared by Risk Management Solutions (RMS). Both models utilized TWIA exposure data as of 12/31/15. TWIA has not directly verified the accuracy of these simulation models, but has relied on documentation provided directly by the modeling firms and submission documentation provided to the Florida Commission on Hurricane Loss Projection Methodology to comply with Actuarial Standard of Practice #38, "Using Models Outside the Actuary's Area of Expertise."

## **LIMITATIONS**

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

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

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

## EXECUTIVE SUMMARY

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

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

**Indicated Rate Change: Long Term Hurricane Methodologies**

<b>Hurricane Projection Methodology</b>	<b>Indicated Rate Change</b>
Actual Experience and Models Combined	+26%
Actual Industry Experience	+19%
Hurricane Simulation Models	+33%

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

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

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

The method using actual industry experience relies on a more traditional approach and is based on 51 years of actual insurance industry premiums and losses and 165 years of actual hurricane experience. This method possesses the advantage of finding broader regulatory acceptance in many states (including Texas). The alternate method incorporates the results of hurricane simulation models. This has the advantage of minimizing many of the theoretical weaknesses of the traditional actuarial methodologies. The overall indication assigns equal weight to these hurricane projection methodologies.

3. The current rate indication is the same as the corresponding indication from the prior TWIA residential rate study. A 5% rate increase, effective January 1, 2016, was offset by the introduction of actual experience from 2015.

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

4. The indicated rate changes presented in this report reflect a separate provision for contributions to funding, including provisions for both the Catastrophe Reserve Trust Fund and the repayment of outstanding pre-event Class 1 public securities. The total funding provision is 20% of TWIA premium. The CRTF provision is necessary to rebuild the fund, which was completely depleted in order to pay losses associated with 2008 hurricanes. The Class 1 securities provision is necessary to repay \$500 million in outstanding debt issued in 2014.

The provision for reinsurance expense is 16.2% of TWIA premium. The provision for reinsurance expense reflects the estimated actual net cost of purchasing catastrophe reinsurance (reinsurance premiums paid net of the expected reduction in TWIA retained losses). Catastrophe reinsurance provides TWIA with annually renewable protection against large storm losses.

## ACTUARIAL ANALYSIS

### Overview of Analysis

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

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

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

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

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

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



### **Earned Premium at Current Rates**

Historical industry and TWIA earned premium is adjusted to TWIA's current rate level. Earned premium at current rates for prior years permits the calculation of historical loss ratios at the current rate level.

Exhibit 10 shows the calculation of earned premium at current TWIA rates. Industry earned premium was provided by TDI/TICO. Historical TWIA written premium is adjusted to the current rate level and adjusted to an earned basis based on a uniform monthly earning assumption.

### **Loss Adjustment Expense Factors**

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

The indicated LAE to loss ratios are shown in Exhibit 4, Sheet 1. For hurricane losses, the indicated LAE ratio of 0.122 is equal to the weighted average of the nine hurricane years included in the analysis. For non-hurricane losses, the indicated ratio of 0.207 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 industry non-hurricane loss for accident years 2006 - 2015 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

12/31/15, and the paid loss development method. LAE is then added to each year's ultimate loss through the non-hurricane LAE factor developed in Exhibit 4.

Paid loss development factors are selected based on the current average of all available years and prior selections. Given the positive skewness of the observed age-to-age development factors, a straight average may be more preferable than an average excluding the highest and lowest observation to avoid understating the expected development.

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

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

The resulting loss and LAE ratios for each accident year from 2006 - 2015 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 2006 - 2015 accident period. This method gives greater weight to more recent years due to TWIA's growth. Given the greater credibility normally associated with more recent experience and the potentially significant change in TWIA's residential book of business due to the growth, this weighting may be more appropriate than a non-weighted average across all years.

The all-territory indicated loss and LAE ratio is then calculated as the weighted average of the territory loss and LAE ratios. TWIA 2015 written premium is used in the weighted average calculation.

#### **Projected Hurricane Loss and LAE Ratio**

Two different methods are used to develop the projected hurricane loss and LAE ratios. The first method is based on insurance industry and meteorological hurricane experience for the last 51 and 165 years, respectively. The other method is based on hurricane simulation models. The “51/165-year” method is utilized because the Texas Insurance Code required until recently the consideration of a 30-year minimum experience period. The simulation method is utilized because it minimizes many of the theoretical weaknesses of the historical method. These weaknesses include:

- A 51-year period is insufficient to measure long-term hurricane intensity.
- A 51-year period of insurance industry experience includes years where land use, population densities, construction techniques and materials, engineering techniques and building codes were different than today. These differences diminish the relevance of insurance data from several decades ago in evaluating today’s residential property rates.

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

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

#### *Actual 51/165-Year Industry Hurricane Experience*

In Exhibit 6, Texas insurance industry seacoast dwelling extended coverage experience for the 1965 - 2015 period is used in the development of a projected hurricane loss ratio. For each year, insurance industry loss ratios at current rates are calculated using information provided by the TDI. For the years where sufficient detail is available (1983 - 2015), these loss ratios are adjusted to TWIA’s rate level and re-weighted based on the TWIA’s current premium distribution by territory within the seacoast area.

A projected hurricane loss ratio is developed from these 51 years of loss ratios by separating the 51 years into the thirteen hurricane years and thirty-eight non-hurricane years. The 38 non-

hurricane years are used to develop an estimated non-hurricane loss ratio.

Hurricane loss ratios are then estimated by subtracting the non-hurricane loss ratio from the total loss ratio in each of the thirteen hurricane years. An average hurricane loss ratio for hurricane years is calculated as the average of the thirteen hurricane loss ratios: 89.7%.

The 51-year period that underlies the selected hurricane loss ratio has experienced significantly fewer hurricanes than the long-term average. As shown in Exhibit 9, the annual hurricane frequency during this 51-year period is 0.275, while the annual frequency during the most recent 164-year period is 0.382. The 51-year period represents all years for which TWIA has been provided industry data by TDI. Because the expected frequency of hurricanes is unrelated to the availability of insurance industry data, there is no reason to use only the most recent 51-year period to estimate the expected frequency of hurricane activity. Given the relatively infrequent occurrence of hurricanes, the largest possible experience period should be considered in order to obtain the most credible result. The selected hurricane frequency is therefore set equal to the 165-year historical hurricane frequency. As shown in Exhibit 6, Sheet 1, multiplying the selected loss ratio for hurricane years by the selected hurricane frequency yields a projected hurricane loss ratio of 34.3%.

#### *Hurricane Simulation Models*

This projected hurricane loss ratio is determined based on the average result of two different hurricane simulation models. The models are AIR Touchstone v3.0.1 and RMS RiskLink v15.0.1. Both models were run using exposure data provided by TWIA as of 12/31/2015. 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 9,773 unique events, respectively, with the following distribution of intensity ratings in Texas:

Saffir-Simpson Category	AIR	RMS
Category 0	15.3%	61.4%
Category 1	35.3%	12.0%
Category 2	22.2%	6.5%
Category 3	18.4%	7.5%
Category 4	8.0%	10.3%
Category 5	0.8%	2.3%

The intensity at first landfall is shown for AIR and RMS events. The total frequency for events of each intensity is shown with the intensity most relevant to Texas exposures. Events shown as Category 0 include bypassing events and events making landfall in neighboring states or Mexico in addition to Cat 0 events that make landfall in TX.

As shown in Exhibits 7 and 8, these models yield projected hurricane loss ratios of 44.5% and 39.8%. The average of these loss ratios is 42.2%.

#### **Fixed Expenses and Variable Permissible Loss and LAE Ratio**

Exhibit 11 shows the expense assumptions used to develop the projected fixed expense ratio and the variable permissible loss and LAE ratio. Fixed expenses include general expenses and the net cost of reinsurance. The sum of these projected expenses provides for a 21.5% fixed expense ratio. Variable expenses include commission, taxes, and catastrophe trust fund contribution. Subtracting these expenses from 100% yields a variable permissible loss and LAE ratio of 62.0%.

As stated above, the expenses include a provision for an annual contribution to the catastrophe reserve trust fund, repayment of Class 1 public securities, and the projected net cost of TWIA's purchasing of reinsurance. The 20% provision for funding contribution is intended to permit the redevelopment of the catastrophe reserve trust fund and to repay outstanding pre-event public securities in order to reduce the potential for future year surcharges on TWIA and coastal insurance policies and assessments to TWIA members. The 16.2% provision for reinsurance

expense reflects the estimated net actual cost of purchasing reinsurance (reinsurance premiums net of the expected reduction in TWIA retained losses). TWIA's purchasing of reinsurance provides additional current year protection to TWIA and coastal policyholders and TWIA members.

**Indicated Rate Change**

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

**Data Issues**

*Reconciliation of Data to TWIA's Annual Statements*

Exhibit 12 shows a reconciliation of the premium data provided by TWIA to TWIA's annual statement data. This reconciliation shows the differences between the two data sources. Differences of less than 1% exist for all recent years except 2010.

**Key Differences Versus Prior Indications**

The indicated rate changes shown in this report are the same as those shown in the prior (July 2015) study. The indications are summarized in the following table.

**Reconciliation of Current vs. Prior Indications**

<b>Rate Indication/Reason for Change</b>	<b>Impact of Change</b>	<b>Rate Indication</b>
<i>Previous Rate Indication (Combined Method)</i>		<b>+26%</b>
TWIA Rate Level	-6%	
Change in Experience Period	+6%	
<i>Current Rate Indication (Combined Method)</i>		<b>+26%</b>

These reasons are discussed below:

*TWIA Rate Level*

The TWIA rate level increased 5% as a result of the most recent filing. This has a 6% impact (reduction) on indicated rates.

*Change in Experience Period*

The indicated rate change increased approximately 6% as a result of the inclusion of actual experience from 2015.

## SUMMARY OF EXHIBITS

<u>Exhibit Number</u>	<u>Exhibit Title or Purpose</u>
1	Summary of Indicated Rate Change
2	Projected Ultimate Non-Hurricane Loss & LAE Ratio
3	Paid Loss Development Factors and Premium and Loss Trend Analysis
4	Development of LAE Factor
5	Summary of Indicated Hurricane Loss & LAE Ratios
6	Development of Hurricane Loss Ratio – 51/165-Year Method
7	Hurricane Loss Ratio – AIR Model
8	Hurricane Loss Ratio – RMS Model
9	Texas Hurricanes 1899 – 2015
10	Earned Premium at Present Rates
11	Fixed Expenses and Variable Permissible Loss & LAE Ratios
12	Reconciliation of Premium Data to Annual Statement
13	Analysis of Current and Proposed Net Premium Income



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

Exhibit 1

Hurricane Projection Method	Indicated Loss & LAE Ratio				Variable Permissible LLAE Ratio	Indicated Rate Change	Proposed Rate Change
	Hurricane	Non-Hurricane	Fixed Expenses	Total			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Using Experience and Models	42.9%	13.9%	21.5%	78.3%	62.0%	+26%	+5.0%
Using Actual Industry Experience	38.5%	13.9%	21.5%	73.9%	62.0%	+19%	
Using Hurricane Models	47.3%	13.9%	21.5%	82.7%	62.0%	+33%	

Notes:

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

**Texas Windstorm Insurance Association**  
**Residential Property - Wind & Hail**  
**Rate Level Review**  
 Projected Ultimate Non-Hurricane Loss & LAE Ratio  
 All Territory Weighted Average

Exhibit 2  
 Sheet 1

Territory	2015 Written Premium		Indicated Non-Hurricane Loss & LAE Ratio
	Amount	Share	
(1)	(2)	(3)	(4)
Tier 1 - Territory 8	124,989,045	30.9%	11.1%
Tier 1 - Territory 9	71,387,041	17.6%	14.3%
Tier 1 - Territory 10	204,336,580	50.4%	15.5%
Tier 2	4,426,182	1.1%	9.9%
<b>Total / Average</b>	<b>405,138,848</b>	<b>100.0%</b>	<b>13.9%</b>

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)
2006	684,266	0.207	1.237	1,021,650	74,151,900	1.4%
2007	1,295,331	0.207	1.185	1,852,705	96,784,322	1.9%
2008	433,109	0.207	1.160	606,405	113,960,998	0.5%
2009	3,441,772	0.207	1.175	4,881,207	115,392,373	4.2%
2010	1,264,721	0.207	1.183	1,805,871	118,764,316	1.5%
2011	1,282,657	0.207	1.181	1,828,385	120,651,921	1.5%
2012	10,863,616	0.207	1.137	14,908,781	122,775,967	12.1%
2013	56,678,122	0.207	1.098	75,114,722	125,644,545	59.8%
2014	549,075	0.207	1.061	703,160	128,251,185	0.5%
2015	19,072,306	0.207	1.044	24,033,165	130,452,998	18.4%
<b>Total</b>	<b>95,564,975</b>			<b>126,756,051</b>	<b>1,146,830,525</b>	<b>11.1%</b>

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)
2006	432,666	0.207	1.237	645,996	28,747,275	2.2%
2007	488,076	0.207	1.185	698,093	44,456,556	1.6%
2008	480,548	0.207	1.160	672,825	60,012,897	1.1%
2009	536,746	0.207	1.175	761,227	62,770,197	1.2%
2010	3,445,556	0.207	1.183	4,919,844	65,748,013	7.5%
2011	19,044,283	0.207	1.181	27,146,997	66,082,980	41.1%
2012	21,106,668	0.207	1.137	28,965,926	67,039,297	43.2%
2013	6,478,319	0.207	1.098	8,585,625	68,108,271	12.6%
2014	1,777,880	0.207	1.061	2,276,801	70,980,126	3.2%
2015	9,870,259	0.207	1.044	12,437,592	73,949,414	16.8%
<b>Total</b>	<b>63,661,001</b>			<b>87,110,926</b>	<b>607,895,026</b>	<b>14.3%</b>

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)
2006	814,136	0.207	1.237	1,215,553	44,822,351	2.7%
2007	3,251,580	0.207	1.185	4,650,719	96,121,098	4.8%
2008	1,390,642	0.207	1.160	1,947,066	153,984,538	1.3%
2009	1,976,152	0.207	1.175	2,802,628	166,359,047	1.7%
2010	6,651,650	0.207	1.183	9,497,765	176,510,555	5.4%
2011	56,373,673	0.207	1.181	80,358,811	183,841,629	43.7%
2012	19,286,242	0.207	1.137	26,467,648	199,257,879	13.3%
2013	5,064,323	0.207	1.098	6,711,676	205,424,530	3.3%
2014	3,005,750	0.207	1.061	3,849,245	211,435,595	1.8%
2015	94,049,261	0.207	1.044	118,512,226	215,872,714	54.9%
<b>Total</b>	<b>191,863,409</b>			<b>256,013,337</b>	<b>1,653,629,936</b>	<b>15.5%</b>

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**

Exhibit 2  
 Sheet 2d

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

Accident Year Ending 9/30/xx	Ultimate Non-Hurricane Loss	LAE Factor	Net Trend Factor	Projected Non-Hurricane Loss & LAE	Earned Premium at Current TWIA Rate Level	Indicated Non-Hurricane Loss & LAE Ratio
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2006	31,341	0.207	1.237	46,794	2,031,559	2.3%
2007	65,115	0.207	1.185	93,134	2,630,384	3.5%
2008	486,202	0.207	1.160	680,741	3,006,325	22.6%
2009	551,702	0.207	1.175	782,438	3,166,361	24.7%
2010	182,872	0.207	1.183	261,119	3,434,692	7.6%
2011	54,654	0.207	1.181	77,907	3,693,748	2.1%
2012	265,513	0.207	1.137	364,379	4,101,505	8.9%
2013	527,394	0.207	1.098	698,948	4,355,905	16.0%
2014	33,792	0.207	1.061	43,275	4,428,933	1.0%
2015	346,539	0.207	1.044	436,677	4,522,798	9.7%
<b>Total</b>	<b>2,545,124</b>			<b>3,485,412</b>	<b>35,372,210</b>	<b>9.9%</b>

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)
2006	684,266	1.000	684,266
2007	1,295,331	1.000	1,295,331
2008	433,109	1.000	433,109
2009	3,441,772	1.000	3,441,772
2010	1,264,721	1.000	1,264,721
2011	1,276,276	1.005	1,282,657
2012	10,609,000	1.024	10,863,616
2013	54,030,622	1.049	56,678,122
2014	499,613	1.099	549,075
2015	16,584,614	1.150	19,072,306
<b>Total</b>	<b>90,119,324</b>		<b>95,564,975</b>

Notes:

- (2) Exhibit 2, Sheet 4a, as of 12/31/15
- (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)

Exhibit 2  
 Sheet 3b

Accident Year	TWIA Non-Hurricane Paid Loss	Development Factor	Ultimate Non-Hurricane Loss
(1)	(2)	(3)	(4)
2006	432,666	1.000	432,666
2007	488,076	1.000	488,076
2008	480,548	1.000	480,548
2009	536,746	1.000	536,746
2010	3,445,556	1.000	3,445,556
2011	18,949,535	1.005	19,044,283
2012	20,611,980	1.024	21,106,668
2013	6,175,709	1.049	6,478,319
2014	1,617,725	1.099	1,777,880
2015	8,582,834	1.150	9,870,259
<b>Total</b>	<b>61,321,375</b>		<b>63,661,001</b>

Notes:

- (2) Exhibit 2, Sheet 4b, as of 12/31/15
- (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)
2006	814,136	1.000	814,136
2007	3,251,580	1.000	3,251,580
2008	1,390,642	1.000	1,390,642
2009	1,976,152	1.000	1,976,152
2010	6,651,650	1.000	6,651,650
2011	56,093,207	1.005	56,373,673
2012	18,834,221	1.024	19,286,242
2013	4,827,763	1.049	5,064,323
2014	2,734,986	1.099	3,005,750
2015	81,781,966	1.150	94,049,261
<b>Total</b>	<b>178,356,303</b>		<b>191,863,409</b>

Notes:

- (2) Exhibit 2, Sheet 4c, as of 12/31/15
- (3) Exhibit 3, Sheet 1
- (4) = (2) \* (3)

Texas Windstorm Insurance Association  
 Residential Property - Wind & Hail  
 Rate Level Review  
 Projected Ultimate Non-Hurricane Loss  
 Tier 2 -- (Territories 1 and 11)

Exhibit 2  
 Sheet 3d

Accident Year	TWIA Non-Hurricane Paid Loss	Development Factor	Ultimate Non-Hurricane Loss
(1)	(2)	(3)	(4)
2006	31,341	1.000	31,341
2007	65,115	1.000	65,115
2008	486,202	1.000	486,202
2009	551,702	1.000	551,702
2010	182,872	1.000	182,872
2011	54,382	1.005	54,654
2012	259,290	1.024	265,513
2013	502,759	1.049	527,394
2014	30,748	1.099	33,792
2015	301,338	1.150	346,539
Total	2,465,749		2,545,124

Notes:

- (2) Exhibit 2, Sheet 4d, as of 12/31/15
- (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 12/31/15  
Tier 1 -- Territory 8 (Galveston County)

Accident Year	Paid Loss Excluding Expense			Total
	Non-Hurricane (1)	Hurricane (2)	Hurricane (3)	
2006	684,266		0	684,266
2007	1,295,331		1,281,713	2,577,044
2008	433,109		1,047,791,683	1,048,224,792
2009	3,441,772		0	3,441,772
2010	1,264,721		0	1,264,721
2011	1,276,276		0	1,276,276
2012	10,609,000		0	10,609,000
2013	54,030,622		0	54,030,622
2014	499,613		0	499,613
2015	16,584,614		0	16,584,614
<b>Total</b>	<b>90,119,324</b>	<b>1,049,073,396</b>		<b>1,139,192,720</b>

Notes:

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

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

Exhibit 2  
Sheet 4b

Summary of TWIA Historical Paid Loss as of 12/31/15  
Tier 1 -- Territory 9 (Nueces County)

Accident Year	<u>Paid Loss Excluding Expense</u>		
	Non-Hurricane (1)	Hurricane (2)	Total (3)
2006	432,666	0	432,666
2007	488,076	0	488,076
2008	480,548	746,099	1,226,647
2009	536,746	0	536,746
2010	3,445,556	187,854	3,633,410
2011	18,949,535	0	18,949,535
2012	20,611,980	0	20,611,980
2013	6,175,709	0	6,175,709
2014	1,617,725	0	1,617,725
2015	8,582,834	0	8,582,834
<b>Total</b>	<b>61,321,375</b>	<b>933,953</b>	<b>62,255,328</b>

Notes:

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

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

Summary of TWIA Historical Paid Loss as of 12/31/15  
Tier 1 -- Territory 10 (Other Tier 1)

Accident Year	Paid Loss Excluding Expense			Total
	Non-Hurricane (1)	Hurricane (2)	(3)	
2006	814,136		0	814,136
2007	3,251,580		4,745,263	7,996,843
2008	1,390,642		626,536,123	627,926,765
2009	1,976,152		0	1,976,152
2010	6,651,650		1,063,585	7,715,235
2011	56,093,207		0	56,093,207
2012	18,834,221		0	18,834,221
2013	4,827,763		0	4,827,763
2014	2,734,986		0	2,734,986
2015	81,781,966		0	81,781,966
Total	178,356,303		632,344,971	810,701,274

Notes:

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

(4) = (2) + (3)

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

Summary of TWIA Historical Paid Loss as of 12/31/15  
 Tier 2 -- (Territories 1 and 11)

Accident Year	Paid Loss Excluding Expense			Total
	(1)	(2)	(3)	
	Non-Hurricane	Hurricane		
2006	31,341	0		31,341
2007	65,115	0		65,115
2008	486,202	36,454,055		36,940,257
2009	551,702	0		551,702
2010	182,872	0		182,872
2011	54,382	0		54,382
2012	259,290	0		259,290
2013	502,759	0		502,759
2014	30,748	0		30,748
2015	301,338	0		301,338
<b>Total</b>	<b>2,465,749</b>	<b>36,454,055</b>		<b>38,919,804</b>

Notes:

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

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

Year / Quarter	Average EPPR		
(1)	(2)		
		(3) Current Average Earned Date	7/1/2015
2007 / 3	1,605.13	(4) Current Average Accident Date	7/1/2015
2008 / 3	1,656.63	(5) Prospective Average Earned / Accident Date	1/1/2018
2009 / 3	1,667.30	(6) Premium Trend Length	2.500
2010 / 3	1,674.89	(7) Loss Trend Length	2.500
2011 / 3	1,643.06	(8) Selected Premium Trend	0.3%
2012 / 3	1,631.12	(9) Selected Loss Trend	2.6%
2013 / 3	1,626.45		
2014 / 3	1,633.56		
2015 / 3	1,657.99		

Accident Year	Current Premium Trend	Current Loss Trend	Prospective Premium Trend	Prospective Loss Trend	Net Trend Factor
(10)	(11)	(12)	(13)	(14)	(15)
2006	1.036	1.209	1.006	1.066	1.237
2007	1.033	1.155	1.006	1.066	1.185
2008	1.033	1.131	1.006	1.066	1.160
2009	1.001	1.110	1.006	1.066	1.175
2010	0.994	1.110	1.006	1.066	1.183
2011	0.990	1.104	1.006	1.066	1.181
2012	1.009	1.083	1.006	1.066	1.137
2013	1.016	1.054	1.006	1.066	1.098
2014	1.019	1.021	1.006	1.066	1.061
2015	1.015	1.000	1.006	1.066	1.044

Notes:

- (2) Exhibit 3, Sheet 2 (9)
- (3) Latest Year / Quarter Ending Date - 6 Months
- (4) Latest Accident Year Ending Date - 6 Months
- (5) Rate Effective Date + 12 Months
- (6) = (5) - (3)
- (7) = (5) - (4)
- (8) Exhibit 3, Sheet 2
- (9) Exhibit 3, Sheet 3a
- (11) = (2) Indexed to 2015 / 3
- (12) Exhibit 3, Sheet 3a
- (13) = [1 + (8)] ^ (6)
- (14) = [1 + (9)] ^ (7)
- (15) = [(12) \* (14)] / [(11) \* (13)]

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

Accident Year	Months of Development									
	15 (1)	27 (2)	39 (3)	51 (4)	63 (5)	75 (6)	87 (7)	99 (8)	111 (9)	111 (10)
2006		49,335	53,120	53,492	53,624	53,755	53,820	53,845	53,847	53,851
2007		53,874	59,731	61,175	61,738	61,853	61,978	61,980	61,987	61,991
2008		435,381	557,638	625,922	688,372	756,380	774,976	775,409	776,862	
2009		114,845	136,583	139,262	140,625	140,941	141,037	141,064		
2010		63,706	70,824	72,510	73,282	73,407	73,508			
2011		137,269	154,006	156,583	157,456	157,929				
2012		162,844	196,788	232,373	242,523					
2013		124,050	143,359	151,995						
2014		151,510	178,253							
2015		173,815								

Accident Year	Development Factors									
	15 - 27 (1)	27 - 39 (2)	39 - 51 (3)	51 - 63 (4)	63 - 75 (5)	75 - 87 (6)	87 - 99 (7)	99 - 111 (8)	111 - Ult (9)	111 - Ult (10)
2006		1.077	1.007	1.002	1.002	1.001	1.000	1.000	1.000	
2007		1.109	1.024	1.009	1.002	1.002	1.000	1.000	1.000	
2008		1.281	1.122	1.100	1.099	1.025	1.001	1.002		
2009		1.189	1.020	1.010	1.002	1.001	1.000			
2010		1.112	1.024	1.011	1.002	1.001				
2011		1.122	1.017	1.006	1.003					
2012		1.208	1.181	1.044						
2013		1.156	1.060							
2014		1.177								
Average		1.159	1.057	1.026	1.018	1.006	1.000	1.001	1.000	
Avg 5 Year		1.155	1.060	1.034	1.022	1.006	1.000	1.001	1.000	
Prior		1.152	1.038	1.022	1.019	1.005	1.001	1.000	1.000	1.000
Selected		1.155	1.048	1.024	1.019	1.005	1.000	1.000	1.000	1.000
Cumulative		1.150	1.099	1.049	1.024	1.005	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	Policies In-Force	Annualized		On- Level Factors	Premium at Present Rates		Earned Premium at Present Rates		Exponential Fitted Trends			
		In-Force	Earned Premium		Written Premium	Written	Earned	Annualized	Average	All-Year	5-Year	4-Year
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
2006 / 2	107,426		31,107,333	1.749	54,416,672	37,029,673						
2006 / 3	119,972		40,282,453	1.733	69,818,129	42,945,618						
2006 / 4	131,781		31,080,816	1.697	52,735,485	48,640,728						
2007 / 1	147,831		37,520,115	1.628	61,095,183	55,360,077	183,976,097					
2007 / 2	168,519	134,389	57,350,584	1.628	93,385,760	64,340,769	211,287,193	1,572	1,646			
2007 / 3	192,867	151,138	66,527,259	1.628	108,328,428	74,254,358	242,595,933	1,605	1,646			
2007 / 4	201,251	168,933	42,163,238	1.628	68,655,727	81,437,278	275,392,482	1,630	1,645			
2008 / 1	204,043	184,644	43,831,073	1.542	67,571,171	83,711,832	303,744,238	1,645	1,645			
2008 / 2	207,335	196,522	66,980,792	1.505	100,801,229	85,462,804	324,866,273	1,653	1,645			
2008 / 3	214,272	204,050	77,031,575	1.505	115,926,928	87,423,390	338,035,304	1,657	1,645			
2008 / 4	212,579	208,141	45,077,819	1.505	67,838,845	88,093,396	344,691,423	1,656	1,645			
2009 / 1	212,647	210,633	50,763,638	1.387	70,403,348	88,345,391	349,324,981	1,658	1,645			
2009 / 2	213,310	212,455	78,390,421	1.340	105,050,661	89,157,880	353,020,057	1,662	1,645			
2009 / 3	214,655	213,250	86,983,368	1.340	116,566,032	89,954,219	355,550,885	1,667	1,645			
2009 / 4	214,900	213,588	53,398,560	1.340	71,559,177	90,362,714	357,820,203	1,675	1,645			
2010 / 1	215,154	214,191	51,747,346	1.340	69,346,393	90,596,721	360,071,533	1,681	1,644	1,634		
2010 / 2	218,549	215,160	80,792,227	1.340	108,269,311	90,897,580	361,811,233	1,682	1,644	1,635		
2010 / 3	225,655	217,190	89,415,866	1.340	119,825,812	91,911,547	363,768,561	1,675	1,644	1,635		
2010 / 4	227,923	220,192	56,161,564	1.340	75,261,867	92,749,064	366,154,912	1,663	1,644	1,635		
2011 / 1	228,987	223,549	57,880,211	1.276	73,871,446	93,730,325	369,288,516	1,652	1,644	1,635	1,620	
2011 / 2	230,887	226,821	89,007,580	1.276	113,598,733	94,834,503	373,225,440	1,645	1,644	1,636	1,621	
2011 / 3	237,411	229,833	96,546,975	1.276	123,221,124	96,315,243	377,629,136	1,643	1,644	1,636	1,623	
2011 / 4	241,392	232,986	64,055,335	1.276	81,752,643	97,176,920	382,056,991	1,640	1,644	1,636	1,624	
2012 / 1	244,498	236,608	66,350,322	1.216	80,649,231	98,733,443	387,060,110	1,636	1,644	1,636	1,625	1,611
2012 / 2	243,404	240,112	93,957,382	1.216	114,205,785	100,103,396	392,329,003	1,634	1,643	1,637	1,627	1,614
2012 / 3	252,609	243,576	109,188,970	1.216	132,719,876	101,288,394	397,302,153	1,631	1,643	1,637	1,628	1,617
2012 / 4	252,764	246,897	66,296,611	1.216	80,583,945	102,446,039	402,571,272	1,631	1,643	1,637	1,630	1,619
2013 / 1	252,059	249,264	69,051,453	1.158	79,935,688	102,222,556	406,060,385	1,629	1,643	1,637	1,631	1,622
2013 / 2	251,745	251,252	105,991,687	1.158	122,698,627	102,812,515	408,769,504	1,627	1,643	1,638	1,632	1,625
2013 / 3	252,644	252,299	108,302,997	1.158	125,374,257	102,868,732	410,349,842	1,626	1,643	1,638	1,634	1,627
2013 / 4	256,918	252,822	77,531,453	1.158	89,752,348	103,578,445	411,482,249	1,628	1,643	1,638	1,635	1,630
2014 / 1	256,609	253,910	74,559,339	1.103	82,201,671	104,675,614	413,935,307	1,630	1,643	1,638	1,637	1,633
2014 / 2	252,210	254,537	107,999,495	1.103	119,069,443	105,226,468	416,349,259	1,636	1,642	1,639	1,638	1,635
2014 / 3	258,434	255,319	124,332,077	1.103	137,076,115	103,599,329	417,079,856	1,634	1,642	1,639	1,639	1,638
2014 / 4	262,181	256,701	82,443,007	1.103	90,893,415	106,835,941	420,337,352	1,637	1,642	1,639	1,641	1,641
2015 / 1	263,030	258,161	81,801,817	1.050	85,891,908	107,650,502	423,312,240	1,640	1,642	1,639	1,642	1,644
2015 / 2	261,783	260,160	120,035,667	1.050	126,037,450	108,156,650	426,242,423	1,638	1,642	1,639	1,644	1,646
2015 / 3	261,230	261,707	122,991,322	1.050	129,140,888	111,263,346	433,906,440	1,658	1,642	1,640	1,645	1,649
2015 / 4	260,677	261,868	83,141,040	1.050	87,298,092	107,486,413	434,556,911	1,659	1,642	1,640	1,646	1,652
(14) Average Annual Change									0.0%	0.1%	0.3%	0.7%
(15) Correlation Coefficient									0.3%	24.1%	2.2%	46.1%
(16) Selected Premium Trend												0.3%

Notes: (2) Provided by TWIA (9) = (8) / (3)  
(3) Calculated from (2) using uniform quarterly earning assumption (10) - (13) = (9) fitted to an exponential distribution  
(4) Provided by TWIA (14) Fitted average annual change  
(5) Cumulative effect of annual rate changes (15) Evaluates the predictability of the fitted curve  
(6) = (4) \* (5) Indexed to 2013 / 4 (16) Selected based on judgment  
(7) Calculated from (6) using uniform quarterly earning assumption  
(8) = Sum of (7) for prior 4 quarters

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

Calendar Year Ending 9/30/xx	Statewide Boeckh	Coastal Boeckh	Modified CPI	Weighted Average
(1)	(2)	(3)	(4)	(5)
2006	1.244	1.249	1.089	1.209
2007	1.180	1.185	1.066	1.155
2008	1.159	1.158	1.050	1.131
2009	1.133	1.127	1.060	1.110
2010	1.129	1.125	1.064	1.110
2011	1.116	1.121	1.053	1.104
2012	1.092	1.100	1.030	1.083
2013	1.058	1.064	1.023	1.054
2014	1.026	1.024	1.013	1.021
2015	1.000	1.000	1.000	1.000

Factors to Adjust For Prospective Loss Costs

(6) Fitted Trend	2.8%	3.0%	1.2%	2.6%
(7) Cost Factor	1.079	1.085	1.033	1.073

Notes:

- (2) = Exhibit 3, Sheet 3b trended forward to 9/30/2015
- (3) = Exhibit 3, Sheet 3c trended forward to 9/30/2015
- (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 4/1/2015 to 1/1/2018)

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

Loss Trend Analysis  
 Boeckh Residential Construction Index Trend (Statewide)

Calendar Year Ending	Texas Statewide Index	Fitted Trends								
		All Years			5 Years		4 Years		3 Years	
(1)	(2)	Linear	Exponential	Linear	Exponential	Linear	Exponential	Linear	Exponential	(10)
3/31/2006	1803.56	1861.03	1868.18							
6/30/2006	1829.79	1872.28	1878.33							
9/30/2006	1862.05	1883.53	1888.52							
12/31/2006	1896.38	1894.78	1898.77							
3/31/2007	1923.66	1906.03	1909.08							
6/30/2007	1945.15	1917.28	1919.45							
9/30/2007	1962.77	1928.53	1929.87							
12/31/2007	1973.20	1939.78	1940.34							
3/31/2008	1982.41	1951.04	1950.88							
6/30/2008	1990.80	1962.29	1961.47							
9/30/2008	1998.73	1973.54	1972.12							
12/31/2008	2006.58	1984.79	1982.82							
3/31/2009	2017.74	1996.04	1993.59							
6/30/2009	2034.78	2007.29	2004.41							
9/30/2009	2043.22	2018.54	2015.29							
12/31/2009	2046.48	2029.79	2026.23							
3/31/2010	2047.16	2041.05	2037.23							
6/30/2010	2046.06	2052.30	2048.29							
9/30/2010	2050.43	2063.55	2059.41							
12/31/2010	2057.86	2074.80	2070.59							
3/31/2011	2065.01	2086.05	2081.83	2042.00	2045.10					
6/30/2011	2070.12	2097.30	2093.13	2057.04	2059.21					
9/30/2011	2075.68	2108.55	2104.50	2072.09	2073.42					
12/31/2011	2083.08	2119.81	2115.92	2087.13	2087.73					
3/31/2012	2092.60	2131.06	2127.41	2102.17	2102.14	2091.09	2093.01			
6/30/2012	2103.60	2142.31	2138.96	2117.22	2116.65	2107.31	2108.43			
9/30/2012	2121.39	2153.56	2150.57	2132.26	2131.25	2123.54	2123.97			
12/31/2012	2139.89	2164.81	2162.25	2147.30	2145.96	2139.76	2139.62			
3/31/2013	2155.38	2176.06	2173.98	2162.35	2160.77	2155.98	2155.39	2157.58	2158.49	
6/30/2013	2172.48	2187.31	2185.79	2177.39	2175.68	2172.21	2171.27	2173.58	2173.95	
9/30/2013	2188.26	2198.56	2197.65	2192.43	2190.69	2188.43	2187.27	2189.58	2189.51	
12/31/2013	2202.59	2209.82	2209.58	2207.47	2205.81	2204.66	2203.39	2205.58	2205.19	
3/31/2014	2219.60	2221.07	2221.58	2222.52	2221.03	2220.88	2219.63	2221.57	2220.98	
6/30/2014	2238.93	2232.32	2233.64	2237.56	2236.36	2237.11	2235.99	2237.57	2236.89	
9/30/2014	2257.35	2243.57	2245.77	2252.60	2251.79	2253.33	2252.47	2253.57	2252.91	
12/31/2014	2275.49	2254.82	2257.96	2267.65	2267.33	2269.56	2269.07	2269.57	2269.04	
3/31/2015	2293.52	2266.07	2270.22	2282.69	2282.98	2285.78	2285.79	2285.56	2285.29	
6/30/2015	2307.48	2277.32	2282.54	2297.73	2298.73	2302.00	2302.63	2301.56	2301.65	
9/30/2015	2315.94	2288.57	2294.93	2312.78	2314.60	2318.23	2319.60	2317.56	2318.13	
12/31/2015	2319.83	2299.83	2307.39	2327.82	2330.57	2334.45	2336.70	2333.56	2334.73	
Annual Trend		2.0%	2.2%	2.6%	2.8%	2.8%	3.0%	2.7%	2.9%	
R-Squared		0.961	0.960	0.989	0.990	0.996	0.995	0.990	0.989	

Notes:

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

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

Calendar Year Ending	Texas Coastal Index	Fitted Trends		5 Years		4 Years		3 Years		Exponential
		All Years Linear	Exponential	Linear	Exponential	Linear	Exponential	Linear	Exponential	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
3/31/2006	1803.22	1869.24	1876.24							
6/30/2006	1831.27	1880.56	1886.46							
9/30/2006	1865.04	1891.89	1896.73							
12/31/2006	1900.04	1903.22	1907.05							
3/31/2007	1925.97	1914.55	1917.43							
6/30/2007	1947.53	1925.88	1927.87							
9/30/2007	1966.27	1937.20	1938.37							
12/31/2007	1977.64	1948.53	1948.92							
3/31/2008	1991.21	1959.86	1959.53							
6/30/2008	2002.80	1971.19	1970.20							
9/30/2008	2013.23	1982.52	1980.93							
12/31/2008	2024.37	1993.84	1991.71							
3/31/2009	2036.37	2005.17	2002.55							
6/30/2009	2055.55	2016.50	2013.46							
9/30/2009	2068.58	2027.83	2024.42							
12/31/2009	2075.34	2039.16	2035.44							
3/31/2010	2075.01	2050.48	2046.52							
6/30/2010	2072.68	2061.81	2057.66							
9/30/2010	2070.90	2073.14	2068.87							
12/31/2010	2070.54	2084.47	2080.13							
3/31/2011	2073.35	2095.80	2091.45	2039.51	2043.11					
6/30/2011	2074.41	2107.12	2102.84	2055.52	2058.06					
9/30/2011	2078.04	2118.45	2114.29	2071.53	2073.11					
12/31/2011	2083.41	2129.78	2125.80	2087.53	2088.28					
3/31/2012	2089.91	2141.11	2137.37	2103.54	2103.56	2086.55	2088.81			
6/30/2012	2099.29	2152.43	2149.01	2119.55	2118.95	2104.36	2105.67			
9/30/2012	2118.77	2163.76	2160.71	2135.56	2134.45	2122.18	2122.66			
12/31/2012	2139.83	2175.09	2172.47	2151.57	2150.06	2139.99	2139.80			
3/31/2013	2157.69	2186.42	2184.30	2167.57	2165.79	2157.81	2157.07	2159.70	2160.70	
6/30/2013	2175.59	2197.75	2196.19	2183.58	2181.64	2175.62	2174.48	2177.25	2177.62	
9/30/2013	2189.58	2209.07	2208.15	2199.59	2197.60	2193.43	2192.03	2194.80	2194.66	
12/31/2013	2203.33	2220.40	2220.17	2215.60	2213.68	2211.25	2209.72	2212.35	2211.85	
3/31/2014	2227.66	2231.73	2232.26	2231.60	2229.87	2229.06	2227.55	2229.90	2229.16	
6/30/2014	2252.59	2243.06	2244.41	2247.61	2246.19	2246.88	2245.53	2247.45	2246.61	
9/30/2014	2274.95	2254.39	2256.63	2263.62	2262.62	2264.69	2263.66	2265.00	2264.20	
12/31/2014	2296.72	2265.71	2268.91	2279.63	2279.17	2282.50	2281.93	2282.55	2281.92	
3/31/2015	2310.53	2277.04	2281.27	2295.63	2295.85	2300.32	2300.34	2300.10	2299.79	
6/30/2015	2322.48	2288.37	2293.69	2311.64	2312.64	2318.13	2318.91	2317.65	2317.79	
9/30/2015	2330.34	2299.70	2306.17	2327.65	2329.56	2335.95	2337.63	2335.20	2335.94	
12/31/2015	2333.21	2311.03	2318.73	2343.66	2346.61	2353.76	2356.49	2352.75	2354.22	
Annual Trend		2.0%	2.2%	2.7%	3.0%	3.0%	3.3%	3.0%	3.2%	
R-Squared		0.943	0.941	0.978	0.979	0.990	0.990	0.978	0.977	

Notes:  
(2) = Average Index for Corpus Christi and Houston  
(5) - (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

Calendar Year Ending	Modified CPI	Fitted Trends		5 Years		4 Years		3 Years		Exponential
		All Years Linear	Exponential	Linear	Exponential	Linear	Exponential	Linear	Exponential	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
9/30/2005	170.66	173.06	173.17							
12/31/2005	171.45	173.46	173.55							
3/31/2006	171.94	173.86	173.93							
6/30/2006	172.99	174.26	174.32							
9/30/2006	174.54	174.66	174.70							
12/31/2006	175.48	175.06	175.09							
3/31/2007	176.25	175.46	175.48							
6/30/2007	177.33	175.86	175.87							
9/30/2007	178.34	176.26	176.25							
12/31/2007	179.24	176.66	176.64							
3/31/2008	180.31	177.06	177.04							
6/30/2008	180.58	177.46	177.43							
9/30/2008	181.04	177.86	177.82							
12/31/2008	181.06	178.26	178.21							
3/31/2009	180.55	178.66	178.61							
6/30/2009	180.07	179.06	179.00							
9/30/2009	179.30	179.46	179.40							
12/31/2009	178.80	179.86	179.79							
3/31/2010	178.46	180.26	180.19							
6/30/2010	178.56	180.66	180.59							
9/30/2010	178.59	181.06	180.99							
12/31/2010	178.72	181.46	181.39							
3/31/2011	178.97	181.86	181.79	180.02	180.06					
6/30/2011	179.61	182.26	182.19	180.59	180.61					
9/30/2011	180.52	182.66	182.59	181.16	181.17					
12/31/2011	181.55	183.06	183.00	181.73	181.73					
3/31/2012	182.78	183.46	183.40	182.30	182.29	183.14	183.17			
6/30/2012	183.87	183.86	183.81	182.87	182.85	183.62	183.64			
9/30/2012	184.57	184.26	184.21	183.44	183.42	184.11	184.11			
12/31/2012	185.03	184.66	184.62	184.01	183.98	184.59	184.59			
3/31/2013	185.38	185.06	185.03	184.58	184.55	185.07	185.06	184.81	184.82	
6/30/2013	185.51	185.46	185.44	185.15	185.12	185.55	185.54	185.33	185.33	
9/30/2013	185.82	185.86	185.85	185.72	185.69	186.03	186.02	185.84	185.84	
12/31/2013	186.03	186.26	186.26	186.29	186.26	186.51	186.50	186.36	186.36	
3/31/2014	186.43	186.66	186.67	186.86	186.84	187.00	186.98	186.88	186.87	
6/30/2014	186.87	187.06	187.09	187.43	187.42	187.48	187.47	187.39	187.39	
9/30/2014	187.59	187.46	187.50	188.00	187.99	187.96	187.95	187.91	187.90	
12/31/2014	188.62	187.86	187.91	188.57	188.57	188.44	188.43	188.43	188.42	
3/31/2015	189.46	188.26	188.33	189.14	189.16	188.92	188.92	188.94	188.94	
6/30/2015	189.59	188.66	188.75	189.71	189.74	189.40	189.41	189.46	189.46	
9/30/2015	190.03	189.06	189.16	190.28	190.33	189.89	189.90	189.98	189.98	
12/31/2015	190.50	189.46	189.58	190.85	190.91	190.37	190.39	190.50	190.51	
Annual Trend		0.8%	0.9%	1.2%	1.2%	1.0%	1.0%	1.1%	1.1%	
R-Squared		0.890	0.888	0.965	0.962	0.973	0.973	0.965	0.966	

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)
1979	1,423	147	0.103	
1980	12,911	488	0.038	H
1981	2,512	1,318	0.525	
1982	796	543	0.682	
1983	148,999	565	0.004	H
1984	999	9,127	9.136	
1985	512	324	0.633	
1986	881	395	0.448	H
1987	1,897	674	0.355	
1988	1,160	774	0.667	
1989	12,296	1,036	0.084	H
1990	335	2,833	8.457	
1991	1,217	445	0.366	
1992	489	687	1.405	
1993	3,375	839	0.249	
1994	679	1,121	1.651	
1995	2,977	397	0.133	
1996	1,166	925	0.793	
1997	2,964	806	0.272	
1998	22,401	1,704	0.076	
1999	8,773	4,551	0.519	H
2000	6,227	2,433	0.391	
2001	24,605	1,882	0.076	
2002	5,167	2,790	0.540	
2003	155,001	5,526	0.036	H
2004	5,167	4,270	0.826	
2005	154,981	20,229	0.131	H
2006	4,276	1,110	0.260	
2007	15,746	4,941	0.314	H
2008	2,595,925	342,028	0.132	H
2009	10,384	2,213	0.213	
2010	18,194	4,271	0.235	
2011	94,915	14,877	0.157	
2012	66,390	15,143	0.228	
2013	73,006	13,555	0.186	
2014	7,846	6,124	0.781	
2015	159,169	32,477	0.204	
All Years Total	3,625,761	503,568	0.139	
Hurricane Years Total	3,105,513	379,759	0.122	
Non-Hurricane Years				
Total	520,248	123,809	0.238	
10 Year	434,180	89,770	0.207	

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 12/31/15	Development Factor	Indicated Ultimate Loss
(1)	(2)	(3)	(4)
1979			1,423
1980			12,911
1981			2,512
1982			796
1983			148,999
1984			999
1985			512
1986			881
1987			1,897
1988			1,160
1989			12,296
1990			335
1991			1,217
1992			489
1993			3,375
1994			679
1995			2,977
1996			1,166
1997			2,964
1998			22,401
1999			8,773
2000			6,227
2001			24,605
2002			5,167
2003			155,001
2004			5,167
2005			154,981
2006			4,276
2007			15,746
2008			2,595,925
2009	10,384	1.000	10,384
2010	18,267	0.996	18,194
2011	96,263	0.986	94,915
2012	66,724	0.995	66,390
2013	72,860	1.002	73,006
2014	7,854	0.999	7,846
2015	147,927	1.076	159,169

Notes:

- (2) Exhibit 4, Sheet 3
- (3) Exhibit 4, Sheet 3
- (4) 2007 - 2015: (2) \* (3); 1979 - 2006: from prior TWIA annual statements

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

Accident Year	Months of Development							
	12 (1)	24 (2)	36 (3)	48 (4)	60 (5)	72 (6)	84 (7)	(8)
2006		4,471	4,616	4,507	4,279	4,365	4,284	4,276
2007		16,446	15,813	15,537	15,834	15,867	15,750	15,746
2008		1,902,481	1,774,393	2,273,398	2,384,020	2,680,497	2,632,000	2,595,925
2009		8,267	10,825	10,581	10,732	10,453	10,404	10,384
2010		15,215	18,166	18,173	18,522	18,361	18,267	
2011		94,870	96,967	97,503	96,828	96,263		
2012		62,722	69,764	67,287	66,724			
2013		77,204	75,204	72,860				
2014		6,739	7,854					
2015		147,927						

Accident Year	Development Factors							
	12 - 24 (1)	24 - 36 (2)	36 - 48 (3)	48 - 60 (4)	60 - 72 (5)	72 - 84 (6)	84 - Ult (7)	(8)
2006		1.032	0.976	0.949	1.020	0.981	0.998	
2007		0.962	0.983	1.019	1.002	0.993	1.000	
2008		0.933	1.281	1.049	1.124	0.982	0.986	
2009		1.309	0.977	1.014	0.974	0.995	0.998	
2010		1.194	1.000	1.019	0.991	0.995		
2011		1.022	1.006	0.993	0.994			
2012		1.112	0.964	0.992				
2013		0.974	0.969					
2014		1.165						
Average		1.078	1.020	1.005	1.018	0.989	0.996	
Avg x hi / lo		1.066	0.985	1.007	1.002	0.990	0.998	
Avg 3 Year		1.084	0.980	1.001	0.986	0.991	0.995	
Avg 5 Year		1.094	0.983	1.013	1.017	0.989	0.996	
Prior		1.065	1.016	1.010	1.020	0.992	0.998	1.000
Selected		1.077	0.997	1.007	1.009	0.990	0.996	1.000
Cumulative		1.076	0.999	1.002	0.995	0.986	0.996	1.000



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

Accident Year	Incurred ALAE at 12/31/15	Development Factor	Indicated Ultimate ALAE	Incurred ULAE	Incurred LAE
(1)	(2)	(3)	(4)	(5)	(6)
1979					147
1980					488
1981					1,318
1982					543
1983					565
1984					9,127
1985					324
1986					395
1987				270	404
1988				652	122
1989				235	801
1990				2,727	106
1991				119	326
1992				403	284
1993				270	569
1994				806	315
1995				192	205
1996				698	227
1997				355	451
1998				892	812
1999				3,920	631
2000				1,757	676
2001				1,209	673
2002				1,207	1,583
2003				3,643	1,883
2004				3,643	627
2005	15,227	1.000	15,227	5,002	20,229
2006	860	1.000	860	250	1,110
2007	2,489	1.000	2,489	2,452	4,941
2008	97,249	1.000	97,249	244,779	342,028
2009	223	1.000	223	1,990	2,213
2010	324	1.009	327	3,944	4,271
2011	629	0.961	604	14,273	14,877
2012	632	0.957	605	14,538	15,143
2013	715	0.945	676	12,879	13,555
2014	493	0.973	480	5,644	6,124
2015	973	1.119	1,089	31,388	32,477

Notes:

- (2) Exhibit 4, Sheet 5
- (3) Exhibit 4, Sheet 5
- (4) 2005 - 2015: (2) \* (3); 1987 - 2004: from TWIA's annual statements
- (5) From TWIA's annual statements
- (6) 1987 - 2015: (4) + (5); prior years from prior TWIA annual statements

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

Accident Year	<u>Months of Development</u>							
	12 (1)	24 (2)	36 (3)	48 (4)	60 (5)	72 (6)	84 (7)	(8)
2005		12,902	16,742	18,549	16,151	15,253	15,243	15,227
2006		704	891	899	879	867	860	860
2007		2,660	3,107	2,921	2,519	2,497	2,490	2,489
2008		167,316	139,787	106,761	111,632	120,296	92,426	97,249
2009		7,335	359	226	231	223	223	223
2010		391	312	322	316	335	324	
2011		515	592	609	682	629		
2012		516	679	719	632			
2013		802	806	715				
2014		516	493					
2015		973						

Accident Year	<u>Development Factors</u>							
	12 - 24 (1)	24 - 36 (2)	36 - 48 (3)	48 - 60 (4)	60 - 72 (5)	72 - 84 (6)	84 - Ult (7)	(8)
2005		1.298	1.108	0.871	0.944	0.999	0.999	
2006		1.266	1.009	0.978	0.986	0.992	1.000	
2007		1.168	0.940	0.862	0.991	0.997	1.000	
2008		0.835	0.764	1.046	1.078	0.768	1.052	
2009		0.049	0.630	1.022	0.965	1.000	1.000	
2010		0.798	1.032	0.981	1.060	0.967		
2011		1.150	1.029	1.120	0.922			
2012		1.316	1.059	0.879				
2013		1.005	0.887					
2014		0.955						

Average		0.984	0.940	0.970	0.992	0.954	1.010	
Avg x hi / lo		1.059	0.960	0.963	0.990	0.989	1.000	
Avg 3 Year		1.092	0.992	0.993	0.983	0.912	1.017	
Avg 5 Year		1.045	0.927	1.010	1.003	0.945	1.010	
Prior		1.150	1.030	1.000	1.011	0.961	1.004	1.000
Selected		1.150	1.030	0.987	0.996	0.952	1.009	1.000
Cumulative		1.119	0.973	0.945	0.957	0.961	1.009	1.000

Texas Windstorm Insurance Association  
 Residential 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	34.3%	0.122	38.5%
<u>Hurricane Models</u>			
AIR Model	44.5%	0.122	49.9%
RMS Model	39.8%	0.122	44.7%
Average of Models	42.2%	0.122	47.3%

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  
 1965 - 2015 -- Hurricane Years Only

Accident Year	Earned Premium at Current TWIA Rate Level	Incurred Loss Ratio
(1)	(2)	(3)
1968	32,352,963	34.5%
1970	33,003,457	63.0%
1971	32,889,747	69.1%
1980	55,862,175	74.8%
1983	71,735,293	419.7%
1986	91,389,990	10.6%
1989	104,030,471	7.4%
1990	100,637,414	17.1%
1999	176,998,167	9.1%
2003	215,117,367	22.6%
2005	236,824,522	125.3%
2007	366,317,087	5.6%
2008	454,891,821	432.9%
<hr/>		
(4) Simple Average Loss Ratio for Hurricane Years		99.4%
(5) Selected Non-Hurricane Loss Ratio		9.7%
(6) Average Hurricane Loss Ratio for Hurricane Years		89.7%
(7) Historical Hurricane Frequency		
(a) 51-Year (1/1/1965 - 12/31/2015)		0.275 (1 Hurricane Every 3.6 years)
(a) 165-Year (1/1/1851 - 12/31/2015)		0.382 (1 Hurricane Every 2.6 years)
Selected Frequency		0.382 (1 Hurricane Every 2.6 years)
(8) Indicated Hurricane Loss Ratio		34.3%

Notes:

- (2) Exhibit 6, Sheet 2. Accident years ending 9/30/xx
- (3) Exhibit 6, Sheet 2. Accident years ending 9/30/xx
- (4) = Average of (3)
- (5) Exhibit 6, Sheet 2
- (6) = (4) - (5)
- (7) Exhibit 9
- (8) = (6) \* (7) Selected

Texas Windstorm Insurance Association  
Residential Property - Wind & Hail  
Rate Level Review  
Industry Experience -- Residential Extended Coverage  
1965 - 2015

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)
1965		12,141,513	30,256,650	944,410	3.1%	
1966		13,011,528	32,424,728	1,178,131	3.6%	
1967		13,130,860	32,722,103	663,024	2.0%	
1968		12,982,730	32,352,963	11,171,683	34.5%	H
1969		12,499,176	31,147,947	3,218,757	10.3%	
1970		13,243,763	33,003,457	20,786,468	63.0%	H
1971	10,640,335	13,198,133	32,889,747	22,731,206	69.1%	H
1972	12,302,040	13,902,740	34,645,628	2,242,093	6.5%	
1973	12,935,382	12,724,690	31,709,927	4,933,261	15.6%	
1974	12,794,652	11,637,700	29,001,148	2,293,219	7.9%	
1975	13,633,616	12,392,309	30,881,634	3,062,897	9.9%	
1976	17,088,846	13,884,831	34,600,999	1,522,489	4.4%	
1977	23,643,216	17,474,220	43,545,756	972,383	2.2%	
1978	28,157,329	19,320,941	48,147,785	1,449,823	3.0%	
1979	32,867,536	21,563,567	53,736,409	3,940,899	7.3%	
1980	32,179,994	22,416,603	55,862,175		74.8%	H
1981	30,817,037	29,693,419	73,996,000		3.2%	
1982	28,140,159	32,398,474	80,736,997		2.3%	
1983	28,786,234	39,817,626	71,735,293		419.7%	H
1984	20,078,668	34,626,400	50,036,041		13.5%	
1985	30,043,452	53,801,222	74,868,282		5.7%	
1986	36,673,352		91,389,990		10.6%	
1987	41,598,709		103,663,983		2.6%	
1988	45,044,392		112,250,622		11.1%	
1989	41,745,774		104,030,471		7.4%	H
1990	40,384,195		100,637,414		17.1%	H
1991	46,237,137		115,222,945		76.3%	
1992	44,512,572		110,925,332		6.8%	
1993	50,741,120		126,446,871		10.6%	
1994	57,584,585		143,500,786		5.3%	
1995	60,740,049		151,364,204		7.3%	
1996	71,865,572		179,089,006		3.7%	
1997	79,154,547		197,253,131		4.7%	
1998	80,238,260		199,953,742		20.6%	
1999	71,026,552		176,998,167		9.1%	H
2000	75,114,174		187,184,521		5.5%	
2001	74,726,401		155,881,082		7.2%	
2002	86,289,350		165,438,639		17.8%	
2003	112,200,741		215,117,367		22.6%	H
2004	123,050,217		224,959,088		1.8%	
2005	135,380,924		236,824,522		125.3%	H
2006	154,699,767		269,969,890		2.2%	
2007	219,914,305		366,317,087		5.6%	H
2008	289,558,186		454,891,821		432.9%	H
2009	327,305,758		467,175,914		1.9%	
2010	355,219,215		476,156,421		4.1%	
2011	370,875,863		484,864,298		20.4%	
2012	406,981,851		506,740,068		14.1%	
2013	440,952,159		522,962,964		16.7%	
2014	477,983,216		540,001,733		2.3%	
2015	517,316,267		556,714,178		25.1%	
Total / Average	4,751,907,439	425,862,445	8,682,227,927		32.6%	
Average of Non-Hurricane Years Selected					9.7%	
					9.7%	

Notes: (2), (3) Provided by TDI. Accident years ending 9/30/xx as of 12/31/2015  
(4) 1981 - 2005: Sum of Exhibit 6, Sheet 4 - Sheet 7, (4); 1972 - 1980: (3) \* 2.5  
(5) Provided by TDI. Accident years ending 9/30/xx as of 12/31/2015  
(6) 1981 - 2005: Exhibit 6, Sheet 3; 1965 - 1980: (5) / (4)  
(7) "H" indicates occurrence of hurricane(s) during the time period (years ending 9/30/xx)

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

Accident Year	Loss Ratios by Territory / Tier				Weighted Loss Ratio
	Territory 8	Territory 9	Territory 10	Tier 2	
(1)	(2)	(3)	(4)	(5)	(6)
1983	1105.0%	6.5%	149.6%	152.5%	419.7%
1984	3.3%	6.1%	21.8%	34.8%	13.5%
1985	1.8%	7.5%	7.3%	11.6%	5.7%
1986	1.1%	2.6%	19.2%	12.7%	10.6%
1987	0.6%	3.7%	3.3%	6.7%	2.6%
1988	5.1%	6.3%	16.6%	6.7%	11.1%
1989	5.7%	6.0%	8.7%	16.1%	7.4%
1990	30.3%	10.9%	11.1%	22.4%	17.1%
1991	61.4%	13.5%	108.7%	16.2%	76.3%
1992	1.2%	12.0%	8.1%	18.4%	6.8%
1993	13.1%	11.6%	8.4%	22.5%	10.6%
1994	2.4%	6.0%	6.7%	8.0%	5.3%
1995	3.0%	9.0%	9.0%	23.6%	7.3%
1996	1.4%	5.0%	4.6%	9.5%	3.7%
1997	1.8%	4.2%	6.6%	8.0%	4.7%
1998	18.5%	10.4%	25.6%	9.8%	20.6%
1999	2.1%	17.9%	10.2%	10.2%	9.1%
2000	0.8%	2.3%	9.3%	10.5%	5.5%
2001	5.3%	7.5%	7.7%	34.3%	7.2%
2002	25.6%	6.1%	17.3%	11.1%	17.8%
2003	5.4%	8.6%	38.3%	10.8%	22.6%
2004	1.3%	2.0%	2.0%	4.1%	1.8%
2005	53.7%	2.9%	213.8%	39.0%	125.3%
2006	1.1%	1.8%	2.9%	5.1%	2.2%
2007	2.8%	1.7%	8.7%	5.2%	5.6%
2008	729.4%	2.3%	401.4%	438.9%	432.9%
2009	3.0%	0.9%	1.4%	9.9%	1.9%
2010	1.2%	5.9%	5.0%	11.5%	4.1%
2011	1.1%	28.4%	29.8%	6.3%	20.4%
2012	8.7%	30.4%	10.0%	88.3%	14.1%
2013	42.8%	9.6%	3.0%	20.4%	16.7%
2014	0.5%	2.6%	2.9%	17.5%	2.3%
2015	12.9%	11.8%	37.1%	30.9%	25.1%
Average	65.3%	8.0%	36.9%	34.3%	40.5%

TWIA 2015 Written Premium by Territory / Tier

	Territory 8	Territory 9	Territory 10	Tier 2	Total
(7) Amount	124,989,045	71,387,041	204,336,580	4,426,182	405,138,848
(8) % Share	30.9%	17.6%	50.4%	1.1%	100.0%

Notes:

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

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

Accident Year	Earned Premium	Factor to TWIA Rate Level	Earned Premium at Current TWIA Rate Level	Incurred Loss	Incurred Loss Ratio
(1)	(2)	(3)	(4)	(5)	(6)
1983	4,317,605	2.492	10,759,472	118,889,570	1105.0%
1984	3,512,853	2.492	8,754,030	292,543	3.3%
1985	6,066,870	2.492	15,118,640	265,705	1.8%
1986	6,846,710	2.492	17,062,001	187,218	1.1%
1987	7,738,740	2.492	19,284,940	111,242	0.6%
1988	8,043,378	2.492	20,044,098	1,026,666	5.1%
1989	8,149,957	2.492	20,309,693	1,163,813	5.7%
1990	7,816,199	2.492	19,477,968	5,908,943	30.3%
1991	8,645,208	2.492	21,543,858	13,225,287	61.4%
1992	5,826,467	2.492	14,519,556	180,484	1.2%
1993	5,825,916	2.492	14,518,183	1,900,088	13.1%
1994	6,996,874	2.492	17,436,210	420,038	2.4%
1995	8,737,576	2.492	21,774,039	644,169	3.0%
1996	11,652,672	2.492	29,038,459	406,004	1.4%
1997	12,573,252	2.492	31,332,544	573,343	1.8%
1998	13,838,930	2.492	34,486,614	6,371,206	18.5%
1999	14,103,814	2.492	35,146,704	742,130	2.1%
2000	15,784,218	2.492	39,334,271	324,948	0.8%
2001	17,776,666	2.086	37,082,556	1,947,817	5.3%
2002	20,514,469	1.917	39,331,457	10,059,284	25.6%
2003	25,868,450	1.917	49,596,400	2,672,918	5.4%
2004	30,357,860	1.828	55,499,914	731,759	1.3%
2005	36,780,457	1.749	64,340,779	34,527,644	53.7%
2006	43,562,211	1.745	76,021,351	813,430	1.1%
2007	59,282,257	1.666	98,748,027	2,757,645	2.8%
2008	73,789,694	1.571	115,922,567	845,578,067	729.4%
2009	81,999,709	1.427	117,041,293	3,567,563	3.0%
2010	89,665,314	1.340	120,192,583	1,451,547	1.2%
2011	93,230,854	1.307	121,885,291	1,328,761	1.1%
2012	99,629,727	1.245	124,050,678	10,755,770	8.7%
2013	107,104,250	1.186	127,024,111	54,341,825	42.8%
2014	114,784,032	1.130	129,677,307	705,697	0.5%
2015	122,773,982	1.076	132,124,236	17,028,580	12.9%
<b>Total</b>	<b>1,173,597,171</b>		<b>1,798,479,830</b>	<b>1,140,901,704</b>	<b>63.4%</b>

Notes:

- (2) Provided by TDI. Accident years ending 1/0/xx as of 1/0/1900
- (3) 1998 and prior judgementally selected; 1999 - 2012 based on TWIA on-level factors
- (4) = (2) \* (3)
- (5) Provided by TDI. Accident years ending 1/0/xx as of 1/0/1900
- (6) = (5) / (4)

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

Accident Year	Earned Premium	Factor to TWIA Rate Level	Earned Premium at Current TWIA Rate Level	Incurred Loss	Incurred Loss Ratio
(1)	(2)	(3)	(4)	(5)	(6)
1983	2,331,938	2.492	5,811,189	377,010	6.5%
1984	1,632,317	2.492	4,067,734	249,086	6.1%
1985	2,505,564	2.492	6,243,865	467,721	7.5%
1986	2,977,992	2.492	7,421,156	189,449	2.6%
1987	3,639,667	2.492	9,070,050	335,212	3.7%
1988	3,971,251	2.492	9,896,357	626,491	6.3%
1989	3,702,536	2.492	9,226,720	550,215	6.0%
1990	3,519,306	2.492	8,770,111	955,271	10.9%
1991	4,065,190	2.492	10,130,453	1,367,254	13.5%
1992	3,907,712	2.492	9,738,018	1,170,578	12.0%
1993	4,552,395	2.492	11,344,568	1,312,776	11.6%
1994	5,710,806	2.492	14,231,329	856,369	6.0%
1995	6,908,552	2.492	17,216,112	1,552,987	9.0%
1996	8,568,168	2.492	21,351,875	1,061,115	5.0%
1997	8,425,344	2.492	20,995,957	882,561	4.2%
1998	8,803,621	2.492	21,938,624	2,289,890	10.4%
1999	8,465,256	2.492	21,095,418	3,778,386	17.9%
2000	8,437,094	2.492	21,025,238	485,581	2.3%
2001	8,894,552	2.086	18,554,251	1,394,445	7.5%
2002	10,534,795	1.917	20,197,882	1,227,528	6.1%
2003	13,881,847	1.917	26,615,033	2,295,803	8.6%
2004	15,458,506	1.828	28,261,075	569,877	2.0%
2005	17,471,646	1.749	30,563,495	872,451	2.9%
2006	19,888,512	1.745	34,707,870	621,501	1.8%
2007	29,704,042	1.666	49,478,810	833,793	1.7%
2008	40,565,108	1.571	63,727,212	1,468,028	2.3%
2009	46,363,445	1.427	66,176,302	615,469	0.9%
2010	51,529,115	1.340	69,072,612	4,059,049	5.9%
2011	52,931,755	1.307	69,200,293	19,683,778	28.4%
2012	56,334,273	1.245	70,142,768	21,319,045	30.4%
2013	60,101,696	1.186	71,279,753	6,853,103	9.6%
2014	65,642,137	1.130	74,159,231	1,912,302	2.6%
2015	72,122,054	1.076	77,614,745	9,135,472	11.8%
<b>Total</b>	<b>653,548,192</b>		<b>999,326,106</b>	<b>91,369,596</b>	<b>9.1%</b>

Notes:

- (2) Provided by TDI. Accident years ending 9/30/xx as of 12/31/2015
- (3) 1998 and prior judgementally selected; 1999 - 2012 based on TWIA on-level factors
- (4) = (2) \* (3)
- (5) Provided by TDI. Accident years ending 9/30/xx as of 12/31/2015
- (6) = (5) / (4)



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

Accident Year	Earned Premium	Factor to TWIA Rate Level	Earned Premium at Current TWIA Rate Level	Incurred Loss	Incurred Loss Ratio
(1)	(2)	(3)	(4)	(5)	(6)
1983	5,888,781	2.492	14,674,842	21,953,626	149.6%
1984	3,924,651	2.492	9,780,230	2,135,063	21.8%
1985	5,808,825	2.492	14,475,592	1,055,065	7.3%
1986	6,993,722	2.492	17,428,355	3,338,312	19.2%
1987	7,677,374	2.492	19,132,016	634,637	3.3%
1988	8,284,768	2.492	20,645,642	3,434,130	16.6%
1989	7,733,295	2.492	19,271,371	1,670,422	8.7%
1990	7,568,146	2.492	18,859,820	2,095,151	11.1%
1991	8,287,605	2.492	20,652,712	22,444,044	108.7%
1992	8,059,407	2.492	20,084,042	1,625,108	8.1%
1993	8,448,603	2.492	21,053,919	1,776,572	8.4%
1994	9,743,293	2.492	24,280,286	1,637,915	6.7%
1995	10,745,995	2.492	26,779,020	2,416,675	9.0%
1996	13,294,968	2.492	33,131,060	1,520,229	4.6%
1997	15,708,220	2.492	39,144,884	2,569,544	6.6%
1998	16,168,136	2.492	40,290,995	10,312,506	25.6%
1999	14,452,667	2.492	36,016,046	3,655,754	10.2%
2000	14,453,385	2.492	36,017,835	3,332,580	9.3%
2001	15,173,521	2.086	31,652,332	2,426,814	7.7%
2002	17,843,905	1.917	34,211,306	5,925,066	17.3%
2003	23,423,208	1.917	44,908,249	17,213,668	38.3%
2004	27,306,202	1.828	49,920,906	990,613	2.0%
2005	31,012,304	1.749	54,250,435	115,989,785	213.8%
2006	36,545,725	1.745	63,776,730	1,842,548	2.9%
2007	69,945,120	1.666	116,509,440	10,105,722	8.7%
2008	110,187,567	1.571	173,103,112	694,898,619	401.4%
2009	128,275,387	1.427	183,092,322	2,519,648	1.4%
2010	143,236,007	1.340	192,001,844	9,644,035	5.0%
2011	151,387,931	1.307	197,916,905	59,042,393	29.8%
2012	170,159,709	1.245	211,868,766	21,170,924	10.0%
2013	183,495,510	1.186	217,623,055	6,585,528	3.0%
2014	197,640,983	1.130	223,284,981	6,409,302	2.9%
2015	212,299,032	1.076	228,467,358	84,683,737	37.1%
<b>Total</b>	<b>1,478,874,920</b>		<b>2,454,306,410</b>	<b>1,127,055,735</b>	<b>45.9%</b>

Notes:

- (2) Provided by TDI. Accident years ending 9/30/xx as of 12/31/2015
- (3) 1998 and prior judgementally selected; 1999 - 2012 based on TWIA on-level factors
- (4) = (2) \* (3)
- (5) Provided by TDI. Accident years ending 9/30/xx as of 12/31/2015
- (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	Eamed Premium	Factor to TWIA Rate Level	Earned Premium at Current TWIA Rate Level	Incurred Loss	Incurred Loss Ratio
(1)	(2)	(3)	(4)	(5)	(6)
1983	16,247,909	2.492	40,489,789	61,752,490	152.5%
1984	11,008,847	2.492	27,434,047	9,535,536	34.8%
1985	15,662,193	2.492	39,030,185	4,532,749	11.6%
1986	19,854,927	2.492	49,478,478	6,306,903	12.7%
1987	22,542,928	2.492	56,176,977	3,739,010	6.7%
1988	24,744,994	2.492	61,664,525	4,139,098	6.7%
1989	22,159,987	2.492	55,222,688	8,884,751	16.1%
1990	21,480,544	2.492	53,529,516	11,997,188	22.4%
1991	25,239,134	2.492	62,895,922	10,178,608	16.2%
1992	26,718,987	2.492	66,583,716	12,221,034	18.4%
1993	31,914,206	2.492	79,530,201	17,910,197	22.5%
1994	35,133,612	2.492	87,552,961	6,968,697	8.0%
1995	34,347,927	2.492	85,595,034	20,240,594	23.6%
1996	38,349,764	2.492	95,567,612	9,046,495	9.5%
1997	42,447,731	2.492	105,779,746	8,514,675	8.0%
1998	41,427,572	2.492	103,237,509	10,127,907	9.8%
1999	34,004,815	2.492	84,739,999	8,680,187	10.2%
2000	36,439,477	2.492	90,807,177	9,518,422	10.5%
2001	32,881,662	2.086	68,591,943	23,547,404	34.3%
2002	37,396,181	1.917	71,697,994	7,950,367	11.1%
2003	49,027,236	1.917	93,997,685	10,177,909	10.8%
2004	49,927,649	1.828	91,277,193	3,738,542	4.1%
2005	50,116,517	1.749	87,669,812	34,201,898	39.0%
2006	54,703,319	1.745	95,463,938	4,909,932	5.1%
2007	60,982,886	1.666	101,580,810	5,242,698	5.2%
2008	65,015,817	1.571	102,138,930	448,338,326	438.9%
2009	70,667,217	1.427	100,865,997	9,959,665	9.9%
2010	70,788,779	1.340	94,889,382	10,866,315	11.5%
2011	73,325,323	1.307	95,861,809	6,057,368	6.3%
2012	80,858,142	1.245	100,677,857	88,924,880	88.3%
2013	90,250,703	1.186	107,036,045	21,873,435	20.4%
2014	99,916,064	1.130	112,880,214	19,742,217	17.5%
2015	110,121,199	1.076	118,507,839	36,580,903	30.9%
<b>Total</b>	<b>1,495,704,248</b>		<b>2,688,453,528</b>	<b>956,406,400</b>	<b>35.6%</b>

Notes:

- (2) Provided by TDI. Accident years ending 9/30/xx as of 12/31/2015
- (3) 1998 and prior judgementally selected; 1999 - 2012 based on TWIA on-level factors
- (4) = (2) \* (3)
- (5) Provided by TDI. Accident years ending 9/30/xx as of 12/31/2015
- (6) = (5) / (4)

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

County	TWIA Insured Values (000s) as of 12/31/15	Modeled Loss Cost	Expected Annual Hurricane Loss
(1)	(2)	(3)	(4)
Aransas	2,212,429	2.748	6,079,755
Brazoria	15,749,328	1.540	24,253,965
Calhoun	971,845	3.269	3,176,961
Cameron	3,836,656	1.441	5,528,621
Chambers	2,134,920	1.611	3,439,356
Galveston	23,177,412	3.685	85,408,763
Harris	1,180,761	4.324	5,105,611
Jefferson	9,198,131	1.929	17,743,195
Kenedy	6,765	1.124	7,604
Kleberg	264,457	1.053	278,473
Matagorda	1,292,189	2.726	3,522,507
Nueces	13,372,285	2.515	33,631,297
Refugio	93,075	1.669	155,342
San Patricio	2,413,752	1.957	4,723,713
Willacy	117,742	1.786	210,287
<b>Total</b>	<b>76,021,747</b>	<b>2.542</b>	<b>193,265,450</b>
(5) 2015 Earned Premium at Present Rates			434,556,911
(6) Indicated Hurricane Loss Ratio			44.5%

Notes:

- (2) Provided by TWIA
- (3) Exhibit 7, Sheet 2
- (4) = (2) \* (3)
- (5) Exhibit 10, Sheet 2
- (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 12/31/15	Average Annual Modeled Loss	Provision for Storm Surge	Modeled Loss Cost
(1)	(2)	(3)	(4)	(5)
Aransas	2,212,429	6,056,158	1.004	2.748
Brazoria	15,749,328	24,158,706	1.004	1.540
Calhoun	971,845	3,164,346	1.004	3.269
Cameron	3,836,656	5,505,281	1.004	1.441
Chambers	2,134,920	3,424,942	1.004	1.611
Galveston	23,177,412	85,059,526	1.004	3.685
Harris	1,180,761	5,085,589	1.004	4.324
Jefferson	9,198,131	17,673,158	1.004	1.929
Kenedy	6,765	7,574	1.004	1.124
Kleberg	264,457	277,426	1.004	1.053
Matagorda	1,292,189	3,508,383	1.004	2.726
Nueces	13,372,285	33,496,629	1.004	2.515
Refugio	93,075	154,715	1.004	1.669
San Patricio	2,413,752	4,705,456	1.004	1.957
Willacy	117,742	209,418	1.004	1.786
<b>Total</b>	<b>76,021,747</b>	<b>192,487,307</b>	<b>1.004</b>	<b>2.542</b>

Notes:

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

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

County	TWIA Insured Values (000s) as of 12/31/15	Modeled Loss Cost	Expected Annual Hurricane Loss
(1)	(2)	(3)	(4)
Aransas	2,204,381	2.596	5,722,573
Brazoria	15,715,040	1.608	25,269,784
Calhoun	970,656	3.883	3,769,057
Cameron	3,836,833	1.829	7,017,568
Chambers	2,114,748	1.650	3,489,334
Galveston	23,195,999	2.987	69,286,449
Harris	1,214,333	3.004	3,647,856
Jefferson	9,202,466	1.912	17,595,115
Kenedy	6,706	2.488	16,685
Kleberg	264,457	1.569	414,933
Matagorda	1,290,089	2.839	3,662,563
Nueces	13,362,825	2.081	27,808,039
Refugio	94,331	2.374	223,942
San Patricio	2,431,261	1.989	4,835,778
Willacy	117,624	2.442	287,238
<b>Total</b>	<b>76,021,749</b>	<b>2.276</b>	<b>173,046,914</b>
(5) 2015 Earned Premium at Present Rates			434,556,911
(6) Indicated Hurricane Loss Ratio			39.8%

Notes:

- (2) Provided by TWIA
- (3) Exhibit 8, Sheet 2
- (4) = (2) \* (3)
- (5) Exhibit 10, Sheet 2
- (6) = (4) Total / (5)

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

Exhibit 8  
Sheet 2

County	TWIA Insured Values (000s) as of 12/31/15	Average Annual Modeled Loss	Provision for Storm Surge	Modeled Loss Cost
(1)	(2)	(3)	(4)	(5)
Aransas	2,204,381	5,621,455	1.018	2.596
Brazoria	15,715,040	24,827,956	1.018	1.608
Calhoun	970,656	3,702,682	1.018	3.883
Cameron	3,836,833	6,892,924	1.018	1.829
Chambers	2,114,748	3,428,507	1.018	1.650
Galveston	23,195,999	68,064,168	1.018	2.987
Harris	1,214,333	3,583,922	1.018	3.004
Jefferson	9,202,466	17,286,198	1.018	1.912
Kenedy	6,706	16,391	1.018	2.488
Kleberg	264,457	407,595	1.018	1.569
Matagorda	1,290,089	3,597,309	1.018	2.839
Nueces	13,362,825	27,318,111	1.018	2.081
Refugio	94,331	219,943	1.018	2.374
San Patricio	2,431,261	4,751,050	1.018	1.989
Willacy	117,624	282,186	1.018	2.442
<b>Total</b>	<b>76,021,749</b>	<b>170,000,397</b>	<b>1.018</b>	<b>2.276</b>

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 - 2015

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

Frequency	Date Period	Hurricanes	Period	Annual Frequency
51-Year	1/1/1965 - 12/31/2015	14	51	0.275
165-Year	1/1/1851 - 12/31/2015	63	165	0.382

Notes:

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

Texas Windstorm Insurance Association  
Residential Property - Wind & Hail

Rate Level Review

Calculation of TWIA Earned Premium at Present Rate Level

Tier 1 -- Territory 8 (Galveston County)

Year	TWIA Earned Premium	Factor to Current Rate Level	Earned Premium at Current Rate Level
(1)	(2)	(3)	(4)
2006	42,490,967	1.745	74,151,900
2007	58,103,369	1.666	96,784,322
2008	72,541,071	1.571	113,960,998
2009	80,844,468	1.427	115,392,373
2010	88,599,807	1.340	118,764,316
2011	92,287,441	1.307	120,651,921
2012	98,605,959	1.245	122,775,967
2013	105,941,027	1.186	125,644,545
2014	113,521,698	1.130	128,251,185
2015	121,221,015	1.076	130,452,998
Total	874,156,822		1,146,830,525

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)
2006	16,472,936	1.745	28,747,275
2007	26,688,989	1.666	44,456,556
2008	38,200,787	1.571	60,012,897
2009	43,977,111	1.427	62,770,197
2010	49,048,919	1.340	65,748,013
2011	50,547,302	1.307	66,082,980
2012	53,841,760	1.245	67,039,297
2013	57,427,564	1.186	68,108,271
2014	62,828,148	1.130	70,980,126
2015	68,716,114	1.076	73,949,414
<b>Total</b>	<b>467,749,630</b>		<b>607,895,026</b>

Notes:

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

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

Exhibit 10  
 Sheet 1c

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)
2006	25,684,373	1.745	44,822,351
2007	57,705,210	1.666	96,121,098
2008	98,017,773	1.571	153,984,538
2009	116,551,972	1.427	166,359,047
2010	131,679,293	1.340	176,510,555
2011	140,621,661	1.307	183,841,629
2012	160,031,435	1.245	199,257,879
2013	173,209,952	1.186	205,424,530
2014	187,152,484	1.130	211,435,595
2015	200,595,693	1.076	215,872,714
<b>Total</b>	<b>1,291,249,846</b>		<b>1,653,629,936</b>

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)
2006	1,164,136	1.745	2,031,559
2007	1,579,121	1.666	2,630,384
2008	1,913,655	1.571	3,006,325
2009	2,218,368	1.427	3,166,361
2010	2,562,327	1.340	3,434,692
2011	2,825,372	1.307	3,693,748
2012	3,294,072	1.245	4,101,505
2013	3,672,814	1.186	4,355,905
2014	3,920,276	1.130	4,428,933
2015	4,202,726	1.076	4,522,798
<b>Total</b>	<b>27,352,867</b>		<b>35,372,210</b>

Notes:

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

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

Year	Earned Premium at Current Manual Rates	Factor to Current Rate Level	Earned Premium at Current Rate Level
(1)	(2)	(3)	(4)
2006	93,584,144	1.745	163,315,701
2007	165,328,751	1.666	275,392,482
2008	219,410,898	1.571	344,691,423
2009	250,690,606	1.427	357,820,203
2010	273,156,582	1.340	366,154,912
2011	292,237,884	1.307	382,056,991
2012	323,320,005	1.245	402,571,272
2013	346,953,797	1.186	411,482,249
2014	372,062,138	1.130	420,337,352
2015	403,803,905	1.076	434,556,911
<b>Total</b>	<b>2,740,548,710</b>		<b>3,558,379,496</b>

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	2013	2014	2015	Selected
(1) Direct Written Premium	\$472,739,474	\$494,036,010	\$503,824,316	
(2) Direct Earned Premium	456,629,705	484,048,868	501,721,842	
(3) Commission				
\$ Amount	75,609,038	79,013,534	80,599,761	
% 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	\$24,108,302	\$26,497,842	\$27,800,836	
Adjustments				
Contribution to Statutory Fund	0	0	0	
Adjusted \$ Amount	24,108,302	26,497,842	27,800,836	
% of DWP	5.1%	5.4%	5.5%	5.3%
(6) Taxes, Licenses & Fees				
\$ Amount	\$9,329,687	\$9,640,039	\$9,828,083	
% of DWP	2.0%	2.0%	2.0%	2.0%
(7) Reinsurance Expense				16.2%
(8) Total Fixed Expenses				21.5%
(9) Total Variable Expenses				18.0%
(10) CRTF Contribution				5.2%
Class 1 Public Security Repayment				14.8%
Total Funding Contribution				20.0%
(11) Variable Permissible Loss & LAE Ratio				62.0%

Notes:

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

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

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(1) 2016 - 2017 Reinsurance Premium	121,302,185
(2a) Average Annual Loss by Reinsurance Layer (AIR) 100% of \$2200M XS \$2700M	34,810,000
Total	34,810,000
(2b) Average Annual Loss by Reinsurance Layer (RMS) 100% of \$2200M XS \$2700M	26,380,000
Total	26,380,000
(2c) Selected Total Average Annual Loss	30,595,000
(3) Annual Exposure Growth	0.0%
(4) Prospective Average Annual Loss	30,595,000
(5) Net Cost of Reinsurance	87,647,685
(6) TWIA 2015 Earned Premium at Present Rates	544,040,899
(7) 2016 - 2017 TWIA Prospective Earned Premium at Present Rates	542,277,861
(8) Indicated Reinsurance Expense %	16.2%

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Notes:

- (1) From TWIA reinsurance contract effective 6/1/2016 through 5/31/2017
- (2a) Provided by Guy Carpenter, based on AIR model using TWIA exposures as of 12/31/2015 and adjusted for ALAE
- (2b) Provided by Guy Carpenter, based on RMS model using TWIA exposures as of 12/31/2015 and adjusted for ALAE
- (2c) Selected equal to the average of the modeled average annual losses
- (3) Selected based on projections communicated to reinsurers
- (4) = Sum of (2a) \* [(3) ^ 0.667]
- (5) = (1) - (4)
- (6) = Commercial Exhibit 10, Sheet 1 + Residential Exhibit 10, Sheet 2, calendar year ending 12/31/xx
- (7) = (6) adjusted for premium trend \* [(3) ^ 1.167] (projected premium growth from 7/1/2015 to 9/1/2016)
- (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	
	Commercial	Residential	Total	Written Premium	Difference
(1)	(2)	(3)	(4)	(5)	(6)
1993	9,185,541	10,130,170	19,315,711	19,376,959	(61,248)
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	98,037,185	232,921,259	330,958,444	331,057,645	(99,201)
2009	111,269,480	269,535,987	380,805,467	382,342,402	(1,536,935)
2010	102,171,553	278,117,003	380,288,556	385,549,582	(5,261,026)
2011	100,011,848	307,490,101	407,501,949	403,748,164	3,753,785
2012	110,524,395	335,793,285	446,317,679	443,479,701	2,837,978
2013	113,035,972	360,877,590	473,913,562	472,739,474	1,174,088
2014	104,642,691	389,333,918	493,976,609	494,036,010	(59,401)
2015	98,715,934	407,969,846	506,685,780	503,824,316	2,861,464
<b>Total</b>	<b>1,279,923,052</b>	<b>3,378,496,592</b>	<b>4,658,419,643</b>	<b>4,658,780,449</b>	<b>(360,806)</b>

Notes:

- (2), (3) Provided by TWIA, as of 12/31/2015
- (4) = (2) + (3)
- (5) Based on TWIA Annual Statements
- (6) = (4) - (5)

Texas Windstorm Insurance Association  
Commercial and Residential Property - Wind & Hail  
Rate Level Review  
Analysis of Current and Proposed Net Premium Income

Exhibit 13

Premiums and Rate Components	TWIA Indications at Current / Proposed Rates		
	Commercial	Residential	Total
(1) 2017 Written Premium	107,808,048	401,044,392	508,852,440
(2) 2017 Earned Premium	114,885,402	391,616,050	506,501,453
(3) Non-Hurricane Loss & LAE Ratio	8.7%	13.9%	12.7%
(4) General Expenses	5.3%	5.3%	5.3%
(5) Reinsurance	23.8%	23.8%	23.8%
(6) Commission	16.0%	16.0%	16.0%
(7) Taxes, Licenses, & Fees	2.0%	2.0%	2.0%
(8) Total Non-Catastrophe Expenses	60,813,999	243,480,466	304,294,465
(9) Net Premium Income			202,206,988
<u>Costs for \$500 Million Class 1 Bonds (Issued 2014)</u>			
(10) Net Required Premium			100,380,000
(11) Net Debt Service			80,304,000
<u>Costs as a Percentage of Prospective Earned Premium</u>			
(12) Net Required Premium			19.8%
(13) Net Debt Service			15.9%

Notes:

- (1) from financial projections
- (2) from financial projections
- (3) Exhibit 2, Sheet 1
- (4) Exhibit 11, Sheet 1 (5)
- (5) Exhibit 11, Sheet 1 (7)
- (6) Exhibit 11, Sheet 1 (3)
- (7) Exhibit 11, Sheet 1 (6)
- (8) = (1) \* [(4) + (6) + (7)] + (2) \* (3)
- (9) = (2) - (8)
- (10) from covenants associated with outstanding pre-event Class 1 public securities
- (11) from covenants associated with outstanding pre-event Class 1 public securities
- (12) = (10) / (2)
- (13) = (11) / (2)