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Background

This report is in rebuttal to TWIA's *Response to TWIA Actuarial and Underwriting Committee Open Issues from the October 17, 2019 Committee Meeting dated November 12, 2019.*

Compliance with Texas Law and Actuarial Standards of Practice

TWIA's rate adequacy analysis is not in full compliance with applicable Texas law and actuarial standards of practice. The 2019 rate adequacy analysis information posted on TWIA's website on July 22, 2019 does not satisfy the legislative requirement, because the model "output data" is not "sufficiently detailed to allow the historical experience in this state to be compared to results produced by the model". To compare means "to examine the character, or qualities of, especially in order to discover resemblances or differences".[1]

TWIA's minimal disclosure only included estimated modeled losses. Information was insufficient to "discover resemblances or differences" between modeled losses and the National Oceanographic and Atmospheric Association (NOAA) 169-year history of actual Texas hurricane experience[2].

Furthermore, TWIA failed to disclose why its modeled 2020 hurricane losses were nearly twice as large as estimated losses based upon Texas historical experience (hurricane modeled loss ratio of 51.9% compared to Texas historical experience loss ratio of 27.7%[3]). Failing to provide sufficient data to explain such a large discrepancy between modeled and historical results does not comply with HB 1900 or with Actuarial Standard of Practice 39 (attached).

The NOAA data included Texas hurricane experience by Saffir-Simpson Wind Scale Category (Wind Category) and by landfall location. To satisfy HB 1900, one reasonability check, which could have been easily done if TWIA had provided appropriate model output (for each model it relied upon) would have been to compare the number of modeled hurricanes by Wind Category to actual Texas experience by the same categories.

TWIA only used the NOAA data to estimate Texas long-term historical hurricane frequencies for all Wind Categories combined. TWIA did not compare modeled to actual hurricane frequency by Wind Category for all modeled outputs. If the hurricane models produced more severe storms, more frequent storms or more storms impacting more populated areas, this could explain the much higher losses produced by the models.

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[1] Merriam-Webster dictionary
[2] NOAA Technical Memorandum NWS TPC-59. TWIA used this document in its Analysis.
[3] CWIC revised TWIA Exhibit 1, CWIC rate adequacy analysis of 8-6-19. TWIA's historical hurricane frequencies should have been based on years with one or more hurricanes not the total number of hurricanes.

It is reasonable to expect that 2020 modeled probabilities of hurricanes by Wind Category and by segment of Texas coastline to be comparable to actual experience unless TWIA can reference to credible scientific evidence to the contrary. The following table, based upon NOAA data, shows actual landfalling Texas hurricane experience by Wind Category for the last 169 years.

Landfalling Texas Hurricanes
Actual Historical Experience
1851 to Present

Category at Landfall	Total Years in Historical Period	Number of Actual Hurricanes	Average Number of Years Between Occurrences	Frequency
5		0	n/a	0%
4		8	21	5%
3		12	14	7%
2		19	9	11%
1		23	7	14%
	169	62	3	37%

This table shows that Texas: 1) has on average experienced one landfalling hurricane about every 3 years, 2) hurricane frequency decreases as Wind Category intensity increases and 3) has never experienced a category 5 storm at landfall since 1851.

Because TWIA's hurricane models produced losses significantly greater than Texas historical experience, TWIA should have provided model outputs for each model relied upon to comply with *Actuarial Standard of Practice 39*, *Treatment of Catastrophe Losses in Property Casualty Insurance Ratemaking* (attached): "If … the actuary believes that the available historical insurance data do not sufficiently represent the exposure to catastrophe losses, the actuary should … be satisfied that the resulting ratemaking procedures [using hurricane models] appropriately reflect the expected frequency and severity distribution of catastrophes …".

A second reasonability check, which could have been easily performed, if appropriate data had been provided by TWIA in compliance with HB 1900 and Actuarial Standard of Practice 39, would have been to compare modeled losses for storms of similar intensity, landfall and track to actual hurricane losses (adjusted for inflation, changes in exposure and changes in Texas law) for the following actual recent Texas hurricanes: Harvey (2017), Ike (2008), Gustav (2008), Dolly (2008), Humberto (2007), Rita (2005) and Claudette (2003). It would be reasonable to expect that the modeled losses for these storms would be comparable to adjusted actual experience.

In its November 12, 2019 response (Response), TWIA did compare modeled to actual losses for Hurricanes Ike and Harvey. Modeled losses for Ike matched well with actual losses, however modeled losses for Harvey were far less than actual losses (353 million AIR modeled vs 1.7 billion actual incurred, no RMS modeled results for Hurricane Harvey were provided by TWIA). [4] It is not clear if the AIR modeled results provided by TWIA are net of policyholder deductibles.

Although it is reasonable to expect some deviation from actual losses, such a large discrepancy for Hurricane Harvey does not inspire confidence in the accuracy of the AIR hurricane model. For this reason, it is recommended that comparisons be made for both the AIR and RMS models for all of the above listed recent hurricanes.

A third comparison, which should have been performed to comply with HB 1900 and Actuarial Standard of Practice 39, would have been to compare modeled versus actual hurricane landfalls by segment of Texas coastline. The 367-mile Texas coastline could have been divided into segments corresponding to the average diameter of maximum sustained hurricane winds (usually assumed to be about 45 miles). To determine "resemblances or differences", modeled landfalls by coastal segment could have been compared to actual landfalls for the 169-year history of Texas landfalling hurricanes.

Without disclosure of sufficiently detailed model output data to make the above types of comparisons, TWIA has not demonstrated that its "ratemaking procedures appropriately reflect the expected frequency and severity distribution of catastrophes, as well as anticipated class, [c]overage, geographic, and other relevant exposure distributions as outlined by ASOP 39."[5]

[4] November 12, 2019 Response to TWIA Actuarial and Underwriting Committee Open Issues from the October 17, 2019 Committee Meeting, Appendices C and D

[5] November 12, 2019, Response to TWIA Actuarial and Underwriting Committee Open Issues from the October 17, 2019 Committee Meeting, Page 2

Historical Hurricane Frequencies

The method TWIA uses to calculate its annualized hurricane loss ratio is not at issue. What is at issue is how TWIA calculates its hurricane frequency. The historical hurricane frequency should be calculated on the same basis as the historical loss ratios on TWIA's Exhibit 6, Sheet 1. The historical hurricane year loss ratios in column (3) include all hurricane losses in each hurricane year from one or more hurricanes.

Therefore, TWIA should be determining hurricane frequency on the same basis: counting the number of years with one or more hurricanes instead of the number of hurricanes. TWIA's expected hurricane loss ratio for 2020 of 36.7% (Row (8)) is too high, because TWIA multiplies its selected hurricane frequency (1 hurricane every 2.6 years (Row (7)) times the average hurricane year expected loss ratio of 96.3% (Row (6)).

A more appropriate selection for hurricane frequency is one or more hurricanes every 4 years and an expected 2020 average hurricane loss ratio of 24.1% (1/4 x 96.3%). The year 2008 illustrates the correct calculation. In 2008, two hurricanes made landfall in Texas: Ike and Dolly. In TWIA's rate adequacy analysis, TWIA incorrectly counted both hurricanes instead of counting 2008 as a single year with one or more hurricanes.

TWIA claims that it was not able to adjust industry historical hurricane loss ratios for trends in premiums and losses (could not in actuarial terminology "put them on-level") because of a lack applicable industry data. Consequently, TWIA claims that its indicated rate inadequacy may be "approximately 6% more than originally indicated".[6] TWIA's basis for this claim is its own non-hurricane premium and loss trends.

TWIA claims its non-hurricane loss trend of 1.8% exceeds its non-hurricane premium trend of .3% resulting in a net annual non-hurricane positive trend of 1.015% (1.018/1.003), which if applied to industry historical hurricane loss ratios would increase industry hurricane loss ratios and TWIA's indicated rate inadequacy. TWIA did not provide documentation to support the derivation of its non-hurricane trends.

Furthermore, TWIA did not disclose its own hurricane loss and premium trends, which would be more applicable to industry hurricane loss ratios. It's more likely that after Hurricane Andrew in 1992 both Texas industry and TWIA's own hurricane premium trends substantially exceeded loss trends as private insurers raised rates or withdrew entirely from the Texas coast. Therefore, if TWIA had adjusted industry hurricane loss ratios for its own trends in hurricane premiums and losses, TWIA's rate inadequacy would likely be reduced, not increased, as TWIA claims.

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[6] November 12, 2019, Response to TWIA Actuarial and Underwriting Committee Open Issues from the October 17, 2019 Committee Meeting, Page 3

Repayment of Bonds

An optional early redemption feature or accelerated bond repayment option will enhance rather than detract from TWIA's overall rate adequacy. Use of underwriting gains to pay off debt more quickly appears to be permitted by Texas law and will reduce TWIA's future debt service.

It does not make economic sense to remain locked into a fixed debt repayment schedule at an exorbitant interest rate (currently 8.0%) while earning only 2.0% or less on funds deposited in the CRTF. Contrary to TWIA's claims, providing TWIA with the financial flexibility to make larger principal payments than otherwise required is financially wise.

Texas law provides:
"At the end of each calendar year or policy year, the association shall use the net gain from operations of the association, including all premium and other revenue of the association in excess of incurred losses, operating expenses, public security obligations, and public security administrative expenses, to make payments to the trust fund, procure reinsurance, or use alternative risk financing mechanisms, or to make payments to the trust fund and procure reinsurance or use alternative risk financing mechanisms."[7]

The law provides that net gains from operations include all premium and revenue in excess of public security obligations. If a public security obligation includes an optional early redemption feature or accelerated repayment option, then the net gain from operations should be after the exercise of such feature or option – not before as claimed by TWIA. TWIA does not appear to be restricted by Texas law to use underwriting gains to pay down its debt as quickly as possible as long as its debt obligation contracts include an early redemption or accelerated repayment feature.

Contrary to the best interests of both its policyholders and its member insurers, TWIA has not demonstrated any interest in including early redemption features or accelerated repayment options in its bond agreements. The longer it takes for TWIA to pay off its debt, the more it pays in interest expense, the more it demands in policyholder rate increases and the less funds it has to pay losses.

[7] Sec. 2210.452, (c), Establishment and Use of Trust Fund

Near-Term vs. Long-Term Hurricane Models

"TWIA has consistently relied on long-term models … to avoid volatility in [its] rate indications".[8] Why then doesn't TWIA apply this same principle to avoid volatility in its reinsurance costs? "TWIA staff also considers near-term model outputs particularly useful to the reinsurance purchasing decision, … because near-term model outputs better match the reinsurance pricing." [9]

Reinsurers' pricing is well known to be volatile and to follow their capital positions. After major "capital events", which deplete capital, reinsurers will aggressively raise rates regardless of their near-term or long-term hurricane model indications.

Reinsurers only reduce rates gradually as their capital positions improve. Therefore, it makes no sense for TWIA to match models used by reinsurers. TWIA's 100-year PML should be independent of reinsurers' volatile pricing decisions. TWIA's mixing of near-term and long-term models only further creates unnecessary volatility in its rate indications.

TWIA uses a 50/50 blend of the AIR and RMS long-term model results to estimate expected average annual hurricane losses and a 50/50 blend of the AIR and RMS near-term model results to estimate its 100-year PML. The AIR near-term 100-year PML is $1.61 billion greater than the RMS 100-year PML ($4.46 billion for AIR vs $2.85 billion for RMS). The AIR model may be estimating more severe storms, more frequent storms or more storms impacting more populated areas contrary to Texas historical long-term experience.

The weight given to each model should be based upon how well it matches the historical frequency and severity of Texas hurricanes - barring any credible scientific evidence to the contrary. Until TWIA provides the full disclosure, as outlined in this rebuttal, to satisfy the requirements of HB 1900 and Actuarial Standard of Practice 39, none of the hurricane modeled results should be used in its rate adequacy analysis or in the determination of its 100-year PML.

Until full disclosure, TWIA's rates, its 100-year PML and its provision for reinsurance should be based solely upon its historical experience. On that basis, the projected year 2020 100-year PML should be about $2.4 billion, as documented in my 8/6/19 actuarial rate review, not $4.2 billion as claimed by TWIA.

A $2.4 billion 100-year PML based on TWIA's historical experience is consistent with the RMS near-term 100-year PML of $2.8 billion as 11/30/18 projected to 11/30/20 at a negative exposure trend of -7.0% per year. In Appendix F, TWIA provides probability of exceedance tables for the AIR and RMS near-term models for exposures as of 11/30/17 and 11/30/18. Exposures for this period declined by over 7.0%. For the period 4/30/18 to 4/30/19 exposures declined 9.9%[10]. Therefore, it is reasonable to assume exposures will continue to decline in 2020.

[8] Page 5, TWIA Response
[9] Ibid
[10] Page 19, Texas Windstorm Insurance Association, Annual Report Card, June 1, 2018 - May 31, 2019

MSB Replacement Cost Estimator

TWIA has not done any analysis to determine the impact of the upgrade to its MSB replacement cost estimator. This author has been told by some TWIA agents that the MSB replacement cost values are consistently higher (and frequently much higher) for wind than private insurers' replacement cost values for all other perils.

Agent testimony at the August 6, 2019 board meeting in Galveston was consistent with this anecdotal evidence. TWIA's opinion that "the upgraded MSB version will [not] have a significant, quantifiable impact on replacement cost or written premium"[11] has not been supported by any randomized scientific study of TWIA's book of business.

An increase in replacement costs has a similar impact upon premiums as a rate increase. If the upgrade to the MSB replacement cost estimator had an accelerated impact on replacement costs, this reduces TWIA's 2020 rate indication and should be reflected in its rate adequacy analysis.

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[11] November 12, 2019, Response to TWIA Actuarial and Underwriting Committee Open Issues from the October 17, 2019 Committee Meeting, Page 5