

NORTH CAROLINA RATE BUREAU

2022 RATE FILING

MOBILE HOME (F)



October 31, 2022

Honorable Mike Causey
Commissioner of Insurance
North Carolina Department of Insurance
Raleigh, NC 27699

Re: Revision of Mobile Homeowners MH(F) Insurance Rates

Dear Commissioner Causey:

Enclosed herewith for filing on behalf of all member companies of the North Carolina Rate Bureau are revised premium rates and relativities for Mobile Homeowners MH(F) insurance subject to the jurisdiction of the North Carolina Rate Bureau.

The enclosed memoranda and exhibits set forth and explain the calculations for needed rate level changes totaling an overall indicated statewide average rate level change of 87.5% for Mobile Homeowners MH(F) insurance. For filing purposes, these changes have been capped and are proposed to be implemented over a two year period with an overall statewide average rate level change of +31.5% for Mobile Homeowners MH(F) insurance to be effective 7/1/2023 (31.5% change for Owners coverages and 31.1% change for Tenants coverages), and an overall statewide average rate level change of +33.0% for Mobile Homeowners MH(F) insurance to be effective 7/1/2024 (33.1% change for Owners coverages and 31.3% change for Tenants coverages). The capping of the rate level changes and the two-year phased implementation approach seek to mitigate the impact of rate increases on policyholders, while striving for the Bureau's goal of rate adequacy. The filing shows revised rate levels varying by territory and revised windstorm and hail exclusion credits.

The foregoing changes were calculated based on rates currently in force and reflect consideration, duly given, to data for the experience period set forth herein. In preparing this filing, due consideration has been given to the factors specified in G.S. 58-36-10(2) and G.S. 58-36-10(7).

Information and data required pursuant to G.S. 58-36-15 and 11 NCAC 10.1105 are shown and referenced in Section E. Additionally, the prefiled testimony of (a) Joanna Biliouris, General Manager; b) Paul Anderson, Milliman; (c) Minchong Mao, Aon; and (d) Dr. George Zanjani, University of Alabama are submitted herewith.

We propose that the revised rates and territory definitions become effective according to the following rule of application:

The Year 1 changes are applicable to all new and renewal policies becoming effective on or after July 1, 2023. The Year 2 changes are applicable to all new and renewal policies becoming effective on or after July 1, 2024.

Your approval of these changes is respectfully requested.
Sincerely,

Joanna Biliouris
General Manager

North Carolina Mobile Homeowners MH(F) Program

Explanatory Memorandum

This memorandum has been prepared in support of the North Carolina Rate Bureau's ("NCRB") proposed revision to the North Carolina Mobile Homeowners MH(F) program. The rate indications developed in this analysis are based on an assumed effective date of July 1, 2023 and the assumption that rates will be in effect for one year.

Note that Mobile Homeowners MH(F) policies provide flood coverage, including coverage for both inland flood and storm surge. Accordingly, the analysis underlying this rate filing includes both types of flood losses.

In this filing, the term "hurricane losses" refers to losses identified as being caused by a hurricane and is intended to include hurricane wind losses and storm surge flood losses. The term "catastrophe" generally refers to all losses identified as being caused by a catastrophe, including but not limited to hurricane, inland flood, and non-hurricane windstorm losses.

Premium, Loss, and Expense Experience

This proposed revision is based on the combined premium and loss experience of all licensed companies writing Mobile Homeowners MH(F) insurance in North Carolina, except as noted in *Section E, Supplemental Information*.

The rate indication and rating plan analysis included in this filing were performed using data for calendar/accident years 2017 through 2021 provided by all member companies writing Mobile Homeowners MH(F) insurance in North Carolina. The data provided by member companies was collected and combined by Milliman, Inc. (Milliman) at the direction of the North Carolina Rate Bureau. The data was reviewed by Milliman for reasonability and consistency. In this filing, the above-mentioned data will be referred to as the "data provided by member companies." More information regarding the data editing procedures used by Milliman can be found in *Section E, Supplemental Information*.

The data provided by member companies included both loss and allocated loss adjustment expenses (ALAE), and these items were combined for the purpose of this analysis. The terms "loss" and "losses", as used in this memorandum, represent losses and ALAE combined. Underwriting expenses, unallocated loss adjustment expenses, and deviations data used in the analysis were provided and reviewed by the North Carolina Rate Bureau.

Statewide Indicated Rate Changes

The overall statewide indicated rate changes were calculated separately for Owners and Tenants. The following describes the key elements of the statewide indications:

- **Loss Experience** - The Mobile Homeowners insurance experience for the MH(F) program was compiled on a calendar/accident year basis for the five-year period beginning with the year ending December 31, 2017 and continuing through the year ending December 31, 2021, the most recent period for which such experience is available. For each twelve-month period, the accident year experience reflects losses from accidents occurring during that period with the premiums and number of mobile home exposures "earned" during the same period. Since this filing utilizes

modeled hurricane losses, the actual hurricane losses (which include wind losses and storm surge losses) have been removed from the loss experience used for the rate indications.

The losses compiled for each accident year are incurred losses (i.e., paid losses plus outstanding case loss reserves).

- **Excess Wind Losses and Excess Wind Loss Factor** – Because hurricane and other large-scale wind loss events are highly volatile in nature, both hurricane models and an excess wind procedure were used to achieve stability and adequacy in the indicated rates. As a result, extreme shifts in the rates (either upward or downward) due to the occurrence or non-occurrence of hurricanes or other large wind losses will be avoided. The excess wind procedure used for non-hurricane wind losses is described below. Modeled hurricane losses are discussed in more detail later in this memorandum.

Statewide excess wind losses are calculated for each accident year by first removing actual hurricane wind and storm surge losses and then determining an expected long-term ratio of wind losses relative to total non-hurricane losses excluding wind and flood losses. In determining the expected long-term ratio of wind losses to total non-hurricane losses excluding wind and flood losses, the historical ratios for accident years in which unusually large wind losses were incurred are capped at five times the median statewide wind-to-total-minus-wind-and-flood ratio.

All losses in excess of this expected wind ratio are defined as excess wind losses. The ratio of wind losses to total non-hurricane losses excluding wind and flood losses for a given year is composed of two parts:

- (1) The capped excess wind loss ratio; and
- (2) The excess wind loss ratio above the cap.

The resulting actual excess wind losses identified using the methodology above are then removed from the loss experience used in developing rates. The long-term impact of excess losses (i.e., losses not related to hurricanes and, therefore, not accounted for in the hurricane model) is accounted for in the rates through the use of an excess wind factor, which is calculated using the following formula:

$$\text{Excess Wind Loss Factor} = \frac{1.0 + [(\text{Average Capped Excess Wind Ratio} + \text{Average Excess Wind Ratio above the Cap}) / (1.0 + \text{Average Capped Wind Ratio} - \text{Average Capped Excess Wind Ratio})]}{1.0 + [(\text{Average Capped Excess Wind Ratio} + \text{Average Excess Wind Ratio above the Cap}) / (1.0 + \text{Average Capped Wind Ratio} - \text{Average Capped Excess Wind Ratio})]}$$

The excess wind methodology for MH(F) Owners and Tenants combined can be found on *Section C, Page 28*.

To determine excess wind losses for each MH(F) policy form, the total non-hurricane excess wind losses for each accident year were allocated based on the distribution of incurred wind losses by policy form (see *Section C, Page 29*).

- **Excess Flood Losses and Excess Flood Loss Factor** – Because flood loss events are also highly volatile in nature, an excess flood procedure was used to achieve stability and adequacy in the indicated rates. The excess flood procedure used was analogous to the excess wind procedure described above.

Statewide excess flood losses are calculated for each accident year by first removing actual hurricane flood (i.e., storm surge) losses and then determining an expected long-term ratio of flood losses relative to total non-hurricane losses excluding wind and flood losses. In determining the expected long-term ratio of flood losses to total non-hurricane losses excluding wind and flood losses, the historical ratios for accident years in which unusually large flood losses were incurred are capped at five times the median statewide flood-to-total-minus-wind-and-flood ratio.

All losses in excess of this expected flood ratio are defined as excess flood losses. The ratio of flood losses to total non-hurricane losses excluding wind and flood losses for a given year is composed of two parts:

- (1) The capped excess flood loss ratio; and
- (2) The excess flood loss ratio above the cap.

The resulting actual excess flood losses identified using the methodology above are then removed from the loss experience used in developing rates. The long-term impact of excess losses (i.e., losses not related to hurricanes and, therefore, not accounted for in the hurricane model) is accounted for in the rates through the use of an excess flood factor, which is calculated using the following formula:

$$\text{Excess Flood Loss Factor} = 1.0 + \frac{[(\text{Average Capped Excess Flood Ratio} + \text{Average Excess Flood Ratio above the Cap})]}{(1.0 + \text{Average Capped Flood Ratio} - \text{Average Capped Excess Flood Ratio})}$$

The excess flood methodology for MH(F) Owners and Tenants combined can be found on *Section C, Page 30*.

To determine excess flood losses for each MH(F) policy form, the total non-hurricane excess flood losses for each accident year were allocated based on the distribution of incurred flood losses by policy form (see *Section C, Page 31*).

- **Loss and Claim Development** – To develop the incurred Mobile Homeowners losses and reported claims to ultimate, cumulative loss development factors (LDFs) and cumulative claim development factors (CDFs) are applied to incurred losses and reported claims, respectively. To derive these factors, Mobile Homeowners loss and claim triangles were constructed using data provided by member companies. These triangles for MH(F) Owners and MH(F) Tenants were aggregated and evaluated on a combined basis. Using these aggregate triangles, age-to-age LDFs and CDFs were selected and age-to-ultimate LDFs and CDFs were calculated (see *Section C, Pages 32 and 33*).
- **Unallocated Loss Adjustment Expenses (ULAE)** – The incurred losses used in the rate indication do not include ULAE. To account for these expenses, the incurred losses were multiplied by a ULAE factor selected based on five years of historical incurred ULAE-to-incurred loss & ALAE ratios provided by the North Carolina Rate Bureau. A separate selected catastrophe LAE factor was applied to the modeled hurricane losses (see *Section C, Page 47*). See the pre-filed testimony of M. Mao for support of the catastrophe LAE factor.
- **Loss Trend** – To trend losses, frequency and severity trends were selected by policy form based on six years of quarterly claims data provided by member companies.

So as not to distort the indicated trends, historical catastrophe losses were removed from the loss and claim count data. Because catastrophe losses other than hurricane and flood were not explicitly identified in the data provided by member companies, weekly claim data was reviewed by peril (water and wind) in order to identify catastrophe events. For each peril, weeks during the experience period which had reported claim counts that were greater than two times the standard deviation of weekly reported claims were identified as having catastrophe events. The claims and losses for each peril that occurred during those weeks were excluded from the loss trend analysis.

In order to evaluate trends, both claims and losses were developed to ultimate based on the cumulative claim and loss development factors discussed above. In order to apply these annual development factors to quarterly claims and losses, the factors were interpolated exponentially to derive quarterly development factors.

In trending losses, a two-step trending procedure was used. Frequency and severity trend rates were selected by policy form separately for the experience trend period and the projection trend period. The experience trend period is defined as the first calendar accident day associated with the data provided by member companies, or January 1, 2017, up to and including the last calendar accident day provided in the data provided by member companies, or December 31, 2021. The projection trend period is defined as the end date of the experience period, or December 31, 2021, up to the average accident date of the one-year policy period during which the rates are projected to be in effect, or July 1, 2024. Loss trend rates were then calculated for each policy form using the following formula:

$$\text{Loss Trend Rate} = (1 + \text{Frequency Trend Rate}) \times (1 + \text{Severity Trend Rate}) - 1.$$

Loss trend factors were calculated by policy form for each accident year based on the selected loss trend rates and trend periods. For each accident year, the experience period is calculated as the amount of time from the average accident date within the accident year to the end of the experience period, or December 31, 2021. The projection period is calculated for all accident years as the amount of time from the end date of the experience period, or December 31, 2021, up to the average accident date of the one-year policy period during which the rates are projected to be in effect, or July 1, 2024.

The selected frequency, severity, and loss trend rates, as well as the resulting loss trend factors for each MH(F) policy form are shown in *Section C, Pages 35 and 36*. The calculation of the loss trend factors for each of the MH(F) policy forms is shown in *Section C, Page 34*. *Section C, Page 37* shows the interpolation of the cumulative development factors.

- **Exposure Trend** – Exposure trends were selected by policy form to account for changes in the amounts of insurance purchased by policyholders over time. The indicated exposure trend rates were calculated based on the average amount of insurance per policy (see *Section C, Page 38*). The selected exposure trends were provided to Aon to be applied during the process of determining modeled hurricane losses.
- **Premium Trend** – Premium trends were selected by policy form to account for changes in the average premium per policy over time. The indicated premium trend rates were calculated based on the average rating factors for each accident year and for each policy form.

The historical average rating factors were used to calculate various estimates of the average annual change in premium. Similar to the loss trends, premium trend rates were selected separately for the experience period and the projection period (see *Section C, Page 40*). The experience trend

period is defined as the first calendar accident day associated with the data provided by member companies, or January 1, 2017, up to and including the last calendar accident day in the data provided by member companies, or December 31, 2021. The projection trend period is defined as the end date of the experience period, or December 31, 2021, up to the average written date of the period during which the rates are projected to be in effect, or January 1, 2024.

Following the selection of premium trend rates by policy form, premium trend factors were calculated for each accident year based on the selected premium trend rates and trend periods. For each calendar year, the experience period is calculated as the amount of time from the average written date within the calendar year to the end of the experience period, or December 31, 2021. The projection period is calculated for all calendar years as the amount of time from the end date of the experience period, or December 31, 2021, up to the average written date of the period during which the rates are projected to be in effect, or January 1, 2024 (see *Section C, Page 39*).

- Average Rating Factors** – The rate indications included within this filing are calculated at a base class level. In order to convert the historical experience to a consistent base class level, average rating factors are used. The average rating factors represent the ratio of the average premium (earned premium at current manual rate level divided by the number of earned house years) and the average base class premium. Earned premiums at current manual rates are calculated using the extension of exposures method, which multiplies the rates in effect at the time of the review by the number of earned house years for each risk in the data provided by member companies. The current base class rate used in the rate indication is defined by the following policy characteristics for each MH(F) policy form:

Current MH(F) Base Class Definitions				
Policy Form	Amount of Insurance	Deductible	Policy Form	Tie-Down Credit
Owners	\$25,000	\$250	Named Perils	No
Tenants	\$5,000	\$250	N/A	No

The policy characteristics of the current base class, which are used to convert the historical experience to a consistent level for the purposes of calculating indicated rate changes, are not necessarily the same as the base policy characteristics presented in the current MH(F) rate manual from which policyholder premiums are calculated.

- Credibility** – Credibility of the historical experience was considered in several places throughout this filing, including in the determination of the total base class loss cost calculated for each policy form and each territory as well as in the selection of loss trends.

To determine the credibility of the non-hurricane mobile homeowners loss costs for each policy form, a limited fluctuation credibility methodology was used, as explained in a CAS Proceedings Paper “*Credibility of the Pure Premium*” by Mayerson, Jones, and Bowers. This methodology assumes that loss costs are normally distributed and the standard for full credibility is based on a 90% probability that the observed loss cost is within 10% of the expected loss cost. The methodology is intended to limit the effect that random fluctuations in the data can have on the indicated loss cost.

Based on the limited fluctuation credibility model framework, the formula for the full credibility standard (N_C) is equal to:

$$N_C = (z / k)^2 = 271$$

where: N_C = # of claims required for full credibility (rounded to nearest integer)
 $z = 1.645$ (from the standard normal table corresponding to a 90% confidence interval)
 $k = 10\%$ (tolerance for error)

For each policy form, the number of claims, N_C , required for full credibility from the formula above was converted from a claims basis into an earned house years basis using a frequency and severity modification. This conversion was performed using the five-year historical frequency, average severity, and variance of the severity distribution for each policy form in the following formula:

$$N_E = (N_C / f) \times (1 + \sigma^2 / s^2) = 30,000$$

where: N_E = # of earned house years required for full credibility (rounded up to nearest 10,000)
 f = Five-Year Claim Frequency
 σ^2 = Variance of the Severity Distribution
 s = Average Claim Severity

Using N_E as the standard for full credibility, the credibility (Z) for each statewide policy form and each territory or territory group was calculated using the standard Square Root Rule or:

$$Z = (E / N_E)^{0.5}$$

where: Z = Credibility of Segment (limited to a maximum of 1.00)
 E = Five-Year Earned House Years

The table below displays the standard for full credibility for each policy form, the statewide total house years during the experience period, and the calculated credibility:

Policy Form	Standard (N_E)	Earned House Years (E)	Credibility (Z)
Owners	30,000	335,533	100.0%
Tenants	190,000	3,233	13.0%

The credibility-weighted loss cost from the NCRB's 2021 mobile homeowners MH(F) rate filing (trended to the proposed policy period) was used as the complement of credibility (CC) such that the credibility-weighted loss cost (LC_{CW}) is calculated as:

$$LC_{CW} = LC \times Z + CC \times (1.0 - Z)$$

where: LC_{CW} = Credibility-Weighted Loss Cost
 LC = Indicated Base Class Loss Cost
 CC = Complement of Credibility

To calculate the credibility of the indicated loss trends, limited fluctuation credibility was also used. A claims standard of 1,082 was used, which represents the number of claims needed to be within 5% of the expected trends with 90% probability. As the credibility was only used for informational purposes when making trend selections, no complement of credibility was used.

- **Modeled Hurricane Loss Costs** – Statewide average annual hurricane losses for each MH(F) policy form were provided by Aon evaluated as of December 31, 2021. The losses provided are based on an average of the AIR Touchstone v9 hurricane model and the RMS RiskLink v21 hurricane model. The losses were determined based on exposures that were trended to the proposed policy period and loaded for LAE using the selected 6.0% catastrophe LAE factor. On *Section C, Page 43*, the modeled hurricane losses are divided by the product of the 2021 earned house years, the 2021 average rating factor, and the 2021 premium trend factor to derive the modeled hurricane base class loss cost for each policy form.
- **Underwriting Expenses** – *Section C, Page 46* shows five years of aggregate premium and aggregate underwriting expenses for all companies writing MH(F) policies in North Carolina. The expense ratios shown for Commission & Brokerage and for Taxes, Licenses, & Fees use written premium as the denominator because these expenses are typically incurred when policies are written. The ratios for Other Acquisition and General Expenses use earned premium as the denominator because these expenses are typically incurred over the entire length of the policy. The selected expense ratios reflect an average of the historical ratios over the last three years for each expense item. The sum of the expense ratios for Commission & Brokerage expenses and Taxes, Licenses, and Fees comprise the prospective policy's variable expense load whereas the sum of the expense ratios for Other Acquisition and General Expense comprise the fixed expense load.
- **Expense Trend** – Trend rates for fixed expenses, similar to loss trend rates, were selected separately for the experience period and the projection period. Indicated expense trend rates were derived from several different expense indices – the Consumer Price Index (including all items), the Consumer Price Index (all items excluding Energy), and the Compensation Cost Index. Additionally, a blended indication was derived by using a weighted average of the three indices with weights of 25%, 25%, and 50%, respectively.

The selected expense trend rates are used to calculate expense trend factors by policy form, which are used in the calculation of the fixed expense per policy. *Section C, Page 44* shows the derivation of the expense trend factors, which are calculated in a manner similar to the loss trend factors. The experience trend period spans from the average date of incurred expense over the most recent three years, or July 1, 2020, to the end date of the experience period, or December 31, 2021. The projection trend period spans from the end date of the experience period, or December 31, 2021, to the average written date of the prospective policy period, or January 1, 2024.

- **Fixed Expense Per Policy** – To calculate the fixed expense per policy, trended fixed expense ratios were calculated by multiplying the selected fixed expense ratios from *Section C, Page 46* by the expense trend factor and dividing by the 2020 premium trend factor (since the average date of expenses underlying the fixed expense ratios is 7/1/2020). The fixed expense per policy was then calculated on *Section C, Page 45* by multiplying the trended fixed expense ratios by the average current base premiums.
- **Profit** – See the pre-filed testimony of G. Zanjani.
- **Contingencies** – See the pre-filed testimony of P. Anderson.

- **Policyholder Dividends** – *Section C, Page 48* contains support for the selected policyholder dividends, which was selected using five years of historical homeowners dividend and written premium data. See also the pre-filed testimony of P. Anderson.
- **Compensation for Assessment Risk** – The provisions for compensation for assessment risk are calculated by policy form as $(0.016 \times \text{Current Average Base Rate}) / (1.0 - \text{Commission \& Brokerage} - \text{Taxes, Licenses, \& Fees})$, as shown in *Section C, Page 49*. The 1.6% compensation for assessment risk provision is based on an analysis completed by Milliman. See also the pre-filed testimony of P. Anderson.
- **Net Cost of Reinsurance** – The provisions for the net cost of reinsurance are based on an analysis performed by Aon. *Section C, Pages 50 and 51* show the average net cost of reinsurance by territory group as well as the statewide total as determined based on 2021 earned house years. The base class net cost of reinsurance is then determined by adjusting the average net cost of reinsurance by the 2021 average rating factor, 2021 premium trend factor, and variable expenses at both the statewide and territory group level.
- **Net Deviations** – *Section C, Page 52* compares actual written premium (including net deviations) to manual written premium (excluding net deviations) by calendar year to calculate the average net deviation from manual premiums. A provision of 5.0% was selected for net deviations. See also the pre-filed testimony of P. Anderson.

Indicated Rate Changes by Territory Group

In addition to the statewide rate indications, rate changes by territory group were also calculated for each policy form. The methodology for calculating the indicated rate changes at the territory group level is generally the same as the methodology used to produce the statewide indications. To calculate the indications by territory group, indicated base class loss costs (*Section C, Pages 6-16 and 17-27*), trended fixed expenses, the compensation for assessment risk, and the net cost of reinsurance (*Section C, Pages 50 and 51*) are calculated for each territory group and each policy form. The statewide excess wind and excess flood losses by policy form were allocated to each territory group using the distribution of wind and flood losses by accident year (see *Section C, Pages 15, 16, 26, and 27*). The indicated base rate excluding deviations was then calculated for each territory group for each policy form. The deviation per exposure was then added to the indicated base rates by territory group to derive the indicated required base class rate by territory group. Indicated rate changes were subsequently calculated by comparing the indicated required base class rate to the current base rate. See *Section C, Pages 6 and 17* for more details.

**North Carolina Mobile Homeowners
MH(F) Program**

Section A

Summary of Overall Rate Change

**North Carolina
Mobile Homeowners
MH(F)**

Summary of Indicated and Proposed Rate Changes

Policy Form	2021 Earned Premium at Current Manual Level ¹	2021 Earned House Years	Indicated Rate Change	Proposed Rate Change ²	
				Year 1	Year 2
Owners	\$47,454,596	56,394	87.6%	31.5%	33.1%
Tenants	114,906	700	72.1%	31.1%	31.3%
Total: All Policy Forms	\$47,569,502	57,094	87.5%	31.5%	33.0%

¹ Premium shown is based on only those policies that contained all the risk characteristics required to calculate a mobile homeowners premium. For more details on data excluded from parts of the rate review analysis, please see Section E, Page 5

² The proposed rate changes by policy form were selected by the North Carolina Rate Bureau and reflect capping of the changes and the implementation of the proposed rates over a two-year period in order to reduce the impact of the rate increases on policyholders, with proposed effective dates of July 1, 2023 for Year 1 and July 1, 2024 for Year 2.

**North Carolina
Mobile Homeowners
MH(F)**

Summary of Indicated and Proposed Rate Changes by Territory Group

Territory Group	2021 Earned Premium at Current Manual Level			2021 Earned House Years		
	Owners	Tenants	Total	Owners	Tenants	Total
1	\$4,394,732	\$2,094	\$4,396,826	3,080	11	3,091
2	4,400,846	2,396	4,403,241	3,524	12	3,536
3	10,814,704	21,521	10,836,225	11,777	111	11,888
4	5,923,984	18,728	5,942,712	6,097	100	6,197
5	5,682,480	12,452	5,694,932	6,811	76	6,887
6	16,237,850	57,716	16,295,566	25,104	391	25,495
Statewide	\$47,454,596	\$114,906	\$47,569,502	56,394	700	57,094

Territory Group	Indicated Rate Change			Proposed Rate Change - Year 1		
	Owners	Tenants	Total	Owners	Tenants	Total
1	195.9%	113.9%	195.8%	63.6%	46.3%	63.6%
2	105.3%	90.6%	105.3%	37.9%	38.1%	37.9%
3	118.4%	89.5%	118.3%	41.9%	37.7%	41.9%
4	75.2%	65.7%	75.2%	28.2%	28.7%	28.2%
5	72.8%	71.0%	72.8%	27.4%	30.8%	27.4%
6	42.6%	65.6%	42.7%	16.8%	28.7%	16.9%
Statewide	87.6%	72.1%	87.5%	31.5%	31.1%	31.5%

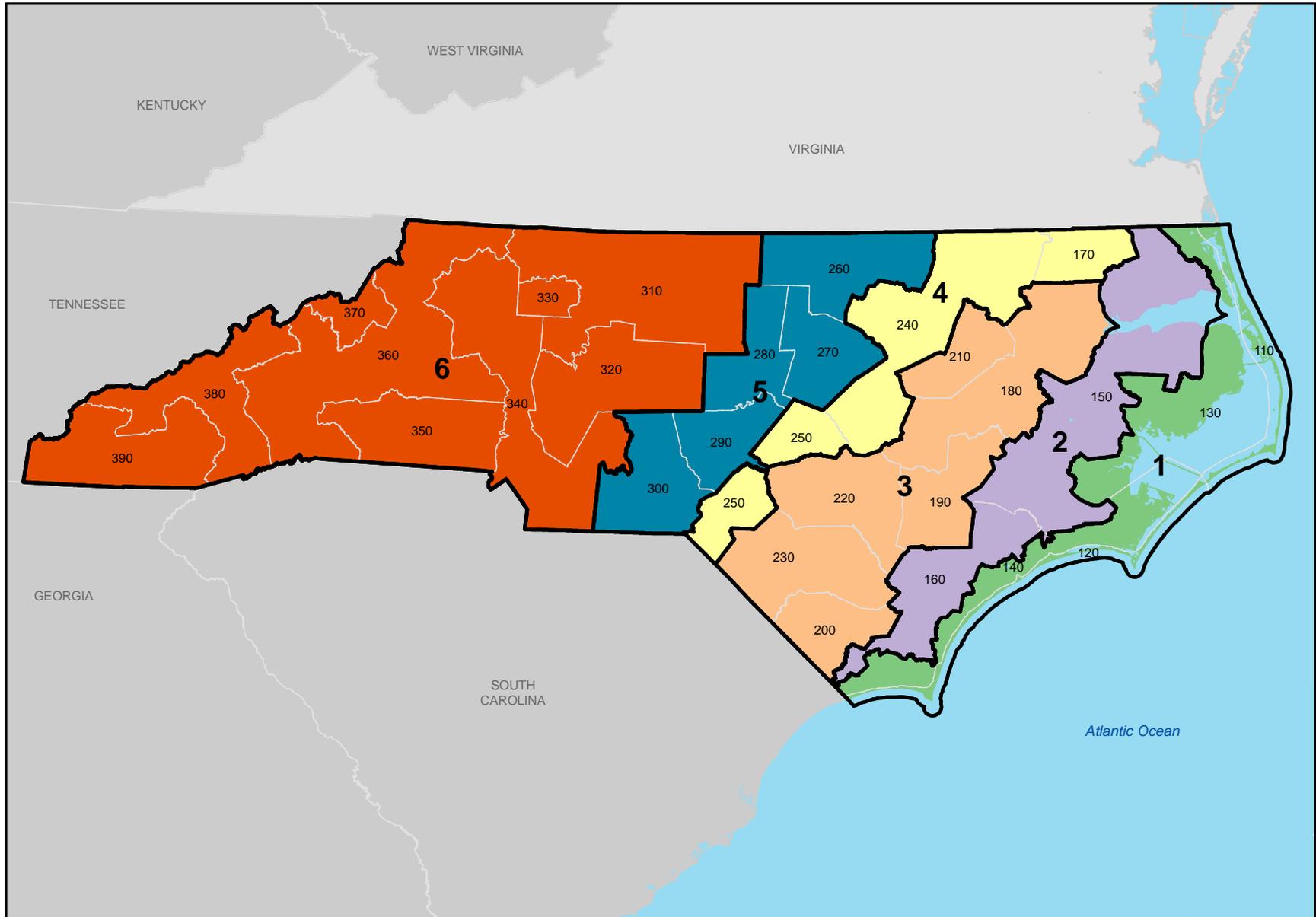
Territory Group	2021 Earned Premium at Proposed Year 1 Rate Level			Proposed Rate Change - Year 2		
	Owners	Tenants	Total	Owners	Tenants	Total
1	\$7,191,121	\$3,063	\$7,194,184	63.6%	46.3%	63.6%
2	6,069,167	3,308	6,072,474	37.9%	38.1%	37.9%
3	15,346,792	29,627	15,376,419	41.9%	37.7%	41.9%
4	7,596,153	24,109	7,620,261	28.2%	28.7%	28.2%
5	7,239,571	16,283	7,255,854	27.4%	30.8%	27.4%
6	18,972,182	74,276	19,046,459	16.8%	28.7%	16.9%
Statewide	\$62,414,986	\$150,665	\$62,565,652	33.1%	31.3%	33.0%

Notes:

Premium shown is based on only those policies that contained all the risk characteristics required to calculate a mobile homeowners premium. For more details on data excluded from parts of the rate review analysis, please see Section E, Page 5

The proposed rate changes by territory group were selected by the North Carolina Rate Bureau and reflect capping of the changes and the implementation of the proposed rates over a two-year period in order to reduce the impact of the rate increases on policyholders.

**North Carolina
Mobile Homeowners
MH(F)**
Current Territory Definitions and Territory Groups



**North Carolina Mobile Homeowners
MH(F) Program**

Section B

Changes to Base Rates and Rating Plan Relativities

North Carolina Mobile Homeowners
MH(F) Program

Changes to Base Rates and Rating Plan Relativities

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**North Carolina
Mobile Homeowners
MH(F)**

Derivation of Proposed Year 1 Territory Relativities

Owners

	(1)	(2)	(3)	(4) = (3) / (1)	(5)	(6)	(7) = (6) / (5)
Territory Group	2021 Earned Premium at Current Rate Level	Proposed Year 1 Rate Change	2021 Earned Premium at Proposed Yr 1 Rate Level	Measured Impact (% Change)	Current Territory Relativity	Proposed Yr 1 Territory Relativity	% Change
1	\$4,394,732	63.6%	\$7,190,032	63.6%	1.434	1.624	13.2%
2	4,400,846	37.9%	6,068,832	37.9%	1.289	1.255	-2.6%
3	10,814,704	41.9%	15,357,008	42.0%	1.000	1.000	0.0%
4	5,923,984	28.2%	7,594,692	28.2%	0.960	0.873	-9.1%
5	5,682,480	27.4%	7,238,836	27.4%	0.853	0.771	-9.6%
6	16,237,850	16.8%	18,969,291	16.8%	0.665	0.558	-16.1%
Statewide	\$47,454,596	31.5%	\$62,418,691	31.5%			

Tenants

	(8)	(9)	(10)	(11) = (10) / (8)	(12)	(13)	(14) = (13) / (12)
Territory Group	2021 Earned Premium at Current Rate Level	Proposed Year 1 Rate Change	2021 Earned Premium at Proposed Yr 1 Rate Level	Measured Impact (% Change)	Current Territory Relativity	Proposed Yr 1 Territory Relativity	% Change
1	\$2,094	46.3%	\$3,063	46.3%	1.422	1.548	8.9%
2	2,396	38.1%	3,307	38.0%	1.357	1.388	2.3%
3	21,521	37.7%	29,620	37.6%	1.000	1.000	0.0%
4	18,728	28.7%	24,110	28.7%	0.882	0.827	-6.2%
5	12,452	30.8%	16,283	30.8%	0.782	0.745	-4.7%
6	57,716	28.7%	74,287	28.7%	0.752	0.707	-6.0%
Statewide	\$114,906	31.1%	\$150,670	31.1%			

(1), (2), (8), (9) From Section A, Page 2

(3), (10) Based on extension of exposures method and proposed balanced rates from Section B, Page 2

(4), (11) Measured impact differs from (2) due to rounding the proposed rates to the nearest dollar

(5), (12) From current MH(F) rate manual

(6), (13) Determined via extension of exposures method such that (3) and (10) achieve the proposed rate changes in (2) and (9), respectively, as close as possible

North Carolina
Mobile Homeowners
MH(F) - Owners

Derivation of Proposed Year 1 Base Rates

Amount of Insurance	(1) Territory Group 3 Earned House Years		(3) Current Rate		(4)	(5)	(6)	(7) = (3) x [1 + (6)]		(8)	(13) = (7) x (12)		(14)	(15)	(16) = (15) / (5)
	MH(F)-2	MH(F)-3	MH(F)-2	MH(F)-3	2021 Terr Grp 3 Earned Premium at Current Rate Level	Proposed Year 1 Rate Change	Unbalanced Proposed Year 1 Rate	MH(F)-2	MH(F)-3	Balanced Proposed Year 1 Rate	MH(F)-2	MH(F)-3	2021 Terr Grp 3 Earned Premium at Proposed Yr 1 Rate Level	Measured Impact (% Change)	
Missing	1,304	113	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	
\$2,000	2	0	346.00	394.00	546	41.9%	491.00	559.00	465.00	529.00	741	35.7%			
3,000	0	0	358.00	409.00	72	41.9%	508.00	580.00	481.00	549.00	97	34.4%			
4,000	4	0	371.00	426.00	1,110	41.9%	526.00	605.00	498.00	573.00	1,523	37.2%			
5,000	3	1	386.00	440.00	1,137	41.9%	548.00	624.00	519.00	591.00	1,549	36.3%			
6,000	3	3	398.00	456.00	1,531	41.9%	565.00	647.00	535.00	612.00	2,056	34.3%			
7,000	10	2	414.00	471.00	3,421	41.9%	587.00	668.00	556.00	632.00	4,695	37.2%			
8,000	4	12	427.00	488.00	4,420	41.9%	606.00	693.00	574.00	656.00	5,941	34.4%			
9,000	11	1	440.00	504.00	3,925	41.9%	624.00	715.00	591.00	677.00	5,321	35.6%			
10,000	53	38	455.00	518.00	27,541	41.9%	646.00	735.00	611.00	696.00	37,561	36.4%			
11,000	24	5	468.00	534.00	9,777	41.9%	664.00	758.00	628.00	717.00	13,290	35.9%			
12,000	69	24	482.00	550.00	31,772	41.9%	684.00	780.00	647.00	738.00	43,115	35.7%			
13,000	35	14	494.00	566.00	17,062	41.9%	701.00	803.00	663.00	760.00	23,333	36.8%			
14,000	89	18	508.00	581.00	39,380	41.9%	721.00	824.00	682.00	780.00	54,446	38.3%			
15,000	117	61	517.00	592.00	63,770	41.9%	734.00	840.00	695.00	795.00	87,550	37.3%			
20,000	300	141	582.00	670.00	173,293	41.9%	826.00	951.00	782.00	900.00	242,705	40.1%			
25,000	345	121	649.00	750.00	207,306	41.9%	921.00	1,064.00	872.00	1,007.00	292,404	41.0%			
30,000	380	161	714.00	828.00	271,648	41.9%	1,013.00	1,175.00	959.00	1,112.00	382,277	40.7%			
35,000	464	141	779.00	907.00	347,673	41.9%	1,105.00	1,287.00	1,046.00	1,218.00	488,290	40.4%			
40,000	558	177	845.00	985.00	471,086	41.9%	1,199.00	1,398.00	1,135.00	1,323.00	658,310	39.7%			
45,000	613	118	910.00	1,065.00	520,223	41.9%	1,291.00	1,511.00	1,222.00	1,430.00	724,716	39.3%			
50,000	792	170	977.00	1,144.00	740,507	41.9%	1,386.00	1,623.00	1,312.00	1,536.00	1,034,198	39.7%			
55,000	685	94	1,042.00	1,223.00	659,349	41.9%	1,479.00	1,736.00	1,400.00	1,643.00	924,232	40.2%			
60,000	691	150	1,108.00	1,301.00	739,326	41.9%	1,572.00	1,846.00	1,488.00	1,747.00	1,045,627	41.4%			
65,000	660	105	1,173.00	1,379.00	728,721	41.9%	1,665.00	1,957.00	1,576.00	1,852.00	1,034,849	42.0%			
70,000	609	86	1,238.00	1,458.00	712,891	41.9%	1,757.00	2,069.00	1,663.00	1,958.00	1,015,116	42.4%			
75,000	569	92	1,305.00	1,537.00	723,571	41.9%	1,852.00	2,181.00	1,753.00	2,064.00	1,029,489	42.3%			
80,000	479	65	1,370.00	1,616.00	624,657	41.9%	1,944.00	2,293.00	1,840.00	2,170.00	892,384	42.9%			
85,000	456	35	1,436.00	1,695.00	615,397	41.9%	2,038.00	2,405.00	1,929.00	2,276.00	869,304	41.3%			
90,000	387	20	1,501.00	1,774.00	544,281	41.9%	2,130.00	2,517.00	2,016.00	2,382.00	765,774	40.7%			
95,000	294	13	1,567.00	1,852.00	426,071	41.9%	2,224.00	2,628.00	2,105.00	2,487.00	603,054	41.5%			
100,000	1,149	65	1,633.00	1,932.00	2,103,242	41.9%	2,317.00	2,742.00	2,193.00	2,595.00	3,073,060	46.1%			
Total / Average	11,158	2,046			\$10,814,704	41.9%					\$15,357,008	42.0%			
Each Addl \$1,000			13.00	16.00			18.00	23.00	17.00	22.00					

(9) Total Unbalanced Proposed Year 1 Premium: \$16,226,441
 (10) % Change: 50.0%
 (11) Indicated Base Rate Offset: 0.946
 (12) Selected Base Rate Offset: 0.946

- (1), (2) Based on data provided by member companies
- (3), (4) Based on current MH(F) rate manual
- (5) Based on data provided by member companies and the extension of exposures method
- (6) From Section A, Page 2
- (7), (8) Rounded to the nearest dollar
- (9) Based on (7), (8), and the extension of exposures method
- (10) = (9) / (5), Total - 1
- (11) = [1 + (6), Total] / [1 + (10)]
- (12) Based on (11) and the extension of exposures method. Selected so that (16), Total is as close as possible to (6), Total
- (13), (14) Rounded to the nearest dollar
- (15) Based on (13), (14), and the extension of exposures method

**North Carolina
Mobile Homeowners
MH(F) - Tenants**

Derivation of Proposed Year 1 Base Rates

	(1)	(2)	(3)	(4)	(5) = (2) x [1 + (4)]	(10) = (5) x (9)	(11)	(12) = (11) / (3)
			2021 Terr Grp 3 Earned Premium at Current Manual Level	Proposed Year 1 Rate Change	Unbalanced Proposed Yr 1 Rate	Balanced Proposed Yr 1 Rate	2021 Terr Grp 3 Earned Premium at Proposed Yr 1 Rate Level	Measured Impact (% Change)
Amount of Insurance	Terr Grp 3 Earned House Years	Current Rate						
Missing	0	N/A	0	N/A	N/A	N/A	0	N/A
\$2,000	0	55.00	0	37.7%	76.00	74.00	0	N/A
3,000	0	67.00	0	37.7%	92.00	90.00	0	N/A
4,000	0	80.00	0	37.7%	110.00	107.00	0	N/A
5,000	0	92.00	0	37.7%	127.00	124.00	0	N/A
6,000	0	105.00	0	37.7%	145.00	142.00	0	N/A
7,000	0	118.00	0	37.7%	162.00	158.00	0	N/A
8,000	0	129.00	0	37.7%	178.00	174.00	0	N/A
9,000	0	143.00	0	37.7%	197.00	192.00	0	N/A
10,000	0	155.00	0	37.7%	213.00	208.00	0	N/A
11,000	0	167.00	0	37.7%	230.00	225.00	0	N/A
12,000	0	179.00	0	37.7%	246.00	240.00	0	N/A
13,000	0	191.00	0	37.7%	263.00	257.00	0	N/A
14,000	0	203.00	0	37.7%	279.00	273.00	0	N/A
15,000	0	215.00	0	37.7%	296.00	289.00	0	N/A
20,000	0	275.00	0	37.7%	379.00	370.00	0	N/A
25,000	0	335.00	0	37.7%	461.00	450.00	0	N/A
30,000	2	395.00	87	37.7%	544.00	532.00	117	34.3%
35,000	0	455.00	0	37.7%	626.00	612.00	0	N/A
40,000	0	514.00	0	37.7%	708.00	692.00	0	N/A
45,000	0	574.00	0	37.7%	790.00	772.00	0	N/A
50,000	109	634.00	21,433	37.7%	873.00	853.00	29,502	37.6%
Total / Average	111		\$21,521	37.7%			\$29,620	37.6%
Each Addl \$1,000		12.00			17.00	17.00		

(6) Total Unbalanced Proposed Year 1 Premium: \$30,315
 (7) % Change: 40.9%
 (8) Indicated Base Rate Offset: 0.977
 (9) Selected Base Rate Offset: 0.977

- (1) Based on data provided by member companies
- (2) Based on current MH(F) rate manual
- (3) Based on data provided by member companies and the extension of exposures method
- (4) From Section A, Page 2
- (5) Rounded to the nearest dollar
- (6) Based on (5) and the extension of exposures method
- (7) = (6) / (3), Total - 1
- (8) = [1 + (4), Total] / [1 + (7)]
- (9) Based on (8) and the extension of exposures method. Selected so that (12), Total is as close as possible to (4), Total
- (10) Rounded to the nearest dollar
- (11) Based on (10) and the extension of exposures method

**North Carolina
Mobile Homeowners
MH(F)**

Wind Exclusion Credits
Territory Groups 1 and 2 (Territories 110-160)

Owners			
Territory Group	Current Credit	Measured Impact (% Change)	Proposed Credit
1	73.9%	-0.8%	74.1%
2	73.9%	13.4%	70.4%

Tenants			
Territory Group	Current Credit	Measured Impact (% Change)	Proposed Credit
1	61.3%	-19.1%	68.7%
2	61.3%	31.3%	49.2%

Note:

Measured Impact = (1 - Proposed Credit) / (1 - Current Credit) - 1

**North Carolina
Mobile Homeowners
MH(F)**

Derivation of Proposed Year 2 Territory Relativities

Owners

	(1)	(2)	(3)	(4) = (3) / (1)	(5)	(6)	(7) = (6) / (5)
Territory Group	2021 Earned Premium at Proposed Yr 1 Rate Level	Proposed Year 2 Rate Change	2021 Earned Premium at Proposed Yr 2 Rate Level	Measured Impact (% Change)	Proposed Yr 1 Territory Relativity	Proposed Yr 2 Territory Relativity	% Change
1	\$7,190,032	63.6%	\$11,765,246	63.6%	1.624	1.860	14.5%
2	6,068,832	37.9%	8,366,440	37.9%	1.255	1.223	-2.5%
3	15,357,008	41.9%	21,814,012	42.0%	1.000	1.000	0.0%
4	7,594,692	28.2%	9,733,475	28.2%	0.873	0.797	-8.7%
5	7,238,836	27.4%	9,224,372	27.4%	0.771	0.698	-9.5%
6	18,969,291	16.8%	22,167,291	16.9%	0.558	0.469	-15.9%
Statewide	\$62,418,691	33.1%	\$83,070,837	33.1%			

Tenants

	(8)	(9)	(10)	(11) = (10) / (8)	(12)	(13)	(14) = (13) / (12)
Territory Group	2021 Earned Premium at Proposed Yr 1 Rate Level	Proposed Year 2 Rate Change	2021 Earned Premium at Proposed Yr 2 Rate Level	Measured Impact (% Change)	Proposed Yr 1 Territory Relativity	Proposed Yr 2 Territory Relativity	% Change
1	\$3,063	46.3%	\$4,480	46.3%	1.548	1.663	7.4%
2	3,307	38.1%	4,565	38.1%	1.388	1.405	1.2%
3	29,620	37.7%	40,703	37.4%	1.000	1.000	0.0%
4	24,110	28.7%	31,031	28.7%	0.827	0.782	-5.4%
5	16,283	30.8%	21,309	30.9%	0.745	0.713	-4.3%
6	74,287	28.7%	95,682	28.8%	0.707	0.668	-5.5%
Statewide	\$150,670	31.3%	\$197,770	31.3%			

(1), (8) From Section B, Page 1

(2), (9) From Section A, Page 2

(3), (10) Based on extension of exposures method and proposed balanced rates from Section B, Page 6

(4), (11) Measured impact differs from (2) due to rounding the proposed rates to the nearest dollar

(5), (12) From proposed year 1 MH(F) rate manual

(6), (13) Determined via extension of exposures method such that (3) and (10) achieve the proposed rate changes in (2) and (9), respectively, as close as possible

North Carolina
Mobile Homeowners
MH(F) - Owners

Derivation of Proposed Year 2 Base Rates

Amount of Insurance	(1) Territory Group 3 Earned House Years		(3) Proposed Year 1 Rate		(4) Yr 1 Rate Level	(5) Terr Grp 3 Earned Premium at Proposed Year 2 Rate Change	(7) Unbalanced Proposed Year 2 Rate		(8) Balanced Proposed Year 2 Rate		(13) MH(F)-2	(14) MH(F)-3	(15) Terr Grp 3 Earned Premium at Proposed Yr 2 Rate Level	(16) Measured Impact (% Change)
	MH(F)-2	MH(F)-3	MH(F)-2	MH(F)-3			MH(F)-2	MH(F)-3	MH(F)-2	MH(F)-3				
	(2)	(3)	(4)	(5)			(6) = (3) x [1 + (6)]	(8) = (4) x [1 + (6)]	(9) = (7) x (12)	(10) = (8) x (12)				
Missing	1,304	113	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A
\$2,000	2	0	465.00	529.00	741	41.9%	660.00	751.00	636.00	724.00	1,046	41.2%		
3,000	0	0	481.00	549.00	97	41.9%	683.00	779.00	658.00	751.00	132	36.8%		
4,000	4	0	498.00	573.00	1,523	41.9%	707.00	813.00	681.00	784.00	2,178	43.0%		
5,000	3	1	519.00	591.00	1,549	41.9%	736.00	839.00	709.00	809.00	2,197	41.8%		
6,000	3	3	535.00	612.00	2,056	41.9%	759.00	868.00	732.00	837.00	2,865	39.3%		
7,000	10	2	556.00	632.00	4,695	41.9%	789.00	897.00	760.00	865.00	6,587	40.3%		
8,000	4	12	574.00	656.00	5,941	41.9%	815.00	931.00	785.00	897.00	8,289	39.5%		
9,000	11	1	591.00	677.00	5,321	41.9%	839.00	961.00	809.00	926.00	7,765	45.9%		
10,000	53	38	611.00	696.00	37,561	41.9%	867.00	988.00	836.00	952.00	53,403	42.2%		
11,000	24	5	628.00	717.00	13,290	41.9%	891.00	1,017.00	859.00	980.00	19,178	44.3%		
12,000	69	24	647.00	738.00	43,115	41.9%	918.00	1,047.00	885.00	1,009.00	62,659	45.3%		
13,000	35	14	663.00	760.00	23,333	41.9%	941.00	1,078.00	907.00	1,039.00	33,469	43.4%		
14,000	89	18	682.00	780.00	54,446	41.9%	968.00	1,107.00	933.00	1,067.00	79,804	46.6%		
15,000	117	61	695.00	795.00	87,550	41.9%	986.00	1,128.00	950.00	1,087.00	125,623	43.5%		
20,000	300	141	782.00	900.00	242,705	41.9%	1,110.00	1,277.00	1,070.00	1,231.00	346,226	42.7%		
25,000	345	121	872.00	1,007.00	292,404	41.9%	1,237.00	1,429.00	1,192.00	1,377.00	413,857	41.5%		
30,000	380	161	959.00	1,112.00	382,277	41.9%	1,361.00	1,578.00	1,312.00	1,521.00	541,951	41.8%		
35,000	464	141	1,046.00	1,218.00	488,290	41.9%	1,484.00	1,728.00	1,430.00	1,665.00	696,532	42.6%		
40,000	558	177	1,135.00	1,323.00	658,310	41.9%	1,611.00	1,877.00	1,553.00	1,809.00	945,702	43.7%		
45,000	613	118	1,222.00	1,430.00	724,716	41.9%	1,734.00	2,029.00	1,671.00	1,956.00	1,047,922	44.6%		
50,000	792	170	1,312.00	1,536.00	1,034,198	41.9%	1,862.00	2,180.00	1,795.00	2,101.00	1,498,504	44.9%		
55,000	685	94	1,400.00	1,643.00	924,232	41.9%	1,987.00	2,332.00	1,915.00	2,248.00	1,332,200	44.1%		
60,000	691	150	1,488.00	1,747.00	1,045,627	41.9%	2,112.00	2,479.00	2,036.00	2,389.00	1,511,571	44.6%		
65,000	660	105	1,576.00	1,852.00	1,034,849	41.9%	2,236.00	2,628.00	2,155.00	2,533.00	1,485,766	43.6%		
70,000	609	86	1,663.00	1,958.00	1,015,116	41.9%	2,360.00	2,779.00	2,275.00	2,678.00	1,449,544	42.8%		
75,000	569	92	1,753.00	2,064.00	1,029,489	41.9%	2,488.00	2,929.00	2,398.00	2,823.00	1,464,781	42.3%		
80,000	479	65	1,840.00	2,170.00	892,384	41.9%	2,611.00	3,079.00	2,516.00	2,968.00	1,270,687	42.4%		
85,000	456	35	1,929.00	2,276.00	869,304	41.9%	2,737.00	3,230.00	2,638.00	3,113.00	1,229,903	41.5%		
90,000	387	20	2,016.00	2,382.00	765,774	41.9%	2,861.00	3,380.00	2,757.00	3,258.00	1,079,839	41.0%		
95,000	294	13	2,105.00	2,487.00	603,054	41.9%	2,987.00	3,529.00	2,879.00	3,401.00	850,182	41.0%		
100,000	1,149	65	2,193.00	2,595.00	3,073,060	41.9%	3,112.00	3,682.00	2,999.00	3,549.00	4,243,654	38.1%		
Total / Average	11,158	2,046			\$15,357,008	41.9%					\$21,814,012	42.0%		
Each Addl \$1,000			17.00	22.00			24.00	31.00	23.00	30.00				

(9) Total Unbalanced Proposed Year 2 Premium: \$22,633,283
 (10) % Change: 47.4%
 (11) Indicated Base Rate Offset: 0.963
 (12) Selected Base Rate Offset: 0.964

- (1), (2) Based on data provided by member companies
- (3), (4) Based on proposed year 1 MH(F) rate manual
- (5) Based on data provided by member companies and the extension of exposures method
- (6) From Section A, Page 2
- (7), (8) Rounded to the nearest dollar
- (9) Based on (7), (8), and the extension of exposures method
- (10) = (9) / (5), Total - 1
- (11) = [1 + (6), Total] / [1 + (10)]
- (12) Based on (11) and the extension of exposures method. Selected so that (16), Total is as close as possible to (6), Total
- (13), (14) Rounded to the nearest dollar
- (15) Based on (13), (14), and the extension of exposures method

**North Carolina
Mobile Homeowners
MH(F) - Tenants**

Derivation of Proposed Year 2 Base Rates

	(1)	(2)	(3)	(4)	(5)	(10) = (5) x (9)	(11)	(12) = (11) / (3)
			2021 Terr Grp 3 Earned Premium at Proposed Yr 1 Rate Level	Proposed Year 2 Rate Change	Unbalanced Proposed Yr 2 Rate	Balanced Proposed Yr 2 Rate	2021 Terr Grp 3 Earned Premium at Proposed Yr 2 Rate Level	Measured Impact (% Change)
Amount of Insurance	Terr Grp 3 Earned House Years	Proposed Year 1 Rate						
Missing	0	N/A	0	N/A	N/A	N/A	0	N/A
\$2,000	0	74.00	0	37.7%	102.00	99.00	0	N/A
3,000	0	90.00	0	37.7%	124.00	120.00	0	N/A
4,000	0	107.00	0	37.7%	147.00	142.00	0	N/A
5,000	0	124.00	0	37.7%	171.00	166.00	0	N/A
6,000	0	142.00	0	37.7%	195.00	189.00	0	N/A
7,000	0	158.00	0	37.7%	218.00	211.00	0	N/A
8,000	0	174.00	0	37.7%	240.00	232.00	0	N/A
9,000	0	192.00	0	37.7%	264.00	256.00	0	N/A
10,000	0	208.00	0	37.7%	286.00	277.00	0	N/A
11,000	0	225.00	0	37.7%	310.00	300.00	0	N/A
12,000	0	240.00	0	37.7%	330.00	319.00	0	N/A
13,000	0	257.00	0	37.7%	354.00	343.00	0	N/A
14,000	0	273.00	0	37.7%	376.00	364.00	0	N/A
15,000	0	289.00	0	37.7%	398.00	385.00	0	N/A
20,000	0	370.00	0	37.7%	509.00	493.00	0	N/A
25,000	0	450.00	0	37.7%	619.00	599.00	0	N/A
30,000	2	532.00	117	37.7%	732.00	708.00	157	33.3%
35,000	0	612.00	0	37.7%	843.00	816.00	0	N/A
40,000	0	692.00	0	37.7%	953.00	922.00	0	N/A
45,000	0	772.00	0	37.7%	1,063.00	1,029.00	0	N/A
50,000	109	853.00	29,502	37.7%	1,174.00	1,136.00	40,546	37.4%
Total / Average	111		\$29,620	37.7%			\$40,703	37.4%
Each Addl \$1,000		17.00			23.00	22.00		

(6) Total Unbalanced Proposed Year 2 Premium: \$42,055
 (7) % Change: 42.0%
 (8) Indicated Base Rate Offset: 0.970
 (9) Selected Base Rate Offset: 0.968

- (1) Based on data provided by member companies
- (2) Based on proposed year 1 MH(F) rate manual
- (3) Based on data provided by member companies and the extension of exposures method
- (4) From Section A, Page 2
- (5) Rounded to the nearest dollar
- (6) Based on (5) and the extension of exposures method
- (7) = (6) / (3), Total - 1
- (8) = [1 + (4), Total] / [1 + (7)]
- (9) Based on (8) and the extension of exposures method. Selected so that (12), Total is as close as possible to (4), Total
- (10) Rounded to the nearest dollar
- (11) Based on (10) and the extension of exposures method

**North Carolina Mobile Homeowners
MH(F) Program**

Current Rate Pages

**MOBILE HOMEOWNERS POLICY: MH(F) PROGRAM NORTH CAROLINA
RATE PAGES**

OWNERS FORMS						TENANTS FORM		
TERRITORY GROUP 3; \$50 DEDUCTIBLE						TERRITORY GROUP 3; \$50 DEDUCTIBLE		
Amount of Insurance				Premium		Amount of Insurance		Premium
A	B	C	D	MH(F)-2	MH(F)-3	C	D	MH(F)-4
\$2,000	\$200	\$600	\$200	\$346.00	\$394.00	\$2,000	\$200	\$55.00
3,000	300	900	300	358.00	409.00	3,000	300	67.00
4,000	400	1,200	400	371.00	426.00	4,000	400	80.00
5,000	500	1,500	500	386.00	440.00	5,000	500	92.00
6,000	600	1,800	600	398.00	456.00	6,000	600	105.00
7,000	700	2,100	700	414.00	471.00	7,000	700	118.00
8,000	800	2,400	800	427.00	488.00	8,000	800	129.00
9,000	900	2,700	900	440.00	504.00	9,000	900	143.00
10,000	1,000	3,000	1,000	455.00	518.00	10,000	1,000	155.00
11,000	1,100	3,300	1,100	468.00	534.00	11,000	1,100	167.00
12,000	1,200	3,600	1,200	482.00	550.00	12,000	1,200	179.00
13,000	1,300	3,900	1,300	494.00	566.00	13,000	1,300	191.00
14,000	1,400	4,200	1,400	508.00	581.00	14,000	1,400	203.00
15,000	1,500	4,500	1,500	517.00	592.00	15,000	1,500	215.00
20,000	2,000	6,000	2,000	582.00	670.00	20,000	2,000	275.00
25,000	2,500	7,500	2,500	649.00	750.00	25,000	2,500	335.00
30,000	3,000	9,000	3,000	714.00	828.00	30,000	3,000	395.00
35,000	3,500	10,500	3,500	779.00	907.00	35,000	3,500	455.00
40,000	4,000	12,000	4,000	845.00	985.00	40,000	4,000	514.00
45,000	4,500	13,500	4,500	910.00	1,065.00	45,000	4,500	574.00
50,000	5,000	15,000	5,000	977.00	1,144.00	50,000	5,000	634.00
55,000	5,500	16,500	5,500	1,042.00	1,223.00			
60,000	6,000	18,000	6,000	1,108.00	1,301.00			
65,000	6,500	19,500	6,500	1,173.00	1,379.00			
70,000	7,000	21,000	7,000	1,238.00	1,458.00			
75,000	7,500	22,500	7,500	1,305.00	1,537.00			
80,000	8,000	24,000	8,000	1,370.00	1,616.00			
85,000	8,500	25,500	8,500	1,436.00	1,695.00			
90,000	9,000	27,000	9,000	1,501.00	1,774.00			
95,000	9,500	28,500	9,500	1,567.00	1,852.00			
100,000	10,000	30,000	10,000	1,633.00	1,932.00			
Each Add'l \$1,000				\$13.00	\$16.00	Each Add'l \$1,000		\$12.00

Territory Group 1	Surcharge	43.4%	Territory Group 1	Surcharge	42.2%
Territory Group 2	Surcharge	28.9%	Territory Group 2	Surcharge	35.7%
Territory Group 4	Discount	-4.0%	Territory Group 4	Discount	-11.8%
Territory Group 5	Discount	-14.7%	Territory Group 5	Discount	-21.8%
Territory Group 6	Discount	-33.5%	Territory Group 6	Discount	-24.8%

**MOBILE HOMEOWNERS POLICY: MH(F) PROGRAM
RATE PAGES**

NORTH CAROLINA

m. Inflation Guard Coverage - Form MH(F)-2 and Form MH(F)-3

When the Limits of Liability on Coverages A, B, C & D are automatically increased in accordance with the provisions of the Inflation Guard Endorsement the annual additional premium shall be developed by applying the following charges to the annual premium for Coverage A.

Amount of Quarterly Increase	Charge
1.0%	1.50%
1.5%	2.25%
2.0%	3.00%
Each Add'l 0.5%	Add 0.75%

Minimum Annual Premium \$1.00. Additional premium for three year policies shall be three times the annual premium.

Attach Endorsement **MH(F) 50** Mobile Homeowners Inflation Guard.

n. Personal Property Replacement Cost - Form MH(F)-2 and Form MH(F)-3

When Coverage C is extended to include full cost of repair or replacement without deduction for depreciation the additional premium shall be developed as follows:

- Manual charge to increase Coverage C limit to 40% of Coverage A.
- 5% surcharge to the adjusted total base premium (including the additional premium for the increased Coverage C limit). The surcharge shall be applied to the Total Adjusted Basic Premium before credit for optional higher deductible is applied. The minimum additional premium is \$20.

Attach Endorsement **MH(F) 51** Personal Property Replacement Cost.

o. Coverage B - Off Premises - Form MH(F)-2 and Form MH(F)-3

When Coverage B - Off Premises is provided to cover other structures which are located off the residence premises, the additional charge shall be \$33.

Attach Endorsement **MH(F) 52** Coverage B - Off Premises

p. Windstorm or Hail Exclusion Credit - Territory Groups 1 and 2 only

When the perils of windstorm or hail are excluded from coverage under Section I of the policy the following credits shall be deducted from the applicable basic premium.

FORM	Territory Group 1	Territory Group 2
MH(F) 2 and MH(F) 3	73.9%	73.9%
MH(F) 4	61.3%	61.3%

q. Mobile Home Stated Value Loss Settlement

When coverage is provided on a stated value basis, charge 3% of the premium from the premium rate table.

Attach endorsement **MH(F) 310** Stated Value Loss Settlement.

**North Carolina Mobile Homeowners
MH(F) Program**

Proposed Rate Pages - Year 1

**MOBILE HOMEOWNERS POLICY: MH(F) PROGRAM
RATE PAGES**

NORTH CAROLINA

OWNERS FORMS						TENANTS FORM		
TERRITORY GROUP 3; \$50 DEDUCTIBLE						TERRITORY GROUP 3; \$50 DEDUCTIBLE		
Amount of Insurance				Premium		Amount of Insurance		Premium
A	B	C	D	MH(F)-2	MH(F)-3	C	D	MH(F)-4
\$2,000	\$200	\$600	\$200	\$465.00	\$529.00	\$2,000	\$200	\$74.00
3,000	300	900	300	481.00	549.00	3,000	300	90.00
4,000	400	1,200	400	498.00	573.00	4,000	400	107.00
5,000	500	1,500	500	519.00	591.00	5,000	500	124.00
6,000	600	1,800	600	535.00	612.00	6,000	600	142.00
7,000	700	2,100	700	556.00	632.00	7,000	700	158.00
8,000	800	2,400	800	574.00	656.00	8,000	800	174.00
9,000	900	2,700	900	591.00	677.00	9,000	900	192.00
10,000	1,000	3,000	1,000	611.00	696.00	10,000	1,000	208.00
11,000	1,100	3,300	1,100	628.00	717.00	11,000	1,100	225.00
12,000	1,200	3,600	1,200	647.00	738.00	12,000	1,200	240.00
13,000	1,300	3,900	1,300	663.00	760.00	13,000	1,300	257.00
14,000	1,400	4,200	1,400	682.00	780.00	14,000	1,400	273.00
15,000	1,500	4,500	1,500	695.00	795.00	15,000	1,500	289.00
20,000	2,000	6,000	2,000	782.00	900.00	20,000	2,000	370.00
25,000	2,500	7,500	2,500	872.00	1,007.00	25,000	2,500	450.00
30,000	3,000	9,000	3,000	959.00	1,112.00	30,000	3,000	532.00
35,000	3,500	10,500	3,500	1,046.00	1,218.00	35,000	3,500	612.00
40,000	4,000	12,000	4,000	1,135.00	1,323.00	40,000	4,000	692.00
45,000	4,500	13,500	4,500	1,222.00	1,430.00	45,000	4,500	772.00
50,000	5,000	15,000	5,000	1,312.00	1,536.00	50,000	5,000	853.00
55,000	5,500	16,500	5,500	1,400.00	1,643.00			
60,000	6,000	18,000	6,000	1,488.00	1,747.00			
65,000	6,500	19,500	6,500	1,576.00	1,852.00			
70,000	7,000	21,000	7,000	1,663.00	1,958.00			
75,000	7,500	22,500	7,500	1,753.00	2,064.00			
80,000	8,000	24,000	8,000	1,840.00	2,170.00			
85,000	8,500	25,500	8,500	1,929.00	2,276.00			
90,000	9,000	27,000	9,000	2,016.00	2,382.00			
95,000	9,500	28,500	9,500	2,105.00	2,487.00			
100,000	10,000	30,000	10,000	2,193.00	2,595.00			
Each Add'l \$1,000				\$17.00	\$22.00	Each Add'l \$1,000		\$17.00

Territory Group 1	Surcharge	62.4%	Territory Group 1	Surcharge	54.8%
Territory Group 2	Surcharge	25.5%	Territory Group 2	Surcharge	38.8%
Territory Group 4	Discount	-12.7%	Territory Group 4	Discount	-17.3%
Territory Group 5	Discount	-22.9%	Territory Group 5	Discount	-25.5%
Territory Group 6	Discount	-44.2%	Territory Group 6	Discount	-29.3%

**MOBILE HOMEOWNERS POLICY: MH(F) PROGRAM
RATE PAGES**

NORTH CAROLINA

m. Inflation Guard Coverage - Form MH(F)-2 and Form MH(F)-3

When the Limits of Liability on Coverages A, B, C & D are automatically increased in accordance with the provisions of the Inflation Guard Endorsement the annual additional premium shall be developed by applying the following charges to the annual premium for Coverage A.

Amount of Quarterly Increase	Charge
1.0%	1.50%
1.5%	2.25%
2.0%	3.00%
Each Add'l 0.5%	Add 0.75%

Minimum Annual Premium \$1.00. Additional premium for three year policies shall be three times the annual premium.

Attach Endorsement **MH(F) 50** Mobile Homeowners Inflation Guard.

n. Personal Property Replacement Cost - Form MH(F)-2 and Form MH(F)-3

When Coverage C is extended to include full cost of repair or replacement without deduction for depreciation the additional premium shall be developed as follows:

- Manual charge to increase Coverage C limit to 40% of Coverage A.
- 5% surcharge to the adjusted total base premium (including the additional premium for the increased Coverage C limit). The surcharge shall be applied to the Total Adjusted Basic Premium before credit for optional higher deductible is applied. The minimum additional premium is \$20.

Attach Endorsement **MH(F) 51** Personal Property Replacement Cost.

o. Coverage B - Off Premises - Form MH(F)-2 and Form MH(F)-3

When Coverage B - Off Premises is provided to cover other structures which are located off the residence premises, the additional charge shall be \$33.

Attach Endorsement **MH(F) 52** Coverage B - Off Premises

p. Windstorm or Hail Exclusion Credit - Territory Groups 1 and 2 only

When the perils of windstorm or hail are excluded from coverage under Section I of the policy the following credits shall be deducted from the applicable basic premium.

FORM	Territory Group 1	Territory Group 2
MH(F) 2 and MH(F) 3	74.1%	70.4%
MH(F) 4	68.7%	49.2%

q. Mobile Home Stated Value Loss Settlement

When coverage is provided on a stated value basis, charge 3% of the premium from the premium rate table.

Attach endorsement **MH(F) 310** Stated Value Loss Settlement.

**North Carolina Mobile Homeowners
MH(F) Program**

Proposed Rate Pages - Year 2

**MOBILE HOMEOWNERS POLICY: MH(F) PROGRAM
RATE PAGES**

NORTH CAROLINA

OWNERS FORMS						TENANTS FORM		
TERRITORY GROUP 3; \$50 DEDUCTIBLE						TERRITORY GROUP 3; \$50 DEDUCTIBLE		
Amount of Insurance				Premium		Amount of Insurance		Premium
A	B	C	D	MH(F)-2	MH(F)-3	C	D	MH(F)-4
\$2,000	\$200	\$600	\$200	\$636.00	\$724.00	\$2,000	\$200	\$99.00
3,000	300	900	300	658.00	751.00	3,000	300	120.00
4,000	400	1,200	400	681.00	784.00	4,000	400	142.00
5,000	500	1,500	500	709.00	809.00	5,000	500	166.00
6,000	600	1,800	600	732.00	837.00	6,000	600	189.00
7,000	700	2,100	700	760.00	865.00	7,000	700	211.00
8,000	800	2,400	800	785.00	897.00	8,000	800	232.00
9,000	900	2,700	900	809.00	926.00	9,000	900	256.00
10,000	1,000	3,000	1,000	836.00	952.00	10,000	1,000	277.00
11,000	1,100	3,300	1,100	859.00	980.00	11,000	1,100	300.00
12,000	1,200	3,600	1,200	885.00	1,009.00	12,000	1,200	319.00
13,000	1,300	3,900	1,300	907.00	1,039.00	13,000	1,300	343.00
14,000	1,400	4,200	1,400	933.00	1,067.00	14,000	1,400	364.00
15,000	1,500	4,500	1,500	950.00	1,087.00	15,000	1,500	385.00
20,000	2,000	6,000	2,000	1,070.00	1,231.00	20,000	2,000	493.00
25,000	2,500	7,500	2,500	1,192.00	1,377.00	25,000	2,500	599.00
30,000	3,000	9,000	3,000	1,312.00	1,521.00	30,000	3,000	708.00
35,000	3,500	10,500	3,500	1,430.00	1,665.00	35,000	3,500	816.00
40,000	4,000	12,000	4,000	1,553.00	1,809.00	40,000	4,000	922.00
45,000	4,500	13,500	4,500	1,671.00	1,956.00	45,000	4,500	1,029.00
50,000	5,000	15,000	5,000	1,795.00	2,101.00	50,000	5,000	1,136.00
55,000	5,500	16,500	5,500	1,915.00	2,248.00			
60,000	6,000	18,000	6,000	2,036.00	2,389.00			
65,000	6,500	19,500	6,500	2,155.00	2,533.00			
70,000	7,000	21,000	7,000	2,275.00	2,678.00			
75,000	7,500	22,500	7,500	2,398.00	2,823.00			
80,000	8,000	24,000	8,000	2,516.00	2,968.00			
85,000	8,500	25,500	8,500	2,638.00	3,113.00			
90,000	9,000	27,000	9,000	2,757.00	3,258.00			
95,000	9,500	28,500	9,500	2,879.00	3,401.00			
100,000	10,000	30,000	10,000	2,999.00	3,549.00			
Each Add'l \$1,000				\$23.00	\$30.00	Each Add'l \$1,000		\$22.00

Territory Group 1	Surcharge	86.0%	Territory Group 1	Surcharge	66.3%
Territory Group 2	Surcharge	22.3%	Territory Group 2	Surcharge	40.5%
Territory Group 4	Discount	-20.3%	Territory Group 4	Discount	-21.8%
Territory Group 5	Discount	-30.2%	Territory Group 5	Discount	-28.7%
Territory Group 6	Discount	-53.1%	Territory Group 6	Discount	-33.2%

**MOBILE HOMEOWNERS POLICY: MH(F) PROGRAM
RATE PAGES**

NORTH CAROLINA

m. Inflation Guard Coverage - Form MH(F)-2 and Form MH(F)-3

When the Limits of Liability on Coverages A, B, C & D are automatically increased in accordance with the provisions of the Inflation Guard Endorsement the annual additional premium shall be developed by applying the following charges to the annual premium for Coverage A.

Amount of Quarterly Increase	Charge
1.0%	1.50%
1.5%	2.25%
2.0%	3.00%
Each Add'l 0.5%	Add 0.75%

Minimum Annual Premium \$1.00. Additional premium for three year policies shall be three times the annual premium.

Attach Endorsement **MH(F) 50** Mobile Homeowners Inflation Guard.

n. Personal Property Replacement Cost - Form MH(F)-2 and Form MH(F)-3

When Coverage C is extended to include full cost of repair or replacement without deduction for depreciation the additional premium shall be developed as follows:

- Manual charge to increase Coverage C limit to 40% of Coverage A.
- 5% surcharge to the adjusted total base premium (including the additional premium for the increased Coverage C limit). The surcharge shall be applied to the Total Adjusted Basic Premium before credit for optional higher deductible is applied. The minimum additional premium is \$20.

Attach Endorsement **MH(F) 51** Personal Property Replacement Cost.

o. Coverage B - Off Premises - Form MH(F)-2 and Form MH(F)-3

When Coverage B - Off Premises is provided to cover other structures which are located off the residence premises, the additional charge shall be \$33.

Attach Endorsement **MH(F) 52** Coverage B - Off Premises

p. Windstorm or Hail Exclusion Credit - Territory Groups 1 and 2 only

When the perils of windstorm or hail are excluded from coverage under Section I of the policy the following credits shall be deducted from the applicable basic premium.

FORM	Territory Group 1	Territory Group 2
MH(F) 2 and MH(F) 3	74.1%	70.4%
MH(F) 4	68.7%	49.2%

q. Mobile Home Stated Value Loss Settlement

When coverage is provided on a stated value basis, charge 3% of the premium from the premium rate table.

Attach endorsement **MH(F) 310** Stated Value Loss Settlement.

**North Carolina Mobile Homeowners
MH(F) Program**

Section C

Exhibits Supporting the Rate Indications

North Carolina Mobile Homeowners
MH(F) Program

Exhibits Supporting the Rate Indications

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**North Carolina
Mobile Homeowners
MH(F)**

Determination of Statewide Indicated Rate Changes

	Owners	Tenants
(1) Total Base Class Loss Cost	\$370.99	\$56.83
(2) (a) Fixed Expense per Policy	\$54.17	\$7.62
(b) Variable Expense per Policy	20.70%	20.70%
(c) Profit	6.50%	6.50%
(d) Contingencies	1.00%	1.00%
(e) Policyholder Dividends	0.45%	0.45%
(3) Base Rate excl. Reinsurance Cost; = [(1) + (2a)] / [1 - (2b) - (2c) - (2d) - (2e)]	\$595.88	\$90.33
(4) Compensation for Assessment Risk per Policy	\$9.86	\$1.25
(5) Net Cost of Reinsurance per Policy	\$258.03	\$8.69
(6) Indicated Manual Base Rate; = (3) + (4) + (5)	\$863.76	\$100.27
(7) Net Deviations	5.0%	5.0%
(8) Required Base Rate; = (6) / [1 - (7)]	\$909.22	\$105.54
(9) Average Current Base Rate	\$484.71	\$61.33
(10) Indicated Rate Change; = (8) / (9) - 1	87.6%	72.1%
(11) Proposed Rate Change - Year 1	31.5%	31.1%
(12) Proposed Base Rate - Year 1; = (9) x [1 + (11)]	\$637.52	\$80.41
(13) Proposed Rate Change - Year 2	33.1%	31.3%
(14) Proposed Base Rate - Year 2; = (12) x [1 + (13)]	\$848.25	\$105.54

(1) From Section C, Pages 2 and 4

(2a), (9) From Section C, Page 45

(2b) From Section C, Page 46

(2c) See pre-filed testimony from G. Zanjani for support of the Profit provision

(2d) See pre-filed testimony from P. Anderson for support of the Contingencies provision

(2e) From Section C, Page 48

(4) From Section C, Page 49

(5) From Section C, Pages 50 and 51

(7) From Section C, Page 52

(11), (13) Reflect selections by the North Carolina Rate Bureau

**North Carolina
Mobile Homeowners
MH(F) - Owners**

Determination of Base Class Loss Cost

	(1)	(2)	(3)	(4)	(5) = [(1) x (2)] / [(3) x (4)]	(6)	(7) = (5) / (6)	(8)
Accident Year	Non-Hurricane Ultimate Loss and LAE	Loss Trend Factor	Earned House Years	Premium Trend Factor	Trended Average Loss Cost	Average Rating Factor	Trended Base Class Loss Cost	Accident Year Weights
2017	\$23,852,111	1.612	70,067	1.267	\$433.07	1.526	\$283.80	10.0%
2018	25,393,582	1.521	69,582	1.227	452.45	1.564	289.26	15.0%
2019	20,600,386	1.435	68,622	1.188	362.70	1.610	225.28	20.0%
2020	21,759,261	1.354	64,017	1.150	400.20	1.665	240.43	25.0%
2021	20,655,655	1.277	63,245	1.113	374.74	1.736	215.86	30.0%

(9) Weighted Average Non-Hurricane Base Class Loss Cost: \$241.69

(10) Credibility: 100.0%

(11) Complement of Credibility: \$238.00

(12) Credibility-Weighted Loss Cost: \$241.69

(13) Modeled Hurricane Base Class Loss Cost: \$129.30

(14) Total Base Class Loss Cost: \$370.99

(1) From Section C, Page 3

(2) From Section C, Page 34

(3) Based on data provided by member companies

(4) From Section C, Page 39

(6) From Section C, Page 40

(9) Average of (7) based on the weights in (8)

(10) Based on the Square Root Rule using a Full-Credibility Standard of 30,000 earned house years

(11) From Section C, Page 42

(12) = (9) x (10) + (11) x [1 - (10)]

(13) From Section C, Page 43

(14) = (12) + (13)

**North Carolina
Mobile Homeowners
MH(F) - Owners**

Determination of Non-Hurricane Ultimate Loss & LAE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8) = (6) x (7)	(9)	(10) = (8) x (9)
Accident Year	Non-Hurricane Incurred Loss & ALAE	Excess Wind Loss & ALAE	Excess Flood Loss & ALAE	Excess Wind Loss Factor	Excess Flood Loss Factor	Adjusted Non-Hurricane Incurred Loss & ALAE	Loss & ALAE Development Factor	Non-Hurricane Ultimate Loss & ALAE	ULAE Factor	Non-Hurricane Ultimate Loss and LAE
2017	\$18,099,383	\$0	\$0	1.095	1.031	\$20,384,007	1.000	\$20,384,007	1.170	\$23,852,111
2018	22,870,446	0	3,601,369	1.095	1.031	21,701,348	1.000	21,701,348	1.170	25,393,582
2019	16,925,584	1,278,017	0	1.095	1.031	17,622,706	0.999	17,605,084	1.170	20,600,386
2020	21,260,363	4,617,114	115,428	1.095	1.031	18,614,072	0.999	18,595,458	1.170	21,759,261
2021	15,781,493	0	277,987	1.095	1.031	17,460,461	1.011	17,652,317	1.170	20,655,655

(1) Based on data provided by member companies

(2) From Section C, Page 29

(3) From Section C, Page 31

(4) From Section C, Page 28

(5) From Section C, Page 30

(6) = [(1) - (2) - (3)] x [(4) + (5) - 1]

(7) From Section C, Page 32

(9) From Section C, Page 47

**North Carolina
Mobile Homeowners
MH(F) - Tenants**

Determination of Base Class Loss Cost

(1)	(2)	(3)	(4)	(5) = [(1) x (2)] / [(3) x (4)]	(6)	(7) = (5) / (6)	(8)	
Accident Year	Non-Hurricane Ultimate Loss and LAE	Loss Trend Factor	Earned House Years	Premium Trend Factor	Trended Average Loss Cost	Average Rating Factor	Trended Base Class Loss Cost	Accident Year Weights
2017	\$12,160	1.005	588	1.050	\$19.80	2.595	\$7.63	20.0%
2018	54,918	1.020	632	1.045	84.79	2.619	32.37	20.0%
2019	1,974	1.034	641	1.040	3.07	2.613	1.17	20.0%
2020	5,560	1.049	672	1.034	8.39	2.600	3.23	20.0%
2021	12,367	1.064	700	1.029	18.26	2.676	6.83	20.0%

(9) Weighted Average Non-Hurricane Base Class Loss Cost: \$10.25

(10) Credibility: 13.0%

(11) Complement of Credibility: \$59.49

(12) Credibility-Weighted Loss Cost: \$53.07

(13) Modeled Hurricane Base Class Loss Cost: \$3.76

(14) Total Base Class Loss Cost: \$56.83

(1) From Section C, Page 5

(2) From Section C, Page 34

(3) Based on data provided by member companies

(4) From Section C, Page 39

(6) From Section C, Page 40

(9) Average of (7) based on the weights in (8)

(10) Based on the Square Root Rule using a Full-Credibility Standard of 190,000 earned house years

(11) From Section C, Page 42

(12) = (9) x (10) + (11) x [1 - (10)]

(13) From Section C, Page 43

(14) = (12) + (13)

**North Carolina
Mobile Homeowners
MH(F) - Tenants**

Determination of Non-Hurricane Ultimate Loss & LAE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8) = (6) x (7)	(9)	(10) = (8) x (9)
Accident Year	Non-Hurricane Incurred Loss & ALAE	Excess Wind Loss & ALAE	Excess Flood Loss & ALAE	Excess Wind Loss Factor	Excess Flood Loss Factor	Adjusted Non-Hurricane Incurred Loss & ALAE	Loss & ALAE Development Factor	Non-Hurricane Ultimate Loss & ALAE	ULAE Factor	Non-Hurricane Ultimate Loss and LAE
2017	\$9,227	\$0	\$0	1.095	1.031	\$10,392	1.000	\$10,392	1.170	\$12,160
2018	41,673	0	0	1.095	1.031	46,933	1.000	46,933	1.170	54,918
2019	1,648	149	0	1.095	1.031	1,689	0.999	1,687	1.170	1,974
2020	4,223	0	0	1.095	1.031	4,757	0.999	4,752	1.170	5,560
2021	34,660	0	25,378	1.095	1.031	10,454	1.011	10,568	1.170	12,367

(1) Based on data provided by member companies

(2) From Section C, Page 29

(3) From Section C, Page 31

(4) From Section C, Page 28

(5) From Section C, Page 30

(6) = [(1) - (2) - (3)] x [(4) + (5) - 1]

(7) From Section C, Page 32

(9) From Section C, Page 47

**North Carolina
Mobile Homeowners
MH(F) - Owners**

Determination of Indicated Rate Change by Territory Group

	(1)	(2)	(3) = (2)(Statewide) / (2) x (3)(Statewide)	(4)	(5)	(6) = [(1) + (3)] / [1 - (4)]	(7)	(8)	(9) = (6) + (7) + (8)	(10)	(11) = (9) + (10)	(12) = (11) / (5) - 1	(13)	(14)	(15)
Territory Group	Indicated Base Class Loss Cost	2021 Average Rating Factor	Trended Fixed Expenses	Variable Expenses	Average Current Base Rate	Indicated Net Base Rate	Compensation for Assessment Risk	Net Cost of Reinsurance	Indicated Base Rate Excluding Deviation	Net Deviation Per Exposure	Indicated Required Base Class Rate	Indicated Rate Change	Balanced Indicated Rate Change	Proposed Year 1 Rate Change	Proposed Year 2 Rate Change
1	\$846.12	1.761	\$53.40	28.7%	\$810.17	\$1,260.71	\$16.47	\$1,004.41	\$2,281.60	\$120.08	\$2,401.68	196.4%	195.9%	63.6%	63.6%
2	522.97	1.730	54.36	28.7%	721.98	809.16	14.68	587.05	1,410.88	74.26	1,485.14	105.7%	105.3%	37.9%	37.9%
3	458.37	1.635	57.53	28.7%	561.75	723.05	11.42	433.13	1,167.60	61.45	1,229.05	118.8%	118.4%	41.9%	41.9%
4	387.22	1.808	52.02	28.7%	537.43	615.60	10.93	269.79	896.32	47.17	943.50	75.6%	75.2%	28.2%	28.2%
5	359.79	1.770	53.13	28.7%	471.42	578.72	9.59	186.86	775.17	40.80	815.97	73.1%	72.8%	27.4%	27.4%
6	253.16	1.767	53.23	28.7%	366.14	429.42	7.45	60.21	497.07	26.16	523.23	42.9%	42.6%	16.8%	16.8%
Statewide	\$370.99	1.736	\$54.17	28.7%	\$484.71	\$595.88	\$9.86	\$258.03	\$863.76	\$45.46	\$909.22	87.9%	87.6%	31.5%	33.1%

(1) From Section C, Page 7

(2), (5) From Section C, Page 41

(3) Statewide from Section C, Page 1

(4) From Section C, Page 46. Includes Commission and Brokerage expense; Taxes, Licenses, and Fees; Profit; Contingencies; and Policyholder Dividends

(7) = (5) x 0.020; Reflects 2.0% Compensation for Assessment Risk from Section C, Page 49, Row (5)

(8) From Section C, Page 50

(10) = (9) / [1 - 0.05] - (9); Reflects 5% Net Deviation selected on Section C, Page 52

(12) Statewide based on premium-weighted average using the 2021 earned premium at current manual level

(13) = [1 + (12)] / [1 + (12) Statewide] x [1 + (13) Statewide]; Statewide (13) from Section C, Page 1

(14), (15) From Section A, Page 2

**North Carolina
Mobile Homeowners
MH(F) - Owners**

Determination of Indicated Base Class Loss Cost by Territory Group

	(1)	(2)	(3)	(4)	(5)	(6) = (4) / (4) Statewide	(7)	(8)	(9) = (7) + (8)	(10) = (9) / (9) Statewide	(11)
Territory Group	Non-Hurricane Base Class Loss Cost	Five Year Earned House Years	Credibility	Credibility Weighted Non-Hurricane Base Class Loss Cost	2021 Earned House Years	Indicated Relativity	Indicated Non-Hurricane Base Class Loss Cost	Modeled Hurricane Base Class Loss Cost	Total Loss Cost	Indicated Relativity	Indicated Base Class Loss Cost
1	\$208.84	15,935	72.9%	\$217.75	3,297	0.901	\$217.81	\$626.23	\$844.04	2.281	\$846.12
2	199.12	18,901	79.4%	207.90	3,772	0.860	207.96	313.72	521.68	1.410	522.97
3	257.40	68,937	100.0%	257.40	13,203	1.065	257.48	199.76	457.24	1.236	458.37
4	269.01	36,363	100.0%	269.01	6,900	1.113	269.09	117.17	386.26	1.044	387.22
5	281.74	42,812	100.0%	281.74	7,928	1.166	281.82	77.08	358.90	0.970	359.79
6	223.52	152,570	100.0%	223.52	28,145	0.925	223.58	28.95	252.53	0.682	253.16
Statewide	\$241.69	335,518		\$241.62	63,245	1.000	\$241.69	\$129.30	\$370.08	1.000	\$370.99

(1) From Section C, Pages 9 through 14; Statewide from Section C, Page 2

(2), (5) Based on data provided by member companies

(3) Based on the Square Root Rule using a Full-Credibility Standard of 30,000 earned house years

(4) = (1) x (3) + (1) Statewide x [1 - (3)]

(7) = (6) x (7) Statewide; (7) Statewide From Section C, Page 2

(8) From Section C, Page 8

(11) = (10) x (11) Statewide; (11) Statewide From Section C, Page 2

**North Carolina
Mobile Homeowners
MH(F) - Owners**

Determination of Modeled Hurricane Base Class Lost Cost by Territory Group

	(1)	(2)	(3)	(4)	(5) = (1) / [(2) x (3) x (4)]
Territory Group	Trended Modeled Hurricane Loss & LAE	2021 Earned House Years	2021 Premium Trend Factor	2021 Average Rating Factor	Modeled Hurricane Base Class Loss Cost
1	\$3,780,806	3,080	1.113	1.761	\$626.23
2	2,128,401	3,524	1.113	1.730	313.72
3	4,283,646	11,787	1.113	1.635	199.76
4	1,437,881	6,099	1.113	1.808	117.17
5	1,034,730	6,815	1.113	1.770	77.08
6	1,429,443	25,112	1.113	1.767	28.95
Statewide	\$14,094,908	56,416	1.113	1.736	\$129.30

(1) Provided by Aon

(2) Based on data provided by member companies; excludes exposure where amount of insurance is unavailable

(3) From Section C, Page 39

(4) From Section C, Page 41

**North Carolina
Mobile Homeowners
MH(F) - Owners
Territory Group 1**

Determination of Non-Hurricane Base Class Loss Cost

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8) = (6) x (7)	(9)	(10) = (8) x (9)
Accident Year	Non-Hurricane Incurred Loss & ALAE	Excess Wind Loss & ALAE	Excess Flood Loss & ALAE	Excess Wind Loss Factor	Excess Flood Loss Factor	Adjusted Non-Hurricane Incurred Loss & ALAE	Loss & ALAE Development Factor	Non-Hurricane Ultimate Loss & ALAE	ULAE Factor	Non-Hurricane Ultimate Loss and LAE
2017	\$758,011	\$0	\$0	1.095	1.031	\$853,692	1.000	\$853,692	1.170	\$998,938
2018	698,282	0	0	1.095	1.031	786,424	1.000	786,424	1.170	920,225
2019	398,610	6,182	0	1.095	1.031	441,963	0.999	441,521	1.170	516,640
2020	357,712	30,381	0	1.095	1.031	368,648	0.999	368,280	1.170	430,938
2021	1,255,967	0	0	1.095	1.031	1,414,504	1.011	1,430,046	1.170	1,673,352

	(11)	(12)	(13)	(14) = [(10) x (11)] / [(12) x (13)]	(15)	(16)	(17) (15) / (16)	(18) (14) / (17)	(19)
Accident Year	Loss Trend Factor	Earned House Years	Premium Trend Factor	Trended Average Loss Cost	Earned Premium at Current Manual Level	Earned Premium at Current Base	Average Rating Factor	Trended Base Class Loss Cost	Accident Year Weights
2017	1.612	3,145	1.267	\$404.10	\$3,445,178	\$2,279,762	1.511	\$267.41	10.0%
2018	1.521	3,153	1.227	361.86	3,605,867	2,308,881	1.562	231.70	15.0%
2019	1.435	3,127	1.188	199.60	3,751,228	2,323,215	1.615	123.62	20.0%
2020	1.354	3,213	1.150	157.91	4,062,311	2,408,405	1.687	93.62	25.0%
2021	1.277	3,297	1.113	582.42	4,394,732	2,495,439	1.761	330.71	30.0%

(20) Weighted Average Non-Hurricane Base Class Loss Cost: \$208.84

(1), (12) Based on data provided by member companies

(2) From Section C, Page 15

(3) From Section C, Page 16

(4) From Section C, Page 28

(5) From Section C, Page 30

(7) From Section C, Page 32

(9) From Section C, Page 47

(11) From Section C, Page 34

(13) From Section C, Page 39

(15), (16) Based on data provided by member companies and the extension of exposures method

See Section E, Page 9 for more details as well as an example related to the calculation of premium at present (manual) rates.

See Explanatory Memorandum (Average Rating Factors) for definitions of the base class.

(20) Average of (18) based on the weights in (19)

**North Carolina
Mobile Homeowners
MH(F) - Owners
Territory Group 2**

Determination of Non-Hurricane Base Class Loss Cost

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8) = (6) x (7)	(9)	(10) = (8) x (9)
Accident Year	Non-Hurricane Incurred Loss & ALAE	Excess Wind Loss & ALAE	Excess Flood Loss & ALAE	Excess Wind Loss Factor	Excess Flood Loss Factor	Adjusted Non-Hurricane Incurred Loss & ALAE	Loss & ALAE Development Factor	Non-Hurricane Ultimate Loss & ALAE	ULAE Factor	Non-Hurricane Ultimate Loss and LAE
2017	\$541,550	\$0	\$0	1.095	1.031	\$609,908	1.000	\$609,908	1.170	\$713,677
2018	996,407	0	0	1.095	1.031	1,122,180	1.000	1,122,180	1.170	1,313,107
2019	679,500	9,636	0	1.095	1.031	754,419	0.999	753,665	1.170	881,893
2020	911,183	138,010	0	1.095	1.031	870,768	0.999	869,897	1.170	1,017,900
2021	867,140	0	0	1.095	1.031	976,596	1.011	987,327	1.170	1,155,309

	(11)	(12)	(13)	(14) = [(10) x (11)] / [(12) x (13)]	(15)	(16)	(17) (15) / (16)	(18) (14) / (17)	(19)
Accident Year	Loss Trend Factor	Earned House Years	Premium Trend Factor	Trended Average Loss Cost	Earned Premium at Current Manual Level	Earned Premium at Current Base	Average Rating Factor	Trended Base Class Loss Cost	Accident Year Weights
2017	1.612	3,826	1.267	\$237.31	\$3,889,347	\$2,517,907	1.545	\$153.63	10.0%
2018	1.521	3,812	1.227	427.00	4,003,493	2,527,839	1.584	269.61	15.0%
2019	1.435	3,751	1.188	284.07	4,088,742	2,505,376	1.632	174.07	20.0%
2020	1.354	3,740	1.150	320.49	4,229,142	2,509,727	1.685	190.19	25.0%
2021	1.277	3,772	1.113	351.44	4,400,846	2,544,129	1.730	203.17	30.0%

(20) Weighted Average Non-Hurricane Base Class Loss Cost: \$199.12

(1), (12) Based on data provided by member companies

(2) From Section C, Page 15

(3) From Section C, Page 16

(4) From Section C, Page 28

(5) From Section C, Page 30

(7) From Section C, Page 32

(9) From Section C, Page 47

(11) From Section C, Page 34

(13) From Section C, Page 39

(15), (16) Based on data provided by member companies and the extension of exposures method

See Section E, Page 9 for more details as well as an example related to the calculation of premium at present (manual) rates.

See Explanatory Memorandum (Average Rating Factors) for definitions of the base class.

(20) Average of (18) based on the weights in (19)

**North Carolina
Mobile Homeowners
MH(F) - Owners
Territory Group 3**

Determination of Non-Hurricane Base Class Loss Cost

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8) = (6) x (7)	(9)	(10) = (8) x (9)
Accident Year	Non-Hurricane Incurred Loss & ALAE	Excess Wind Loss & ALAE	Excess Flood Loss & ALAE	Excess Wind Loss Factor	Excess Flood Loss Factor	Adjusted Non-Hurricane Incurred Loss & ALAE	Loss & ALAE Development Factor	Non-Hurricane Ultimate Loss & ALAE	ULAE Factor	Non-Hurricane Ultimate Loss and LAE
2017	\$3,946,793	\$0	\$0	1.095	1.031	\$4,444,984	1.000	\$4,444,984	1.170	\$5,201,246
2018	7,356,617	0	3,414,983	1.095	1.031	4,439,173	1.000	4,439,173	1.170	5,194,447
2019	3,483,196	216,379	0	1.095	1.031	3,679,176	0.999	3,675,497	1.170	4,300,840
2020	4,552,664	838,553	7,907	1.095	1.031	4,174,026	0.999	4,169,852	1.170	4,879,304
2021	2,982,088	0	9,960	1.095	1.031	3,347,290	1.011	3,384,070	1.170	3,959,830

	(11)	(12)	(13)	(14) = [(10) x (11)] / [(12) x (13)]	(15)	(16)	(17) (15) / (16)	(18) (14) / (17)	(19)
Accident Year	Loss Trend Factor	Earned House Years	Premium Trend Factor	Trended Average Loss Cost	Earned Premium at Current Manual Level	Earned Premium at Current Base	Average Rating Factor	Trended Base Class Loss Cost	Accident Year Weights
2017	1.612	14,331	1.267	\$461.70	\$10,241,172	\$6,950,080	1.474	\$313.33	10.0%
2018	1.521	14,204	1.227	453.40	10,464,714	6,964,292	1.503	301.74	15.0%
2019	1.435	14,022	1.188	370.59	10,667,444	6,939,137	1.537	241.07	20.0%
2020	1.354	13,177	1.150	435.97	10,258,002	6,535,266	1.570	277.75	25.0%
2021	1.277	13,203	1.113	344.13	10,814,704	6,616,004	1.635	210.52	30.0%

(20) Weighted Average Non-Hurricane Base Class Loss Cost: \$257.40

(1), (12) Based on data provided by member companies

(2) From Section C, Page 15

(3) From Section C, Page 16

(4) From Section C, Page 28

(5) From Section C, Page 30

(7) From Section C, Page 32

(9) From Section C, Page 47

(11) From Section C, Page 34

(13) From Section C, Page 39

(15), (16) Based on data provided by member companies and the extension of exposures method

See Section E, Page 9 for more details as well as an example related to the calculation of premium at present (manual) rates.

See Explanatory Memorandum (Average Rating Factors) for definitions of the base class.

(20) Average of (18) based on the weights in (19)

**North Carolina
Mobile Homeowners
MH(F) - Owners
Territory Group 4**

Determination of Non-Hurricane Base Class Loss Cost

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8) = (6) x (7)	(9)	(10) = (8) x (9)
Accident Year	Non-Hurricane Incurred Loss & ALAE	Excess Wind Loss & ALAE	Excess Flood Loss & ALAE	Excess Wind Loss Factor	Excess Flood Loss Factor	Adjusted Non-Hurricane Incurred Loss & ALAE	Loss & ALAE Development Factor	Non-Hurricane Ultimate Loss & ALAE	ULAE Factor	Non-Hurricane Ultimate Loss and LAE
2017	\$2,509,819	\$0	\$0	1.095	1.031	\$2,826,625	1.000	\$2,826,625	1.170	\$3,307,543
2018	2,170,128	0	49,007	1.095	1.031	2,388,864	1.000	2,388,864	1.170	2,795,301
2019	3,072,746	310,815	0	1.095	1.031	3,110,560	0.999	3,107,449	1.170	3,636,146
2020	2,399,174	693,887	9,468	1.095	1.031	1,909,876	0.999	1,907,966	1.170	2,232,585
2021	1,786,251	0	0	1.095	1.031	2,011,723	1.011	2,033,828	1.170	2,379,861

	(11)	(12)	(13)	(14) = [(10) x (11)] / [(12) x (13)]	(15)	(16)	(17) (15) / (16)	(18) (14) / (17)	(19)
Accident Year	Loss Trend Factor	Earned House Years	Premium Trend Factor	Trended Average Loss Cost	Earned Premium at Current Manual Level	Earned Premium at Current Base	Average Rating Factor	Trended Base Class Loss Cost	Accident Year Weights
2017	1.612	7,598	1.267	\$553.80	\$5,528,033	\$3,490,929	1.584	\$349.72	10.0%
2018	1.521	7,508	1.227	461.58	5,652,124	3,487,432	1.621	284.80	15.0%
2019	1.435	7,411	1.188	592.77	5,822,082	3,479,317	1.673	354.24	20.0%
2020	1.354	6,946	1.150	378.44	5,636,574	3,264,587	1.727	219.18	25.0%
2021	1.277	6,900	1.113	395.75	5,923,984	3,276,941	1.808	218.92	30.0%

(20) Weighted Average Non-Hurricane Base Class Loss Cost: \$269.01

(1), (12) Based on data provided by member companies

(2) From Section C, Page 15

(3) From Section C, Page 16

(4) From Section C, Page 28

(5) From Section C, Page 30

(7) From Section C, Page 32

(9) From Section C, Page 47

(11) From Section C, Page 34

(13) From Section C, Page 39

(15), (16) Based on data provided by member companies and the extension of exposures method

See Section E, Page 9 for more details as well as an example related to the calculation of premium at present (manual) rates.

See Explanatory Memorandum (Average Rating Factors) for definitions of the base class.

(20) Average of (18) based on the weights in (19)

**North Carolina
Mobile Homeowners
MH(F) - Owners
Territory Group 5**

Determination of Non-Hurricane Base Class Loss Cost

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8) = (6) x (7)	(9)	(10) = (8) x (9)
Accident Year	Non-Hurricane Incurred Loss & ALAE	Excess Wind Loss & ALAE	Excess Flood Loss & ALAE	Excess Wind Loss Factor	Excess Flood Loss Factor	Adjusted Non-Hurricane Incurred Loss & ALAE	Loss & ALAE Development Factor	Non-Hurricane Ultimate Loss & ALAE	ULAE Factor	Non-Hurricane Ultimate Loss and LAE
2017	\$2,592,460	\$0	\$0	1.095	1.031	\$2,919,697	1.000	\$2,919,697	1.170	\$3,416,450
2018	2,307,298	0	37,575	1.095	1.031	2,556,222	1.000	2,556,222	1.170	2,991,134
2019	2,428,041	231,850	0	1.095	1.031	2,473,408	0.999	2,470,935	1.170	2,891,336
2020	3,221,750	776,853	0	1.095	1.031	2,753,508	0.999	2,750,754	1.170	3,218,763
2021	2,886,384	0	0	1.095	1.031	3,250,722	1.011	3,286,441	1.170	3,845,591

	(11)	(12)	(13)	(14) = [(10) x (11)] / [(12) x (13)]	(15)	(16)	(17) (15) / (16)	(18) (14) / (17)	(19)
Accident Year	Loss Trend Factor	Earned House Years	Premium Trend Factor	Trended Average Loss Cost	Earned Premium at Current Manual Level	Earned Premium at Current Base	Average Rating Factor	Trended Base Class Loss Cost	Accident Year Weights
2017	1.612	9,008	1.267	\$482.50	\$5,467,618	\$3,511,815	1.557	\$309.90	10.0%
2018	1.521	8,941	1.227	414.76	5,618,661	3,537,561	1.588	261.14	15.0%
2019	1.435	8,808	1.188	396.61	5,759,348	3,522,262	1.635	242.55	20.0%
2020	1.354	8,127	1.150	466.32	5,514,884	3,251,120	1.696	274.91	25.0%
2021	1.277	7,928	1.113	556.54	5,682,480	3,210,725	1.770	314.46	30.0%

(20) Weighted Average Non-Hurricane Base Class Loss Cost: \$281.74

(1), (12) Based on data provided by member companies

(2) From Section C, Page 15

(3) From Section C, Page 16

(4) From Section C, Page 28

(5) From Section C, Page 30

(7) From Section C, Page 32

(9) From Section C, Page 47

(11) From Section C, Page 34

(13) From Section C, Page 39

(15), (16) Based on data provided by member companies and the extension of exposures method

See Section E, Page 9 for more details as well as an example related to the calculation of premium at present (manual) rates.

See Explanatory Memorandum (Average Rating Factors) for definitions of the base class.

(20) Average of (18) based on the weights in (19)

**North Carolina
Mobile Homeowners
MH(F) - Owners
Territory Group 6**

Determination of Non-Hurricane Base Class Loss Cost

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8) = (6) x (7)	(9)	(10) = (8) x (9)
Accident Year	Non-Hurricane Incurred Loss & ALAE	Excess Wind Loss & ALAE	Excess Flood Loss & ALAE	Excess Wind Loss Factor	Excess Flood Loss Factor	Adjusted Non-Hurricane Incurred Loss & ALAE	Loss & ALAE Development Factor	Non-Hurricane Ultimate Loss & ALAE	ULAE Factor	Non-Hurricane Ultimate Loss and LAE
2017	\$7,731,272	\$0	\$0	1.095	1.031	\$8,707,165	1.000	\$8,707,165	1.170	\$10,188,588
2018	9,183,064	0	99,804	1.095	1.031	10,229,809	1.000	10,229,809	1.170	11,970,293
2019	6,863,491	503,154	0	1.095	1.031	7,163,180	0.999	7,156,017	1.170	8,373,531
2020	9,817,882	2,139,431	98,053	1.095	1.031	8,537,246	0.999	8,528,709	1.170	9,979,770
2021	6,002,748	0	268,027	1.095	1.031	6,458,596	1.011	6,529,563	1.170	7,640,493

	(11)	(12)	(13)	(14) = [(10) x (11)] / [(12) x (13)]	(15)	(16)	(17) (15) / (16)	(18) (14) / (17)	(19)
Accident Year	Loss Trend Factor	Earned House Years	Premium Trend Factor	Trended Average Loss Cost	Earned Premium at Current Manual Level	Earned Premium at Current Base	Average Rating Factor	Trended Base Class Loss Cost	Accident Year Weights
2017	1.612	32,154	1.267	\$403.11	\$15,664,867	\$10,238,221	1.530	\$263.46	10.0%
2018	1.521	31,960	1.227	464.34	16,194,183	10,288,302	1.574	295.00	15.0%
2019	1.435	31,499	1.188	321.18	16,591,432	10,225,237	1.623	197.94	20.0%
2020	1.354	28,812	1.150	407.83	15,750,307	9,336,610	1.687	241.76	25.0%
2021	1.277	28,145	1.113	311.49	16,237,850	9,191,498	1.767	176.32	30.0%

(20) Weighted Average Non-Hurricane Base Class Loss Cost: \$223.52

(1), (12) Based on data provided by member companies

(2) From Section C, Page 15

(3) From Section C, Page 16

(4) From Section C, Page 28

(5) From Section C, Page 30

(7) From Section C, Page 32

(9) From Section C, Page 47

(11) From Section C, Page 34

(13) From Section C, Page 39

(15), (16) Based on data provided by member companies and the extension of exposures method

See Section E, Page 9 for more details as well as an example related to the calculation of premium at present (manual) rates.

See Explanatory Memorandum (Average Rating Factors) for definitions of the base class.

(20) Average of (18) based on the weights in (19)

**North Carolina
Mobile Homeowners
MH(F) - Owners**

Allocation of Excess Wind Loss & ALAE to Territory Group

(1) (2) (3) (4) (5) (6) (7)

Distribution of Wind & Hail Losses by Territory Group by Year

Accident Year	Territory Group 1	Territory Group 2	Territory Group 3	Territory Group 4	Territory Group 5	Territory Group 6	Statewide
2017	1.268%	1.481%	18.699%	9.725%	13.891%	54.936%	100.000%
2018	2.366%	4.510%	17.784%	12.281%	13.729%	49.331%	100.000%
2019	0.484%	0.754%	16.931%	24.320%	18.141%	39.370%	100.000%
2020	0.658%	2.989%	18.162%	15.029%	16.826%	46.337%	100.000%
2021	3.674%	2.769%	21.877%	15.802%	17.663%	38.215%	100.000%

(8) (9) (10) (11) (12) (13) (14)
 = (1) x (8) = (2) x (8) = (3) x (8) = (4) x (8) = (5) x (8) = (6) x (8)

Excess Wind Loss & ALAE

Accident Year	Statewide	Territory Group 1	Territory Group 2	Territory Group 3	Territory Group 4	Territory Group 5	Territory Group 6
2017	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2018	0	0	0	0	0	0	0
2019	1,278,017	6,182	9,636	216,379	310,815	231,850	503,154
2020	4,617,114	30,381	138,010	838,553	693,887	776,853	2,139,431
2021	0	0	0	0	0	0	0

(1) - (6) Based on data provided by member companies

(7) = Sum of (1) through (6)

(8) From Section C, Page 29

**North Carolina
Mobile Homeowners
MH(F) - Owners**

Allocation of Excess Flood Loss & ALAE to Territory Group

(1) (2) (3) (4) (5) (6) (7)

Distribution of Flood Losses by Territory Group by Year

Accident Year	Territory Group 1	Territory Group 2	Territory Group 3	Territory Group 4	Territory Group 5	Territory Group 6	Statewide
2017	0.000%	0.000%	0.000%	8.087%	78.519%	13.394%	100.000%
2018	0.000%	0.000%	94.825%	1.361%	1.043%	2.771%	100.000%
2019	0.000%	8.374%	11.352%	0.000%	2.750%	77.524%	100.000%
2020	0.000%	0.000%	6.850%	8.203%	0.000%	84.947%	100.000%
2021	0.000%	0.000%	3.583%	0.000%	0.000%	96.417%	100.000%

(8) (9) (10) (11) (12) (13) (14)
 = (1) x (8) = (2) x (8) = (3) x (8) = (4) x (8) = (5) x (8) = (6) x (8)

Excess Flood Loss & ALAE

Accident Year	Statewide	Territory Group 1	Territory Group 2	Territory Group 3	Territory Group 4	Territory Group 5	Territory Group 6
2017	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2018	3,601,369	0	0	3,414,983	49,007	37,575	99,804
2019	0	0	0	0	0	0	0
2020	115,428	0	0	7,907	9,468	0	98,053
2021	277,987	0	0	9,960	0	0	268,027

(1) - (6) Based on data provided by member companies

(7) = Sum of (1) through (6)

(8) From Section C, Page 31

**North Carolina
Mobile Homeowners
MH(F) - Tenants**

Determination of Indicated Rate Change by Territory Group

	(1)	(2)	(3) = (2)(Statewide) / (2) x (3)(Statewide)	(4)	(5)	(6) = [(1) + (3)] / [1 - (4)]	(7)	(8)	(9) = (6) + (7) + (8)	(10)	(11) = (9) + (10)	(12) = (11) / (5) - 1	(13)	(14)	(15)
Territory Group	Indicated Base Class Loss Cost	2021 Average Rating Factor	Trended Fixed Expenses	Variable Expenses	Average Current Base Rate	Indicated Net Base Rate	Compensation for Assessment Risk	Net Cost of Reinsurance	Indicated Base Rate Excluding Deviation	Net Deviation Per Exposure	Indicated Required Base Class Rate	Indicated Rate Change	Balanced Indicated Rate Change	Proposed Year 1 Rate Change	Proposed Year 2 Rate Change
1	\$89.84	1.902	\$10.72	28.7%	\$104.66	\$140.94	\$2.13	\$69.77	\$212.84	\$11.20	\$224.05	114.1%	113.9%	46.3%	46.3%
2	77.19	2.046	9.96	28.7%	99.88	122.15	2.03	56.82	181.00	9.53	190.53	90.8%	90.6%	38.1%	38.1%
3	70.03	2.641	7.72	28.7%	73.60	108.97	1.50	22.14	132.61	6.98	139.58	89.7%	89.5%	37.7%	37.7%
4	56.56	2.883	7.07	28.7%	64.92	89.18	1.32	11.78	102.27	5.38	107.66	65.8%	65.7%	28.7%	28.7%
5	53.98	2.834	7.19	28.7%	57.56	85.74	1.17	6.65	93.57	4.92	98.49	71.1%	71.0%	30.8%	30.8%
6	52.22	2.669	7.64	28.7%	55.35	83.89	1.13	2.13	87.14	4.59	91.73	65.7%	65.6%	28.7%	28.7%
Statewide	\$56.83	2.676	\$7.62	28.7%	\$61.33	\$90.33	\$1.25	\$8.69	\$100.27	\$5.28	\$105.54	72.2%	72.1%	31.1%	31.3%

(1) From Section C, Page 18

(2), (5) From Section C, Page 41

(3) Statewide from Section C, Page 1

(4) From Section C, Page 46. Includes Commission and Brokerage expense; Taxes, Licenses, and Fees; Profit; Contingencies; and Policyholder Dividends

(7) = (5) x 0.020; Reflects 2.0% Compensation for Assessment Risk from Section C, Page 49, Row (5)

(8) From Section C, Page 51

(10) = (9) / [1 - 0.05] - (9); Reflects 5% Net Deviation selected on Section C, Page 52

(12) Statewide based on premium-weighted average using the 2021 earned premium at current manual level

(13) = [1 + (12)] / [1 + (12) Statewide] x [1 + (13) Statewide]; Statewide (13) from Section C, Page 1

(14), (15) From Section A, Page 2

**North Carolina
Mobile Homeowners
MH(F) - Tenants**

Determination of Indicated Base Class Loss Cost by Territory Group

	(1)	(2)	(3)	(4)	(5)	(6) = (4) / (4) Statewide	(7)	(8)	(9) = (7) + (8)	(10) = (9) / (9) Statewide	(11)
Territory Group	Non-Hurricane Base Class Loss Cost	Five Year Earned House Years	Credibility	Credibility Weighted Non-Hurricane Base Class Loss Cost	2021 Earned House Years	Indicated Relativity	Indicated Non-Hurricane Base Class Loss Cost	Modeled Hurricane Base Class Loss Cost	Total Loss Cost	Indicated Relativity	Indicated Base Class Loss Cost
1	\$0.00	56	1.7%	\$10.07	11	0.996	\$52.86	\$37.31	\$90.18	1.581	\$89.84
2	0.00	49	1.6%	10.08	12	0.997	52.92	24.55	77.47	1.358	77.19
3	34.23	593	5.6%	11.58	111	1.146	60.82	9.47	70.29	1.232	70.03
4	3.70	489	5.1%	9.91	100	0.981	52.04	4.73	56.77	0.995	56.56
5	0.00	339	4.2%	9.81	76	0.971	51.51	2.67	54.18	0.950	53.98
6	5.53	1,706	9.5%	9.80	391	0.969	51.44	0.97	52.41	0.919	52.22
Statewide	\$10.25	3,233		\$10.11	700	1.000	\$53.07	\$3.76	\$57.04	1.000	\$56.83

(1) From Section C, Pages 20 through 25; Statewide from Section C, Page 4

(2), (5) Based on data provided by member companies

(3) Based on the Square Root Rule using a Full-Credibility Standard of 190,000 earned house years

(4) = (1) x (3) + (1) Statewide x [1 - (3)]

(7) = (6) x (7) Statewide; (7) Statewide From Section C, Page 4

(8) From Section C, Page 19

(11) = (10) x (11) Statewide; (11) Statewide From Section C, Page 4

**North Carolina
Mobile Homeowners
MH(F) - Tenants**

Determination of Modeled Hurricane Base Class Lost Cost by Territory Group

	(1)	(2)	(3)	(4)	(5) = (1) / [(2) x (3) x (4)]
Territory Group	Trended Modeled Hurricane Loss & LAE	2021 Earned House Years	2021 Premium Trend Factor	2021 Average Rating Factor	Modeled Hurricane Base Class Loss Cost
1	\$768	11	1.029	1.902	\$37.31
2	606	12	1.029	2.046	24.55
3	2,851	111	1.029	2.641	9.47
4	1,403	100	1.029	2.883	4.73
5	595	76	1.029	2.834	2.67
6	1,037	391	1.029	2.669	0.97
Statewide	\$7,260	700	1.029	2.676	\$3.76

(1) Provided by Aon

(2) Based on data provided by member companies; excludes exposure where amount of insurance is unavailable

(3) From Section C, Page 39

(4) From Section C, Page 41

**North Carolina
Mobile Homeowners
MH(F) - Tenants
Territory Group 1**

Determination of Non-Hurricane Base Class Loss Cost

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8) = (6) x (7)	(9)	(10) = (8) x (9)
Accident Year	Non-Hurricane Incurred Loss & ALAE	Excess Wind Loss & ALAE	Excess Flood Loss & ALAE	Excess Wind Loss Factor	Excess Flood Loss Factor	Adjusted Non-Hurricane Incurred Loss & ALAE	Loss & ALAE Development Factor	Non-Hurricane Ultimate Loss & ALAE	ULAE Factor	Non-Hurricane Ultimate Loss and LAE
2017	\$0	\$0	\$0	1.095	1.031	\$0	1.000	\$0	1.170	\$0
2018	0	0	0	1.095	1.031	0	1.000	0	1.170	0
2019	0	0	0	1.095	1.031	0	0.999	0	1.170	0
2020	0	0	0	1.095	1.031	0	0.999	0	1.170	0
2021	0	0	0	1.095	1.031	0	1.011	0	1.170	0

	(11)	(12)	(13)	(14) = [(10) x (11)] / [(12) x (13)]	(15)	(16)	(17) (15) / (16)	(18) (14) / (17)	(19)
Accident Year	Loss Trend Factor	Earned House Years	Premium Trend Factor	Trended Average Loss Cost	Earned Premium at Current Manual Level	Earned Premium at Current Base	Average Rating Factor	Trended Base Class Loss Cost	Accident Year Weights
2017	1.005	12	1.050	\$0.00	\$3,121	\$1,281	2.435	\$0.00	20.0%
2018	1.020	10	1.045	0.00	3,428	1,040	3.296	0.00	20.0%
2019	1.034	12	1.040	0.00	3,549	1,220	2.909	0.00	20.0%
2020	1.049	12	1.034	0.00	2,352	1,250	1.882	0.00	20.0%
2021	1.064	11	1.029	0.00	2,094	1,101	1.902	0.00	20.0%

(20) Weighted Average Non-Hurricane Base Class Loss Cost: \$0.00

(1), (12) Based on data provided by member companies

(2) From Section C, Page 26

(3) From Section C, Page 27

(4) From Section C, Page 28

(5) From Section C, Page 30

(7) From Section C, Page 32

(9) From Section C, Page 47

(11) From Section C, Page 34

(13) From Section C, Page 39

(15), (16) Based on data provided by member companies and the extension of exposures method

See Section E, Page 9 for more details as well as an example related to the calculation of premium at present (manual) rates.

See Explanatory Memorandum (Average Rating Factors) for definitions of the base class.

(20) Average of (18) based on the weights in (19)

**North Carolina
Mobile Homeowners
MH(F) - Tenants
Territory Group 2**

Determination of Non-Hurricane Base Class Loss Cost

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8) = (6) x (7)	(9)	(10) = (8) x (9)
Accident Year	Non-Hurricane Incurred Loss & ALAE	Excess Wind Loss & ALAE	Excess Flood Loss & ALAE	Excess Wind Loss Factor	Excess Flood Loss Factor	Adjusted Non-Hurricane Incurred Loss & ALAE	Loss & ALAE Development Factor	Non-Hurricane Ultimate Loss & ALAE	ULAE Factor	Non-Hurricane Ultimate Loss and LAE
2017	\$0	\$0	\$0	1.095	1.031	\$0	1.000	\$0	1.170	\$0
2018	0	0	0	1.095	1.031	0	1.000	0	1.170	0
2019	0	0	0	1.095	1.031	0	0.999	0	1.170	0
2020	0	0	0	1.095	1.031	0	0.999	0	1.170	0
2021	0	0	0	1.095	1.031	0	1.011	0	1.170	0

	(11)	(12)	(13)	(14) = [(10) x (11)] / [(12) x (13)]	(15)	(16)	(17) (15) / (16)	(18) (14) / (17)	(19)
Accident Year	Loss Trend Factor	Earned House Years	Premium Trend Factor	Trended Average Loss Cost	Earned Premium at Current Manual Level	Earned Premium at Current Base	Average Rating Factor	Trended Base Class Loss Cost	Accident Year Weights
2017	1.005	10	1.050	\$0.00	\$2,890	\$984	2.937	\$0.00	20.0%
2018	1.020	9	1.045	0.00	2,602	917	2.838	0.00	20.0%
2019	1.034	9	1.040	0.00	2,709	929	2.918	0.00	20.0%
2020	1.049	9	1.034	0.00	2,186	936	2.335	0.00	20.0%
2021	1.064	12	1.029	0.00	2,396	1,171	2.046	0.00	20.0%

(20) Weighted Average Non-Hurricane Base Class Loss Cost: \$0.00

(1), (12) Based on data provided by member companies

(2) From Section C, Page 26

(3) From Section C, Page 27

(4) From Section C, Page 28

(5) From Section C, Page 30

(7) From Section C, Page 32

(9) From Section C, Page 47

(11) From Section C, Page 34

(13) From Section C, Page 39

(15), (16) Based on data provided by member companies and the extension of exposures method

See Section E, Page 9 for more details as well as an example related to the calculation of premium at present (manual) rates.

See Explanatory Memorandum (Average Rating Factors) for definitions of the base class.

(20) Average of (18) based on the weights in (19)

**North Carolina
Mobile Homeowners
MH(F) - Tenants
Territory Group 3**

Determination of Non-Hurricane Base Class Loss Cost

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8) = (6) x (7)	(9)	(10) = (8) x (9)
Accident Year	Non-Hurricane Incurred Loss & ALAE	Excess Wind Loss & ALAE	Excess Flood Loss & ALAE	Excess Wind Loss Factor	Excess Flood Loss Factor	Adjusted Non-Hurricane Incurred Loss & ALAE	Loss & ALAE Development Factor	Non-Hurricane Ultimate Loss & ALAE	ULAE Factor	Non-Hurricane Ultimate Loss and LAE
2017	\$2,573	\$0	\$0	1.095	1.031	\$2,897	1.000	\$2,897	1.170	\$3,390
2018	36,491	0	0	1.095	1.031	41,097	1.000	41,097	1.170	48,089
2019	714	149	0	1.095	1.031	636	0.999	636	1.170	744
2020	1,905	0	0	1.095	1.031	2,145	0.999	2,143	1.170	2,508
2021	0	0	0	1.095	1.031	0	1.011	0	1.170	0

	(11)	(12)	(13)	(14) = [(10) x (11)] / [(12) x (13)]	(15)	(16)	(17) (15) / (16)	(18) (14) / (17)	(19)
Accident Year	Loss Trend Factor	Earned House Years	Premium Trend Factor	Trended Average Loss Cost	Earned Premium at Current Manual Level	Earned Premium at Current Base	Average Rating Factor	Trended Base Class Loss Cost	Accident Year Weights
2017	1.005	118	1.050	\$27.53	\$21,766	\$8,677	2.509	\$10.97	20.0%
2018	1.020	122	1.045	383.22	23,062	9,014	2.559	149.78	20.0%
2019	1.034	121	1.040	6.13	23,226	8,890	2.613	2.35	20.0%
2020	1.049	121	1.034	21.06	23,190	8,889	2.609	8.07	20.0%
2021	1.064	111	1.029	0.00	21,521	8,149	2.641	0.00	20.0%

(20) Weighted Average Non-Hurricane Base Class Loss Cost: \$34.23

(1), (12) Based on data provided by member companies

(2) From Section C, Page 26

(3) From Section C, Page 27

(4) From Section C, Page 28

(5) From Section C, Page 30

(7) From Section C, Page 32

(9) From Section C, Page 47

(11) From Section C, Page 34

(13) From Section C, Page 39

(15), (16) Based on data provided by member companies and the extension of exposures method

See Section E, Page 9 for more details as well as an example related to the calculation of premium at present (manual) rates.

See Explanatory Memorandum (Average Rating Factors) for definitions of the base class.

(20) Average of (18) based on the weights in (19)

**North Carolina
Mobile Homeowners
MH(F) - Tenants
Territory Group 4**

Determination of Non-Hurricane Base Class Loss Cost

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8) = (6) x (7)	(9)	(10) = (8) x (9)
Accident Year	Non-Hurricane Incurred Loss & ALAE	Excess Wind Loss & ALAE	Excess Flood Loss & ALAE	Excess Wind Loss Factor	Excess Flood Loss Factor	Adjusted Non-Hurricane Incurred Loss & ALAE	Loss & ALAE Development Factor	Non-Hurricane Ultimate Loss & ALAE	ULAE Factor	Non-Hurricane Ultimate Loss and LAE
2017	\$2,497	\$0	\$0	1.095	1.031	\$2,812	1.000	\$2,812	1.170	\$3,291
2018	0	0	0	1.095	1.031	0	1.000	0	1.170	0
2019	0	0	0	1.095	1.031	0	0.999	0	1.170	0
2020	0	0	0	1.095	1.031	0	0.999	0	1.170	0
2021	1,210	0	0	1.095	1.031	1,362	1.011	1,377	1.170	1,612

	(11)	(12)	(13)	(14) = [(10) x (11)] / [(12) x (13)]	(15)	(16)	(17) (15) / (16)	(18) (14) / (17)	(19)
Accident Year	Loss Trend Factor	Earned House Years	Premium Trend Factor	Trended Average Loss Cost	Earned Premium at Current Manual Level	Earned Premium at Current Base	Average Rating Factor	Trended Base Class Loss Cost	Accident Year Weights
2017	1.005	100	1.050	\$31.50	\$16,096	\$6,492	2.479	\$12.70	20.0%
2018	1.020	100	1.045	0.00	16,692	6,468	2.581	0.00	20.0%
2019	1.034	94	1.040	0.00	15,446	6,077	2.542	0.00	20.0%
2020	1.049	96	1.034	0.00	16,085	6,229	2.582	0.00	20.0%
2021	1.064	100	1.029	16.66	18,728	6,496	2.883	5.78	20.0%

(20) Weighted Average Non-Hurricane Base Class Loss Cost: \$3.70

(1), (12) Based on data provided by member companies

(2) From Section C, Page 26

(3) From Section C, Page 27

(4) From Section C, Page 28

(5) From Section C, Page 30

(7) From Section C, Page 32

(9) From Section C, Page 47

(11) From Section C, Page 34

(13) From Section C, Page 39

(15), (16) Based on data provided by member companies and the extension of exposures method

See Section E, Page 9 for more details as well as an example related to the calculation of premium at present (manual) rates.

See Explanatory Memorandum (Average Rating Factors) for definitions of the base class.

(20) Average of (18) based on the weights in (19)

**North Carolina
Mobile Homeowners
MH(F) - Tenants
Territory Group 5**

Determination of Non-Hurricane Base Class Loss Cost

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8) = (6) x (7)	(9)	(10) = (8) x (9)
Accident Year	Non-Hurricane Incurred Loss & ALAE	Excess Wind Loss & ALAE	Excess Flood Loss & ALAE	Excess Wind Loss Factor	Excess Flood Loss Factor	Adjusted Non-Hurricane Incurred Loss & ALAE	Loss & ALAE Development Factor	Non-Hurricane Ultimate Loss & ALAE	ULAE Factor	Non-Hurricane Ultimate Loss and LAE
2017	\$0	\$0	\$0	1.095	1.031	\$0	1.000	\$0	1.170	\$0
2018	0	0	0	1.095	1.031	0	1.000	0	1.170	0
2019	0	0	0	1.095	1.031	0	0.999	0	1.170	0
2020	0	0	0	1.095	1.031	0	0.999	0	1.170	0
2021	0	0	0	1.095	1.031	0	1.011	0	1.170	0

	(11)	(12)	(13)	(14) = [(10) x (11)] / [(12) x (13)]	(15)	(16)	(17) (15) / (16)	(18) (14) / (17)	(19)
Accident Year	Loss Trend Factor	Earned House Years	Premium Trend Factor	Trended Average Loss Cost	Earned Premium at Current Manual Level	Earned Premium at Current Base	Average Rating Factor	Trended Base Class Loss Cost	Accident Year Weights
2017	1.005	61	1.050	\$0.00	\$9,445	\$3,496	2.702	\$0.00	20.0%
2018	1.020	69	1.045	0.00	10,198	3,947	2.584	0.00	20.0%
2019	1.034	62	1.040	0.00	9,350	3,584	2.609	0.00	20.0%
2020	1.049	72	1.034	0.00	11,306	4,116	2.747	0.00	20.0%
2021	1.064	76	1.029	0.00	12,452	4,394	2.834	0.00	20.0%

(20) Weighted Average Non-Hurricane Base Class Loss Cost: \$0.00

(1), (12) Based on data provided by member companies

(2) From Section C, Page 26

(3) From Section C, Page 27

(4) From Section C, Page 28

(5) From Section C, Page 30

(7) From Section C, Page 32

(9) From Section C, Page 47

(11) From Section C, Page 34

(13) From Section C, Page 39

(15), (16) Based on data provided by member companies and the extension of exposures method

See Section E, Page 9 for more details as well as an example related to the calculation of premium at present (manual) rates.

See Explanatory Memorandum (Average Rating Factors) for definitions of the base class.

(20) Average of (18) based on the weights in (19)

**North Carolina
Mobile Homeowners
MH(F) - Tenants
Territory Group 6**

Determination of Non-Hurricane Base Class Loss Cost

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8) = (6) x (7)	(9)	(10) = (8) x (9)
Accident Year	Non-Hurricane Incurred Loss & ALAE	Excess Wind Loss & ALAE	Excess Flood Loss & ALAE	Excess Wind Loss Factor	Excess Flood Loss Factor	Adjusted Non-Hurricane Incurred Loss & ALAE	Loss & ALAE Development Factor	Non-Hurricane Ultimate Loss & ALAE	ULAE Factor	Non-Hurricane Ultimate Loss and LAE
2017	\$2,719	\$0	\$0	1.095	1.031	\$3,062	1.000	\$3,062	1.170	\$3,583
2018	5,182	0	0	1.095	1.031	5,836	1.000	5,836	1.170	6,829
2019	934	0	0	1.095	1.031	1,052	0.999	1,051	1.170	1,230
2020	2,319	0	0	1.095	1.031	2,611	0.999	2,609	1.170	3,053
2021	33,450	0	25,378	1.095	1.031	9,091	1.011	9,191	1.170	10,755

	(11)	(12)	(13)	(14) = [(10) x (11)] / [(12) x (13)]	(15)	(16)	(17) (15) / (16)	(18) (14) / (17)	(19)
Accident Year	Loss Trend Factor	Earned House Years	Premium Trend Factor	Trended Average Loss Cost	Earned Premium at Current Manual Level	Earned Premium at Current Base	Average Rating Factor	Trended Base Class Loss Cost	Accident Year Weights
2017	1.005	287	1.050	\$11.95	\$42,224	\$15,891	2.657	\$4.50	20.0%
2018	1.020	322	1.045	20.68	46,767	17,841	2.621	7.89	20.0%
2019	1.034	343	1.040	3.57	49,429	18,993	2.602	1.37	20.0%
2020	1.049	363	1.034	8.54	52,767	20,077	2.628	3.25	20.0%
2021	1.064	391	1.029	28.46	57,716	21,628	2.669	10.67	20.0%

(20) Weighted Average Non-Hurricane Base Class Loss Cost: **\$5.53**

(1), (12) Based on data provided by member companies

(2) From Section C, Page 26

(3) From Section C, Page 27

(4) From Section C, Page 28

(5) From Section C, Page 30

(7) From Section C, Page 32

(9) From Section C, Page 47

(11) From Section C, Page 34

(13) From Section C, Page 39

(15), (16) Based on data provided by member companies and the extension of exposures method

See Section E, Page 9 for more details as well as an example related to the calculation of premium at present (manual) rates.

See Explanatory Memorandum (Average Rating Factors) for definitions of the base class.

(20) Average of (18) based on the weights in (19)

**North Carolina
Mobile Homeowners
MH(F) - Tenants**

Allocation of Excess Wind Loss & ALAE to Territory Group

(1) (2) (3) (4) (5) (6) (7)

Distribution of Wind & Hail Losses by Territory Group by Year

Accident Year	Territory Group 1	Territory Group 2	Territory Group 3	Territory Group 4	Territory Group 5	Territory Group 6	Statewide
2017	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
2018	0.000%	0.000%	0.000%	0.000%	0.000%	100.000%	100.000%
2019	0.000%	0.000%	100.000%	0.000%	0.000%	0.000%	100.000%
2020	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
2021	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%

(8) (9) (10) (11) (12) (13) (14)
 = (1) x (8) = (2) x (8) = (3) x (8) = (4) x (8) = (5) x (8) = (6) x (8)

Excess Wind Loss & ALAE

Accident Year	Statewide	Territory Group 1	Territory Group 2	Territory Group 3	Territory Group 4	Territory Group 5	Territory Group 6
2017	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2018	0	0	0	0	0	0	0
2019	149	0	0	149	0	0	0
2020	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0

(1) - (6) Based on data provided by member companies

(7) = Sum of (1) through (6)

(8) From Section C, Page 29

**North Carolina
Mobile Homeowners
MH(F) - Tenants**

Allocation of Excess Flood Loss & ALAE to Territory Group

(1) (2) (3) (4) (5) (6) (7)

Distribution of Flood Losses by Territory Group by Year

Accident Year	Territory Group 1	Territory Group 2	Territory Group 3	Territory Group 4	Territory Group 5	Territory Group 6	Statewide
2017	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
2018	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
2019	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
2020	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
2021	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%

(8) (9) (10) (11) (12) (13) (14)
 = (1) x (8) = (2) x (8) = (3) x (8) = (4) x (8) = (5) x (8) = (6) x (8)

Excess Flood Loss & ALAE

Accident Year	Statewide	Territory Group 1	Territory Group 2	Territory Group 3	Territory Group 4	Territory Group 5	Territory Group 6
2017	\$0	\$0	\$0	\$0	\$0	\$0	\$0
2018	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0
2021	25,378	0	0	0	0	0	25,378

(1) - (6) Based on data provided by member companies

(7) = Sum of (1) through (6)

(8) From Section C, Page 31

**North Carolina
Mobile Homeowners
MH(F)**

Derivation of Excess Wind Loss & ALAE Factor (Excluding Hurricane Losses)

Accident Year	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Total Incurred Losses Excl Liability	Incurred Wind Losses	Incurred Flood Losses	Total Losses Excl Wind & Flood	Wind Losses / Total Losses Excl Wind & Flood	= (1) - (2) - (3) = (2) / (4) = Min [(5), 5 x Median (5)]	Capped Excess Wind Ratio	Capped Excess Wind Losses	Excess Wind Ratio Above Cap	Excess Wind Losses Above Cap	Total Non-Hurricane Excess Wind Losses
1997	\$9,692,691	\$1,765,855	\$0	\$7,926,836	0.223	0.223	0.000	\$0	0.000	\$0	\$0
1998	15,273,548	5,415,029	96,857	9,761,662	0.555	0.555	0.051	497,845	0.000	0	497,845
1999	30,024,153	19,985,129	71,028	9,967,996	2.005	2.005	1.501	14,961,962	0.000	0	14,961,962
2000	16,567,551	2,638,389	7,068	13,922,094	0.190	0.190	0.000	0	0.000	0	0
2001	18,079,627	1,212,549	16,556	16,850,522	0.072	0.072	0.000	0	0.000	0	0
2002	19,163,073	2,186,891	0	16,976,182	0.129	0.129	0.000	0	0.000	0	0
2003	23,896,208	8,723,033	149,507	15,023,668	0.581	0.581	0.077	1,156,822	0.000	0	1,156,822
2004	17,677,162	2,423,276	237,721	15,016,165	0.161	0.161	0.000	0	0.000	0	0
2005	13,081,778	3,035,427	20,148	10,026,202	0.303	0.303	0.000	0	0.000	0	0
2006	14,247,179	3,481,603	113,920	10,651,655	0.327	0.327	0.000	0	0.000	0	0
2007	14,282,549	2,655,248	0	11,627,301	0.228	0.228	0.000	0	0.000	0	0
2008	18,637,634	5,258,658	22,057	13,356,919	0.394	0.394	0.000	0	0.000	0	0
2009	19,030,275	5,000,380	33,978	13,995,917	0.357	0.357	0.000	0	0.000	0	0
2010	17,217,172	4,275,270	317,560	12,624,342	0.339	0.339	0.000	0	0.000	0	0
2011	33,751,759	19,245,054	131,253	14,375,452	1.339	1.339	0.835	12,003,502	0.000	0	12,003,502
2012	21,069,821	7,677,326	42,649	13,349,846	0.575	0.575	0.071	947,839	0.000	0	947,839
2013	18,270,546	5,449,973	167,285	12,653,288	0.431	0.431	0.000	0	0.000	0	0
2014	18,092,408	4,362,963	13,270	13,716,175	0.318	0.318	0.000	0	0.000	0	0
2015	19,427,667	6,779,839	65,205	12,582,623	0.539	0.539	0.035	440,392	0.000	0	440,392
2016	24,881,226	7,720,741	5,315,559	11,844,926	0.652	0.652	0.148	1,753,049	0.000	0	1,753,049
2017	17,018,251	5,154,881	31,839	11,831,530	0.436	0.436	0.000	0	0.000	0	0
2018	21,789,424	5,850,170	3,576,616	12,362,637	0.473	0.473	0.000	0	0.000	0	0
2019	15,975,515	6,139,958	67,349	9,768,208	0.629	0.629	0.125	1,221,026	0.000	0	1,221,026
2020	19,649,697	9,440,645	211,241	9,997,812	0.944	0.944	0.440	4,399,037	0.000	0	4,399,037
2021	15,039,997	4,217,738	394,481	10,427,778	0.404	0.404	0.000	0	0.000	0	0
Total	\$471,836,911	\$150,096,026	\$11,103,148	\$310,637,737	0.483			\$37,381,475		\$0	\$37,381,475
				Average:	0.504	0.504	0.131		0.000		
				Median of Column (5):	0.404						
				Median of Column (5) x 5:	2.020						
				Excess Wind Loss Factor = 1 + [(Avg(7) + Avg(9)) / (1.0 + Avg(6) - Avg(7))]:	1.095						

(1), (2), (3) Based on data provided by member companies

**North Carolina
Mobile Homeowners
MH(F)**

Derivation of Excess Wind Loss & ALAE by Policy Form (Excluding Hurricane)

	(1)	(2)	(3)	(4) = (2) + (3)	(5) = (2) / (4)	(6) = (3) / (4)	(7)	(8)	(9) = (8) / (7)	(10) = (1) x (5) x (9)	(11) = (1) x (6) x (9)
Accident Year	Total Non-Hurricane Excess Wind Losses	Incurred Wind Losses			Distribution of Wind Losses by Policy Form		Total Incurred Losses Excl Liability	Total Incurred Loss & ALAE Excl Liability	Non-Hurricane ALAE Factor	Allocated Non-Hurricane Excess Wind Loss & ALAE by Form	
		Owners	Tenants	Total	Owners	Tenants				Owners	Tenants
2017	\$0	\$5,154,881	\$0	\$5,154,881	100.00%	0.00%	\$17,018,251	\$17,727,659	1.042	\$0	\$0
2018	0	5,845,812	4,358	5,850,170	99.93%	0.07%	21,789,424	22,750,871	1.044	0	0
2019	1,221,026	6,139,245	714	6,139,958	99.99%	0.01%	15,975,515	16,723,111	1.047	1,278,017	149
2020	4,399,037	9,440,645	0	9,440,645	100.00%	0.00%	19,649,697	20,623,807	1.050	4,617,114	0
2021	0	4,217,738	0	4,217,738	100.00%	0.00%	15,039,997	15,626,545	1.039	0	0
Total	\$5,620,063	\$30,798,321	\$5,072	\$30,803,393			\$89,472,884	\$93,451,993		\$5,895,131	\$149

(1) From Section C, Page 28, Column (11)

(2), (3), (7), (8) Based on data provided by member companies

**North Carolina
Mobile Homeowners
MH(F)**

Derivation of Excess Flood Loss & ALAE Factor (Excluding Hurricane Losses)

Accident Year	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Total Incurred Losses Excl Liability	Incurred Wind Losses	Incurred Flood Losses	= (1) - (2) - (3) Total Losses Excl Wind & Flood	= (3) / (4) Flood Losses / Total Losses Excl Wind & Flood	= Min [(5), 5 x Median (5)] Capped Flood Ratio	= (6) - Avg (6) Capped Excess Flood Ratio	= (4) x (7) Capped Excess Flood Losses	= (5) - (6) Excess Flood Ratio Above Cap	= (4) x (9) Excess Flood Losses Above Cap	= (8) + (10) Total Excess Flood Losses
1997	\$9,692,691	\$1,765,855	\$0	\$7,926,836	0.000	0.000	0.000	\$0	0.000	\$0	\$0
1998	15,273,548	5,415,029	96,857	9,761,662	0.010	0.010	0.000	0	0.000	0	0
1999	30,024,153	19,985,129	71,028	9,967,996	0.007	0.007	0.000	0	0.000	0	0
2000	16,567,551	2,638,389	7,068	13,922,094	0.001	0.001	0.000	0	0.000	0	0
2001	18,079,627	1,212,549	16,556	16,850,522	0.001	0.001	0.000	0	0.000	0	0
2002	19,163,073	2,186,891	0	16,976,182	0.000	0.000	0.000	0	0.000	0	0
2003	23,896,208	8,723,033	149,507	15,023,668	0.010	0.010	0.000	0	0.000	0	0
2004	17,677,162	2,423,276	237,721	15,016,165	0.016	0.016	0.006	90,097	0.000	0	90,097
2005	13,081,778	3,035,427	20,148	10,026,202	0.002	0.002	0.000	0	0.000	0	0
2006	14,247,179	3,481,603	113,920	10,651,655	0.011	0.011	0.001	10,652	0.000	0	10,652
2007	14,282,549	2,655,248	0	11,627,301	0.000	0.000	0.000	0	0.000	0	0
2008	18,637,634	5,258,658	22,057	13,356,919	0.002	0.002	0.000	0	0.000	0	0
2009	19,030,275	5,000,380	33,978	13,995,917	0.002	0.002	0.000	0	0.000	0	0
2010	17,217,172	4,275,270	317,560	12,624,342	0.025	0.025	0.015	189,365	0.000	0	189,365
2011	33,751,759	19,245,054	131,253	14,375,452	0.009	0.009	0.000	0	0.000	0	0
2012	21,069,821	7,677,326	42,649	13,349,846	0.003	0.003	0.000	0	0.000	0	0
2013	18,270,546	5,449,973	167,285	12,653,288	0.013	0.013	0.003	37,960	0.000	0	37,960
2014	18,092,408	4,362,963	13,270	13,716,175	0.001	0.001	0.000	0	0.000	0	0
2015	19,427,667	6,779,839	65,205	12,582,623	0.005	0.005	0.000	0	0.000	0	0
2016	24,881,226	7,720,741	5,315,559	11,844,926	0.449	0.035	0.025	296,123	0.414	4,903,799	5,199,922
2017	17,018,251	5,154,881	31,839	11,831,530	0.003	0.003	0.000	0	0.000	0	0
2018	21,789,424	5,850,170	3,576,616	12,362,637	0.289	0.035	0.025	309,066	0.254	3,140,110	3,449,176
2019	15,975,515	6,139,958	67,349	9,768,208	0.007	0.007	0.000	0	0.000	0	0
2020	19,649,697	9,440,645	211,241	9,997,812	0.021	0.021	0.011	109,976	0.000	0	109,976
2021	15,039,997	4,217,738	394,481	10,427,778	0.038	0.035	0.025	260,694	0.003	31,283	291,978
Total	\$471,836,911	\$150,096,026	\$11,103,148	\$310,637,737	0.036			\$1,303,933		\$8,075,193	\$9,379,126
				Average:	0.037	0.010	0.004		0.027		
				Median of Column (5):	0.007						
				Median of Column (5) x 5:	0.035						
				Excess Flood Loss Factor = 1 + [(Avg(7) + Avg(9)) / (1.0 + Avg(6) - Avg(7))]:	1.031						

(1), (2), (3) Based on data provided by member companies

**North Carolina
Mobile Homeowners
MH(F)**

Derivation of Excess Flood Loss & ALAE by Policy Form (Excluding Hurricane)

Accident Year	(1)	(2)			(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)		(11)
	Total Non-Hurricane Excess Flood Losses	Owners	Tenants	Total	Total	= (2) + (3)	= (2) / (4)	= (3) / (4)	Total Incurred Losses Excl Liability	Total Incurred Loss & ALAE Excl Liability	= (8) / (7)	Non-Hurricane ALAE Factor	= (1) x (5) x (9)	= (1) x (6) x (9)
		Incurred Flood Losses			Distribution of Flood Losses by Policy Form							Allocated Non-Hurricane Excess Flood Loss & ALAE by Form		
		Owners	Tenants	Total	Owners	Tenants						Owners	Tenants	
2017	\$0	\$31,839	\$0	\$31,839	100.00%	0.00%			\$17,018,251	\$17,727,659	1.042	\$0	\$0	
2018	3,449,176	3,576,616	0	3,576,616	100.00%	0.00%			21,789,424	22,750,871	1.044	3,601,369	0	
2019	0	67,349	0	67,349	100.00%	0.00%			15,975,515	16,723,111	1.047	0	0	
2020	109,976	211,241	0	211,241	100.00%	0.00%			19,649,697	20,623,807	1.050	115,428	0	
2021	291,978	361,481	33,000	394,481	91.63%	8.37%			15,039,997	15,626,545	1.039	277,987	25,378	
Total	\$3,851,130	\$4,248,526	\$33,000	\$4,281,526					\$89,472,884	\$93,451,993		\$3,994,784	\$25,378	

(1) From Section C, Page 30, Column (11)

(2), (3), (7), (8) Based on data provided by member companies

**North Carolina
Mobile Homeowners
MH(F)**

Derivation of Loss Trend Factors

Owners

	(1)	(2)	(3) = (2) - (1), in years	(4)	(5) = (4) - (2), in years	(6)	(7)	(8)
Accident Year	Average Date of Accident	End Date of Experience Period	Experience Period	Trend-to Date	Projection Period	Selected Experience Period Loss Cost Trend	Selected Projection Period Loss Cost Trend	Loss Trend Factor
2017	7/1/2017	12/31/2021	4.50	7/1/2024	2.50	6.0%	9.0%	1.612
2018	7/1/2018	12/31/2021	3.50	7/1/2024	2.50	6.0%	9.0%	1.521
2019	7/1/2019	12/31/2021	2.50	7/1/2024	2.50	6.0%	9.0%	1.435
2020	7/1/2020	12/31/2021	1.50	7/1/2024	2.50	6.0%	9.0%	1.354
2021	7/1/2021	12/31/2021	0.50	7/1/2024	2.50	6.0%	9.0%	1.277

Tenants

	(9)	(10)	(11) = (10) - (9), in years	(12)	(13) = (12) - (10), in years	(14)	(15)	(16)
Accident Year	Average Date of Accident	End Date of Experience Period	Experience Period	Trend-to Date	Projection Period	Selected Experience Period Loss Cost Trend	Selected Projection Period Loss Cost Trend	Loss Trend Factor
2017	7/1/2017	12/31/2021	4.50	7/1/2024	2.50	-1.4%	2.8%	1.005
2018	7/1/2018	12/31/2021	3.50	7/1/2024	2.50	-1.4%	2.8%	1.020
2019	7/1/2019	12/31/2021	2.50	7/1/2024	2.50	-1.4%	2.8%	1.034
2020	7/1/2020	12/31/2021	1.50	7/1/2024	2.50	-1.4%	2.8%	1.049
2021	7/1/2021	12/31/2021	0.50	7/1/2024	2.50	-1.4%	2.8%	1.064

(4), (12) Based on a proposed effective date of July 1, 2023; rates assumed to be in effect for 1 year

(6), (7), (14), (15) From Section C, Pages 35 and 36

(8) = [1 + (6)] ^ (3) x [1 + (7)] ^ (5)

(16) = [1 + (14)] ^ (11) x [1 + (15)] ^ (13)

**North Carolina
Mobile Homeowners
MH(F) - Owners**

Determination of Non-Catastrophe Loss and ALAE Trends

	(1)	(2)	(3)	(4) = (2) x (3) / (1)	(5)	(6)	(7) = (5) x (6) / [(2) x (3)]	
Accident Year Ending	Earned Exposures	Reported Claims	Development Factor to Ultimate	Ultimate Frequency	Incurred Loss & ALAE	Development Factor to Ultimate	Ultimate Severity	
2016-4	60,741	5,219	1.000	8.59%	\$18,151,577	1.000	\$3,478	
2017-1	60,527	5,076	1.000	8.39%	18,131,078	1.000	3,572	
2017-2	60,505	5,105	1.000	8.44%	16,872,984	1.000	3,305	
2017-3	60,545	4,689	1.000	7.74%	15,828,719	1.000	3,376	
2017-4	60,620	4,654	1.000	7.68%	16,830,109	1.000	3,616	
2018-1	60,697	4,546	1.000	7.49%	16,110,312	1.000	3,543	
2018-2	60,761	4,330	1.000	7.13%	15,412,406	1.000	3,558	
2018-3	60,821	4,596	1.001	7.56%	15,338,657	1.000	3,335	
2018-4	60,862	5,015	1.001	8.25%	15,951,151	1.000	3,178	
2019-1	60,860	4,896	1.001	8.05%	16,504,288	1.000	3,366	
2019-2	60,866	4,725	1.001	7.77%	15,902,524	0.999	3,359	
2019-3	60,874	4,402	1.002	7.24%	14,836,425	0.999	3,362	
2019-4	60,583	3,977	1.002	6.58%	13,816,121	0.999	3,464	
2020-1	60,089	4,019	1.003	6.71%	13,603,654	0.999	3,372	
2020-2	59,099	4,154	1.003	7.05%	14,530,615	0.999	3,482	
2020-3	57,738	4,269	1.004	7.43%	15,763,134	0.999	3,673	
2020-4	56,572	4,430	1.005	7.87%	16,559,610	0.999	3,716	
2021-1	55,785	4,483	1.014	8.15%	17,398,653	1.002	3,835	
2021-2	55,614	4,196	1.023	7.72%	17,047,088	1.005	3,990	
2021-3	55,901	3,962	1.033	7.32%	16,544,576	1.008	4,076	
2021-4	56,416	3,610	1.042	6.67%	15,413,652	1.011	4,143	
				Annual Exponential Trend			Annual Exponential Trend	
		5 Years (2017 - 2021)		-2.2%		5 Years (2017 - 2021)	3.4%	
		4 Years (2018 - 2021)		-1.0%		4 Years (2018 - 2021)	5.4%	
		3 Years (2019 - 2021)		-0.8%		3 Years (2019 - 2021)	8.9%	
		2 Years (2020 - 2021)		1.4%		2 Years (2020 - 2021)	12.7%	
		(8) Credibility:		100.0%		(9) Credibility:	100.0%	
				Selected Frequency Trend			Selected Severity Trend	Pure Premium Trend
		Experience Period:		0.0%		Experience Period:	6.0%	6.0%
		Projection Period:		0.0%		Projection Period:	9.0%	9.0%

(1), (2), (5) Based on data provided by member companies

(2), (5) Adjusted to exclude catastrophe losses

(3), (6) From Section C, Page 37

(8) Based on 355,794 exposures in the experience period, a full credibility standard of 20,000 exposures, and the square root rule

(9) Based on 26,905 claims during the experience period, a full credibility standard of 1,082 claims, and the square root rule

**North Carolina
Mobile Homeowners
MH(F) - Tenants**

Determination of Non-Catastrophe Loss and ALAE Trends

(1)	(2)	(3)	(4) = (2) x (3) / (1)	(5)	(6)	(7)	(8) = (6) x (7) / [(2) x (3)]	(9)			
Accident Year Ending	Earned Exposures	Reported Claims	Development Factor to Ultimate	Ultimate Frequency	MH(C) Personal Effects Frequency	Incurred Loss & ALAE	Development Factor to Ultimate	Ultimate Severity	MH(C) Personal Effects Severity		
2016-4	455	9	1.000	1.98%	1.75%	\$5,677	1.000	\$631	\$2,423		
2017-1	461	11	1.000	2.39%	1.71%	7,304	1.000	664	2,430		
2017-2	495	13	1.000	2.63%	1.70%	12,106	1.000	931	2,443		
2017-3	545	15	1.000	2.75%	1.57%	11,133	1.000	742	2,504		
2017-4	588	13	1.000	2.21%	1.47%	9,227	1.000	710	2,464		
2018-1	617	13	1.000	2.11%	1.43%	10,475	1.000	806	2,568		
2018-2	630	10	1.000	1.59%	1.41%	5,405	1.000	540	2,680		
2018-3	632	5	1.001	0.79%	1.51%	7,314	1.000	1,462	2,583		
2018-4	632	4	1.001	0.63%	1.54%	10,271	1.000	2,565	2,327		
2019-1	634	2	1.001	0.32%	1.53%	7,396	1.000	3,692	2,224		
2019-2	636	3	1.001	0.47%	1.47%	8,109	0.999	2,698	2,331		
2019-3	638	3	1.002	0.47%	1.35%	6,043	0.999	2,009	2,483		
2019-4	641	2	1.002	0.31%	1.29%	1,648	0.999	821	2,605		
2020-1	649	3	1.003	0.46%	1.27%	3,553	0.999	1,180	2,821		
2020-2	658	3	1.003	0.46%	1.24%	2,839	0.999	942	2,741		
2020-3	667	2	1.004	0.30%	1.29%	1,905	0.999	947	2,811		
2020-4	672	3	1.005	0.45%	1.29%	4,223	0.999	1,399	3,039		
2021-1	674	2	1.014	0.30%	1.29%	2,319	1.002	1,146	2,873		
2021-2	680	2	1.023	0.30%	1.25%	3,529	1.005	1,733	2,950		
2021-3	688	4	1.033	0.60%	1.14%	3,979	1.008	971	3,048		
2021-4	700	3	1.042	0.45%	1.08%	1,660	1.011	537	3,084		
				Annual Exponential Trend	Annual Exponential Trend	Credibility- Weighted Trend		Annual Exponential Trend	Annual Exponential Trend	Credibility- Weighted Trend	
		5 Years (2017 - 2021)		-37.0%	-7.4%	-12.8%		5 Years (2017 - 2021)	4.6%	5.2%	5.1%
		4 Years (2018 - 2021)		-26.7%	-7.2%	-10.8%		4 Years (2018 - 2021)	-9.9%	6.9%	3.9%
		3 Years (2019 - 2021)		3.0%	-8.8%	-6.7%		3 Years (2019 - 2021)	-33.6%	11.8%	3.7%
		2 Years (2020 - 2021)		3.4%	-7.6%	-5.6%		2 Years (2020 - 2021)	-16.4%	6.1%	2.1%
		(10) Credibility:		18.3%				(11) Credibility:	17.7%		
					Selected Frequency Trend			Selected Severity Trend		Pure Premium Trend	
				Experience Period:	-7.0%			Experience Period:	6.0%	-1.4%	
				Projection Period:	-3.0%			Projection Period:	6.0%	2.8%	

(1), (2), (6) Based on data provided by member companies

(2), (6) Adjusted to exclude catastrophe losses

(3), (7) From Section C, Page 37

(5), (9) From MH(C) Section C, Page 59

(10) Based on 3,688 exposures in the experience period, a full credibility standard of 110,000 exposures, and the square root rule

(11) Based on 34 claims during the experience period, a full credibility standard of 1,082 claims, and the square root rule

**North Carolina
Mobile Homeowners
MH(F)**

Interpolation of Cumulative Development Factors

Accident Year Ending	Months of Development	(1)	(2)	(3)	(4)
		Owners & Tenants			
		Cumulative Incurred Loss & ALAE Development Factor		Cumulative Reported Claims Development Factor	
		Selected	Interpolated	Selected	Interpolated
2016-4	75	1.000	1.000	1.000	1.000
2017-1	72		1.000		1.000
2017-2	69		1.000		1.000
2017-3	66		1.000		1.000
2017-4	63	1.000	1.000	1.000	1.000
2018-1	60		1.000		1.000
2018-2	57		1.000		1.000
2018-3	54		1.000		1.001
2018-4	51	1.000	1.000	1.001	1.001
2019-1	48		1.000		1.001
2019-2	45		0.999		1.001
2019-3	42		0.999		1.002
2019-4	39	0.999	0.999	1.002	1.002
2020-1	36		0.999		1.003
2020-2	33		0.999		1.003
2020-3	30		0.999		1.004
2020-4	27	0.999	0.999	1.005	1.005
2021-1	24		1.002		1.014
2021-2	21		1.005		1.023
2021-3	18		1.008		1.033
2021-4	15	1.011	1.011	1.042	1.042

(1) and (3) From Section C, Page 32 and 33, respectively

(2) and (4) Exponentially interpolated

**North Carolina
Mobile Homeowners
MH(F)**

Determination of Exposure Trends

Calendar Year Ending	(1)	(2)
	Average Amount of Insurance per Policy	
	Owners	Tenants
2016-1	\$50,898	\$19,094
2016-2	51,161	19,097
2016-3	51,513	19,071
2016-4	51,925	19,261
2017-1	52,341	19,595
2017-2	52,747	20,078
2017-3	53,153	20,557
2017-4	53,557	20,828
2018-1	53,962	20,935
2018-2	54,380	20,929
2018-3	54,822	20,897
2018-4	55,281	20,834
2019-1	55,751	20,801
2019-2	56,239	20,835
2019-3	56,739	20,781
2019-4	57,282	20,768
2020-1	57,846	20,758
2020-2	58,473	20,678
2020-3	59,183	20,760
2020-4	59,946	20,894
2021-1	60,699	21,032
2021-2	61,463	21,246
2021-3	62,252	21,407
2021-4	63,090	21,637
6-Year Trend: 2016-2021	3.7%	1.8%
5-Year Trend: 2017-2021	3.9%	1.0%
4-Year Trend: 2018-2021	4.2%	0.6%
3-Year Trend: 2019-2021	4.6%	1.3%
2-Year Trend: 2020-2021	5.1%	2.6%

Selected Exposure Trends

Projection Period:	5.0%	2.5%
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(1), (2) Based on data provided by member companies

Note: Selected Exposure Trends are used to project the latest year's exposure file for the development of modeled losses

**North Carolina
Mobile Homeowners
MH(F)**

Derivation of Premium Trend Factors

Owners

	(1)	(2)	(3) = (2) - (1), in years	(4)	(5) = (4) - (2), in years	(6)	(7)	(8)
Accident Year	Average Written Date	End Date of Experience Period	Experience Period	Trend-to Date	Projection Period	Selected Experience Period Premium Trend	Selected Projection Period Premium Trend	Premium Trend Factor
2017	1/1/2017	12/31/2021	5.00	1/1/2024	2.00	3.3%	3.8%	1.267
2018	1/1/2018	12/31/2021	4.00	1/1/2024	2.00	3.3%	3.8%	1.227
2019	1/1/2019	12/31/2021	3.00	1/1/2024	2.00	3.3%	3.8%	1.188
2020	1/1/2020	12/31/2021	2.00	1/1/2024	2.00	3.3%	3.8%	1.150
2021	1/1/2021	12/31/2021	1.00	1/1/2024	2.00	3.3%	3.8%	1.113

Tenants

	(9)	(10)	(11) = (10) - (9), in years	(12)	(13) = (12) - (10), in years	(14)	(15)	(16)
Accident Year	Average Written Date	End Date of Experience Period	Experience Period	Trend-to Date	Projection Period	Selected Experience Period Premium Trend	Selected Projection Period Premium Trend	Premium Trend Factor
2017	1/1/2017	12/31/2021	5.00	1/1/2024	2.00	0.5%	1.2%	1.050
2018	1/1/2018	12/31/2021	4.00	1/1/2024	2.00	0.5%	1.2%	1.045
2019	1/1/2019	12/31/2021	3.00	1/1/2024	2.00	0.5%	1.2%	1.040
2020	1/1/2020	12/31/2021	2.00	1/1/2024	2.00	0.5%	1.2%	1.034
2021	1/1/2021	12/31/2021	1.00	1/1/2024	2.00	0.5%	1.2%	1.029

(4), (12) Based on a proposed effective date of July 1, 2023; rates assumed to be in effect for 1 year

(6), (7), (14), (15) From Section C, Page 40

(8) = [1 + (6)] ^ (3) x [1 + (7)] ^ (5)

(16) = [1 + (14)] ^ (11) x [1 + (15)] ^ (13)

**North Carolina
Mobile Homeowners
MH(F)**

Determination of Statewide Average Rating Factors and Premium Trends

	(1)	(2)	(3) = (1) / (2)	(4)	(5)	(6) = (4) / (5)
	Owners			Tenants		
<u>Accident Year</u>	<u>Earned Premium at Current Manual Level</u>	<u>Earned Premium at Current Base</u>	<u>Average Rating Factor</u>	<u>Earned Premium at Current Manual Level</u>	<u>Earned Premium at Current Base</u>	<u>Average Rating Factor</u>
2017	\$44,236,216	\$28,988,713	1.526	\$95,542	\$36,821	2.595
2018	45,539,042	29,114,308	1.564	102,749	39,227	2.619
2019	46,680,276	28,994,544	1.610	103,709	39,692	2.613
2020	45,451,220	27,305,715	1.665	107,885	41,495	2.600
2021	47,454,596	27,334,735	1.736	114,906	42,940	2.676
		<u>Annual Exponential Trend</u>			<u>Annual Exponential Trend</u>	
		5 Years:	3.3%		5 Years:	0.5%
		4 Years:	3.5%		4 Years:	0.6%
		3 Years:	3.8%		3 Years:	1.2%
		<u>Selected Premium Trends</u>			<u>Selected Premium Trends</u>	
	Experience Period:	3.3%		Experience Period:	0.5%	
	Projection Period:	3.8%		Projection Period:	1.2%	

(1) and (4) Calculated based on data provided by member companies and the extension of exposures method.
See Section E, Page 9 for more details as well as an example related to the calculation of premium at present (manual) rates.
(2) and (5) Calculated based on data provided by member companies and the extension of exposures method.
See Explanatory Memorandum (Average Rating Factors) for definitions of the base class.

**North Carolina
Mobile Homeowners
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Determination of Average Rating Factors and Average Current Base Rates by Territory Group

	(1)	(2)	(3)	(4) = (1) / (2)	(5) = (2) / (3)	(6)	(7)	(8)	(9) = (6) / (7)	(10) = (7) / (8)
	Owners					Tenants				
Territory Group	2021 Earned Premium at Current Manual Level	2021 Earned Premium at Current Base	2021 Earned House Years	Average Rating Factor	Average Current Base Rate	2021 Earned Premium at Current Manual Level	2021 Earned Premium at Current Base	2021 Earned House Years	Average Rating Factor	Average Current Base Rate
1	\$4,394,732	\$2,495,439	3,080	1.761	\$810.17	\$2,094	\$1,101	11	1.902	\$104.66
2	4,400,846	2,544,129	3,524	1.730	721.98	2,396	1,171	12	2.046	99.88
3	10,814,704	6,616,004	11,777	1.635	561.75	21,521	8,149	111	2.641	73.60
4	5,923,984	3,276,941	6,097	1.808	537.43	18,728	6,496	100	2.883	64.92
5	5,682,480	3,210,725	6,811	1.770	471.42	12,452	4,394	76	2.834	57.56
6	16,237,850	9,191,498	25,104	1.767	366.14	57,716	21,628	391	2.669	55.35
Total	\$47,454,596	\$27,334,735	56,394	1.736	\$484.71	\$114,906	\$42,940	700	2.676	\$61.33

(1) and (6) Calculated based on data provided by member companies and the extension of exposures method; excludes exposure where amount of insurance is unavailable

See Section E, Page 9 for more details as well as an example related to the calculation of premium at present (manual) rates.

(2) and (7) Calculated based on data provided by member companies and the extension of exposures method.

See Explanatory Memorandum (Average Rating Factors) for definitions of the base class.

(3) and (8) Based on data provided by member companies

**North Carolina
Mobile Homeowners
MH(F)**

Derivation of Complement of Credibility

	Owners	Tenants
(1) Credibility-Wtd Non-Hurricane Base-Class Loss Cost from Prior Filing	\$219.38	\$57.93
(2) Premium Trend Rate	3.8%	1.2%
(3) Premium Trend Factor	1.064	1.020
(4) Loss Trend Rate	9.0%	2.8%
(5) Loss Trend Factor	1.154	1.047
(6) Complement of Credibility	\$238.00	\$59.49

(1) From 2021 NCRB Mobile Homeowners MH(F) rate filing, Section C, Pages 2 and 4

(2) From Section C, Page 40

(3) = $[1 + (2)]^{[20 / 12]}$; Trended 20 months from the trend-to date from the 2021 NCRB Mobile Homeowners MH(F) rate filing, Section C, Page 38 (5/1/2022) to the average written data for the period in which the rates are to be in effect (1/1/2024)

(4) From Section C, Pages 35 and 36

(5) = $[1 + (4)]^{[20 / 12]}$; Trended 20 months from the trend-to date from the 2021 NCRB Mobile Homeowners MH(F) rate filing, Section C, Page 34 (11/1/2022) to the average accident date for the period in which the proposed rates are to be in effect (7/1/2024)

(6) = (1) x (5) / (3)

**North Carolina
Mobile Homeowners
MH(F)**

Derivation of Modeled Hurricane Base Class Lost Cost

	Owners	Tenants
(1) Trended Modeled Hurricane Loss & LAE	\$14,094,908	\$7,260
(2) 2021 Earned House Years	56,416	700
(3) 2021 Average Rating Factor	1.736	2.676
(4) 2021 Premium Trend Factor	1.113	1.029
(5) Modeled Hurricane Base Class Loss Cost; = (1) / [(2) x (3) x (4)]	\$129.30	\$3.76

(1) Provided by Aon

(2) Based on data provided by member companies; excludes exposure where amount of insurance is unavailable

(3) From Section C, Page 40

(4) From Section C, Page 39

**North Carolina
Mobile Homeowners
MH(F)**

Index-Based Expense Trend

Quarter Ending	(1)	(2)	(3)	(4)
	Quarterly Avg CPI: All Items	Quarterly Avg CPI: All Items Less Energy	Quarterly Compensation Cost Index (CCI)	
3/31/2017	102.7	103.1	104.7	
6/30/2017	103.3	103.5	106.3	
9/30/2017	103.7	103.8	106.1	
12/31/2017	104.1	104.2	106.2	
3/31/2018	105.0	105.0	107.4	
6/30/2018	106.1	105.7	109.1	
9/30/2018	106.4	106.0	108.8	
12/31/2018	106.3	106.4	108.7	
3/31/2019	106.7	107.2	110.4	
6/30/2019	108.0	107.8	111.4	
9/30/2019	108.3	108.3	111.8	
12/31/2019	108.5	108.7	111.8	
3/31/2020	109.0	109.5	112.6	
6/30/2020	108.4	109.6	114.1	
9/30/2020	109.6	110.5	114.3	
12/31/2020	109.9	110.9	114.5	
3/31/2021	111.0	111.5	115.8	
6/30/2021	113.6	113.5	116.6	
9/30/2021	115.4	115.0	117.2	
12/31/2021	117.2	116.5	117.8	
3/31/2022	119.9	118.7	120.2	
	Fitted Annual Trends (Exponential)			Blended CPI and CCI Trends
21-point (2017-2022):	2.6%	2.5%	2.5%	2.5%
17-point (2018-2022):	2.8%	2.8%	2.6%	2.7%
13-point (2019-2022):	3.5%	3.2%	2.6%	3.0%
9-point (2020-2022):	5.2%	4.2%	2.9%	3.8%
5-point (2021-2022):	7.6%	6.3%	3.5%	5.2%
		Selected Experience Period Trend:	4.0%	
		Selected Projection Period Trend:	4.0%	

(1), (2) From Bureau of Labor Statistics - Consumer Price Index for All Urban Consumers - U.S. City Average; each expenditure indexed to 2015 (i.e., 2015 index = 100)

(3) From Bureau of Labor Statistics - Employment Cost Index for Insurance Carriers and Related Activities

(4) = (1) x 25% + (2) x 25% + (3) x 50%

**North Carolina
Mobile Homeowners
MH(F)**

Derivation of Fixed Expense Per Policy

	Owners	Tenants
(1) Experience Period Expense Trend	4.0%	4.0%
(2) Projection Period Expense Trend	4.0%	4.0%
(3) (a) Average Date of Expenses	7/1/2020	7/1/2020
(b) End Date of Experience Period	12/31/2021	12/31/2021
(c) Experience Period (Years)	1.500	1.500
(4) (a) Trend-to Date	1/1/2024	1/1/2024
(b) Projection Period (Years)	2.000	2.000
(5) Expense Trend Factor	1.147	1.147
(6) Fixed Expenses	11.2%	11.2%
(7) 2020 Premium Trend Factor	1.150	1.034
(8) Trended Fixed Expenses	11.2%	12.4%
(9) 2021 Manual-Level Base Premium	\$27,334,735	\$42,940
(10) 2021 Earned Exposures	56,394	700
(11) Average Current Base Premium	\$484.71	\$61.33
(12) Fixed Expense Per Policy	\$54.17	\$7.62

(1), (2) From Section C, Page 44

(3a), (3b) Based on experience period used to select expenses

(3c) Difference in years between (3a) and (3b)

(4a) Based on a proposed policy period effective date of 7/1/2023

(4b) Difference in years between (3b) and (4a)

(5) = $[1 + (1)]^{(3c)} \times [1 + (2)]^{(4b)}$

(6) From Section C, Page 46

(7) From Section C, Page 39

(8) = (5) x (6) / (7)

(9) Calculated based on data provided by member companies and the extension of exposures method

See Section E, Page 9 for more details on the rate order calculation

See Explanatory Memorandum (Average Rating Factors) for definitions of the base class

(10) Based on data provided by member companies; excludes exposure where amount of insurance is unavailable

(11) = (9) / (10)

(12) = (8) x (11)

**North Carolina
Mobile Homeowners
MH(F)**

Derivation of Underwriting Expense Ratios

	2017		2018		2019		2020		2021		Average: 2019-2021	Selected
	\$	%	\$	%	\$	%	\$	%	\$	%		
(1) Direct Premiums Written	\$48,591,161	xxx	\$50,776,309	xxx	\$50,045,309	xxx	\$48,902,533	xxx	\$50,538,587	xxx		
(2) Direct Premiums Earned	48,486,081	xxx	49,388,294	xxx	50,846,724	xxx	48,798,817	xxx	49,578,640	xxx		
(3) Commission & Brokerage	\$8,139,446	16.8%	\$8,211,357	16.2%	\$8,598,145	17.2%	\$8,760,572	17.9%	\$9,044,513	17.9%	17.7%	17.7%
(4) Taxes, Licenses, & Fees	1,325,161	2.7%	1,621,222	3.2%	1,506,961	3.0%	1,579,749	3.2%	1,460,475	2.9%	3.0%	3.0%
(5) Other Acquisition	3,081,550	6.4%	3,201,754	6.5%	3,342,506	6.6%	3,357,972	6.9%	3,371,812	6.8%	6.8%	6.8%
(6) General Expenses	2,444,020	5.0%	2,421,903	4.9%	2,504,921	4.9%	2,240,190	4.6%	1,884,728	3.8%	4.4%	4.4%
(7) Total		30.9%		30.8%		31.7%		32.6%		31.4%	31.9%	31.9%
(8) Variable Expenses		19.5%		19.4%		20.2%		21.1%		20.8%	20.7%	20.7%
(9) Fixed Expenses		11.4%		11.4%		11.5%		11.5%		10.6%	11.2%	11.2%

(1) through (6) Provided by the North Carolina Rate Bureau

(3) & (4) Relative to written premium

(5) & (6) Relative to earned premium

(7) = (3) + (4) + (5) + (6)

(8) = (3) + (4)

(9) = (5) + (6)

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Derivation of Ratio of Unallocated Loss Adjustment Expense (ULAE) to Loss & Allocated Loss Adjustment Expense (ALAE)

Calendar Year	(1) Incurred ULAE	(2) Incurred Loss & ALAE	(3) = (1) / (2) Ratio of Incurred ULAE to Incurred Loss & ALAE	(4) Distribution of Incurred Hurricane Loss & ALAE as % of Total
2017	\$3,290,612	\$16,773,362	19.6%	4.6%
2018	12,165,679	68,732,634	17.7%	67.5%
2019	2,543,591	14,788,834	17.2%	6.7%
2020	4,371,110	24,240,705	18.0%	12.1%
2021	2,373,788	17,975,348	13.2%	2.1%
Total	\$24,744,780	\$142,510,883	17.4%	
		Average (2017-2021):	17.2%	
		Average (excluding 2018):	17.0%	
		Average (2019-2021):	16.1%	
		Selected Ratio of ULAE to Loss & ALAE (Non-Hurricane):	17.0%	
		Selected Ratio of LAE to Loss (Hurricane):	6.0%	

(1) = Adjusting & Other Expenses

(2) = Incurred Loss + Defense & Cost Containment Expenses

(1), (2) Provided by the North Carolina Rate Bureau

(4) Based on data provided by member companies

Note: See pre-filed testimony of M. Mao for support of the Catastrophe LAE Ratio, which is applied by Aon to the modeled hurricane wind and storm surge losses

**North Carolina
Mobile Homeowners
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Derivation of Policyholder Dividends

	(1)	(2)	(3) = (2) / (1)
Calendar Year	Total Written Premium: Homeowners (\$000)	Dividends (\$000)	Dividends as Percent of Total Written Premium
2017	\$2,564,886	\$10,203	0.40%
2018	2,710,120	11,678	0.43%
2019	2,887,386	17,986	0.62%
2020	3,105,409	15,534	0.50%
2021	3,322,162	14,368	0.43%
Total	\$14,589,964	\$69,770	0.48%
		Average (2017-2021):	0.48%
		Average (2017-2021 excluding High & Low):	0.45%
		Average (2019-2021):	0.52%
		Selected Policyholder Dividends:	0.45%

(1), (2) From industry Annual Statements, Statutory Page 14, Homeowners Multiple Peril

**North Carolina
Mobile Homeowners
MH(F)**

Derivation of Compensation for Assessment Risk per Policy

	<u>Owners</u>	<u>Tenants</u>
(1) Average Current Base Premium	\$484.71	\$61.33
(2) Compensation for Assessment Risk	1.6%	1.6%
(3) Commission & Brokerage	17.7%	17.7%
(4) Taxes, Licenses, & Fees	3.0%	3.0%
(5) Compensation for Assessment Risk (Adj for Expenses)	2.0%	2.0%
(6) Compensation for Assessment Risk per Policy	\$9.86	\$1.25

(1) From Section C, Page 45

(2) See pre-filed testimony from P. Anderson for support of Compensation for Assessment Risk provision

(3), (4) From Section C, Page 46

(5) = (2) / [1 - (3) - (4)]

(6) = (1) x (5)

**North Carolina
Mobile Homeowners
MH(F) - Owners**

Derivation of Base Class Net Cost of Reinsurance by Territory Group

	(1)	(2)	(3) = (1) / (2)	(4)	(5)	(6)	(7) = (3) / {(4) x (5) x [1-(6)]}
Territory Group	Estimated Net Cost of Reinsurance	2021 House Years	Average Net Cost of Reinsurance	2021 Average Rating Factor	2021 Premium Trend Factor	Variable Expenses	Base Class Net Cost of Reinsurance
1	\$4,326,723	3,080	\$1,404.71	1.761	1.113	0.287	\$1,004.41
2	2,841,654	3,524	806.41	1.730	1.113	0.287	587.05
3	6,627,047	11,787	562.25	1.635	1.113	0.287	433.13
4	2,362,265	6,099	387.32	1.808	1.113	0.287	269.79
5	1,789,739	6,815	262.63	1.770	1.113	0.287	186.86
6	2,121,235	25,112	84.47	1.767	1.113	0.287	60.21
Statewide	\$20,068,663	56,416	\$355.73	1.736	1.113	0.287	\$258.03

(1) Provided by Aon

(2) Based on data provided by member companies; excludes exposure where amount of insurance is unavailable

(4) From Section C, Page 41

(5) From Section C, Page 39

(6) From Section C, Page 1. Includes Commission and Brokerage expense; Taxes, Licenses, and Fees; Profit; Contingencies; and Policyholder Dividends

**North Carolina
Mobile Homeowners
MH(F) - Tenants**

Derivation of Base Class Net Cost of Reinsurance by Territory Group

	(1)	(2)	(3) = (1) / (2)	(4)	(5)	(6)	(7) = (3) / {(4) x (5) x [1-(6)]}
Territory Group	Estimated Net Cost of Reinsurance	2021 House Years	Average Net Cost of Reinsurance	2021 Average Rating Factor	2021 Premium Trend Factor	Variable Expenses	Base Class Net Cost of Reinsurance
1	\$1,025	11	\$97.43	1.902	1.029	0.287	\$69.77
2	1,001	12	85.36	2.046	1.029	0.287	56.82
3	4,754	111	42.94	2.641	1.029	0.287	22.14
4	2,495	100	24.93	2.883	1.029	0.287	11.78
5	1,057	76	13.84	2.834	1.029	0.287	6.65
6	1,631	391	4.17	2.669	1.029	0.287	2.13
Statewide	\$11,963	700	\$17.09	2.676	1.029	0.287	\$8.69

(1) Provided by Aon

(2) Based on data provided by member companies; excludes exposure where amount of insurance is unavailable

(4) From Section C, Page 41

(5) From Section C, Page 39

(6) From Section C, Page 1. Includes Commission and Brokerage expense; Taxes, Licenses, and Fees; Profit; Contingencies; and Policyholder Dividends

**North Carolina Mobile Homeowners
MH(F) Program**

Section D

Exhibits Supporting the Rating Plan Revisions

North Carolina Mobile Homeowners
MH(F) Program

Exhibits Supporting the Rating Plan Revisions

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**North Carolina
Mobile Homeowners
MH(F)**

Derivation of Wind Exclusion Credits

	Territory Group 1		Territory Group 2	
	Owners	Tenants	Owners	Tenants
(1) Indicated Required Base Class Rate	\$2,401.68	\$224.05	\$1,485.14	\$190.53
(2) Loss Cost Underlying Indicated Rate Change	\$846.12	\$89.84	\$522.97	\$77.19
(3) Non-Wind Portion of Losses	29.33%	17.00%	37.76%	57.69%
(4) Fixed Expenses per Policy	\$53.40	\$10.72	\$54.36	\$9.96
(5) Variable Expense per Policy	28.65%	28.65%	28.65%	28.65%
(6) Non-Wind Base Rate excl. Reinsurance Cost; = [(2) x (3) + (4)] / [1.0 - (5)]	\$422.69	\$36.43	\$352.95	\$76.38
(7) Compensation for Assessment Risk per Policy	\$16.47	\$2.13	\$14.68	\$2.03
(8) Compensation for Assessment Risk Adjustment Factor	0.335	0.258	0.436	0.625
(9) Adjusted Compensation for Assessment Risk; = (7) x (8)	\$5.52	\$0.55	\$6.40	\$1.27
(10) Net Cost of Reinsurance (Non-Wind Perils Only)	\$159.04	\$13.87	\$107.29	\$36.36
(11) Net Deviations	5.0%	5.0%	5.0%	5.0%
(12) Indicated Wind Exclusion Credit	74.3%	76.1%	66.9%	37.0%
(13) Current Wind Exclusion Credit	73.9%	61.3%	73.9%	61.3%
(14) Proposed Wind Exclusion Credit	74.1%	68.7%	70.4%	49.2%

(1), (2), (4), (5), (7) From Section C, Pages 6 and 17

(3) = $X / (X + Y + Z)$; where X = 5-year average annual non-wind losses + 2021 modeled storm surge losses, Y = 2021 modeled hurricane wind losses, and Z = 5-year average annual non-hurricane wind losses

(8) = $[(2) \times (3) + (4)] / [(2) + (4)]$

(10) Based on data provided by Aon

(11) From Section C, Page 1

(12) = $\{(1) - [(6) + (9) + (10)] / [1 - (11)]\} / (1)$

(13) From NCRB MH(F) Rate Manual

(14) Based on average of (12) and (13)

**North Carolina Mobile Homeowners
MH(F) Program**

Section E

Supplemental Information

North Carolina Mobile Homeowners
MH(F) Program

Supplemental Information
Responses to North Carolina Administrative Code Title 11, Chapter 10.1105

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North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (1)
Summary of Earned Premium by Coverage and Year

Earned Premium at Actual (i.e. Collected) Level

	(1)	(2)	(3) = (1) + (2)
Calendar / Accident Year	Owners	Tenants	Total
2017	\$47,088,196	\$98,857	\$47,187,053
2018	47,790,209	103,280	47,893,489
2019	48,951,495	102,365	49,053,860
2020	46,677,351	111,314	46,788,665
2021	46,329,301	98,986	46,428,287
Total	\$236,836,552	\$514,802	\$237,351,354

Earned Premium at Current (i.e. Manual) Rate Level

	(4)	(5)	(6) = (4) + (5)
Calendar / Accident Year	Owners	Tenants	Total
2017	\$44,236,216	\$95,542	\$44,331,758
2018	45,539,042	102,749	45,641,792
2019	46,680,276	103,709	46,783,985
2020	45,451,220	107,885	45,559,104
2021	47,454,596	114,906	47,569,502
Total	\$229,361,350	\$524,791	\$229,886,141

Note: based on data provided by member companies; earned premiums at current (manual) rate level are calculated using the extension of exposures method

Earned Premium at Current (i.e. Manual) Rate Level shown is based on only those policies that contained all the risk characteristics required to calculate a mobile homeowners premium. For more details on data excluded from parts of the rate review analysis, please see Section E, Page 5

**North Carolina
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North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (1)
Summary of Paid Losses and Allocated Loss Adjustment Expenses (ALAE) by Coverage and Year

Paid Losses

	(1)	(2)	(3) = (1) + (2)
Calendar / Accident Year	Owners	Tenants	Total
2017	\$18,204,702	\$9,190	\$18,213,891
2018	67,915,536	59,946	67,975,482
2019	17,257,647	1,648	17,259,295
2020	22,651,566	8,374	22,659,940
2021	14,989,644	34,210	15,023,854
Total	\$141,019,094	\$113,368	\$141,132,462

Paid ALAE

	(4)	(5)	(6) = (4) + (5)
Calendar / Accident Year	Owners	Tenants	Total
2017	\$763,896	\$38	\$763,934
2018	2,500,592	4,457	2,505,049
2019	847,467	0	847,467
2020	1,133,583	0	1,133,583
2021	614,047	450	614,497
Total	\$5,859,585	\$4,945	\$5,864,530

Notes:

Losses and ALAE based on data provided by member companies and include actual hurricane losses.

All amounts shown exclude Unallocated Loss Adjustment Expenses (ULAE).

ULAE was accounted for in the rate indication via a 17.0% ULAE factor applied to Non-Hurricane losses and a 6.0% LAE factor applied to Hurricane Losses (see Section C, Page 47).

For Non-Hurricane losses, the ULAE factors are applied on Section C, Pages 3 and 5.

For Hurricane losses, the LAE factor is applied by Aon.

**North Carolina
Mobile Homeowners
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North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (1)
Summary of Incurred Losses and Allocated Loss Adjustment Expenses (ALAE) by Coverage and Year

Incurred Losses			
	(1)	(2)	(3) = (1) + (2)
Calendar / Accident Year	Owners	Tenants	Total
2017	\$18,204,702	\$9,190	\$18,213,891
2018	67,917,536	59,946	67,977,482
2019	17,277,647	1,648	17,279,295
2020	22,935,175	8,374	22,943,549
2021	15,492,479	34,210	15,526,688
Total	\$141,827,538	\$113,368	\$141,940,906

Incurred ALAE			
	(4)	(5)	(6) = (4) + (5)
Calendar / Accident Year	Owners	Tenants	Total
2017	\$763,896	\$38	\$763,934
2018	2,500,592	4,457	2,505,049
2019	862,467	0	862,467
2020	1,246,708	0	1,246,708
2021	622,536	450	622,986
Total	\$5,996,199	\$4,945	\$6,001,144

Notes:

Losses and ALAE based on data provided by member companies and include actual hurricane losses.

All amounts shown exclude Unallocated Loss Adjustment Expenses (ULAE).
ULAE was accounted for in the rate indication via a 17.0% ULAE factor applied to Non-Hurricane losses and a 6.0% LAE factor applied to Hurricane Losses (see Section C, Page 47).
For Non-Hurricane losses, the ULAE factors are applied on Section C, Pages 3 and 5.
For Hurricane losses, the LAE factor is applied by Aon.

**North Carolina
Mobile Homeowners
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North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (1)
Summary of Incurred Losses by Coverage and Year

Anticipated Loss Ratio

The following were the anticipated loss and LAE ratios in the prior filings:

Policy Form	Anticipated Loss Ratio			
	Eff. 11/1/2021	Eff. 6/1/2020	Eff. 10/1/2015	Eff. Prior to 10/1/2015
Owners	15.2%	16.7%	38.2%	48.7%
Tenants	45.3%	45.6%	36.2%	48.7%

Note:

See explanatory filing memorandum and Section C in Exhibit RB-1 for additional information about expenses.

**North Carolina
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North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (1a)
Summary of Exposure Data by Coverage and Year

Calendar / Accident Year	Earned House Years		
	(1) Owners	(2) Tenants	(3) = (1) + (2) Total
2017	70,067	588	70,655
2018	69,582	632	70,214
2019	68,622	641	69,263
2020	64,017	672	64,689
2021	63,245	700	63,945
Total	335,533	3,233	338,767

Excluded Companies:

- American Modern Insurance Group (13.7% market share) was unable to provide amount of coverage data. As such, American Modern Insurance Group's exposure and premium data were excluded from the analysis when calculating the average rating factors, exposure trend, premium trend, modeled hurricane loss cost, net cost of reinsurance, and fixed expense per policy.
- No companies were excluded from the loss data used to develop the loss development and loss trend calculations.
- No companies were excluded from the underwriting expense, loss adjustment expense, and deviation data used to develop the rate level calculations.

**North Carolina
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North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (1b)

Not applicable to Mobile Homeowners rate filings.

**North Carolina
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North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (1c)
Summary of Data Adjustments

(1) Hurricane Losses

Actual hurricane losses were removed from the experience period data and replaced with modeled (i.e. expected) hurricane losses developed by Aon. Additionally, because storm surge is included in the modeled losses, flood losses in territories 110, 120, 130, 140, 150, and 160 associated with hurricanes were also removed. The tables below show, by accident year for each coverage, the proportion of the total losses and claim counts removed from the analysis due to hurricanes and storm surge:

Owners:

Territory	Proportion of Loss & ALAE Due to Hurricanes					Proportion of Claims Due to Hurricanes				
	Accident Year					Accident Year				
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021
110	0.0%	80.6%	99.2%	0.0%	0.0%	0.0%	78.6%	80.0%	0.0%	0.0%
120	0.0%	99.4%	21.4%	13.5%	0.0%	0.1%	93.9%	39.6%	43.1%	0.0%
130	0.0%	56.9%	89.4%	9.6%	0.0%	3.3%	62.1%	69.2%	20.8%	0.0%
140	0.2%	90.3%	19.5%	44.1%	0.0%	1.3%	84.1%	27.3%	44.7%	0.0%
150	0.0%	85.2%	27.3%	21.9%	0.0%	0.0%	66.5%	32.6%	21.3%	0.0%
160	0.6%	95.6%	15.4%	24.9%	0.0%	5.3%	86.7%	21.4%	31.3%	0.0%
170	0.0%	8.0%	0.0%	37.2%	0.0%	0.0%	8.5%	1.1%	20.4%	0.0%
180	1.1%	54.0%	17.9%	37.3%	0.0%	1.7%	52.6%	24.5%	22.9%	0.0%
190	1.1%	85.5%	17.5%	28.5%	0.0%	1.3%	74.5%	27.0%	21.2%	0.0%
200	7.4%	83.5%	26.4%	23.2%	0.0%	3.7%	84.1%	20.0%	6.4%	0.0%
210	0.0%	34.5%	6.1%	6.6%	0.0%	0.0%	30.6%	7.3%	8.0%	0.0%
220	0.1%	81.3%	20.6%	2.5%	0.4%	1.8%	77.7%	15.6%	4.8%	1.4%
230	2.4%	84.6%	11.1%	2.0%	7.4%	2.1%	81.8%	11.0%	2.1%	1.2%
240	2.9%	45.7%	2.2%	10.2%	0.0%	2.5%	38.1%	3.5%	8.7%	0.0%
250	4.1%	68.2%	0.3%	3.1%	0.0%	7.5%	69.4%	5.3%	3.1%	0.0%
260	2.0%	28.6%	1.0%	6.5%	0.0%	2.6%	20.7%	0.6%	6.6%	0.0%
270	36.5%	27.1%	0.3%	4.2%	0.0%	28.3%	31.4%	1.5%	1.8%	0.0%
280	0.0%	19.4%	0.0%	6.3%	0.0%	0.0%	26.9%	0.0%	9.3%	0.0%
290	2.1%	70.6%	4.8%	0.1%	0.0%	2.7%	59.5%	5.5%	1.1%	0.0%
300	0.1%	71.7%	0.0%	5.1%	0.7%	2.6%	61.9%	0.0%	3.2%	1.7%
310	0.6%	17.3%	0.0%	11.3%	1.4%	1.8%	23.9%	0.3%	11.5%	0.9%
320	1.1%	38.2%	0.8%	6.4%	0.0%	1.1%	28.4%	0.4%	6.6%	0.0%
330	0.0%	5.6%	0.0%	15.2%	0.0%	0.0%	8.8%	0.0%	15.9%	0.0%
340	2.2%	29.8%	0.1%	6.4%	0.0%	3.0%	26.6%	0.5%	6.4%	0.0%
350	0.8%	16.0%	1.1%	5.6%	0.0%	4.7%	11.9%	0.5%	7.3%	0.0%
360	3.2%	8.5%	0.1%	10.5%	0.9%	3.9%	8.0%	0.2%	8.3%	0.6%
370	0.0%	3.9%	0.0%	0.0%	0.0%	0.0%	4.5%	0.0%	0.0%	0.0%
380	3.7%	0.0%	0.0%	2.5%	0.0%	3.9%	1.1%	0.0%	3.8%	0.0%
390	3.7%	0.9%	0.0%	0.0%	0.0%	9.8%	6.8%	0.0%	0.0%	0.0%

**North Carolina
Mobile Homeowners
MH(F)**

North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (1c)
Summary of Data Adjustments

(2) Catastrophe Losses

Losses and claim counts used in the loss trend analysis were adjusted to remove catastrophe losses. This was done to prevent the volatile nature of catastrophe losses from impacting historical and projected trend selections. Because catastrophe losses other than hurricane and flood were not explicitly identified in the data provided by member companies, weekly claim data was reviewed by peril (water and wind) in order to identify catastrophe events. For each peril, weeks during the experience period which had reported claim counts that were greater than two times the standard deviation of weekly reported claims were identified as having catastrophe events. The claims and losses for each peril that occurred during those weeks were excluded from the loss trend analysis. The tables below show, by accident year for each coverage, the proportion of the total losses and claim counts removed from the analysis due to catastrophes:

Accident Year	Proportion of Losses Due to Catastrophes		Accident Year	Proportion of Claims Due to Catastrophes	
	Owners	Tenants		Owners	Tenants
2017	11.3%	0.0%	2017	10.4%	0.0%
2018	77.3%	84.1%	2018	65.6%	63.6%
2019	23.8%	0.0%	2019	19.6%	0.0%
2020	31.5%	49.6%	2020	30.1%	50.0%
2021	4.4%	95.2%	2021	2.0%	25.0%

(3) Excess Wind Losses

Non-hurricane wind losses have been smoothed using an excess wind procedure. See the prefiled testimony of P. Anderson.

(4) Excess Flood Losses

Non-hurricane flood losses have been smoothed using an excess flood procedure. See the prefiled testimony of P. Anderson.

(5) Allocation of Data to Territory Groups

Because data provided by member companies only included zip code, the exposure, premium, and loss data needed to be allocated to the current territory definitions in instances where zip codes are located in multiple territories. The allocation in these instances was determined based on the number of mobile homes in each county/zip code/census block combination, as determined from census data. In the affected zip codes, each county/zip code/census block combination was mapped to a territory. Then, for each territory, the proportion of mobile homes within the territory out of the total mobile homes within the zip code was determined. These proportions within each territory were then used to allocate the exposure, premium, and loss data.

(6) Loss Development

Losses were developed to ultimate using loss development factors. See the prefiled testimony of P. Anderson.

(7) Loss Trend

Losses were trended to the average accident date of the policy period in which the rates are proposed to be in effect in order to bring all historical losses to a common projected cost level. See the prefiled testimony of P. Anderson.

**North Carolina
Mobile Homeowners
MH(F)**

North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (1d)
Calculation of Premium at Current Rate Level

- See Section E, Page 1, which provides the actual earned premiums and earned premiums at present rates.
- Earned premium at present rates were calculated based on the following rate order calculation formula:

Earned Premium = Base Rate for Given Amount of Insurance x Territory Factor x (1 - Tie-Down Credit) x Deductible Factor x Earned Exposure

- The following demonstrates a sample calculation for the earned premium at present rates for a single insured with an Owners policy having \$30,000 of Coverage A and a \$500 deductible, where the mobile home is located in territory group 1 and qualifies for the tie-down credit:

(1) Base Rate for \$30,000 of coverage	\$828.00
(2) Territory Group 1 Surcharge	1.434
(3) Tie-Down Credit	10%
(4) Deductible Credit for \$500 deductible (%)	27%
(5) Deductible Credit for \$500 deductible (\$)	\$241.01
(6) Earned Exposure	1.000
(7) Premium at Present (Manual) Rates	\$827.61

Notes:

- (1) Assumes Policy Form MH(F)-3
- (5) = Min { [(1) x (2) x {1 - (3)}] x (4) , \$241.01 }, where \$241.01 is the maximum deductible credit for territory group 1
- (7) = [(1) x (2) x {1 - (3)} - (5)] x (6)

**North Carolina
Mobile Homeowners
MH(F)**

North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (1e)
Premium Data for Largest Writers of Mobile Home Insurance in North Carolina

	Company	2021 Written Premium	2021 Written Premium Market Share	2021 Earned Premium	2021 Earned Premium Market Share
1	American Bankers Insurance Company of Florida	\$18,040,975	35.7%	\$16,794,720	33.9%
2	State Farm Fire & Casualty Company	13,556,859	26.8%	13,149,343	26.5%
3	American Family Home Insurance Company	6,839,025	13.5%	7,890,934	15.9%
4	North Carolina Farm Bureau Mutual Insurance Company	5,322,069	10.5%	5,268,690	10.6%
5	Erie Insurance Company	3,703,295	7.3%	3,448,719	7.0%
6	Windsor Mount Joy Mutual Insurance Company	3,013,967	6.0%	2,965,967	6.0%
7	American Modern Home Insurance Company	46,899	0.1%	58,001	0.1%
8	American Modern Property and Casualty Insurance Company	15,498	0.0%	2,266	0.0%
	Total	\$50,538,587	100.0%	\$49,578,640	100.0%

Note:

Fewer than ten companies are listed above because only companies with 2021 written premium greater than \$0 are included.

**North Carolina
Mobile Homeowners
MH(F)**

North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (1f)

Not applicable to Mobile Homeowners rate filings.

**North Carolina
Mobile Homeowners
MH(F)**

North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (1g)

Not applicable to Mobile Homeowners rate filings.

**North Carolina
Mobile Homeowners
MH(F)**

North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (1h)

Not applicable to Mobile Homeowners rate filings.

**North Carolina
Mobile Homeowners
MH(F)**

North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (1i)
Experience Period Loss Data by Coverage and Year

Owners

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9) = (5) x (6) x (7) x (8)	(10)
Accident Year	Paid Claims	Outstanding Claims	Paid Loss & ALAE	Case Outstanding Loss & ALAE	Incurred Loss & ALAE	Loss & ALAE Development Factor	ULAE Factor	Loss Trend Factor	Trended Incurred Loss & LAE	Expected Loss Ratio
2017	5,196	0	\$18,968,598	\$0	\$18,968,598	1.000	1.170	1.612	\$35,786,162	15.2%
2018	14,587	1	70,416,127	2,000	70,418,127	1.000	1.170	1.521	125,330,999	15.2%
2019	4,945	1	18,105,114	35,000	18,140,114	0.999	1.170	1.435	30,428,019	15.2%
2020	6,318	16	23,785,149	396,734	24,181,883	0.999	1.170	1.354	38,266,426	15.2%
2021	3,621	61	15,603,691	511,324	16,115,015	1.011	1.170	1.277	24,346,310	15.2%
Total	34,667	79	\$146,878,679	\$945,058	\$147,823,737				\$254,157,916	15.2%

Tenants

	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19) = (15) x (16) x (17) x (18)	(20)
Accident Year	Paid Claims	Outstanding Claims	Paid Loss & ALAE	Case Outstanding Loss & ALAE	Incurred Loss & ALAE	Loss & ALAE Development Factor	ULAE Factor	Loss Trend Factor	Trended Incurred Loss & LAE	Expected Loss Ratio
2017	13	0	\$9,227	\$0	\$9,227	1.000	1.170	1.005	\$10,853	45.3%
2018	11	0	64,404	0	64,404	1.000	1.170	1.020	76,843	45.3%
2019	2	0	1,648	0	1,648	0.999	1.170	1.034	1,993	45.3%
2020	6	0	8,374	0	8,374	0.999	1.170	1.049	10,271	45.3%
2021	4	0	34,660	0	34,660	1.011	1.170	1.064	43,641	45.3%
Total	36	0	\$118,312	\$0	\$118,312				\$143,600	45.3%

Note: Loss & ALAE and claims based on data provided by member companies; losses include actual hurricane losses

(6), (16) from Section C, Page 32
 (7), (17) from Section C, Page 47
 (8), (18) from Section C, Page 34
 (10), (20) from Section E, Page 4

**North Carolina
Mobile Homeowners
MH(F)**

North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (1j)

Not applicable to Mobile Homeowners rate filings.

**North Carolina
Mobile Homeowners
MH(F)**

North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (1k)

See explanatory filing memorandum in Exhibit RB-1 and prefiled testimony of P. Anderson and M. Mao.

**North Carolina
Mobile Homeowners
MH(F)**

North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (1)
Summary of Loss & ALAE Data by Cause of Loss

Owners

Accident Year	Incurred Loss & ALAE by Peril									Total
	Fire, Lightning & Removal	Liability	Theft	Non-Flood Water	Flood	Non-Hurricane Wind & Hail	Hurricane	Vandalism	All Other	
2017	\$6,171,256	\$380,951	\$719,601	\$4,561,132	\$32,569	\$5,383,215	\$869,215	\$191,482	\$659,177	\$18,968,598
2018	4,873,551	161,249	701,472	5,535,746	3,635,078	6,202,992	47,547,681	175,271	1,585,088	70,418,127
2019	4,903,729	204,121	559,490	3,830,896	68,797	6,454,450	1,214,531	105,396	798,705	18,140,114
2020	4,765,926	640,780	310,359	4,454,588	215,954	9,960,130	2,921,520	53,705	858,920	24,181,883
2021	5,127,785	189,608	264,696	4,481,555	367,841	4,444,537	333,522	272,194	633,277	16,115,015
Total	\$25,842,248	\$1,576,708	\$2,555,618	\$22,863,918	\$4,320,239	\$32,445,323	\$52,886,467	\$798,049	\$4,535,167	\$147,823,737

Tenants

Accident Year	Incurred Loss & ALAE by Peril									Total
	Fire, Lightning & Removal	Liability	Theft	Non-Flood Water	Flood	Non-Hurricane Wind & Hail	Hurricane	Vandalism	All Other	
2017	\$313	\$0	\$7,287	\$1,627	\$0	\$0	\$0	\$0	\$0	\$9,227
2018	33,616	0	2,875	786	0	4,396	22,731	0	0	64,404
2019	0	0	0	0	0	714	0	0	934	1,648
2020	0	0	1,905	2,319	0	0	4,150	0	0	8,374
2021	0	0	0	0	33,000	0	0	0	1,660	34,660
Total	\$33,929	\$0	\$12,067	\$4,732	\$33,000	\$5,109	\$26,881	\$0	\$2,594	\$118,312

Note: based on data provided by member companies

**North Carolina
Mobile Homeowners
MH(F)**

North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (2)
Credibility Factor Development and Application

See explanatory filing memorandum in Exhibit RB-1 and prefiled testimony of P. Anderson.

**North Carolina
Mobile Homeowners
MH(F)**

North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (3)

Not applicable to Mobile Homeowners rate filings.

**North Carolina
Mobile Homeowners
MH(F)**

North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (4)
Loss Trend Factor Development and Application

- (4a) See Section C, Pages 34 through 37 and prefiled testimony of P. Anderson.
- (4b) Not applicable (no external indices used for loss trending purposes)
- (4c) Not applicable to Mobile Homeowners rate filings.

**North Carolina
Mobile Homeowners
MH(F)**

North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (5)
Changes in Premium Base resulting from Rating Exposure Trend

(5a) See Section C, Pages 38 through 40 and prefiled testimony of P. Anderson.

(5b) Not applicable to Mobile Homeowners rate filings.

**North Carolina
Mobile Homeowners
MH(F)**

North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (6)
Limitations

- (6a) No limitations were placed on the loss data provided by member companies included in the filing.
- (6b) Limitations were applied to the rate changes by coverage. The filed overall rate level changes for Owners and Tenants are 31.5% and 31.1% in Year 1, and 33.1% and 31.3% in Year 2, respectively.

There were no limitations on the extent of the rate level change by coverage amount, by form, by protection class, by construction, or by deductible

- (6c) Limitations were applied to the territorial rate changes as follows:

Territory Group	Proposed Rate Change - Year 1			Proposed Rate Change - Year 2		
	Owners	Tenants	Total	Owners	Tenants	Total
1	63.6%	46.3%	63.6%	63.6%	46.3%	63.6%
2	37.9%	38.1%	37.9%	37.9%	38.1%	37.9%
3	41.9%	37.7%	41.9%	41.9%	37.7%	41.9%
4	28.2%	28.7%	28.2%	28.2%	28.7%	28.2%
5	27.4%	30.8%	27.4%	27.4%	30.8%	27.4%
6	16.8%	28.7%	16.9%	16.8%	28.7%	16.9%

Note:

- Territory Group 1 (Territories 110, 120, 130, and 140)
 Territory Group 2 (Territories 150 and 160)
 Territory Group 3 (Territories 180, 190, 200, 210, 220, and 230)
 Territory Group 4 (Territories 170, 240, and 250)
 Territory Group 5 (Territories 260, 270, 280, 290, and 300)
 Territory Group 6 (Territories 310, 320, 330, 340, 350, 360, 370, 380, and 390)

- (6d) Other than the excluded data discussed on Section E, Page 5 and those mentioned above, there were no other limitations

**North Carolina
Mobile Homeowners
MH(F)**

North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (7)
Overhead and Underwriting Expenses

(7a) See Section C, Pages 44 through 46 and prefiled testimony of P. Anderson.

(7b) Not applicable to Mobile Homeowners rate filings.

(7c) Not applicable to Mobile Homeowners rate filings.

**North Carolina
Mobile Homeowners
MH(F)**

North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (8)
Percent Rate Change

(8a) See Section A, Page 1

(8b) The proposed rate changes are based on the indicated rate changes, which reflect an assumed effective date of 7/1/2023 and the assumption that the proposed rates will be in effect for one year. However, the Rate Bureau Governing Committee elected to spread the proposed rate changes over two years, with a proposed effective date of 7/1/2023 for the year 1 change and an effective date of 7/1/2024 for the year 2 change.

If the actual implementation date is later than the assumed effective date for the year 1 change, the indicated and proposed rate changes would be impacted, as the change in the proposed effective date would impact the loss and premium trend periods used in the filing. Changes in trend periods would impact projected losses, premiums, and fixed expenses used to calculate the rate level indications.

If the effective data were to change, advance notice of 105 days is required for an orderly implementation of the change in rates.

(8c) Not applicable

**North Carolina
Mobile Homeowners
MH(F)**

North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (9)
Final Proposed Rates

- (9a) The proposed rates and rating factors can be found in Section B of Exhibit RB-1 accompanying this filing.
- (9b) Not applicable

**North Carolina
Mobile Homeowners
MH(F)**

North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (10)
Investment Earnings

(10a) See Investment Income calculations on Section E, Pages 28 and 29.

Note: The Investment Income calculations reflect data for the entire statutory line of business, Homeowners Multiple Peril, rather than only Mobile Homeowners policies since the investment income information is from Statutory Page 14 of the Annual Statement.

(10b) Not applicable to Mobile Homeowners rate filings.

(10c) Not applicable to Mobile Homeowners rate filings.

**North Carolina
Mobile Homeowners
MH(F)**

North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (10a)
Investment Earnings

	Accident Year				
	2017	2018	2019	2020	2021
Direct Earned Premium					
(1) Direct Earned Premium	\$2,507,844,811	\$2,627,900,639	\$2,801,717,952	\$2,986,362,325	\$3,181,779,596
Unearned Premium Reserve (UPR)					
(2) Prior Year UPR as of 12/31	\$1,271,993,627	\$1,329,073,828	\$1,410,344,202	\$1,495,357,747	\$1,615,506,455
(3) Current Year UPR as of 12/31	1,329,073,828	1,410,344,202	1,495,357,747	1,615,506,455	1,736,266,771
(4) Average UPR; = [(2) + (3)] / 2	1,300,533,728	1,369,709,015	1,452,850,975	1,555,432,101	1,675,886,613
(5) Total Prepaid Expenses; = (5a) + (5b) + (5c) + (5d)	25.2%	25.1%	25.9%	26.9%	26.1%
(5a) Commission & Brokerage	16.8%	16.2%	17.2%	17.9%	17.9%
(5b) Taxes, Licenses & Fees	2.7%	3.2%	3.0%	3.2%	2.9%
(5c) General Expenses / 2	2.5%	2.5%	2.5%	2.3%	1.9%
(5d) Other Acquisition / 2	3.2%	3.2%	3.3%	3.4%	3.4%
(6) Deduction for Prepaid Expenses; = (4) x (5)	327,424,215	343,219,095	376,898,125	418,111,289	437,193,371
(7) Net UPR Subject to Investment; = (4) - (6)	\$973,109,513	\$1,026,489,920	\$1,075,952,849	\$1,137,320,812	\$1,238,693,242
Delayed Remission of Premium (Agents' Balances)					
(8) Agents' Balances - premium due < 90 days (% of net written premium)	16.45%	16.27%	15.65%	15.13%	14.35%
(9) Factor for Agents' Balances due > 90 days	1.021	1.021	1.021	1.021	1.021
(10) Delayed Remission; = (1) x (8) x (9)	\$421,203,821	\$436,538,182	\$447,676,706	\$461,325,189	\$466,173,665
Loss and Loss Adjustment Expense (LAE) Reserve					
(11) Expected Loss and LAE Expense Ratio	61.18%	61.30%	60.36%	59.43%	60.66%
(12) Expected Incurred Loss and LAE; = (1) x (11)	\$1,534,193,099	\$1,610,873,645	\$1,691,060,356	\$1,774,894,368	\$1,930,115,147
(13) Expected Loss and LAE Reserve Ratio; = (13d / 13a) x (1 + 13e) / (1 + 13f)	36.55%	25.57%	45.05%	32.19%	38.20%
(13a) Current Calendar Year Incurred Losses	1,239,571,663	2,460,297,524	1,577,131,843	1,888,147,346	1,607,231,192
(13b) Prior Year Loss Reserves as of 12/31	454,664,103	405,130,335	789,176,282	554,613,540	611,757,026
(13c) Current Year Loss Reserves as of 12/31	405,130,335	789,176,282	554,613,540	611,757,026	577,425,079
(13d) Average Loss Reserves; = [(13b) + (13c)] / 2	429,897,219	597,153,309	671,894,911	583,185,283	594,591,053
(13e) Ratio of LAE Reserves to Loss Reserves	19.84%	18.75%	21.27%	18.83%	17.20%
(13f) Ratio of Incurred LAE to Incurred Losses	13.70%	12.73%	14.69%	14.00%	13.50%
(14) Expected Average Loss and LAE Reserves; = (12) x (13)	\$560,804,070	\$411,848,662	\$761,803,927	\$571,410,081	\$737,282,787
Total Net Reserves Subject to Investment					
(15) Total Net Subject to Investment; = (7) - (10) + (14)	\$1,112,709,762	\$1,001,800,401	\$1,390,080,071	\$1,247,405,704	\$1,509,802,364
Average Rate of Return					
(16) Net Investment Income Earned	\$51,092,459	\$57,828,994	\$57,147,344	\$54,385,089	\$56,619,534
(17) Average Cash and Invested Assets	1,676,831,258	1,733,729,297	1,822,857,949	1,975,605,647	2,045,710,371
(18) Average Rate of Return; = (16) / (17)	3.05%	3.34%	3.14%	2.75%	2.77%
(19) Investment Earnings on Net Subject to Investment; = (15) x (18)	\$33,903,875	\$33,415,314	\$43,579,580	\$34,338,974	\$41,787,101
(20) Average Rate of Return as % of Direct Earned Premium; = (19) / (1)	1.35%	1.27%	1.56%	1.15%	1.31%
(21) Federal Income Tax Rate; From Section E, Page 29	23.5%	14.9%	15.9%	15.6%	15.6%
(22) Average Rate of Return after Federal Income Tax; = (20) * [1 - (21)]	1.03%	1.08%	1.31%	0.97%	1.11%

(1), (2), (3), (8), (13a), (13b), (13c), (16), (17) Aggregate North Carolina Homeowners information from Statutory Page 14 of Annual Statement

(5), (11) from NCRB's selected expense, profit, contingency, and dividend ratios

(9) Based on data provided by A.M. Best

(13e), (13f) From A.M. Best Aggregate Insurance Expense Exhibit

**North Carolina
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North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (10a)
Federal Income Tax Rate

Federal Income Tax Rate	2017		2018		2019		2020		2021	
	Investment Income	Tax Rate								
(1) Taxable Bonds	\$23,362,682	35.0%	\$26,150,371	21.0%	\$29,370,354	21.0%	\$28,332,003	21.0%	\$27,541,921	21.0%
(2) Non-Taxable Bonds	9,714,339	0.0%	8,700,372	0.0%	7,800,625	0.0%	7,245,882	0.0%	6,758,270	0.0%
(3) Sub-total / Weighted Average	\$33,077,021	24.7%	\$34,850,743	15.8%	\$37,170,979	16.6%	\$35,577,885	16.7%	\$34,300,191	16.9%
(4) Taxable Stocks	\$7,610,774	10.5%	\$7,971,643	10.5%	\$8,913,032	10.5%	\$8,486,504	10.5%	\$9,208,921	10.5%
(5) Non-Taxable Stocks	1,785,853	0.0%	4,181,953	0.0%	1,595,181	0.0%	2,429,550	0.0%	3,215,338	0.0%
(6) Sub-total / Weighted Average	\$9,396,627	8.5%	\$12,153,596	6.9%	\$10,508,213	8.9%	\$10,916,054	8.2%	\$12,424,259	7.8%
(7) Mortgage Loans	\$755,495	35.0%	\$908,689	21.0%	\$996,462	21.0%	\$1,029,624	21.0%	\$1,149,755	21.0%
(8) Real Estate	1,839,346	35.0%	1,937,053	21.0%	2,034,695	21.0%	1,999,576	21.0%	1,995,863	21.0%
(9) Collateral Loans	622	35.0%	5,854	21.0%	202	21.0%	17,597	21.0%	91	21.0%
(10) Cash on Deposit	980,167	35.0%	1,984,480	21.0%	2,497,031	21.0%	819,448	21.0%	138,807	21.0%
(11) Short-term Investments	(156,684)	35.0%	(116,536)	21.0%	(92,630)	21.0%	(183,091)	21.0%	46,945	21.0%
(12) All Other	10,384,974	35.0%	12,017,086	21.0%	9,878,232	21.0%	10,043,449	21.0%	12,669,733	21.0%
(13) Sub-total / Weighted Average	\$13,803,920	35.0%	\$16,736,626	21.0%	\$15,313,992	21.0%	\$13,726,603	21.0%	\$16,001,194	21.0%
(14) Total; = (3) + (6) + (13)	\$56,277,568	24.5%	\$63,740,965	15.4%	\$62,993,184	16.4%	\$60,220,542	16.1%	\$62,725,644	16.1%
(15) Investment Deductions	\$5,185,109	35.0%	\$5,911,971	21.0%	\$5,845,840	21.0%	\$5,835,453	21.0%	\$6,106,110	21.0%
(16) Net Investment Income Earned	\$51,092,459		\$57,828,994		\$57,147,344		\$54,385,089		\$56,619,534	
(17) Federal Income Tax Rate		23.5%		14.9%		15.9%		15.6%		15.6%

All investment income and investment deductions based on A.M. Best's Aggregates and Averages; Underwriting & Investment Exhibit, Part 1, Col. 8

(4) For calendar year 2017, 30% of dividend income from held securities is subject to tax, hence the tax rate on stocks = 35% x 0.30 = 10.5%

For calendar years 2018 - 2021, 50% of dividend income from held securities is subject to tax, hence the tax rate on stocks = 21% x 0.50 = 10.5%

(17) weighted average of (14) and (15)

**North Carolina
Mobile Homeowners
MH(F)**

North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (11)
Statistical Plans & Programs

(11a) The list below identifies the applicable data calls and the data utilized:

Data Calls

North Carolina Rate Bureau 2022 Mobile Homeowners Data Call
Annual Statement for Calendar Year 2021
Insurance Expense Exhibit for Calendar Year 2021
RB Calls for 2021 North Carolina Expense Experience
Mobile Home Census Data

- (11b) The North Carolina Rate Bureau certifies that there is no evidence known to it or, insofar as it is aware following reasonable inquiry, to Milliman that the data which were collected under the data calls identified in response (11)(a) above and used in the filing are not materially true and accurate representations of the experience of the companies whose data underlie such experience. While the Rate Bureau is aware that the collected data sometimes require corrections or adjustments, the Rate Bureau's review of the data, the data collection process, and the ratemaking process indicates that the aggregate data are reasonable and reliable for ratemaking purposes. See also the prefiled testimony of P. Anderson.
- (11c)
1. After receiving the data provided by each member company, each data set is checked to verify that all fields represented as part of each plan are included in the data and that the values for each record are appropriate for the given field. For instance, numeric fields are checked to make sure that only numeric data is reported.
 2. Record count and exposure distributions are then summarized for every field included in each dataset to identify unusual, unexpected, or missing values as well as unintuitive distributional relationships.
 3. Univariate statistical summaries are then run on all numeric fields, such as premiums, losses, and exposures, to identify outliers or unusual values.
 4. When appropriate, records with missing values are overridden to an appropriate null or missing value. For instance, for numeric fields such as claim counts and losses, records with missing values are set to 0. For text fields, records with missing values might be set to "Missing."
 5. Loss, premium, and exposure data by individual company was then summarized and compared to data provided by member companies from the most recent Mobile Homeowners MH(F) filing for consistency. When inconsistencies are noted, the member companies are subsequently notified so that the inconsistencies can be verified.
 6. Incurred loss, written and earned premium, and exposure data was aggregated across all member companies and summarized by calendar / accident year to compare against data from the most recent Mobile Homeowners MH(F) filing for consistency.
 7. The average written premium, average earned premium, average incurred severity, frequency, and incurred pure premium are summarized by member company and in aggregate for each field included in each dataset. These metrics are also summarized for each field by calendar / accident year, policy form, and coverage. The summaries are also compared to data summaries from the most recent Mobile Homeowners MH(F) filing for consistency, to the extent that prior data is available. These summaries were reviewed to identify inconsistencies in the data. When inconsistencies are noted, the member companies are subsequently notified so that the inconsistencies can be verified.

**North Carolina
Mobile Homeowners
MH(F)**

North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (12)

Not applicable to Mobile Homeowners rate filings.

**North Carolina
Mobile Homeowners
MH(F)**

North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (13)
Required Surplus

- (13a) The weighted average premium to surplus ratios (weighted by North Carolina Mobile Homeowners Direct Premiums Written) for the calendar years 2012-2021 for the company groups that wrote the coverages in each of those years, based on data from the North Carolina Rate Bureau and S&P Global Market Intelligence, are:

Calendar Year	Premium to Surplus Ratio
2012	1.23
2013	1.20
2014	1.24
2015	1.23
2016	1.25
2017	1.38
2018	1.45
2019	1.36
2020	1.27
2021	1.34

- (13b) The expected weighted average premium to surplus ratio for all companies writing Mobile Homeowners insurance during the years the proposed rates are expected to be in effect is estimated to be 1.30. See the prefilled testimony of G. Zanjani.
- (13c) The necessary level of capital and surplus to support particular coverages varies by line, and the Rate Bureau regards the ratios shown in (a) as indicative of levels typical within the industry for the lines of business covered by this filing. The actual level of capital and surplus needed to support premium writings without endangering the solvency of a company is dependent upon (among others) the financial structure and investments unique to each company, the relationship of the company with affiliated companies as a group (and the experience of the affiliated companies), the mix of business of each company, and the conditions of the economy as they affect each company's individual circumstances. The Rate Bureau is advised that the National Association of Insurance Commissioners, as one of several criteria, generally considers that a premium to surplus ratio for an individual company of 3 to 1 warrants close regulatory attention and monitoring with respect to the company's solvency position.
- (13d) The Rate Bureau has determined the premium to surplus ratios for Mobile Homeowners insurance in North Carolina based on the weighted average premium to surplus ratios for insurance groups writing Mobile Homeowners insurance in North Carolina, where the weights are the actual premiums written. The premium to surplus ratios of the insurers actually writing this business in North Carolina are representative of the leverage relevant for this line and state. The Rate Bureau has not further allocated surplus within these insurers across lines and states in this or other filings in North Carolina.

**North Carolina
Mobile Homeowners
MH(F)**

North Carolina Administrative Code (NCAC) Title 11, Chapter 10.1105, Section (14)
Additional Information Requested by the Commissioner

(14a) See pre-filed testimony of G. Zanjani and P. Anderson.

(14b) Not applicable to Mobile Homeowners rate filings.

(14c) Not applicable to Mobile Homeowners rate filings.

(14d) The items below summarize the changes in methodology, approach, or presentation from that used in the Rate Bureau's 2021 Mobile Homeowners rate filing:

- (1) In this filing, the modeled hurricane losses for the 2022 storm season for the Beach and FAIR Plans were not available for use in the compensation for assessment risk analysis. The compensation for assessment risk provision was determined by using an average of the compensation for assessment risk provisions used in the 2017, 2018, 2019, 2020, and 2021 property filings and then modifying that average to reflect that some insurance companies no longer retain exposure to assessments from the Beach and FAIR Plans pursuant to their respective reinsurance agreements. In the previous filing, the modeled losses for the 2019 storm season were adjusted to the 2020 storm season based on the impact of changes in the underlying exposures and the hurricane models, because the modeled losses for the 2020 storm season were not available.

See also prefiled testimony of P. Anderson.

**North Carolina Mobile Homeowners
MH(F) Program**

Section F

Modeled Catastrophe Data

**NOTE: SECTION F IS INCLUDED SEPARATELY
AS PART 2 OF THE FILING**

North Carolina

Mobile Homeowners Policy

MH(F) Program

**MOBILE HOMEOWNERS POLICY: MH(F) PROGRAM
RULES**

NORTH CAROLINA

1. GENERAL INSTRUCTIONS

The Mobile Homeowners Policy provides property and liability coverage using the forms and endorsements herein. This manual also contains the rules governing the writing of the Mobile Homeowners Policy. The rules, rates, forms and endorsements filed by or on behalf of the Company for each coverage shall govern in all cases not specifically provided for herein.

2. POLICY AND FORMS AND DESCRIPTION OF COVERAGE

The following is a general description of the coverages provided by the individual Mobile Homeowners Forms. The Policy and Forms should be consulted for exact contract conditions.

a. Section I Coverages – Property Damage

Coverage A – Dwelling

Coverage B – Other Structures

Coverage C – Personal Property

Coverage D – Loss of Use

- (1) Form MH(F)-2 BROAD FORM. Covers dwelling, other structures, personal property and loss of use against loss by:

- | | |
|---------------------------|---|
| • Fire or Lighting | • Falling Objects |
| • Windstorm or Hail | • Vandalism or Malicious Mischief |
| • Explosion | • Weight of ice, snow or sleet |
| • Riot or Civil Commotion | • Collapse of Buildings |
| • Aircraft | • Accidental discharge of Water or Steam |
| • Vehicles | • Freezing of plumbing, heating systems and appliances |
| • Smoke | • Sudden and Accidental injury from electrical currents |
| • Breakage of Glass | • Sudden and Accidental tearing apart of heating systems and appliances |
| • Theft | |
| • Flood | |

- (2) Form MH(F)-3 COMPREHENSIVE FORM. Covers dwelling, other structures, and loss of use against all risks of physical loss, with certain exceptions. Personal property is covered for the same perils as provided in Form MH(F)-2 BROAD FORM.

- (3) Form MH(F)-4 CONTENTS BROAD FORM. Covers personal property, including the Insured's interest in building additions and alterations and loss of use, against loss by the same perils as provided in Form MH(F)-2 BROAD FORM.

b. Section II Coverages – Liability - All Forms

Coverage E – Personal Liability

Coverage F – Medical Payments to Others

- (1) Personal Liability – Covers payment on behalf of the Insured of all sums which he shall become legally obligated to pay as damages because of bodily injury or property damage caused by an occurrence arising out of his premises or personal activities.
- (2) Medical Payments to Others – Covers medical expenses incurred by persons, other than the Insured, who sustain bodily injury caused by an accident arising out of the Insured's premises or personal activities.

3. ELIGIBILITY

- a. Form MH(F)-1 not filed or approved under this program.
- b. Form MH(F)-2, MH(F)-3 – A Mobile Homeowners Policy may be issued:
To an owner occupant of a mobile home which is used exclusively for private residential purposes (except as provided in **General** Rule 3.f.) and contains not more than two families and with not more than two boarders or roomers.
- c. Form MH(F)-4 – A Mobile Homeowners Policy may be issued only to:
The Tenant (non-owner) of a mobile home; provided the residence premises occupied by the insured is used exclusively for residential purposes (except as provided in General Rule 3.f.) and is not occupied by more than one additional family or more than two boarders or roomers.
- d. When a mobile home is occupied by co-owners, a Mobile Homeowners Policy providing Coverage A & B may be issued to only one of the co-owners and endorsed to cover the interest of the other co-owner in the mobile home and appurtenant private structures and for premises liability.
Attach Endorsement MH(F)-23 Additional Insured - Residence Premises. A separate Mobile Homeowners Policy with FORM MH(F)-4 may be issued to the second co-owner.
- e. It is permissible to extend the Mobile Homeowners Policy, without additional premium charge, to cover the interest of a non-occupied joint owner(s) in the mobile home(s) and for premises liability.
Attach Endorsement MH(F)-23 Additional Insured
- f. Subject to all other sections of this rule, a Mobile Homeowners Policy may be issued to cover a seasonal mobile home and such mobile home shall be described as 'Seasonal Mobile Home' in the policy.
- g. Incidental office, professional, private school and studio occupancies are permitted provided:
(1) the premises is occupied principally for mobile home purposes;
(2) there is no other business conducted on the premises; and
(3) there is no increase in the applicable fire rate for such occupancy.
- h. A Mobile Homeowners Policy shall not be issued covering any property to which farm forms or rates apply under the rules filed by or on behalf of the Company. In no event shall a policy be issued to cover any property situated on premises used for farming purposes, unless farming conducted thereon is only incidental to the occupancy of the premises by the Insured as a mobile home and farming is not the occupation of the Insured.
- i. A Travel Trailer which is defined as "a recreational vehicle equipped with temporary living quarters, including cooking and eating facilities" is not eligible for this program.

4. MANDATORY COVERAGES

- a. It is mandatory that insurance be written for all coverages provided under both Sections I and II of the Mobile Homeowners Policy, except for those optional coverages provided for under General Rule 8 of this manual.
- b. Section II of the policy requires coverage for the following exposures and the additional premium developed must be charged when such exposures exist.
(1) All additional residence premises where the Named Insured or spouse maintain a residence other than business or farm properties;
(2) All residence employees of the Named Insured or spouse not covered or not required to be covered by Workers' Compensation Insurance (charge required for residence employees in excess of two); and
(3) Incidental office, professional private school or studio occupancies by the insured on residential premises of the Insured.

5. OFFICE, PROFESSIONAL, PRIVATE SCHOOL OR STUDIO OCCUPANCY

- a. When the Insured maintains an incidental office, professional, private school or studio occupancy in the mobile home or in a separate structure on the premises, which otherwise meets the eligibility requirements, an additional premium for the increased Coverage C limit and for the liability exposure must be charged. Under a Mobile Homeowners Policy with Form MH(F)-4, the minimum limit of liability for Coverage C shall be \$2,000.
Attach Endorsement MH(F)-24 Office, Professional, Private School or Studio Use - Residence Premises

b. When the insured gives professional instruction, such as music, dancing or similar instruction in the mobile home, employs no assistants and there has been no physical alteration of the mobile home to accommodate the occupancy, the additional premium for the liability exposure must be charged.

Attach Endorsement MH(F)-24 Office, Professional, Private School or Studio Use - Residence Premises

c. When the Insured has permissible office, professional, private school or studio occupancy in an additional residential premises occupied by the insured, other than the described mobile home, the additional premium for the liability exposures must be charged.

Attach Endorsement MH(F)-25 Office, Professional, Private School or Studio Use - Other Residence

6. LIMITS OF LIABILITY

a. The limits of liability required under the Mobile Homeowners Policy are as follows:

Section I Coverage	MH(F)-2	MH(F)-3	MH(F)-4
A. Dwelling Minimum Limit	\$2,000	\$2,000	
B. Other Structures	10% of Mobile Home	10% of Mobile Home	
C. Personal Property	30% of Mobile Home	30% of Mobile Home	\$500
D. Loss of Use	10% of Mobile Home	10% of Mobile Home	10% of Unscheduled Personal Property

Section II Coverage	All Forms
E. Personal Liability	\$25,000 Each Occurrence
F. Medical payments to Others	\$500 Each Person \$25,000 Each Accident

b. ALL FORMS - The limit of liability for Coverage C of Section I and Coverages E or F of Section II may be increased. See General Rule 8.

c. FORM MH(F)-2, MH(F)-3 – Under Coverage B of Section I an additional amount of insurance may be written on a specific private structure. See General Rule 8.

7. DEDUCTIBLES

a. All Mobile Homeowners Forms contain a \$50 Loss Deductible Clause applicable to loss under Section I of the policy except loss under Coverage D, Fire Department Service Charge and Emergency Removal Expense.

b. FORM MH(F)-2, MH(F)-3 & MH(F)-4 – The Mobile Homeowners Policy may be endorsed to provide a flat (non-disappearing) deductible in the amount of \$100, \$250, \$500, \$750, \$1,000, \$2,000, or \$5,000 at a premium credit.

c. Optional \$100 or \$250 Flat Theft Deductible

FORM MH(F)-2, MH(F)-3, MH(F)-4 – The Mobile Homeowners Policy may be endorsed to provide a flat (non-disappearing) deductible in the amount of \$100 or \$250 applicable to any loss caused by theft of property only covered under Coverage C of the policy. This deductible shall be applied to the amount of each adjusted loss. A premium credit is applicable.

d. Optional Windstorm or Hail Deductibles – Territories 110, 120, 130, 140, 150, and 160 only

In territories 110, 120, 130, 140, 150, and 160 only, the Mobile Homeowners Policy may be endorsed to provide an optional Windstorm or Hail Deductible used in conjunction with the deductibles applicable to All Other Perils. This option provides for higher dollar deductible amounts of \$1,000, \$2,000, \$5,000, 1%, 2%, or 5% when the higher deductible amount selected exceeds the deductible applicable to All Other Perils.

e. Optional Named Storm Percentage Deductible – Territories 110, 120, 130, 140, 150, and 160 only

In territories 110, 120, 130, 140, 150, and 160 only, the Mobile Homeowners Policy may be endorsed to provide a Named Storm Percentage Deductible of 1%, 2%, or 5% of the Coverage A or C limit of liability, whichever is greater, when the dollar amount of the percentage deductible exceeds the deductible applicable to All Other Perils. Use MH(F)-58, Named Storm Percentage Deductible.

8. OPTIONAL COVERAGES

a. Section I - Property Damage - The Coverage may be amended as follows:**(1) Other Structures - Increased Limit**

An additional amount of insurance may be written on a specific private structure under Coverage B at an additional premium.

Attach Endorsement MH(F)-28 Other Structures.

(2) Credit Card, Forgery, and Counterfeit Money Coverage

The Mobile Homeowners Policy may be extended to include coverage against loss by forgery or alteration in connection with credit cards, checks or drafts, or loss due to acceptance of counterfeit paper currency at an additional premium.

Attach Endorsement MH(F)-29 Credit Card, Forgery, and Counterfeit Money Coverage

(3) Money and Securities

Increased limits on money, bullion, numismatic property, bank notes, and on securities, accounts, bills, deeds, evidences of debt, letters of credit, notes other than bank notes, passports, railroad and other tickets and stamps, including philatelic property, maybe provided at an additional premium.

The \$100 limit on money may be increased by an amount not exceeding \$400 and the \$500 limit on securities may be increased by an amount not exceeding \$500.

Attach Endorsement MH(F)-32 Coverage C - Increased Special Limits of Liability

(4) Theft Coverage Extension

FORM MH(F)-2, MH(F)-3, MH(F)-4 - Coverage may be extended to include loss by theft of property while unattended in or on any vehicle or watercraft at an additional premium.

Attach Endorsement MH(F)-27 Theft Coverage Extension

(5) Personal Property**(a) Increased Limit - All Forms**

The limit of liability for Coverage C may be increased at an additional premium.

(b) Away from Premises - FORM MH(F)-2, MH(F)-3, MH(F)-4 The limit of liability on unscheduled personal property away from premises under Coverage C maybe increased at an additional premium.

Attach Endorsement MH(F)-33 Coverage C - Away from Premises

(6) Earthquake Damage

The Additional Exclusion section may be amended to include direct loss caused by earthquake and volcanic eruption at an additional premium. A deductible in the amount of 2% is mandatory.

Attach Endorsement MH(F)-43 Earthquake

(7) Fire Department Service Charge

The limit of \$100 in the policy may be increased to \$250 or \$500 at an additional premium.

Attach Endorsement MH(F)-45 Fire Department Service Charge

b. Scheduled Personal Property

Coverage may be provided against all risks of physical loss with certain exceptions on scheduled personal property subject to the rules and rates filed by or on behalf of the Company. This coverage is subject to an annual minimum premium of \$15 irrespective of the term of the Mobile Homeowners Policy.

Attach Endorsement MH(F)-31 Scheduled Personal Property Endorsement

c. Lienholder's Single Interest

Coverage may be provided to cover the interest of the lienholder from the loss caused by collision, upset, conversion, embezzlement or secretion at an additional premium. Repossession and return protection is included. This coverage should be provided only when requested by the lienholder.

Attach Endorsement MH(F)-21 Mobile Home Lienholder's Single Interest

d. Trip Collision

This coverage may be provided to protect the Insured from loss caused by collision or upset at an additional premium. A \$100 deductible is mandatory.

Attach Endorsement MH(F)-22 Trip Collision

e. Consent to Move Mobile Home

This extension of coverage may be provided to avoid termination of coverage when the mobile home is moved and without reduction of coverage while the mobile home is away from the described premises (but not for collision or upset) at an additional premium.

Attach Endorsement MH(F)-20 Consent to Move Mobile Home

f. Scheduled Glass

Coverage may be added for specified glass at the premiums filed by the Company.

Attach Endorsement MH(F)-44 Scheduled Glass

g. Section II - Liability

The Limit of Liability for Coverage E or F may be increased at an additional premium and the following coverage may also be added to the Mobile Homeowners Policy:

Note: Workers' Compensation coverage or liability on a non-comprehensive basis shall not be added to the Mobile Homeowners Policy.

(1) Additional Residence Premises - Rented to Others

Coverage may be provided for additional one or two family residence premises, rented to others, owned by the Named Insured or spouse, at an additional premium.

Attach Endorsement MH(F)-34 Additional Residence - Rented to Others, 1 or 2 Families

(2) Business Pursuits

Coverage may be provided for the liability of an insured arising out of business activities, other than a business of which he is sole owner or a partner, at an additional premium.

Attach Endorsement MH(F)-35 Business Pursuits

(3) Outboard Motors and Watercraft

Coverage is provided for watercraft powered by an outboard motor or combination of outboard motors not exceeding 25 total horsepower. Watercraft not covered under the policy may be insured at an additional premium.

Attach Endorsement MH(F)-36 Watercraft

(4) Owned Snowmobile

Each snowmobile owned by the Named Insured or any other insured who is a resident of the Named Insured's household must be declared. The premium charge shall apply separately to each snowmobile.

Attach Endorsement MH(F)-37 Snowmobile

(5) Farmers Comprehensive Personal Liability

Section II can be amended to provide for this coverage at an additional premium.

Attach Endorsement MH(F)-41 Farmers Comprehensive Personal Liability

9. TIE-DOWN CREDIT

When the mobile home is properly secured in accordance with the regulations of the North Carolina Building Code Council as set forth in the State of North Carolina Regulations for Mobile Homes, a credit of 10% shall be deducted from the applicable basic premium.

Attach Endorsement MH(F)-46 Mobile Home Tie-Down.

10. CHANGE ENDORSEMENT

Endorsement MH(F)-26 Change Endorsement, provides the minimum information requirements for any endorsement or change that takes place during the term of the policy. This endorsement must be used or the equivalent information provided.

11. POLICY TERM

The Mobile Homeowners Policy may be written for a term of one year. It is permissible to extend the policy for successive policy terms by extension certificate based upon the premiums in effect on renewal date. The then current editions of the applicable forms and endorsements must be made a part of the policy.

It is permissible to write for one or three year terms on the following bases:

- An annual policy which may be extended for successive terms by Certificate, subject to the rules, premiums, forms and endorsements then in effect.
- A three year policy with the premium payable in installments at the premium in effect on the anniversary dates.
- A three year policy with the premium prepaid at three times the annual premiums in effect at inception.

Endorsement MH(F)-39 Deferred Premium Payment applies.

12. OTHER INSURANCE

Credit for existing insurance is not permitted, except under Section II as provided for in the rate pages.

13. WHOLE DOLLAR PREMIUM RULE

All premiums shown on the policy and endorsements shall be rounded to the nearest whole dollar. A premium of fifty cents (\$0.50) or more shall be rounded to the next higher whole dollar. In the event of cancellation by the Company, the return premium may be carried to the next higher whole dollar.

14. INTERPOLATION OF PREMIUMS FOR POLICY AMOUNTS NOT SHOWN ON PREMIUM CHARTS

Premiums for limits of liability in excess of the minimums required, not shown in the premium charts, may be obtained by interpolation.

15. INCREASES IN LIMITS OF LIABILITY OR ADDITION OF COVERAGES

The limits of liability may be increased or coverage may be added during the term of the policy. Any additional premium shall be computed on a pro-rata basis subject to all the rules of this manual.

16. MINIMUM ADDITIONAL PREMIUM

When an endorsement requiring an additional premium is issued subsequent to the inception date of the policy, such total additional premium shall not be less than \$6.00 regardless of the unexpired policy period.

17. CANCELLATION OR REDUCTIONS IN LIMITS OF LIABILITY OR COVERAGES

It shall not be permissible to cancel any of the mandatory coverages in the policy unless the entire policy is cancelled.

If insurance is cancelled or reduced at the request of the Company, or in the event of foreclosure of the mortgage or other lien on the insured mobile home, the earned premium shall be computed on a pro-rata basis.

If insurance is cancelled or reduced at the request of the Insured, the earned premium shall be computed on a short rate basis, using the standard short rate tables subject to a minimum retained premium of \$25.00 unless rewritten by another Mobile Homeowners Policy in this Company.

18. TRANSFER OR ASSIGNMENT

Subject to all the rules of this manual, any necessary adjustment of premium, and with permission of the Company, a Mobile Homeowners Policy may be endorsed to effect:

- a. transfer to another location within the same state; or
- b. assignment from one insured to another in the event of transfer of title of the mobile home.

19. RESTRICTION OF INDIVIDUAL POLICIES

If a Mobile Homeowners Policy would not be issued because of unusual circumstances or exposures, the Named Insured may request a restriction of the policy provided no reduction in the premium is allowed. Such requests shall be referred to the Company and must be handled in accordance with consent to rate statutes.

20. REPLACEMENT COST - COVERAGES A AND B

Coverage may be provided on a replacement cost basis for Coverage A and B, at an additional premium.

Attach Endorsement MH(F)-48 Replacement Cost Loss Settlement

21. INFLATION GUARD ENDORSEMENT

Form MH(F)-2 and MH(F)-3 Limits of Liability on Coverage A, B, C, and D are automatically increased by the amount of quarterly increase shown on the endorsement for an additional charge.

Attach Endorsement MH(F)-50

22. PERSONAL PROPERTY REPLACEMENT COST

Form MH(F)-2 and MH(F)-3 Coverage C may be extended to include full cost of repair or replacement at an additional premium.

Attach Endorsement MH(F)-51

23. COVERAGE B - OFF PREMISES

Forms MH(F)-2 and MH(F)-3 Coverage B - Other structures may be extended to cover other structures which are located off the residence premises at an additional charge.

Attach Endorsement MH(F)-52

24. WINDSTORM OR HAIL EXCLUSION - TERRITORIES 110, 120, 130, 140, 150, and 160 ONLY

The peril of Windstorm or hail may be excluded if:

- a. The property is located in an area eligible for such coverage from the North Carolina Insurance Underwriting Association; and
- b. A Windstorm or Hail Rejection form is secured and maintained by the company.

Attach Endorsement MH(F)-54 Windstorm or Hail Exclusion.

When Endorsement MH(F)-54 is attached to the policy, enter the following on the Declaration Page:

“This policy does not provide coverage for the peril of Windstorm or Hail.”

25. MOBILE HOME STATED VALUE LOSS SETTLEMENT

For an additional premium, your policy may be changed to reflect a stated value for the covered mobile home. For rate information, see Rate Section.

Attach MH(F)-310 (Ed. 9-97)

26. OPTIONAL RATING CHARACTERISTICS

Companies may use the following optional rating characteristics or any combination of such optional rating characteristics and Bureau filed characteristics to determine rates, as long as applicable legal requirements are satisfied. The resulting premium shall not exceed the premium that would have been determined using the rates, rating plans, classifications, schedules, rules and standards promulgated by the Bureau, except as provided by statute. The rating factor for any combination of the following optional risk characteristics cannot exceed 1.00 unless the resulting premium does not exceed the Bureau premium.

- a. Policy characteristics not otherwise recognized in this manual. Examples include: account or multi-policy credit; tiers; continuity of coverage; coverages purchased; intra-agency transfers; payment history; payment options; prior insurance; and new and renewal status.
- b. Policyholder/Insured personal characteristics not otherwise recognized in this manual. Examples include: Smoker/non-smoker status; credit information; loss history; loss prevention training/education; age; work status; marital status; number of years owned; owned real estate; household composition; and good student/education.
- c. Dwelling characteristics not otherwise recognized in this manual. Examples include: Gated community; retirement community; limited access community; mobile home community; revitalized/renovated home; security, safety or loss deterrent systems or devices; age of home; occupancy; fire protection/distance to fire department; and construction type and quality.
- d. Affinity group or other group not otherwise recognized in this manual.
- e. Any other rating characteristics or combination of characteristics if filed by a company and approved by the Commissioner.

27. INSTALLMENT PAYMENT PLAN

When a policy is issued on an installment basis, the following rules apply:

The first installment shall be due on the effective date of the policy and the due date of the last installment shall be no later than one month prior to the policy anniversary date.

An additional charge of \$3.00 shall be made for each installment.

The premium calculated for the first installment payment, exclusive of installment charges, shall not be less than the pro rata charge for the period from the inception date of policy to the due date of the next installment.

28. TERRITORY GROUPS

For rating purposes, territories are grouped as follows:

Territory Group 1: Territories 110, 120, 130, and 140

Territory Group 2: Territories 150 and 160

Territory Group 3: Territories 180, 190, 200, 210, 220, and 230

Territory Group 4: Territories 170, 240, and 250

Territory Group 5: Territories 260, 270, 280, 290, and 300

Territory Group 6: Territories 310, 320, 330, 340, 350, 360, 370, 380, and 390

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OWNERS FORMS						TENANTS FORM		
TERRITORY GROUP 3; \$50 DEDUCTIBLE						TERRITORY GROUP 3; \$50 DEDUCTIBLE		
Amount of Insurance				Premium		Amount of Insurance		Premium
A	B	C	D	MH(F)-2	MH(F)-3	C	D	MH(F)-4
\$2,000	\$200	\$600	\$200	\$346.00	\$394.00	\$2,000	\$200	\$55.00
3,000	300	900	300	358.00	409.00	3,000	300	67.00
4,000	400	1,200	400	371.00	426.00	4,000	400	80.00
5,000	500	1,500	500	386.00	440.00	5,000	500	92.00
6,000	600	1,800	600	398.00	456.00	6,000	600	105.00
7,000	700	2,100	700	414.00	471.00	7,000	700	118.00
8,000	800	2,400	800	427.00	488.00	8,000	800	129.00
9,000	900	2,700	900	440.00	504.00	9,000	900	143.00
10,000	1,000	3,000	1,000	455.00	518.00	10,000	1,000	155.00
11,000	1,100	3,300	1,100	468.00	534.00	11,000	1,100	167.00
12,000	1,200	3,600	1,200	482.00	550.00	12,000	1,200	179.00
13,000	1,300	3,900	1,300	494.00	566.00	13,000	1,300	191.00
14,000	1,400	4,200	1,400	508.00	581.00	14,000	1,400	203.00
15,000	1,500	4,500	1,500	517.00	592.00	15,000	1,500	215.00
20,000	2,000	6,000	2,000	582.00	670.00	20,000	2,000	275.00
25,000	2,500	7,500	2,500	649.00	750.00	25,000	2,500	335.00
30,000	3,000	9,000	3,000	714.00	828.00	30,000	3,000	395.00
35,000	3,500	10,500	3,500	779.00	907.00	35,000	3,500	455.00
40,000	4,000	12,000	4,000	845.00	985.00	40,000	4,000	514.00
45,000	4,500	13,500	4,500	910.00	1,065.00	45,000	4,500	574.00
50,000	5,000	15,000	5,000	977.00	1,144.00	50,000	5,000	634.00
55,000	5,500	16,500	5,500	1,042.00	1,223.00			
60,000	6,000	18,000	6,000	1,108.00	1,301.00			
65,000	6,500	19,500	6,500	1,173.00	1,379.00			
70,000	7,000	21,000	7,000	1,238.00	1,458.00			
75,000	7,500	22,500	7,500	1,305.00	1,537.00			
80,000	8,000	24,000	8,000	1,370.00	1,616.00			
85,000	8,500	25,500	8,500	1,436.00	1,695.00			
90,000	9,000	27,000	9,000	1,501.00	1,774.00			
95,000	9,500	28,500	9,500	1,567.00	1,852.00			
100,000	10,000	30,000	10,000	1,633.00	1,932.00			
Each Add'l \$1,000				\$13.00	\$16.00	Each Add'l \$1,000		\$12.00

Territory Group 1	Surcharge	43.4%	Territory Group 1	Surcharge	42.2%
Territory Group 2	Surcharge	28.9%	Territory Group 2	Surcharge	35.7%
Territory Group 4	Discount	-4.0%	Territory Group 4	Discount	-11.8%
Territory Group 5	Discount	-14.7%	Territory Group 5	Discount	-21.8%
Territory Group 6	Discount	-33.5%	Territory Group 6	Discount	-24.8%

1. DEDUCTIBLES

For the purpose of this rule, premium subject to deductible credits shall be the sum of the following:

- (1) the premium developed from the Basic Premium Chart for Section 1 Deductible
- (2) the premiums for amended limits of liability for Coverage C; and
- (3) the premiums developed for all other Structures, Theft Coverage Extension and Coverage C - Increased Limits - Away from Premises, if applicable.

a. Optional Higher Flat Deductible

ALL FORMS - The Mobile Homeowners Policy may be endorsed to provide a flat (non-disappearing) deductible applicable to any loss under Section 1 of the policy in an amount and at a premium credit developed as follows. The Percentage of premium credit shall be applied to the premium developed above subject to the maximum premium credit indicated.

Owners – Section I Deductible							
Deductible Amount	\$100	\$250	\$500	\$750	\$1,000	\$2,000	\$5,000
Percentage Credit	10%	20%	27%	31%	34%	42%	54%
Maximum Credit:							
Territory Group 1	\$60.26	\$120.50	\$241.01	\$421.77	\$602.53	\$1,068.88	\$2,707.91
Territory Group 2	57.30	114.58	229.18	401.06	572.94	1,016.39	2,574.94
Territory Group 3	43.62	87.25	174.51	305.38	436.25	773.92	1,960.65
Territory Group 4	42.81	85.61	171.24	299.66	428.07	759.40	1,923.88
Territory Group 5	41.09	82.18	164.38	287.66	410.93	729.00	1,846.86
Territory Group 6	32.72	65.45	130.90	229.07	327.24	580.53	1,470.71

Tenants – Section I Deductible							
Deductible Amount	\$100	\$250	\$500	\$750	\$1,000	\$2,000	\$5,000
Percentage Credit	10%	20%	27%	31%	34%	42%	54%
Maximum Credit:							
Territory Group 1	\$43.41	\$86.80	\$173.60	\$303.81	\$434.01	\$769.93	\$1,950.54
Territory Group 2	41.43	82.86	165.71	290.00	414.28	734.93	1,861.88
Territory Group 3	30.52	61.04	122.08	213.64	305.20	541.42	1,371.65
Territory Group 4	26.91	53.82	107.63	188.36	269.08	477.35	1,209.31
Territory Group 5	23.86	47.71	95.42	166.99	238.56	423.20	1,072.14
Territory Group 6	22.94	45.89	91.78	160.61	229.44	407.03	1,031.17

b. Optional Flat Theft Deductible

ALL FORMS - The Mobile Homeowners Policy may be endorsed to provide a \$100 or \$250 Flat Theft Deductible applying to loss by Theft of property covered under Coverage C of the policy at a premium credit developed from the table below. The premium subject to this deductible shall be the sum of:

- (1) the premium developed from the Basic Premium Chart;
- (2) the premiums for amended limits of liability for Coverage C; and
- (3) the premiums developed for Theft Coverage Extension and Coverage C Increased Limits Away from Premises, if applicable.

Theft Deductible Amount	Owners		Tenants	
	\$100	\$250	\$100	\$250
Percentage Credit	3%	5%	3%	5%
Maximum Credit:				
Territory Group 1	\$24.10	\$36.15	\$17.36	\$26.04
Territory Group 2	22.92	34.38	16.57	24.85
Territory Group 3	17.45	26.17	12.21	18.31
Territory Group 4	17.12	25.68	10.76	16.14
Territory Group 5	16.44	24.66	9.54	14.31
Territory Group 6	13.09	19.63	9.18	13.77

c. Optional Windstorm or Hail Deductibles Territory Groups 1 and 2 only

The Windstorm or Hail Deductible options are used in conjunction with the deductibles applicable to All Other Perils. This option provides for higher dollar deductible amounts of \$1,000, \$2,000, \$5,000, 1%, 2%, or 5% when the higher deductible amount selected exceeds the deductible applicable to All Other Perils.

An endorsement is not required. Separately enter on the policy declarations the deductible amounts that apply to Windstorm or Hail and All Other Perils. For example: Deductible - \$500 except \$1000 for Windstorm or Hail.

The Windstorm or Hail Deductible factor applies to the \$50 rate.

\$1,000 WINDSTORM OR HAIL DEDUCTIBLE	
All Other Perils Deductible	Deductible Factor
\$50	0.89
100	0.82
250	0.76
500	0.70
750	0.65
The amount of insurance on the structure must be at least \$10,000.	

The Maximum \$1,000 Windstorm or Hail Deductible credits by Territory Group are:

Territory Group 1	\$602.53
Territory Group 2	\$572.94

\$2,000 WINDSTORM OR HAIL DEDUCTIBLE	
All Other Perils Deductible	Deductible Factor
\$50	0.85
100	0.78
250	0.73
500	0.68
750	0.64
1,000	0.60
The amount of insurance on the structure must be at least \$20,000.	

The Maximum \$2,000 Windstorm or Hail Deductible credits by Territory Group are:

Territory Group 1	\$1,205.05
Territory Group 2	\$1,145.88

\$5,000 WINDSTORM OR HAIL DEDUCTIBLE	
All Other Perils Deductible	Deductible Factor
\$50	0.82
100	0.77
250	0.70
500	0.66
750	0.62
1,000	0.58
2,000	0.48
The amount of insurance on the structure must be at least \$50,000.	

The Maximum \$5,000 Windstorm or Hail Deductible credits by Territory Group are:

Territory Group 1	\$1,928.09
Territory Group 2	\$1,833.41

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1% WINDSTORM OR HAIL DEDUCTIBLE	
All Other Perils Deductible	Deductible Factor
\$50	0.97
100	0.89
250	0.81
500	0.72
The amount of insurance on the structure must be at least \$25,000 for all other peril deductibles below 500 and \$50,000 for an all other peril deductible equal to 500.	

The Maximum 1% Windstorm or Hail Deductible credits by Territory Group are:

Territory Group 1	\$133.90
Territory Group 2	\$127.32

2% WINDSTORM OR HAIL DEDUCTIBLE	
All Other Perils Deductible	Deductible Factor
\$50	0.87
100	0.80
250	0.74
500	0.67
750	0.62
1,000	0.60
2,000	0.55
The amount of insurance on the structure must be at least \$50,000 for all other peril deductibles below 2,000 and \$100,000 for an all other peril deductible equal to 2,000	

The Maximum 2% Windstorm or Hail Deductible credits by Territory Group for All Other Peril Deductibles below 2,000 are:

Territory Group 1	\$848.84
Territory Group 2	\$807.15

The Maximum 2% Windstorm or Hail Deductible credits by Territory Group for the 2,000 All Other Peril Deductible are:

Territory Group 1	\$1,150.98
Territory Group 2	\$1,094.46

5% WINDSTORM OR HAIL DEDUCTIBLE	
All Other Perils Deductible	Deductible Factor
\$50	0.77
100	0.70
250	0.65
500	0.59
750	0.55
1,000	0.52
2,000	0.46
5,000	0.41
The amount of insurance on the structure must be at least \$50,000 for all other peril deductibles below 2,000 and \$100,000 for any other all other deductibles	

The Maximum 2% Windstorm or Hail Deductible credits by Territory Group are:

Territory Group 1	\$3,196.73
Territory Group 2	\$3,039.75

d. Optional Named Storm Percentage Deductibles Territory Groups 1 and 2 only

ALL FORMS - The Mobile Homeowners Policy may be endorsed to provide a Named Storm Percentage Deductible of 1%, 2%, or 5% of the Coverage A or C limit of liability, whichever is greater, when the dollar amount of the percentage deductible exceeds the deductible applicable to All Other Perils. Use **MH(F) 58** Named Storm Percentage Deductible.

The credits displayed incorporate the credits for the All Perils Deductibles. Do not use the credits for the All Other Perils Deductibles when rating a policy with a higher Named Storm Percentage Deductible.

The Named Storm Percentage Deductible factor applies to the \$50 Deductible rate.

Section 1: 1% Deductible - Owners					
All Other Perils Deductible	\$50	\$100	\$250	\$500	\$1,000
Percentage Credit	5%	14%	24%	31%	37%
Maximum Credit:					
Territory Group 1	\$31.72	\$63.41	\$126.85	\$253.70	\$634.24
Territory Group 2	\$30.16	\$60.30	\$120.62	\$241.24	\$603.10

Section 1: 1% Deductible - Tenants					
All Other Perils Deductible	\$50	\$100	\$250	\$500	\$1,000
Percentage Credit	5%	14%	24%	31%	37%
Maximum Credit:					
Territory Group 1	\$22.84	\$45.69	\$91.37	\$182.74	\$456.84
Territory Group 2	\$21.80	\$43.62	\$87.21	\$174.44	\$436.08

The amount of insurance on the structure must be at least \$25,000 for an all other perils deductible equal to 50 or 100 and \$50,000 for an all other perils deductible equal to 250, 500, or 1,000.

Section 1: 2% Deductible - Owners							
All Other Perils Deductible	\$50	\$100	\$250	\$500	\$750	\$1,000	\$2,000
Percentage Credit	11%	19%	28%	32%	35%	39%	43%
Maximum Credit:							
Territory Group 1	\$64.69	\$112.11	\$309.19	\$512.15	\$660.82	\$894.00	\$1,205.47
Territory Group 2	\$61.51	\$106.60	\$294.01	\$487.00	\$628.37	\$850.10	\$1,146.27

Section 1: 2% Deductible - Tenants							
All Other Perils Deductible	\$50	\$100	\$250	\$500	\$750	\$1,000	\$2,000
Percentage Credit	11%	19%	28%	32%	35%	39%	43%
Maximum Credit:							
Territory Group 1	\$46.60	\$80.76	\$222.72	\$368.91	\$476.00	\$643.96	\$868.31
Territory Group 2	\$44.47	\$77.09	\$212.59	\$352.14	\$454.36	\$614.69	\$828.84

The amount of insurance on the structure must be at least \$25,000 for an all other perils deductible equal to 50 or 100; \$50,000 for an all other perils deductible equal to 250, 500, 750, or 1,000; and \$100,000 for an all other perils deductible equal to 2,000.

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Section 1: 5% Deductible - Owners								
All Other Perils Deductible	\$50	\$100	\$250	\$500	\$750	\$1,000	\$2,000	\$5,000
Percentage Credit	18%	26%	36%	40%	42%	44%	49%	58%
Maximum Credit:								
Territory Group 1	\$109.68	\$219.90	\$708.65	\$952.29	\$1,068.88	\$1,273.76	\$2,024.98	\$3,185.96
Territory Group 2	\$104.29	\$209.11	\$673.85	\$905.53	\$1,016.39	\$1,211.21	\$1,925.54	\$3,029.52

Section 1: 5% Deductible - Tenants								
All Other Perils Deductible	\$50	\$100	\$250	\$500	\$750	\$1,000	\$2,000	\$5,000
Percentage Credit	18%	26%	36%	40%	42%	44%	49%	58%
Maximum Credit:								
Territory Group 1	\$79.00	\$158.40	\$510.45	\$685.95	\$769.93	\$917.51	\$1,458.62	\$2,294.88
Territory Group 2	\$75.42	\$151.20	\$487.24	\$654.77	\$734.93	\$875.80	\$1,392.32	\$2,190.57

The amount of insurance on the structure must be at least \$25,000 for an all other perils deductible equal to 50 or 100; \$50,000 for an all other perils deductible equal to 250, 500, 750, or 1,000; and \$100,000 for an all other perils deductible equal to 2,000 or 5,000.

2. OPTIONAL COVERAGES

a. Other Structures Increased Limits

When an additional amount of insurance is written on a specific Other Structure, the premiums listed on the following page per \$1,000 of insurance shall apply separately to each such structure.

FORM	INCREASED LIMIT RATE PER \$1,000
MH(F)-2	\$ 9
MH(F)-3	11

Attach Endorsement **MH(F) 28** Other Structures

b. Credit Card, Forgery and Counterfeit Money Coverage

When Credit Card, Forgery and Counterfeit Money Coverage is provided the additional premium shall be developed as follows:

Limit of Liability	Premium
\$2,500	\$3
5,000	5
10,000	6

For limits in excess of \$10,000 refer to Company

Attach Endorsement **MH(F) 29** Credit Card, Forgery and Counterfeit Money.

c. Money and Securities - Increased Limit

When the limit of liability is increased on money or securities, the additional premium shall be developed as follows:

All Forms	Money	Securities
Per \$100 of Insurance	\$6	\$4

The special limit of liability for theft of jewelry, watches and furs may be increased to \$1,000 but not exceeding \$500 for any one article. The additional premium shall be \$9.

Attach Endorsement **MH(F) 32** Coverage C - Increased Special Limits of Liability.

d. Theft Coverage Extension

ALL FORMS - When the peril of Theft is extended to cover loss of property from unattended vehicles or watercraft, the additional premium shall be \$3.

Attach Endorsement **MH(F) 27** Theft Coverage Extension.

e. Personal Property

(1) Increased Limit

When the limit of liability for Coverage C is increased, the additional premium shall be developed as follows:

Form	Per \$1,000 of insurance
MH(F)-2 or MH(F)-3	\$10

(2) Increased Limits - Away from Premises

When the limit of liability on personal property away from the premises under Coverage C is increased, the additional premium shall be developed as follows:

All Forms	Each Additional \$1,000
Without Theft Extension	\$ 9
With Theft Extension	13

Minimum Premium - \$9 Minimum Retained Premium for this endorsement when cancelled separately.

Attach Endorsement **MH(F) 33** Coverage C Away From Premises

f. Mobile Home Lienholder’s Single Interest

\$10 per year, not subject to Short Rate adjustment. Covers lienholders interest from loss by collision, upset, conversion, embezzlement or secretion and repossession return expense.

Attach endorsement **MH(F) 21** Mobile Home Lienholder’s Single Interest.

g. Trip Collision Coverage

In consideration of a fully earned premium of \$15, the policy is extended to cover loss from collision or upset for a period of 30 days – Subject to a mandatory \$100 deductible.

Attach endorsement **MH(F) 22** Trip Collision.

h. Consent to Move Mobile Home

In consideration of a fully earned premium of \$10, the on premises limits are extended to wherever the mobile home may be, for a period of 30 days.

Attach endorsement **MH(F) 20** Consent to Move Mobile Home.

i. Earthquake Coverage

When Earthquake Coverage is provided it shall apply to all Section 1 Coverages for the same limits as provided under the policy. The premium for each \$1,000 of insurance shall be developed as follows:

Form	Frame	Applied to:
MH(F)-2, MH(F)-3	0.40	Coverage A Limit
MH(F)-4	0.30	Coverage C Limit
MH(F)-2, MH(F)-3	0.30	Amount of Coverage C Increase Only
All Forms	0.40	Private Structure or Coverage D Increased or added limits

Attach endorsement **MH(F) 43** Earthquake.

j. Fire Department Service Charge

The limit may be increased as follows:

- Increase to \$250 \$2
- Increase to \$500 \$5

Attach endorsement **MH(F) 45** Fire Department Service Charge.

k. Tie-Down Credit

See general rule 9.

Attach endorsement **MH(F) 46** Mobile Home Tie-Down.

l. Replacement Cost Coverages A and B

When coverage is provided on a replacement cost basis, charge 5% of the premium from the Basic Premium Chart.

Attach **MH(F) 48** Replacement Cost Loss Settlement

m. Inflation Guard Coverage - Form MH(F)-2 and Form MH(F)-3

When the Limits of Liability on Coverages A, B, C & D are automatically increased in accordance with the provisions of the Inflation Guard Endorsement the annual additional premium shall be developed by applying the following charges to the annual premium for Coverage A.

Amount of Quarterly Increase	Charge
1.0%	1.50%
1.5%	2.25%
2.0%	3.00%
Each Add'l 0.5%	Add 0.75%

Minimum Annual Premium \$1.00. Additional premium for three year policies shall be three times the annual premium.

Attach Endorsement **MH(F) 50** Mobile Homeowners Inflation Guard.

n. Personal Property Replacement Cost - Form MH(F)-2 and Form MH(F)-3

When Coverage C is extended to include full cost of repair or replacement without deduction for depreciation the additional premium shall be developed as follows:

- Manual charge to increase Coverage C limit to 40% of Coverage A.
- 5% surcharge to the adjusted total base premium (including the additional premium for the increased Coverage C limit). The surcharge shall be applied to the Total Adjusted Basic Premium before credit for optional higher deductible is applied. The minimum additional premium is \$20.

Attach Endorsement **MH(F) 51** Personal Property Replacement Cost.

o. Coverage B - Off Premises - Form MH(F)-2 and Form MH(F)-3

When Coverage B - Off Premises is provided to cover other structures which are located off the residence premises, the additional charge shall be \$33.

Attach Endorsement **MH(F) 52** Coverage B - Off Premises

p. Windstorm or Hail Exclusion Credit - Territory Groups 1 and 2 only

When the perils of windstorm or hail are excluded from coverage under Section I of the policy the following credits shall be deducted from the applicable basic premium.

FORM	Territory Group 1	Territory Group 2
MH(F) 2 and MH(F) 3	73.9%	73.9%
MH(F) 4	61.3%	61.3%

q. Mobile Home Stated Value Loss Settlement

When coverage is provided on a stated value basis, charge 3% of the premium from the premium rate table.

Attach endorsement **MH(F) 310** Stated Value Loss Settlement.

SECTION II COVERAGES – LIABILITY

3. GENERAL INSTRUCTIONS

When the limit of liability for Coverage E or F is increased or coverage for additional exposures is provided, the additional premium shall be developed from the following tables. The respective limits of liability for Coverage E and for Coverage F must be uniform for all exposures covered under the policy. Coverage F limits indicated below are “each person” limits and contemplate the basic limit of \$25,000 each accident. Refer to Company for Limits in Excess of those shown.

Limit of Liability															
Coverage E	\$25,000			\$50,000			\$100,000			\$200,000			\$300,000		
Coverage F	None	500	1000	None	500	1000	None	500	1000	None	500	1000	None	500	1000
Residence Premises			3		1	4		2	5		4	7		6	9
Additional Residence Premises															
Occupied by Insured (1 or 2 Family)		3	4		4	5		5	6		6	7		7	8
Rented to Others* (1 Family)	3	6	7	4	7	8	5	8	9	6	9	10	7	10	11
Rented to Others* (2 Family)	5	8	9	6	9	10	7	10	11	8	11	12	9	12	13
Residence Employees**		2	3		3	4		4	5		5	6		6	7

*Attach Endorsement **MH(F) 34** Additional Residence Premises - Rented to Others.
 **Charge for each employee in excess of two other than employees whose time of employment is not more than half of the customary full time or to whom the Worker’s Compensation exclusion applies as set forth in Section II of the policy.

When coverage is provided by a Mobile Homeowners Policy for a Secondary Residence premises of an insured whose Primary Residence is covered by a Homeowners, Farmowners, or Mobile Homeowners Policy in the same company, the secondary premises shall be endorsed on Section II of the Primary policy at the appropriate charge, and a \$7 credit allowed on the Secondary policy if the Primary policy number is shown on the Declarations page of the Secondary policy.

Office, Professional, Private School or Studio Occupancy

When the insured maintains an incidental office, professional, private school or studio occupancy on the premises, the additional premium shall be calculated by adding the appropriate charge from the following table to the premium developed for any required increased in the Coverage C Limit of Liability.

Submit to Company for Medical Payments charges on incidental day nurseries or nursery schools.

Limit of Liability															
Coverage E	\$25,000			\$50,000			\$100,000			\$200,000			\$300,000		
Coverage F	None	500	1000	None	500	1000	None	500	1000	None	500	1000	None	500	1000
Residence Premises															
General Rule 5.a.*	9	11	13	10	12	14	11	13	15	12	14	16	13	15	17
General Rule 5.b.*		3	4		4	5		5	6		6	7		7	8
General Rule 5.c.**	4	6	8	5	7	9	6	8	10	7	9	11	8	10	12

*Attach Endorsement **MH(F) 24** Office, Professional, Private School or Studio Use – Residence Premises.
 Attach Endorsement **MH(F) 25 Office, Professional, Private School or Studio Use – Other Residence.

SECTION II COVERAGES – LIABILITY

Watercraft

Coverage must be written to expiration of the policy, but it is permissible to stipulate for inboard motor boats or inboard-outboard motor boats or sailboats (not outboard motors) the navigational period of each year. Premium shall be adjusted on a short rate basis. For boats not described below, coverage is not permitted under the Mobile Homeowners Policy. The premium applicable in the state in which the insured's initial residence premises is located shall apply except that if the insured owns another premises where he maintains a residence and operates his boat principally from such other premises, the premiums applicable in the state where the latter premises are located shall apply.

LIMIT OF LIABILITY										
Coverage E	\$25,000		\$50,000		\$100,000		\$200,000		\$300,000	
Coverage F	\$500	\$1,000	\$500	\$1,000	\$500	\$1,000	\$500	\$1,000	\$500	\$1,000
Outboard Motor*										
Less than 50 HP	5	6	6	7	7	8	8	9	9	10
50 HP and over	8	10	10	12	11	13	13	15	14	16
Inboard or Inboard-Outboard Motor Boats and Sailboats **										
• Under 16 MPH										
Less than 26 feet	11	12	13	14	15	16	17	18	19	20
26 to 40 feet	30	33	34	37	39	42	44	47	50	53
Over 40 feet	58	65	67	74	76	83	87	94	99	106
• 16 to 30 MPH										
Less than 26 feet	23	26	27	30	30	33	35	38	40	43
26 to 40 feet	47	53	54	60	61	67	70	76	80	86
Over 40 feet	87	98	100	111	114	125	131	142	149	160
• Over 30 MPH										
Less than 26 feet	58	65	67	74	76	83	87	94	99	106
26 to 40 feet	87	98	100	111	114	125	131	142	149	160
Sailboats No Auxiliary Power 26 to 40 feet	23	26	27	30	30	33	35	38	40	43
*Where two or more outboard motors are regularly used together in connection with any single watercraft owned by the Insured, the horsepower of all such outboards shall be accumulated for rating purposes.										
**Sailboats 26 to 40 feet inclusive equipped with Auxiliary Power are classed as Inboard Motor Boats.										
Attach Endorsement MH(F) 36 Watercraft										

SECTION II COVERAGES – LIABILITY

Business Pursuits

Classify and apply charge separately for each person insured:

A - Clerical Office Employees - Defines as those employees whose duties are confined to keeping the books or records, conducting correspondence, or who are engaged wholly in office work where such books or records are kept or where such correspondence is conducted, having no other duty or any nature in or about the employer's premises. This classification applies only to persons who are employed exclusively in separate buildings or on separate floors of buildings or in departments on such floors which are separated from all other work places of the employer by structural partitions and within which no work is performed other than clerical office duties.

B - Salesmen, Collectors or Messengers - Including installation, demonstration or servicing operations.

C - Teachers - Athletic, laboratory, manual training, physical training and swimming instruction, excluding liability for corporal punishment of pupils.

D - Teachers - Not otherwise classified, excluding liability for corporal punishment of pupils.

E - Teachers - Liability for corporal punishment of pupils. Additional premium for this coverage must be added to premium for classification C or D.

Occupations not otherwise classified - Refer to Company.

Limit of Liability															
Coverage E	\$25,000			\$50,000			\$100,000			\$200,000			\$300,000		
Coverage F	None	500	1000	None	500	1000	None	500	1000	None	500	1000	None	500	1000
Class															
A	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
B	2	3	4	2	3	4	3	4	5	3	4	5	3	4	5
C	3	5	6	3	6	7	4	7	8	5	8	9	6	9	10
D	1	2	3	1	2	3	1	2	3	2	3	4	2	3	4
E		2			3			4			5			6	

*Attach Endorsement **MH(F) 35** Business Pursuits

SECTION II COVERAGES – LIABILITY

Farmers Comprehensive Personal Liability

Coverage must be written to expiration of the policy, but it is permissible to stipulate for inboard motor boats or inboard-outboard motor boats or sailboats (not outboard motors) the navigational period of each year. Premium shall be adjusted on a short rate basis. For boats not described below, coverage is not permitted under the Mobile Homeowners Policy. The premium applicable in the state in which the insured's initial residence premises is located shall apply except that if the insured owns another premises where he maintains a residence and operates his boat principally from such other premises, the premiums applicable in the state where the latter premises are located shall apply.

LIMIT OF LIABILITY										
Coverage E	\$25,000		\$50,000		\$100,000		\$200,000		\$300,000	
Coverage F	\$500	\$1,000	\$500	\$1,000	\$500	\$1,000	\$500	\$1,000	\$500	\$1,000
Initial Farm Premises	21	23	23	26	26	29	29	32	32	35
Each Additional Farm Premises Occupied or Rented	12	13	14	15	15	16	17	18	19	20
Total Acreage for All Locations Occupied or Rented Over 500	5		6		7		8		9	
Farm Employees*										
• Per 100 Days or Fraction	6	7	7	8	8	9	9	10	10	11
• Each Farm Employee Part Time	8	9	9	10	10	11	11	13	12	14
• Each Farm Employee Full Time	18	20	20	22	22	25	25	28	28	31
Minimum Premium Per Policy	11	13	13	15	14	17	16	19	18	21
Animal Collision Coverage G	\$300 Limit - \$3									
Attach Endorsement MH(F) 41 Farmer's Comprehensive Personal Liability										

Owned Snowmobile

Each snowmobile owned by the Named Insured or any other Insured who is a resident of the Named Insured's household must be declared. The premium charge shall apply separately to each snowmobile. The minimum charge for each snowmobile for any period of coverage within a policy year shall be as indicated below for the respective Limits of Liability.

LIMIT OF LIABILITY										
Coverage E	\$25,000		\$50,000		\$100,000		\$200,000		\$300,000	
Coverage F	\$500	\$1,000	\$500	\$1,000	\$500	\$1,000	\$500	\$1,000	\$500	\$1,000
Each Snowmobile	-	-	-	-	-	-	-	-	-	-
Annual Minimum Premium	34	35	39	40	42	44	48	50	54	55
Attach Endorsement MH(F) 37 Snowmobile										

1. TERRITORY ASSIGNMENTS

If a territory shown is defined in terms of United States Postal Service (USPS) ZIP code:

A. Determine the applicable rating territory based on the location of the dwelling.

B. An insured's rates shall not be changed solely because the USPS changed his or her ZIP code and the physical boundaries of a rating territory shall be determined by the ZIP code boundaries in effect at the time of the latest rate filing defining the territory. Territory boundaries in North Carolina are concurrent with USPS ZIP code boundaries in effect as of **July 1, 2013**. If the USPS introduces a new ZIP code or realigns a ZIP code boundary after **July 1, 2013**, the new ZIP code may not yet be listed in Rule **2.C**. If this is the case, assign the rating territory based on the ZIP code boundary that formerly applied to the dwelling before the USPS changed the ZIP code.

2. TERRITORY DEFINITIONS – (For all Coverages and Perils Other than Earthquake).

Assign the applicable territory using the following order of priority:

A. County of	Code
Alamance	310
Alexander	340
Alleghany	360
Anson	300
Ashe	360
Avery	370
Beaufort	150
Bertie	180
Bladen	230
Buncombe	360
Burke	360
Cabarrus	320
Caldwell	360
Camden	150
Caswell	310
Catawba	360
Chatham	280
Cherokee	390
Chowan	150
Clay	390
Cleveland	350
Columbus	200
Craven	150
Cumberland	220
Currituck (other than Beach Areas)	130
Dare (other than Beach Areas)	130
Davidson	320
Davie	310
Duplin	190
Durham	270
Edgecombe	210
Forsyth	310
Franklin	240
Gaston	350
Gates	170

County of	Code
Graham	390
Granville	260
Greene	180
Guilford	310
Halifax	240
Harnett	250
Haywood	380
Henderson	360
Hertford	170
Hoke	250
Hyde (other than Beach Areas)	130
Iredell	340
Jackson	390
Johnston	240
Jones	150
Lee	290
Lenoir	190
Lincoln	350
Macon	390
Madison	380
Martin	180
McDowell	360
Mecklenburg	340
Mitchell	370
Montgomery	300
Moore	290
Nash	240
Northampton	240
Orange	280
Pamlico	130
Pasquotank	150
Perquimans	150
Person	260
Pitt	180
Polk	360
Randolph	320
Richmond	300
Robeson	230
Rockingham	310
Rowan	320
Rutherford	350
Sampson	220
Scotland	250
Stanly	340
Stokes	310
Surry	310
Swain	380
Transylvania	380
Tyrrell	150
Union	340
Vance	260
Wake	270
Warren	260
Washington	150
Watauga	360
Wayne	180
Wilkes	340
Wilson	210
Yadkin	330
Yancey	360

B. Beach Areas

Beach Area – Localities south and east of the Inland Waterway from the South Carolina Line to Fort Macon (Beaufort Inlet), thence south and east of Core, Pamlico, Roanoke and Currituck Sounds to the Virginia Line, being those portions of land generally known as the "Outer Banks".

Beach areas in Currituck, Dare, and Hyde Counties: 110
Beach areas in Brunswick, Carteret, New Hanover, Onslow, and Pender Counties: 120

C. Other than Beach Areas of Brunswick, Carteret, New Hanover, Onslow, and Pender Counties

For areas of Brunswick, Carteret, New Hanover, Onslow and Pender Counties, other than the Beach Areas, refer to the following ZIP codes. If portions of these ZIP codes fall in Counties other than Brunswick, Carteret, New Hanover, Onslow and Pender Counties use the territory code for those Counties.

1. Eastern Coastal Territory

ZIP Code	USPS ZIP Code Name	Code
28403	Wilmington	140
28404	Wilmington	140
28405	Wilmington	140
28406	Wilmington	140
28407	Wilmington	140
28408	Wilmington	140
28409	Wilmington	140
28410	Wilmington	140
28411	Wilmington	140
28412	Wilmington	140
28422	Bolivia	140
28428	Carolina Beach	140
28443	Hampstead	140
28445	Holly Ridge	140
28459	Shallotte	140
28460	Sneads Ferry	140
28461	Southport	140
28462	Supply	140
28467	Calabash	140
28468	Sunset Beach	140
28469	Ocean Isle Beach	140
28470	Shallotte	140
28480	Wrightsville Beach	140
28511	Atlantic	140
28516	Beaufort	140
28520	Cedar Island	140
28524	Davis	140
28528	Gloucester	140

ZIP Code	USPS ZIP Code Name	Code
28531	Harkers Island	140
28532	Havelock	140
28533	Cherry Point	140
28539	Hubert	140
28553	Marshallberg	140
28557	Morehead City	140
28570	Newport	140
28577	Sealevel	140
28579	Smyrna	140
28581	Stacy	140
28584	Swansboro	140
28589	Williston	140

2. Western Coastal Territory

ZIP Code	USPS ZIP Code Name	Code
28401	Wilmington	160
28402	Wilmington	160
28420	Ash	160
28421	Atkinson	160
28425	Burgaw	160
28429	Castle Hayne	160
28435	Currie	160
28436	Delco	160
28447	Ivanhoe	160
28448	Kelly	160
28451	Leland	160
28452	Longwood	160
28454	Maple Hill	160
28456	Riegelwood	160
28457	Rocky Point	160
28466	Wallace	160
28478	Willard	160
28479	Winnabow	160
28518	Beulaville	160
28521	Chinquapin	160
28540	Jacksonville	160
28541	Jacksonville	160
28542	Camp Lejeune	160
28543	Tarawa Terrace	160
28544	Midway Park	160
28545	McCutcheon Field	160
28546	Jacksonville	160
28547	Camp Lejeune	160
28555	Maysville	160
28574	Richlands	160
28582	Stella	160

PRE-FILED TESTIMONY
OF
JOANNA BILIOURIS

OCTOBER 2022

2022 NORTH CAROLINA MOBILE HOMEOWNERS MH(F) INSURANCE RATE
FILING
BY THE NORTH CAROLINA RATE BUREAU

Q. Would you state your full name and business address?

A. My name is Joanna Biliouris. My business address is 2910 Sumner Blvd, Raleigh, North Carolina 27616.

Q. Are you employed by the North Carolina Rate Bureau (“Bureau”)?

A. Yes.

Q. In what capacity?

A. I am the General Manager.

Q. What is the Bureau’s function with respect to rates for Mobile Homeowners MH(F) insurance?

A. The Bureau promulgates rates and rules for residential property insurance in North Carolina, including this MH(F) program.

Q. Can you identify Exhibits RB-1 through RB-22?

A. Yes. Exhibit RB-1 sets forth the revised rates for the MH(F) market in North Carolina, as well as the data and calculations underlying those rates and the MH(F) rate manual changes that accompany the filed rate changes. RB-1 also includes the supplemental data and exhibits required by statute and by regulation for this filing. Exhibit RB-2 is the current MH(F) rate manual. Exhibits RB-3 through RB-22 contain the required accompanying pre-filed testimony and exhibits. Together, these materials constitute a filing (the "Filing") that is dated October 31, 2022 submitted by the Bureau to the Honorable Mike Causey, Commissioner of Insurance, with respect to MH(F) rates in North Carolina.

Q. Do you know how the expense data underlying the Filing were compiled?

A. Yes. The underwriting expense provisions included in the Filing were derived from the results of a special call for expense experience that is issued on an annual basis to all member companies of the Bureau. The responses received from that special

call were compiled, reviewed, and furnished to Milliman for incorporation into the Filing. The Bureau also furnished to Milliman the information appearing in the Annual Statements and the Insurance Expense Exhibits of Bureau member companies, which are filed by those companies with the Department of Insurance (“DOI”) and are part of the DOI’s official records.

Q. Was the information you described above, which was furnished to Milliman and utilized in the Filing, correct and accurate to the best of your knowledge, information and belief?

A. Yes.

Q. Can you identify the document (Exhibit RB-2) entitled the North Carolina Mobile Homeowners Policy MH(F) Program?

A. Yes. The North Carolina Mobile Homeowners Policy Program is a manual of the rules, rates and classifications used to write Mobile Homeowners insurance in North Carolina. This manual and any approved amendments are on file with the North Carolina Department of Insurance and a copy is maintained at the offices of the Bureau.

Q. Do you know how the exposure and loss experience data underlying the Filing were compiled?

A. Yes. The exposure and loss experience data included in the Filing were derived from the results of a special call for experience that was issued to all companies writing MH(F) insurance. The responses received from that special call were furnished to Milliman for incorporation into the Filing.

Q. To the extent that actuarial expertise was necessary in the preparation of this Filing, where did the Bureau obtain that expertise?

A. Actuarial expertise was obtained from Milliman. Milliman is retained by the Bureau to provide actuarial services for, among numerous other tasks, preparation of this Filing. Many of the individual company representatives serving on the Bureau’s Mobile Home and Property Rating Subcommittees are also actuaries. The Bureau’s Subcommittees reviewed the data underlying the Filing and made recommendations to the Property Committee, which then made recommendations to the Bureau’s Governing Committee as to the items contained in the Filing. In addition, the Bureau has an actuary on its staff who assisted in the review and the preparation of the Filing.

Q. What is the proposed effective date of the rates in the Filing?

A. The rate review proposes that the indicated rate changes be implemented in two phases over a two-year period. The Bureau proposes that the new rates for Year 1 apply to all policies becoming effective on or after July 1, 2023, and the new rates for Year 2 apply to all policies becoming effective on or after July 1, 2024.

Q. Does the Filing submitted to the Commissioner include, to the extent available,

the information to be furnished in connection with filings under Article 36 of Chapter 58 of the General Statutes?

A. Yes. Those data that were available have been submitted to the Commissioner as part of the Filing. As shown and explained in that submission, some data were not collected or, if collected, were not retrievable in the form requested. The individual circumstances with respect to such data are explained in the submission.

Q. Does that conclude your pre-filed testimony?

A. Yes.

**PREFILED TESTIMONY
OF
PAUL D. ANDERSON**

**2022 MOBILE HOMEOWNERS MH(F) INSURANCE RATE FILING
BY THE NORTH CAROLINA RATE BUREAU**

Q. Please state your name and business address.

A. My name is Paul D. Anderson. My business address is 17335 Golf Parkway, Brookfield, WI 53045.

Q. By whom are you employed?

A. I am employed by Milliman, Inc. (Milliman) and have been employed by Milliman since February 1, 2007.

Q. What is your educational background?

A. I received a Bachelor of Science in Actuarial Science from Drake University in Des Moines, Iowa in 1993.

Q. Do you have any additional certifications or qualifications?

A. Yes. I have been a Fellow of the Casualty Actuarial Society (CAS) since 2002 and a Certified Specialist in Predictive Analytics of the CAS Institute (iCAS) since 2018. Since 2002, I have served on several committees of the Casualty Actuarial Society, including the following:

- Syllabus & Examination Committee: April 2004 to July 2006;
- Volunteer Support Task Force: February 2012 to April 2013;
- Volunteer Resources Committee: April 2013 to March 2020;
- Vehicle Technology & Impact on Loss Trends Planning Committee: October 2017 to August 2018;
- Participation Survey Task Force: January 2018 to January 2019;
- Crash Course in Vehicle Technology & Driverless Cars Committee (chairperson): February 2020 to November 2021;
- Volunteer Resources Advisory Committee: June 2020 to November 2021;
- Crash Course Seminar Task Force (volunteer chairperson): November 2021 to Present; and
- Volunteer Resources Task Force: November 2021 to Present.

I have also been a member of the American Academy of Actuaries since 2002 and meet all of the continuing education requirements of that organization as well as those of the Casualty Actuarial Society.

Q. What is your employment background?

A. I was employed by Allstate Insurance Company from June 1993 until January 2007. While at Allstate, I held various actuarial roles. I began my career as an Auto Pricing Analyst, and over time, I assumed increasing responsibility in various departments that included Property Pricing, Auto Pricing, Property Research, and Auto Research. On the pricing teams, I assisted in developing rates for property and auto insurance products in most states across the country. On the research teams, I assisted in developing new property and auto risk classification plans to be implemented by Allstate's pricing teams. From 2006 until January 2007, I served as a Senior Manager for Allstate's Eastern region, which included assisting in the oversight of the pricing strategies for approximately half the country, including North Carolina.

In February 2007 I began my career at Milliman. Since 2007, I have completed, managed, or overseen numerous property and auto pricing analyses for a variety of clients. My clients have included small single-state insurance companies, industry-leading national insurance companies, start-up InsurTech insurance companies, government entities, the North Carolina Rate Bureau, and other entities with similar coastal property exposure in states such as Florida, Hawaii, and Texas. These client assignments have included such projects as pricing analyses to evaluate overall rate adequacy, predictive modeling assignments to develop new risk classification plans, and analyses of catastrophe losses to evaluate the adequacy and allocation of property premiums corresponding to catastrophe risk.

Q. What is Milliman?

A. Milliman is among the world's largest providers of actuarial, risk management, and related technology and data solutions. Milliman was founded in Seattle in 1947 as Milliman & Robertson and today has offices in principal cities worldwide, covering markets in North America, Latin America, Europe, Asia and the Pacific, the Middle East, and Africa. Milliman employs more than 4,000 people, including actuaries and specialists ranging from clinicians to economists. The firm has consulting practices in employee benefits, financial services, healthcare, life insurance, and property and casualty insurance. Milliman serves the full spectrum of business, education, financial, governmental, union, and nonprofit organizations.

Q. What are your current responsibilities at Milliman?

A. I am responsible for managing and overseeing the personal lines and insurance-related predictive analytics portion of Milliman's Milwaukee Casualty practice. The personal lines and predictive analytics team conducts a variety of property and auto pricing, product development, and predictive modeling assignments, primarily for insurance companies. Over the last five years, we have completed property analyses for nearly every state in the country, including North Carolina.

Q. Were you engaged to provide actuarial services to the North Carolina Rate Bureau (Rate Bureau or Bureau) in relation to its 2022 mobile homeowners MH(F) rate filing?

A. Yes, I was.

Q. What work did Milliman perform in connection with the rate review and this rate filing?

A. Milliman was engaged to provide actuarial ratemaking services directly to the Rate Bureau to assist in the preparation of the 2022 mobile homeowners MH(F) rate review. As such, I was involved in several aspects of the preparation of this filing.

First, under the direction and administration of the Rate Bureau, Milliman developed a Mobile Homeowners Data Call. In response to this data call, Milliman received data from Bureau member companies that write mobile homeowners insurance in North Carolina. Milliman compiled the data and reviewed the data for reasonability and consistency. In addition to data from the data call, Milliman received and evaluated expense-related data that the Rate Bureau collected from its member companies. During the course of our analysis for this filing, Milliman also received modeled hurricane data and net cost of reinsurance data from Aon. Milliman aggregated all of this data and reviewed each component for reasonability.

Second, I and other Milliman staff under my direction compiled the ratemaking data to be reviewed by the Rate Bureau's Mobile Home Subcommittee, Property Rating Subcommittee, Property Committee, and Governing Committee in preparation for the rate review.

Third, Milliman staff under my direction assembled the vast majority of the data and performed all of the calculations contained in Exhibits RB-1, RB-6, and RB-7. This work was performed under the ultimate direction of the Bureau committees.

Finally, I reviewed the filed rates to determine whether they are calculated in accordance with applicable actuarial standards and reasonable actuarial methodologies. In conducting this review and making this determination, I adhered to the American Academy of Actuaries' *Code of Professional Conduct*. Based on the guidance of Precept 3 in the *Code of Professional Conduct*, which states that actuarial services shall satisfy applicable standards of practice, I conducted my review in accordance with all Actuarial Standards of Practice (ASOPs) that relate to this filing. A few examples of the ASOPs that I applied during my review include ASOP No. 13, *Trending Procedures in Property/Casualty Insurance*; ASOP No. 39, *Treatment of Catastrophe Losses in Property/Casualty Insurance Ratemaking*; and ASOP No. 53, *Estimating Future Costs for Prospective Property/Casualty Risk Transfer and Risk Retention*.

I also conducted my review in accordance with ASOP No. 17, *Expert Testimony by Actuaries*. In addition, I applied the rate standards set forth in the North Carolina General Statutes, including G.S. 58-36-10, which provides that rates must not be excessive, inadequate, or unfairly discriminatory and that certain statutory rating factors must be considered.

Q. Is your firm being compensated for this engagement?

A. Yes, it is.

Q. Is that compensation in any way contingent on providing favorable testimony in support of the filing?

A. No, it is not.

Q. Were there any constraints placed on your analysis, such as limited or delayed access to data or limited time, that may have hindered your complete review?

A. No, I was provided all the data and information necessary for my work, and I had adequate time for a complete analysis. My analysis was not limited in any way.

Q. What is the source of the data evaluated in Exhibit RB-1?

A. The ratemaking data reflected in Exhibit RB-1 was, in general, supplied by the individual insurance companies that write mobile homeowners insurance policies in North Carolina on the MH(F) policy form. Those companies submitted their data in response to the mobile homeowners data call described above. Data received in response to the data call included the following:

- Premium data – 7 years of policy-level data with rating characteristics needed to calculate mobile homeowners premium;
- Claims data – 7 years of claims-level data including cause of loss;
- Summarized loss data – at least 15 years of summarized losses for non-hurricane wind, hurricane, flood, and all (non-liability) perils combined; and
- Loss development data – 12 years of summarized loss and claim data by accident year evaluated at successive evaluation dates.

After receiving the data from the individual insurance companies, Milliman reviewed and verified each company's data and then consolidated the data for use in the rate review analysis.

The individual insurance companies that write mobile homeowners policies in North Carolina on the MH(F) policy form also submitted expense-related data to the North Carolina Rate Bureau. The Rate Bureau reviewed the expense data for

reasonability and aggregated the data before providing it to Milliman for final review and consolidation.

During the rate review analysis, Milliman also received modeled hurricane losses and net cost of reinsurance data from Aon. After receiving the data from Aon, Milliman reviewed the modeled hurricane losses and reinsurance costs for reasonability.

After consolidating the data from the member companies, the Rate Bureau, and Aon, Milliman produced various exhibits of the combined data in a format and detail necessary for review by the Rate Bureau committees and ultimately for use in rate filings.

Q. What exposure and loss experience data supporting this filing are contained in Exhibit RB-1?

- A. In general, the supporting data for the indicated and proposed rate changes are contained in Sections C and D. The most recent five years of loss experience are summarized and displayed in Section C. The experience used in this filing includes accident year experience for the years ending December 31, 2017 through December 31, 2021. To clarify what is meant by “accident year,” the losses for the accident year ending December 31, 2021 include all losses resulting from claims caused by events that occurred between January 1, 2021 and December 31, 2021, even if the loss was paid or a reserve established on or after January 1, 2022.

Similar to Section C, the information underlying Section D is also based on accident year experience for the years 2017 through 2021. That information supports changes to the wind exclusion credits, which are one of the mobile homeowners rating variables.

Q. Why are five years of loss experience used to determine the indicated rate changes?

- A. The objective of ratemaking is to establish rates that are sufficient to cover all expected losses and expenses and to provide a reasonable margin for profit. Rates are prospective and, as such, are developed for the time period during which they will be in effect. The rate review underlying this filing was performed with the assumption that the effective date would be July 1, 2023, and that the proposed rates would be in effect for one year beginning from that date. However, in order to mitigate the impact of the rate increase on policyholders, the Rate Bureau Governing Committee elected to spread the proposed rate change over two years, with a proposed effective date of July 1, 2023 for the year 1 change and an effective date of July 1, 2024 for the year 2 change.

Historical loss experience is evaluated for the purpose of projecting expected future losses. For insured losses, including flood losses, but not including hurricane

losses (for which hurricane models are used) and not including non-hurricane catastrophic wind losses and flood losses (for which a separate excess wind procedure and a separate excess flood procedure, respectively, are applied), five years of data are considered to be reasonable and appropriate. Using five years of loss experience to evaluate non-catastrophic types of losses balances the overall stability of the rates with the responsiveness of the rates to current market conditions. Additionally, North Carolina statutes allow the Rate Bureau to review five years of experience in its rate filings in addition to other factors that are to be considered. Note that, for the purposes of this filing, “hurricane losses” mean wind and storm surge losses from hurricanes.

Previous North Carolina mobile homeowners rate filings submitted by the Rate Bureau have relied on five years of experience with weights of 10%, 15%, 20%, 25%, and 30% applied to each year respectively as a way to balance stability and responsiveness of the proposed rates. In this filing, we use those same weights for the MH(F) Owners policy forms, but for MH(F) Tenants, as we did in the 2021 filing, we use equal weights (i.e., 20%) in each year due to the low volume of business in this segment and potential variability by year.

Q. What is the overall indicated and proposed change in mobile homeowners MH(F) rates in this filing?

- A. This filing shows the indicated need for an overall 87.5% statewide average rate increase for mobile homeowners MH(F) policies. This includes an indicated 87.6% change to Owners rates and an indicated 72.1% change to Tenants rates.

Based on these indicated rate changes, the Rate Bureau’s Governing Committee decided to implement the proposed rates over a two-year period to achieve a 75.0% rate change out of the 87.5% indicated rate increase. Section A, Page 1 shows the proposed statewide rate changes for each MH(F) policy form separately for year 1 and year 2. Within each territory group, the proposed rate change percentage by policy form will be the same in year 1 and year 2, as shown on Page 2 in Section A. Due to a shift in the premium distribution by territory group and by policy form from year 1 to year 2, the overall proposed rate changes across all territory groups and all policy forms will vary slightly between year 1 and year 2.

As a result of this implementation approach, this filing proposes an overall 31.5% statewide average rate increase in year 1 and an overall 33.0% statewide average rate increase in year 2. Allocating those rate changes by policy form, the year 1 rate change includes a proposed 31.5% change to Owners rates and a proposed 31.1% change to Tenants rates. Similarly, the year 2 rate change includes a proposed 33.1% change to Owners rates and a proposed 31.3% change to Tenants rates.

Q. Please describe the overall ratemaking methodology that underlies the filing.

- A. The approach in this filing is generally consistent with prior mobile homeowners MH(F) filings submitted by the Rate Bureau. Consistent with ASOP No. 53, *Estimating Future Costs for Prospective Property/Casualty Risk Transfer and Risk Retention* as published by the Actuarial Standards Board, the indicated rates reflect the expected costs associated with insuring mobile homeowners MH(F) policies. These expected future costs include claims, claim settlement expenses, operational and administrative expenses, and a fair and reasonable profit.

The statewide rate indications for mobile homeowners MH(F) policies are developed based on a loss cost methodology (instead of a loss ratio methodology). The indicated rate change is calculated for each policy form (i.e., Owners and Tenants) by comparing the required base rate per policy to the current base rate. This comparison of the required and current base rates is consistent with ASOP No. 53 referenced above, is commonly used throughout the industry, and is an actuarially sound method of developing an indicated rate-level change.

Q. Are there any changes in the ratemaking methodology compared to prior filings?

- A. No. The methodology used in the 2022 mobile homeowners MH(F) filing is consistent with the 2021 filing.

Q. Looking at Section C, page 1, what is shown on this exhibit?

- A. Section C, page 1 shows the statewide indicated rate changes for the policy forms offered in the North Carolina mobile homeowners MH(F) program. The data shown on this page reflects all MH(F) business written in the state. The MH(F) program consists of three policy forms: MH(F)-2 (i.e., Broad Form) and MH(F)-3 (i.e., Comprehensive Form) are collectively referred to as Owners, and MH(F)-4 (i.e., Contents Broad Form) is referred to as Tenants. Overall, the perils insured against by MH(F) policies are similar to those insured against under homeowners policies with the exception that MH(F) policies also provide coverage for losses caused by the flood peril.

Q. Referring to row 1 on page 1 of Section C, what is the *total base class loss cost*?

- A. The *total base class loss cost* is the average amount of projected loss per exposure, including both non-hurricane and hurricane losses, for the risk identified as the base class for each respective MH(F) policy form. The calculations underlying the *total base class loss cost* for each policy form are included later in the discussion of Section C, pages 2 and 4.

Q. Please explain each of the items shown in row 2 of Section C, page 1, including the *fixed expense per policy*, *variable expense per policy*, *profit*, *contingencies*, and *policyholder dividends*.

A. Row 2a shows the *fixed expense per policy* for each MH(F) policy form. These amounts reflect the average costs for general expenses and other acquisition expenses that are expected to be paid to service policies written between July 1, 2023 and June 30, 2024. General expenses include overhead expenses such as equipment, rent, and salaries. Other acquisition expenses include costs required to issue a policy, excluding commission and brokerage and including such items as advertising fees, postage, and telephone charges. General expenses and other acquisition expenses are fixed expenses in that they do not vary directly in proportion to the amount of premium charged or collected. As a result, the amounts shown in row 2a (e.g., \$54.17 for Owners) are applicable to each mobile homeowners policy that includes the respective MH(F) policy form.

The *fixed expense per policy* for each policy form is calculated on page 45 of Section C and further supported by data found on pages 44 and 46 of Section C. We began by evaluating historical expense information provided by the Rate Bureau and calculating the ratio of general expenses and other acquisition expenses to earned premium for each year from 2017 through 2021. Although we considered the same five years of experience as used in the overall rate indications, the selected expense ratios were based on the most recent three years in order to best reflect any recent shifts in the expense ratios. The selected general expense ratio is 4.4% and the selected other acquisition expense ratio is 6.8%, resulting in a total fixed expense ratio of 11.2%. Because these selections were based on the average expense ratios from 2019 through 2021, the selected 11.2% fixed expense ratio corresponds to the fixed expenses observed at the midpoint of that experience period, or July 1, 2020.

Row 2b shows the *variable expense per policy* for each MH(F) policy form. Unlike fixed expenses, variable expenses vary directly in proportion to the amount of premium charged or collected. As a result, the variable expenses are included in the indicated rate change calculations as percentages relative to the written premium rather than dollar amounts. The variable expense percentage for each MH(F) policy form includes a provision for commission and brokerage and a provision for premium taxes, licenses, and fees. These provisions are supported by data found on page 46 of Section C. Similar to our analysis of the fixed expenses, we evaluated historical expense information and calculated the ratio of commission and brokerage expenses and taxes, licenses, and fees to written premium for each year from 2017 through 2021. We considered the same five years of experience as used in the overall rate indications; however, the selected expense ratios were based on the most recent three years in order to best reflect any recent shifts in the expense ratios. The selected commission and brokerage expense ratio is 17.7% and the selected taxes, licenses, and fees expense ratio is 3.0%, resulting in a total variable expense ratio of 20.7%.

Similar to the variable expense ratio, rows 2c, 2d, and 2e contain three additional provisions that vary directly in proportion to the written premium. Row 2c includes a provision for *profit*, row 2d contains a provision for *contingencies*, and row 2e contains a provision for *policyholder dividends*. Each of these selected provisions is a consistent percentage across the various MH(F) policy forms.

- The underwriting profit provision used in this filing is 6.5%. This provision was selected by the Rate Bureau based on an analysis completed by Dr. Zanjani.
- The selected contingency provision in this filing is 1.0%, which is consistent with the prior mobile homeowners MH(F) filing and other Rate Bureau property insurance filings.
- The provision for policyholder dividends is supported by data on page 48 of Section C. To determine the provision for policyholder dividends, we evaluated historical annual statement information for companies writing Homeowners Multiple Peril premium in North Carolina. (Similar information specific to mobile homeowners insurance is not available.) We calculated the ratio of total dividends to total written premium for homeowners for each year from 2017 through 2021 and observed that companies consistently paid dividends to policyholders during that time period. Because of the consistency of these dividends during the historical experience, the Rate Bureau concluded that a provision for expected policyholder dividends is appropriate and, as such, selected a provision of 0.45% in this filing.

Q. In your opinion, are the provisions for general expenses and for other acquisition expenses reasonable?

A. Yes, the general expenses provision and the other acquisition expenses provision are reasonable. It is common practice in the industry to rely on historical experience and to calculate a three-year average expense ratio to determine provisions for general expenses and for other acquisition expenses.

Q. In your opinion, are the provisions for commission and brokerage and for taxes, licenses, and fees reasonable?

A. Yes, the commission and brokerage provision and the taxes, licenses, and fees provision are reasonable. It is common practice in the industry to rely on historical experience and to calculate a three-year average expense ratio to determine provisions for commission and brokerage and for taxes, licenses, and fees.

Q. Is the provision for contingencies included in this filing reasonable?

A. Yes, the selected 1% provision for contingencies is reasonable to include in this filing. In addition to being consistent with prior Rate Bureau filings, the use of a contingency provision is common within the property and casualty insurance

industry. According to *Actuarial Standard of Practice No. 30: Treatment of Profit and Contingency Provisions and the Cost of Capital in Property/Casualty Insurance Ratemaking*, “the actuary should include a contingency provision if the assumptions used in the ratemaking process produce cost estimates that are not expected to equal average actual costs, and if this difference cannot be eliminated by changes in other components of the ratemaking process.” There are several reasons why expected cost estimates may not be equal to actual costs. Some of these reasons include adverse court decisions, extension of coverage for unforeseen or unintended exposures, regulatory delay or reduction in filed rate changes, and unexpected large losses not sufficiently recognized in the normal ratemaking process. For these reasons, among others, a contingency provision is appropriate and necessary in my opinion.

Included with this filing as Exhibit RB-7 is an exhibit I prepared that summarizes the estimated impact of delays in the filing process within the State of North Carolina. The delay in obtaining rate changes, whether caused by the regulatory review process or other delays inherent in the filing process, is merely one of several items listed above that supports the use of a contingency provision in a rate-level indication. Exhibit RB-7 lists the eighteen property rate filings submitted by the Rate Bureau between 2008 and 2021. For each filing, I compared the effective date assumed in the rate filing to the actual effective date. This difference, which reflects the delay due to the filing process, ranges from 0 months in the 2019 dwelling filing, to 22 months in the 2011 dwelling filing. After determining the length of delay for each filing, I applied the net trend (i.e., the loss trend offset by the premium trend) in that filing for the number of months of delay to determine the estimated impact of the delay in the filing process on the overall rate level. The estimated impact of delay varies across the eighteen filings, ranging from -1.9% in the 2021 MH(C) mobile homeowners filing to +5.9% in the 2008 MH(C) mobile homeowners filing, with an average impact of +0.9%.

Based on prior filings submitted by the Rate Bureau, my experience with property filings submitted by insurance companies in other states, and the 0.9% estimated impact of delays in the North Carolina filing process, it is my opinion that a 1% contingency provision is reasonable, consistent with common actuarial practice, and appropriate based on fundamental actuarial principles. Again, the impact of delays in the filing process is only one of many reasons that justifies a contingency provision.

Q. Is the provision for policyholder dividends included in this filing reasonable?

A. Yes, as described above, the Rate Bureau evaluated five years of historical experience and selected a 0.45% provision for policyholder dividends based on a five-year average ratio of the total policyholder dividends issued by homeowners insurers in North Carolina to the total direct written premium of those same companies.

The North Carolina ratemaking statutes (N.C. Gen. Stat. § 58-36-10(2)) require that policyholder dividends be considered in setting rates. Also, Actuarial Standard of Practice (ASOP) No. 29 regarding *Expense Provisions in Property/Casualty Insurance Ratemaking* states the following:

When the actuary determines that policyholder dividends are a reasonably expected expense and are associated with the risk transfer, the actuary may include a provision in the rate for the expected amount of policyholder dividends. In making this determination, the actuary should consider the following: the company's dividend payment history, its current dividend policy or practice, whether dividends are related to loss experience, the capitalization of the company, and other considerations affecting the payment of dividends.

ASOP No. 53 (*Estimating Future Costs for Prospective Property/Casualty Risk Transfer and Risk Retention*) also articulates that future cost estimates should reflect the expected costs associated with insuring mobile homeowners policies, including operational and administrative expenses. As such, since policyholder dividends are an operating expense, it is consistent with ASOP No. 29 and ASOP No. 53 to include a provision for policyholder dividends in the proposed rates reflected in this filing. Moreover, policyholder dividends are returns of premium to a company's policyholders and are not the same as dividends that publicly traded stock companies (owned by shareholders) pay to their shareholders. If dividends were not reflected in the Bureau's rates, the profit level in the filing would not be achieved because of dividends paid to policyholders.

By reviewing five years of historical experience to determine a provision for policyholder dividends, the Rate Bureau is complying with the statutes and ASOP No. 53 by considering the dividend payment history and ensuring that the selected provision is a reasonably expected expense.

Q. Referring to row 3 on page 1 of Section C, what is the *base rate excluding reinsurance cost*?

A. The *base rate excluding reinsurance cost* is the average base rate for each policy form before reflecting additional adjustments for the compensation for assessment risk, the net cost of reinsurance, and net deviations. The *base rate excluding reinsurance cost* is calculated based on the following formula:

$$\frac{\text{(total base class loss cost + fixed expense per policy)}}{(1 - \text{variable expense ratio} - \text{profit} - \text{contingencies} - \text{policyholder dividends})}$$

Q. Please explain the item shown in row 4 of Section C, page 1, identified as the *compensation for assessment risk per policy*.

A. There is considerable risk to primary insurers (i.e., the member companies of the Rate Bureau for whom rates are being made in this filing) as a result of the

exposures written in the North Carolina Insurance Underwriting Association (i.e., the Coastal Property Insurance Pool, or “Beach Plan”) and the North Carolina Joint Underwriting Association (i.e., the FAIR Plan). Together, the Beach Plan and FAIR Plan serve as the “residual market” for residential property insurance in North Carolina. These two entities provide property insurance when policyholders are unable to purchase insurance coverage from companies in the voluntary market. In states with significant exposure to catastrophic events, property insurance residual markets may grow to represent a sizable portion of the total insured risk in the exposed regions of the state. In North Carolina, the Beach Plan has become the predominant writer of homeowners and dwelling insurance in the 18 coastal counties that it covers.

The Beach and FAIR Plans use the premiums collected from policies they issue to fund the losses and expenses attributable to the coverages they insure. When premiums are greater than losses and expenses during a fiscal year, the Beach and FAIR Plans accumulate surplus. That surplus is available to pay losses in the event that future losses and expenses exceed collected premiums plus investment income. However, if the surplus (and any applicable reinsurance) of either the Beach Plan or FAIR Plan is exhausted, then additional losses are passed through to property insurers in North Carolina in the form of an assessment. The potential overall industry assessment from the Beach Plan is limited to \$1 billion per year, but the potential assessment from the FAIR Plan is unlimited. If losses in the Beach Plan exceed its retained surplus, the \$1 billion industry assessment, and any other resources of the Beach Plan (including applicable reinsurance), any additional losses are passed through directly to residential property insurance policyholders in North Carolina in the form of a catastrophe recovery charge of up to 10% of premium per year.

This risk of potential assessments by the Beach Plan and FAIR Plan on property insurers in North Carolina requires that insurance companies be compensated for the additional risk to their capital. To quantify this risk, I have applied a procedure developed by Milliman to incorporate a provision in the mobile homeowners rates that compensates insurers for that assessment risk.

Q. Can you please explain the procedure you applied?

A. Yes. The methodology developed by Milliman to quantify the compensation for assessment risk relies on two estimates. The first estimate is based on historical compensation for assessment risk provisions, and the second estimate is to reflect the proportion of North Carolina insurance companies that retain exposure to assessments from the Beach Plan or FAIR Plan. Included with this filing as Exhibit RB-6 is an exhibit I prepared that summarizes these estimates and develops the resulting compensation for assessment risk provision.

In previous mobile homeowners MH(F) filings, I relied on modeled hurricane data corresponding to the Beach Plan and FAIR Plan exposures. However, updated

versions of that data are no longer available to Milliman or the Rate Bureau, and relying on the older data would add uncertainty and variability, which would not be appropriate for use in my analysis.

Because the necessary current modeled hurricane data is not available, I reviewed Rate Bureau property filings from the last several years to develop a compensation for assessment risk provision. From the 2017 homeowners filing to the 2021 mobile homeowners filings, the compensation for assessment risk provision ranged from 2.8% to 3.8%. I grouped the various property filings into rate review seasons, so that each historical compensation for assessment risk analysis received equal weight and determined an average historical compensation for assessment risk provision to be 3.2%.

Based on discussions earlier this year, Milliman and the Rate Bureau were made aware that some reinsurance contracts provide coverage for residual market assessments, including the potential non-recoupable assessments from the Beach Plan and FAIR Plan. As a result, it is possible that the reinsurance contracts purchased by North Carolina property insurance companies include this coverage for assessments and the exposure to Beach Plan or FAIR Plan assessments is no longer retained by the primary carrier. Because the Rate Bureau does not have information about company-specific reinsurance programs, I estimated that 50% of the North Carolina property insurance companies retain their exposure to assessments from the Beach Plan or FAIR Plan.

Next, I multiplied this estimated 50% market share by the 3.2% average historical compensation for assessment risk provision to determine an overall compensation for assessment risk provision of 1.6%.

Q. In your opinion, is it appropriate to include a 1.6% provision for the compensation for assessment risk in mobile homeowners rates in North Carolina?

A. Yes. Insurance companies writing mobile homeowners policies in North Carolina are exposed to the risk of Beach Plan or FAIR Plan assessments as a result of writing voluntary market property insurance in the state. As such, for those insurance companies that retain this exposure, they are entitled to receive fair compensation for bearing that risk and it is appropriate to include that compensation in the mobile homeowners rates. The current provision is based on historical provisions developed by Milliman that rely on a widely accepted measure of compensation that will fairly compensate insurers for bearing this additional risk to their capital. Moreover, the North Carolina statutes (N.C. Gen. Stat. § 58-45-5(6c)) provide that prospective exposure to non-recoupable assessments shall be considered as an appropriate factor in the making of rates by the Rate Bureau.

Q. What is the source of the amounts shown in row 5 of Section C, page 1, labeled as the *net cost of reinsurance per policy*?

- A. The source of the net cost of reinsurance for each MH(F) policy form is an analysis completed for the Rate Bureau by Aon. It is my understanding that Aon was retained by the Rate Bureau based on their ability to access relevant data and experience from the reinsurance market, their expertise with catastrophe-related issues, and their prominence with respect to the reinsurance industry. This is consistent with other recent property rate filings submitted by the Rate Bureau.

In Aon's analysis, they use their experience and expertise as a reinsurance broker to develop layers of reinsurance coverage that are representative of typical amounts of reinsurance coverage purchased by the property insurance industry. Using data, catastrophe models, and other information available to Aon, they estimated the reinsurance premium associated with each layer of coverage, determined the expected losses within each layer, and calculated the net cost of reinsurance as the difference between the reinsurance premium and the expected losses in each layer. In this manner, Aon determined the expected net cost of reinsurance for the composite one company writing mobile homeowners insurance in North Carolina. These premium amounts, losses, and net costs of reinsurance were developed separately by peril and by territory for each MH(F) policy form, so that they could be summarized appropriately to develop a statewide or territory indicated rate change. More details of Aon's analysis are included in Ms. Mao's testimony and exhibits.

To determine the *net cost of reinsurance per policy* found in row 5 of Section C, page 1, the total reinsurance cost for each MH(F) policy form is first divided by the corresponding number of 2021 earned house years. The resulting average reinsurance cost is further adjusted by dividing by the 2021 average rating factor, the 2021 premium trend factor, and the expected loss and fixed expense ratio. These calculations can be found on pages 50 and 51 of Section C for Owners and Tenants, respectively. These supporting pages show the development of the statewide net cost of reinsurance per policy as well as the net cost of reinsurance for each territory group.

- Q. Can you please explain why a provision for the net cost of reinsurance is necessary in this filing?**

- A. Yes. Mobile homeowners insurance is one of several types of coverages that has exposure to potential catastrophic events. In such coverages (mobile homeowners, homeowners, and other property coverages), individual catastrophic events can result in significant losses that exceed the amount of liability the typical insurer can reasonably assume for solvency and financial stability considerations. As a result, in these lines of business, insurers routinely purchase reinsurance to mitigate their exposure to extreme events. In order to accurately reflect the expected costs associated with insuring property policies, it is appropriate to include the cost of this reinsurance in the ratemaking process for these lines of insurance.

Q. In your opinion, is it appropriate to include a provision for the net cost of reinsurance in mobile homeowners rates in North Carolina?

A. Yes. Insurance companies writing mobile homeowners policies in North Carolina incur a significant cost for bearing the risk of insuring properties exposed to catastrophic events. Regardless of whether the risk of catastrophic losses is retained by the primary insurer or transferred to a reinsurer, the market cost of bearing that risk must be included in the rates. This is a foundational actuarial principle included in ASOP No. 29 regarding *Expense Provisions in Property/Casualty Insurance Ratemaking*, and the North Carolina statutes (N.C. Gen. Stat. § 58-36-10(7)) provide for inclusion of the cost of reinsurance in rates. The net cost of reinsurance is a legitimate cost of the risk transfer inherent in the purchase of property insurance, and as such, the net cost of reinsurance should be included in the North Carolina mobile homeowners rates.

Q. In your opinion, is it appropriate to allocate reinsurance costs within North Carolina in a way that is proportional to risk?

A. Yes. The risk associated with insuring properties exposed to catastrophic events varies geographically within North Carolina. As such, the cost for bearing that risk should be allocated proportional to the measurement of risk. In their analysis of reinsurance costs for this filing, Aon provided the statewide provision for the net cost of reinsurance and, as mentioned above, also allocated the reinsurance costs to each MH(F) policy form and each territory. This allocation is appropriate and consistent with the objective of producing rates that are fair, reasonable, and not unfairly discriminatory across policyholders.

Q. Please explain the amounts shown in row 6 of Section C, page 1, identified as the *indicated manual base rate*.

A. The dollar amounts shown in row 6 are the sum of the base rate excluding reinsurance cost (row 3), the compensation for assessment risk per policy (row 4), and the net cost of reinsurance per policy (row 5) for each policy form. These amounts represent the average base rate for each MH(F) policy form after reflecting reasonable provisions for all expected losses, expenses, profit, and contingencies quantified in this filing. If insurance companies did not deviate from the manual premiums, the *indicated manual base rate* would represent the appropriate, actuarially sound base rate for each policy form.

Q. What is the source of the percentages shown in row 7 of Section C, page 1, labeled as *net deviations*?

A. As included in the prior mobile homeowners MH(F) rate filing, the Rate Bureau has selected a provision for *net deviations* of 5%. In making this selection, we evaluated historical written premium and manual premium for each year from 2017 through 2021, and we considered the magnitude of both downward deviations and

upward surcharges through consent to rate. The data supporting this analysis can be found on page 52 of Section C. In an attempt to be conservative and to be consistent with the prior mobile homeowners MH(F) filing, the Rate Bureau retained the same selected provision for net deviations of 5%.

Q. In your opinion, is it appropriate to include a provision for net deviations in mobile homeowners rates in North Carolina?

A. Yes. The difference between the direct premium written by insurance companies and the manual premium should be considered when determining the actuarially sound indicated manual premium. The manual premium must be adjusted upward such that the deviated premium charged by insurance companies will be adequate. In my opinion, the selected provision for net deviations of 5% is a conservative estimate that only partially recognizes the significant deviations we expect to be applied by mobile homeowners insurance companies.

Q. Please explain the amounts shown in row 8 of Section C, page 1, identified as the *required base rate*.

A. The dollar amounts shown in row 8 are the indicated manual base rate for each policy form (row 6) adjusted for the net deviations (row 7). As mentioned above, if insurance companies were not anticipated to deviate from the manual premiums, the indicated manual base rate for each policy form (row 6) would be adequate and appropriate. However, because historical experience shows that mobile homeowners insurance companies consistently deviate by significant amounts each year, the indicated manual base rate for each policy form is divided by 100% minus the provision for net deviations to determine the *required base rate*. The *required base rate* for each policy form represents the appropriate base rate such that, if insurance companies apply net deviations of 5%, the charged premiums will be sufficient to cover all expected costs associated with the transfer of risk related to mobile homeowners insurance.

Q. Would you explain the amounts shown in row 9 of Section C, page 1, labeled as the *average current base rate*?

A. Row 9 displays the current base rate for each policy form, averaged across all policies from 2021 included in our analysis. The average statewide base rate for each policy form assumes each policyholder purchases the base coverage and has the same characteristics as the base risk.

Q. Please explain row 10 of Section C, page 1, identified as the *indicated rate change*.

A. The percentages shown in row 10 represent the needed changes to the current base rate for each policy form so that the mobile homeowners rates will be adequate for the cost levels expected to prevail in the one-year period following

the effective date of this filing. The *indicated rate change* is calculated as the required base rate (row 8) divided by the current average base rate (row 9) minus 1. The resulting indicated rate change for each policy form is as follows:

- Owners = 87.6%
- Tenants = 72.1%

The overall indicated rate change across all MH(F) policy forms, as summarized on page 1 of Section A, is 87.5%.

Q. Would you explain the percentages shown in row 11 of Section C, page 1, labeled as the *proposed rate change - year 1*?

A. Due to the wide range of indicated rate changes across the territory groups and MH(F) policy forms, the Rate Bureau's Governing Committee decided to cap the Owners rate change at 75% and implement the proposed rates over a two-year period. The resulting proposed rate change in year 1 for each policy form is as follows:

- Owners = 31.5%
- Tenants = 31.1%

The overall proposed rate change in year 1 across all MH(F) policy forms, as summarized on page 1 of Section A, is 31.5%.

Q. Please explain row 12 of Section C, page 1, identified as the *proposed base rate - year 1*.

A. The dollar amounts shown in row 12 represent the *proposed year 1 base rate* for each policy form, averaged across all policies from 2021 included in our analysis. Similar to the average current base rate, the average statewide proposed year 1 base rate for each policy form assumes each policyholder purchases the base coverage and has the same characteristics as the base risk. The proposed year 1 base rate for each policy form was calculated as the average current base rate (row 9) multiplied by 1 plus the proposed year 1 rate change (row 11).

Q. Would you explain the percentages shown in row 13 of Section C, page 1, labeled as the *proposed rate change - year 2*?

A. As mentioned above, the Rate Bureau's Governing Committee decided to cap the Owners rate change and implement the proposed rates over a two-year period. After updating each territory group's premium for the year 1 rate changes for each policy form and using the updated premium weights to calculate statewide rate changes, the resulting proposed rate change in year 2 for each policy form is as follows:

- Owners = 33.1%

- Tenants = 31.3%

The overall proposed year 2 rate change across all MH(F) policy forms, as summarized on page 1 of Section A, is 33.0%.

Q. Please explain row 14 of Section C, page 1, identified as the *proposed base rate - year 2*.

A. Similar to the amounts shown in row 12, the dollar amounts shown in row 14 represent the *proposed year 2 base rate* for each policy form, averaged across all policies from 2021 included in our analysis. The average statewide proposed year 2 base rate for each policy form assumes each policyholder purchases the base coverage and has the same characteristics as the base risk. The proposed year 2 base rate for each policy form was calculated as the proposed year 1 base rate (row 12) multiplied by 1 plus the proposed year 2 rate change (row 13).

Q. What is the difference between the indicated rate change and the proposed rate changes in year 1 and year 2?

A. The indicated rate change is the actuarially sound and correct rate at a statewide level or by territory group for each mobile homeowners MH(F) policy form. It is the indicated rate change (statewide or by territory group) that is needed to sufficiently cover the expected losses and expenses while still providing a fair and reasonable profit. The indicated rate is also the rate that complies with the statutory requirement that rates not be excessive, inadequate, or unfairly discriminatory.

In order to mitigate the impact of these indicated rate changes on policyholders, the Rate Bureau decided to cap the Owners rate change and implement the proposed rates for Owners and Tenants over a two-year period in order to reduce the impact of the proposed rate change for each MH(F) policy form. First, the overall statewide rate change for Owners was capped at 75.0% and the proportion of the full Owners indication was determined by dividing 75.0% by the statewide indicated rate change. Based on the calculated proportion for Owners, the capped rate change by territory group was developed by multiplying that proportion by the territory group indicated rate changes. Within each territory group, the proposed rate change percentage will be the same in year 1 and year 2 and was calculated as the square root of 1 plus the capped rate change, minus 1. For example, in territory group 6 for Owners, the indicated rate change is 42.6%, the capped rate change is 36.5% ($= 42.6\% \times 85.6\%$, where 85.6% is the proportion of the full indication applied to Owners), and the proposed rate change in both year 1 and year 2 is 16.8% ($= 1.365^{0.5} - 1$). The statewide proposed rate change for each policy form differs between year 1 and year 2 because the premium weight applied to each territory group changes as a result of the year 1 rate changes.

In my opinion, the Rate Bureau's cap and proposed two-year implementation of the proposed rate change for each MH(F) policy form are reasonable and are an

effective strategy to reduce the impact of this filing. However, because the proposed Owners rates are limited by the cap, it should be noted that the proposed rates in that policy form will continue to be inadequate.

Q. In an earlier question discussing the *total base class loss cost* found in row 1 of Section C, page 1, your response made reference to Section C, pages 2 and 4. Looking at Section C, page 2, what is shown on this exhibit?

A. Section C, page 2 shows the determination of the statewide base class loss cost for the Owners policy forms. More specifically, this exhibit aggregates non-hurricane losses and loss adjustment expenses for the years 2017 through 2021 and combines these amounts with a modeled hurricane loss cost to develop the total base class loss cost. The specific calculations used to aggregate the non-hurricane and hurricane loss experience will be discussed later. Page 4 shows similar calculations for the Tenants policy form.

Q. Referring to column 1 on page 2 of Section C, what is the source for the *non-hurricane ultimate loss and LAE* (loss adjustment expense)?

A. The *non-hurricane ultimate loss and LAE* shown in column 1 is developed on page 3 of Section C for each year from 2017 through 2021. As implied by the column label, the amounts in column 1 have been developed to ultimate and adjusted to include a provision for expected loss adjustment expenses. Those calculations, as well as adjustments to include expected rather than actual excess wind losses and expected rather than actual flood losses, can be found in more detail on page 3 of Section C.

Q. If we turn our attention to Section C, page 3, what is shown on this exhibit?

A. As mentioned in the prior response, Section C, page 3 shows the determination of the *non-hurricane ultimate loss and LAE* for the Owners policy forms. Column 1 on this exhibit contains incurred loss and ALAE for the years 2017 through 2021 from all causes of loss except those losses caused by hurricanes. As noted previously, the mobile homeowners MH(F) policy includes coverage for flood losses, so any flood losses other than storm surge resulting from a hurricane would be included in the historical loss experience (though such losses may be limited by the excess flood procedure).

Q. Please explain columns 2 and 4 of Section C, page 3, which both contain data related to excess wind losses.

A. The incurred loss and ALAE in column 1 reflects all non-hurricane losses, including actual wind losses that may have resulted from very severe storms such as tornados, thunderstorms, or hailstorms. In order to smooth out any potential volatility of severe non-hurricane wind losses, we used the same excess wind methodology as used in prior Rate Bureau property filings. The calculations

supporting this excess wind methodology can be found on pages 28 and 29 of Section C. Based on the results of the excess wind methodology, a portion of the wind loss and ALAE included in column 1 is determined to be excess wind loss and ALAE and is removed from the historical loss experience for the purpose of calculating a reasonable provision for expected non-hurricane losses. Column 2 shows the amount of excess wind loss and ALAE incurred under the Owners policy forms that is being removed from the incurred loss and ALAE in column 1. In place of the actual excess wind loss and ALAE in column 2, an excess wind loss factor is applied to each year of experience, as shown in column 4. By applying an excess wind loss factor, the Rate Bureau is able to smooth out potentially volatile historical loss experience and reflect a consistent provision for long-term excess wind loss and ALAE.

Q. Please describe the excess wind methodology found on pages 28 and 29 of Section C in more detail.

- A. The excess wind methodology used in this filing and in prior Rate Bureau property filings relies on a longer history of loss experience than the five years used to support most of the other components of this filing. Although the mobile homeowners excess wind loss experience is not as extensive as in homeowners, the Rate Bureau was able to aggregate 25 years of mobile homeowners non-hurricane losses for this filing in order to evaluate excess wind losses. Page 28 of Section C shows non-hurricane losses by year from 1997 through 2021. Among the non-hurricane (and non-liability) losses, the wind losses and flood losses are shown separately from the total non-hurricane losses excluding wind and flood. The ratio of wind losses to total non-hurricane losses excluding wind and flood is calculated for each year and, based on calculations consistent with prior Rate Bureau property filings, the amount of non-hurricane excess wind losses is determined for each year. In addition to determining the excess wind losses by year, the yearly ratios of wind losses to total non-hurricane losses excluding wind and flood are used to calculate an excess wind loss factor of 1.095. This excess wind loss factor represents the provision needed to incorporate the long-term average excess wind losses in the adjusted non-hurricane loss experience.

The excess wind losses determined with this methodology reflect all MH(F) policy forms combined. As a result, the total MH(F) excess wind losses are allocated by policy form for each year based on the distribution of incurred non-hurricane wind losses among the policy forms within each year. In addition to allocating the excess wind losses, a non-hurricane ALAE factor is calculated for each year based on the ratio of total non-hurricane (and non-liability) loss and ALAE to total non-hurricane (and non-liability) losses. The resulting non-hurricane ALAE factors are applied to the excess wind losses for each policy form within each year to determine the excess wind loss and ALAE by policy form. That allocation process and application of a non-hurricane ALAE factor can be seen on page 29 of Section C.

Q. Please explain columns 3 and 5 of Section C, page 3, which both contain data related to excess flood losses.

A. Similar to the above discussion related to excess wind losses, the incurred loss and ALAE in column 1 reflects all non-hurricane losses, including actual flood losses that may have resulted from severe thunderstorms, heavy rainfalls, or extensive snow runoff. In order to smooth out any potential volatility of severe non-hurricane flood losses, we used the same excess flood methodology as described above for excess wind losses. The calculations supporting this excess flood methodology can be found on pages 30 and 31 of Section C. Based on the results of the excess flood methodology, a portion of the flood loss and ALAE included in column 1 is determined to be excess flood loss and ALAE and are removed from the historical loss experience for the purpose of calculating a reasonable provision for expected non-hurricane losses. Column 3 shows the amount of excess flood loss and ALAE incurred under the Owners policy forms that is being removed from the incurred loss and ALAE in column 1. In place of the actual excess flood loss and ALAE in column 3, an excess flood loss factor is applied to each year of experience, as shown in column 5. By applying an excess flood loss factor, the Rate Bureau is able to smooth out potentially volatile historical loss experience and reflect a consistent provision for long-term excess flood loss and ALAE.

Q. Please describe the excess flood methodology found on pages 30 and 31 of Section C in more detail.

A. The excess flood methodology utilized in this filing relies on a longer history of loss experience than the five years used to support most of the other components of this filing. Like the excess wind methodology described above, the Rate Bureau was able to aggregate 25 years of mobile homeowners non-hurricane losses for this filing in order to evaluate excess flood losses. Page 30 of Section C shows non-hurricane losses by year from 1997 through 2021. Among the non-hurricane (and non-liability) losses, the wind losses and flood losses are shown separately from the total non-hurricane losses excluding wind and flood. The ratio of flood losses to total non-hurricane losses excluding wind and flood is calculated for each year and, based on calculations consistent with the excess wind methodology, the amount of non-hurricane excess flood losses is determined for each year. In addition to determining the excess flood losses by year, the yearly ratios of flood losses to total non-hurricane losses excluding wind and flood are used to calculate an excess flood loss factor of 1.031. This excess flood loss factor represents the provision needed to incorporate the long-term average excess flood losses in the adjusted non-hurricane loss experience.

The excess flood losses determined with this methodology reflect all MH(F) policy forms combined. As a result, the total MH(F) excess flood losses are allocated by policy form for each year based on the distribution of incurred non-hurricane flood losses among the policy forms within each year. In addition to allocating the excess flood losses, a non-hurricane ALAE factor is calculated for each year based on the

ratio of total non-hurricane (and non-liability) loss and ALAE to total non-hurricane (and non-liability) losses. The resulting non-hurricane ALAE factors are applied to the excess flood losses for each policy form within each year to determine the excess flood loss and ALAE by policy form. That allocation process and application of a non-hurricane ALAE factor can be seen on page 31 of Section C

Q. How are the results of the excess wind methodology and excess flood methodology applied to the Owners loss experience on page 3 of Section C?

A. Based on the wind and flood allocation processes described above, column 2 on page 3 of Section C shows the amount of excess wind loss and ALAE allocated to the Owners policy forms for each year, and column 3 shows the amount of excess flood loss and ALAE allocated for each year. In addition, the excess wind loss factor is shown in column 4 and the excess flood loss factor is shown in column 5. Column 6 on this exhibit adjusts the non-hurricane incurred loss and ALAE in column 1 by removing the excess wind loss and ALAE (column 2) and excess flood loss and ALAE (column 3) and multiplying the result by the sum of the excess wind loss factor (column 4) and excess flood factor (column 5) minus 1.00. This calculation produces the *adjusted non-hurricane incurred loss and ALAE* for each year.

Q. Is the adjusted non-hurricane incurred loss and ALAE shown in column 6 adjusted in any other way?

A. Yes. After adjusting for excess wind loss and ALAE and excess flood loss and ALAE, the amounts in column 6 are further adjusted for loss development and to include a provision for expected unallocated loss adjustment expenses (ULAE).

Based on data collected in response to the Rate Bureau's mobile homeowners data call, we evaluated historical loss development data and historical claim development data for MH(F) Owners and MH(F) Tenants on a combined basis. Details of that analysis can be found on pages 32 through 33 of Section C, and the resulting loss and ALAE development factors are included in column 7 on page 3 of Section C. Column 8 on this same exhibit calculates the *non-hurricane ultimate loss and ALAE* for each year by multiplying the adjusted non-hurricane incurred loss and ALAE (column 6) by the corresponding loss and ALAE development factor (column 7).

In addition to evaluating historical loss and ALAE development data, we also compared the ratio of incurred ULAE to incurred loss and ALAE for each of the five years of experience used in the overall rate indications. This analysis of historical ULAE can be found on page 47 of Section C. Based on the average ratio of incurred ULAE to incurred loss and ALAE, the Rate Bureau selected a ULAE provision of 17.0%. Through the use of a ULAE factor equal to 1.170, the selected ULAE provision is added to non-catastrophe mobile homeowners loss and ALAE evaluated in the rate indications.

Referring back to page 3 of Section C, column 10 calculates the *non-hurricane ultimate loss and LAE* for each year by multiplying the non-hurricane ultimate loss and ALAE (column 8) by the ULAE factor, which is shown in column 9.

Q. In your opinion, is the provision for unallocated loss adjustment expense included in this filing reasonable?

A. Yes, the unallocated loss adjustment expense provision is reasonable. It is common practice in the industry to use an average of historical experience to determine an unallocated loss adjustment expense provision.

Q. Are the non-hurricane ultimate loss and LAE amounts on page 3 of Section C the same as the amounts shown on page 2 of Section C?

A. Yes. After determining the non-hurricane ultimate loss and LAE on page 3 of Section C, those amounts are copied on page 2 so that additional adjustments and calculations can be completed.

Q. What other adjustments must be made to the non-hurricane losses and LAE?

A. The losses need to be adjusted by a loss trend factor to reflect the cost levels expected to prevail during the period that the proposed rates are anticipated to be in effect. For this filing, the assumed effective date is July 1, 2023. If the filing were to become effective on a date later than the July 1, 2023 assumed effective date, then the rate indications would be different than those presented in this filing.

Q. Please describe how the loss trend factors are developed and applied.

A. Loss trend data was evaluated separately for each MH(F) policy form in an analysis on pages 34 through 37 of Section C. For the Owners policy forms, only industry data was considered, but for the Tenants policy form, both MH(F) industry data and MH(C) Personal Effects data were considered.

The industry data included quarterly ultimate claim frequencies and quarterly ultimate loss severities evaluated on a 12-month moving basis from the 4th quarter of 2016 to the 4th quarter of 2021. The reported claims and incurred loss and ALAE were developed to ultimate using interpolated quarterly development factors found on page 37 of Section C.

After compiling the industry-based frequencies and severities and the MH(C) Personal Effects frequencies and severities (only for the Tenants policy form), several different exponential trends were fit to the data in order to evaluate the historical trends and to project potential future trends.

The Rate Bureau reviewed the exponential trends fit to the industry data as well as the exponential trends fit to the MH(C) Personal Effects data that was considered for the Tenants policy form. Based on the fitted trends, the Rate Bureau selected frequency and severity trends for two separate time periods. Trends were selected for the historical experience period and separate trends were selected for the projection period. This two-period trend approach is commonly used throughout the industry because it allows companies to reflect the latest changes in trends as historical experience is projected into the future.

The experience period trends were applied to adjust losses from the midpoint of each historical year to the end date of the most recent experience period (i.e., 12/31/2021). Following this, the projection period trends were applied from the end date of the most recent experience period (i.e., 12/31/2021) to the average accident date for the time period that the proposed rates were originally anticipated to be in effect (i.e., 7/1/2024). The selected experience period loss trends and projection period loss trends were each applied for the appropriate number of years and the combined effect of these trends was calculated to determine loss trend factors for each year in the historical experience period. The calculation of the loss trend factors for each of the MH(F) policy forms can be found on page 34 of Section C.

Q. After loss trend factors are applied, what other adjustments are made to the non-hurricane ultimate loss and LAE amounts?

A. The calculated loss trend factors discussed above can be found in column 2 on page 2 of Section C. In column 5 on the same exhibit, the *trended average loss cost* is calculated for each year based on multiplying the non-hurricane ultimate loss and LAE (column 1) by the loss trend factor (column 2) and dividing by the earned house years (column 3) and the premium trend factor (column 4). The losses need to be offset (i.e., adjusted downward) by a premium trend factor to reflect the fact that higher cost levels are partially the result of higher amounts of coverage being purchased in each subsequent year. These higher amounts of coverage generally correspond to higher average premiums, and the trend in those higher average premiums should be reflected to mitigate the impact of the loss trend factors.

Q. Please describe how the premium trend factors are developed and applied.

A. Premium trend data was evaluated separately for each of the MH(F) policy forms in an analysis on pages 39 and 40 of Section C.

For each of the policy forms, we calculated the average rating factor by year. The average rating factors were calculated as the ratio of the earned premium at current manual level (using each policy's rating characteristics) to the earned premium at current base class level. The earned premium calculations were completed using the extension of exposures method, as described in Section E.

After compiling the average rating factors by year, several different exponential trends were fit to the data in order to evaluate the historical trends and to project potential future trends.

The Rate Bureau reviewed the exponential trends fit to the average rating factors and selected trends for two separate time periods. Similar to the loss trend analysis, premium trends were selected for the historical experience period and separate trends were selected for the projection period. As mentioned previously, this two-period trend approach is commonly used throughout the industry because it allows companies to reflect the latest changes in trends as historical experience is projected into the future.

The experience period trends were applied to adjust premiums from the average written date of each historical year to the end date of the most recent experience period (i.e., 12/31/2021). Following this, the projection period trends were applied from the end date of the most recent experience period (i.e., 12/31/2021) to the average written date for the time period that the proposed rates were originally anticipated to be in effect (i.e., 1/1/2024). The selected experience period premium trends and projection period premium trends were each applied for the appropriate number of years and the combined effect of these trends was calculated to determine premium trend factors for each year.

Q. After premium trend factors are applied, are the trended average loss costs shown in column 5 on page 2 of Section C adjusted in any other way?

A. Yes. The trended average loss costs in column 5 are divided by the average rating factor for each year (column 6) to determine the *trended base class loss cost* as shown in column 7. The average rating factor for each year is calculated as the ratio of the average premium at current manual level to the average current base rate. This ratio represents the relative difference in premium between the average mobile homeowners policy and the base class. To the extent the average policyholder purchases different amounts of coverage, different deductibles, or resides in a different territory group than the base class, the average rating factor will reflect these differences. The average rating factors by year in column 6 are the same factors as were used to develop the premium trends on page 40 of Section C.

Q. Please explain how the trended base class loss costs in column 7 on page 2 of Section C are used after they are calculated for each year in the experience period.

A. The trended base class loss costs shown in column 7 are aggregated using the accident year weights in column 8 to determine the *weighted average non-hurricane base class loss cost* (row 9). As noted previously, we used weights of 10%, 15%, 20%, 25%, and 30% for MH(F) Owners, which is consistent with previous mobile homeowners filings submitted by the Rate Bureau. However, for

the MH(F) Tenants policy form, we used an even distribution of weights (i.e., 20% in each year) due to the low volume of business in this segment and potential variability by year.

The credibility of the weighted average non-hurricane base class loss cost is evaluated for each MH(F) policy form based on policy form-specific full-credibility standards. To the extent the weighted average non-hurricane base class loss cost is not fully credible, the complement of credibility is determined based on loss cost estimates from the prior MH(F) rate filing and updated trends from this filing. More specifically, the credibility-weighted loss cost from the prior filing is trended to the proposed effective date of this filing using the selected loss trend and premium trend for the projection period in order to calculate the complement of credibility. The calculation of the complement of credibility for each MH(F) policy form can be found on page 42 of Section C. Using the weighted average non-hurricane base class loss cost (row 9), the credibility of that loss cost (row 10), and the complement of credibility (row 11), the *credibility-weighted loss cost* is calculated as shown in row 12.

Q. How is credibility determined in this filing?

A. The credibility calculated in row 10 on page 2 of Section C is based on a consistent claims standard for full credibility (i.e., 271 claims) for each of the MH(F) policy forms. However, that claims standard for full credibility is adjusted based on the frequency of claims for each policy form and the variability of the size of those claims. More details on this credibility procedure can be found in the Explanatory Memorandum included in Exhibit RB-1. The result of this adjustment for claims frequency and variability is a full-credibility standard using earned house years that is unique to each policy form. The resulting full-credibility standards for each of the MH(F) policy forms, rounded up to the nearest 10,000 earned house years, are as follows:

- Owners = 30,000
- Tenants = 190,000

To determine the credibility shown in row 10, the number of earned house years during the five-year experience period is compared to the policy form's full-credibility standard and if a policy form's historical experience is not fully credible, the square root rule is applied. Among the MH(F) policy forms, the Owners weighted average non-hurricane base class loss cost is fully credible and the Tenants weighted average non-hurricane base class loss cost has a credibility of 13.0%.

The above full-credibility standards for the MH(F) policy forms are also applied in determining the indicated base class loss cost by territory group, which is discussed later in this testimony.

Q. Please explain the amount shown in row 13 on page 2 of Section C, labeled as the *modeled hurricane base class loss cost*.

A. The amount shown in row 13 is the provision for prospective hurricane losses related to the coverage afforded by the MH(F) Owners policy forms. The credibility-weighted loss cost shown in row 12 includes only non-hurricane losses, so an additional provision is necessary to account for the exposure to hurricane losses on a mobile homeowners policy.

Q. What is the source of the *modeled hurricane base class loss cost* shown in row 13 of Section C, page 2?

A. The source of the modeled hurricane losses for each MH(F) policy form is an analysis completed for the Rate Bureau by Aon. In addition to Aon's analysis to support the net cost of reinsurance (described previously), Aon was also retained by the Rate Bureau to provide the statewide modeled hurricane losses for each of the MH(F) policy forms as well as modeled hurricane losses for each territory. This analysis from Aon is consistent with other recent property rate filings submitted by the Rate Bureau, except that the models were run with storm surge losses to reflect the fact that the mobile homeowners MH(F) policy covers flood losses. It is for this reason, as noted earlier, that when the filing and my testimony refer to "hurricane losses," that term means hurricane wind and storm surge losses, but not inland flood losses. In order to avoid double counting hurricane losses, historical hurricane wind and hurricane storm surge losses in the data underlying our analysis were removed. More details of Aon's analysis, including support for the catastrophe LAE provision of 6.0%, are included in Ms. Mao's testimony and exhibits.

To determine the *modeled hurricane base class loss cost* found in row 13 of Section C, page 2, the trended modeled hurricane loss and LAE for each MH(F) policy form is divided by the corresponding number of 2021 earned house years, the 2021 average rating factor, and the 2021 premium trend factor. These calculations can be found on page 43 of Section C for each of the MH(F) policy forms.

Q. Can you please explain why hurricane models are used to estimate the hurricane losses?

A. Yes. Hurricane models are used to estimate the expected hurricane losses because they provide a more accurate way of quantifying the exposure to hurricanes than using prior insurance ratemaking methodologies. In addition, hurricane models include a storm surge component, which allows us to more accurately quantify the expected losses from storm surge caused by hurricanes as well as the expected hurricane wind losses. Hurricanes are highly variable in their frequency, severity, and place of occurrence. By simulating thousands of possible hurricane events, hurricane models provide a more complete perspective on the

distribution of the types of hurricanes that could occur and avoid the volatility that could result from using actual hurricane losses. If only five years of historical experience were used to evaluate hurricane losses, similar to what we are using for the non-hurricane component of this rate indication, it would be feasible to have a five-year period with no hurricane losses or a five-year period with multiple severe hurricane events. Neither of those scenarios provides a reasonable representation of the expected exposure to hurricane losses in the prospective policy period and, as such, it would not be actuarially appropriate to rely on such a methodology. The use of hurricane models alleviates this issue and provides a more accurate estimate of expected hurricane losses.

Q. Did the Rate Bureau consider actual hurricane losses?

A. Yes. The actual hurricane losses during the five years of historical experience were reviewed and considered; however, as has been done in prior Bureau filings, those losses were excluded from the historical losses used in the filing and were replaced by modeled hurricane losses.

Q. What data did Milliman provide to Aon to enable Aon to perform its analysis?

A. Milliman provided Aon with a dataset containing all of the North Carolina mobile homeowners MH(F) insurance exposures. This data included the number of earned house years and the amount of earned insurance years for the most recent year in the experience period (i.e., 2021). The dataset also included several important risk characteristics such as the territory (and county and city, if available), occupancy code, MH(F) policy form, and whether the mobile home is tied down. Milliman also provided exposure trend information to Aon for Aon's use in trending the mobile homeowners MH(F) exposures that would be used as inputs in the hurricane models. The data provided to Aon by Milliman was correct to the best of my knowledge and information.

Q. Please describe how the exposure trend factors are developed.

A. Exposure trend data was evaluated separately for each policy form in an analysis on page 38 of Section C.

For each policy form, we calculated the average amount of insurance per policy on a 12-month moving basis from the 1st quarter of 2016 to the 4th quarter of 2021. After compiling the average amount of insurance by quarter, several different exponential trends were fit to the data in order to project potential future trends. Because the exposure trends were only needed by Aon to trend the MH(F) exposures into the future in order to be used as inputs in the hurricane models, the Rate Bureau did not select trends for the historical experience period.

The Rate Bureau reviewed the exponential trends fit to the average amounts of insurance and selected trends for the projection period. The exposure trend

selections were then given to Aon for Aon's use in trending the modeled hurricane losses.

Q. What model versions and modeling assumptions were used to develop estimated hurricane losses?

A. The current AIR model is Touchstone v9 and the current RMS model is RiskLink v21. To develop the expected hurricane losses, Aon relied on AIR's Standard event set and on RMS' Historical event set. These event sets were used instead of AIR's Warm Sea-Surface Temperature (WSST) event set and RMS' Medium-Term Rate event set. Although many primary insurance companies consider the WSST and Medium-Term Rate events sets when developing expected hurricane losses for indicated rates in states other than North Carolina, the event sets selected for this filing are reasonable and actuarially sound.

Both the AIR and RMS models were run with aggregate demand surge included, which was identified as loss amplification in the RMS model. This standard procedure accounts for the expected additional costs for labor, materials, and services after a very large hurricane occurs. Historical experience shows that, when major catastrophic events occur, the increased demand for building materials, labor, temporary housing, and other basic necessities can exceed the supply of these same items, which consequently increases their cost. Running models with demand surge is consistent with the Rate Bureau's prior filings, and is the common practice by insurance companies when developing rates based on modeled hurricane losses.

As discussed previously, the modeled hurricane losses also include losses from storm surge due to the fact that the mobile homeowners MH(F) policy includes coverage for flood losses.

Q. Were any other calculations applied to the hurricane losses derived from the models?

A. Yes. Before providing the blended hurricane losses, Aon applied a hurricane-specific provision for loss adjustment expense. As noted previously, more details of Aon's analysis, including support for the catastrophe LAE provision of 6.0%, are included in Ms. Mao's testimony and exhibits.

Q. In your opinion, is it appropriate to allocate modeled hurricane losses within North Carolina in a way that is proportional to risk?

A. Yes. The risk associated with insuring properties exposed to hurricane events varies geographically within North Carolina. As such, the cost for bearing that risk should be allocated proportional to the measurement of risk. In their analysis of modeled hurricane losses for this filing, Aon provided the statewide modeled hurricane losses and also allocated the modeled hurricane losses to each MH(F)

policy form and each territory. This allocation is appropriate and consistent with the objective of producing rates that are fair, reasonable, and not unfairly discriminatory across policyholders.

Q. Please explain the amount shown in row 14 on page 2 of Section C, labeled as the *total base class loss cost*.

A. The amount shown in row 14, that is the *total base class loss cost*, is the average amount of projected loss per exposure, including both non-hurricane and hurricane losses, for the risk identified as the base class for each respective MH(F) policy form. It is calculated as the sum of the credibility-weighted loss cost shown in row 12 and the modeled hurricane base class loss cost shown in row 13.

As noted at the beginning of my testimony, it is the total base class loss cost that begins the calculation of the indicated rate change on page 1 of Section C. The total base class loss cost is copied into row 1 on page 1 so that additional adjustments and calculations can be completed to develop the statewide indicated rate change for each MH(F) policy form.

Q. Up until now, your testimony has focused on the calculations on pages 1 through 3 of Section C. Please explain how pages 4 and 5 compare to pages 1 through 3.

A. As described in my testimony above, page 1 of Section C develops the statewide indicated rate changes for the policy forms offered in the mobile homeowners MH(F) program. As noted previously, those policy forms include MH(F)-2 and MH(F)-3, which are collectively referred to as Owners, and MH(F)-4, which is referred to as Tenants. The calculations to develop the indicated rate change for each policy form begin with the *total base class loss cost*, which is derived on pages 2 and 4 of Section C, depending on the policy form. My testimony above discussed the calculations on page 2, which are further supported by additional calculations on page 3. The calculations on pages 2 and 3 of Section C all relate to the Owners policy forms.

Pages 4 and 5 of Section C display comparable calculations for the Tenants policy form. The calculations and methodology on page 4 are identical to the calculations and methodology on page 2 (except for the differences noted above in the exposure-based standards for full credibility and in the accident year weights). Similarly, the calculations and methodology on page 5 are identical to the calculations and methodology on page 3.

Q. Does the filing review the indicated rate changes by territory or territory group?

A. Yes. The mobile homeowners MH(F) territory definitions are consistent with the territory definitions currently in use in homeowners and dwelling insurance in North

Carolina. To increase the credibility and stability of the rates being evaluated, six territory groups are used in the mobile homeowners program.

Beginning on page 6 of Section C, the Rate Bureau develops indicated rate changes by territory group for each MH(F) policy form using a similar methodology as the statewide indication. Pages 6 through 16 document the Owners indicated rate changes by territory group, while the Tenants indicated rate changes by territory group can be found on pages 17 through 27.

For each of these MH(F) policy forms, a non-hurricane base class loss cost is calculated by territory group using the historical loss experience. A credibility value is assigned to each territory group for each policy form based on the number of house years underlying each loss cost and the same credibility standards discussed above. Using the credibility for each territory group, a credibility-weighted non-hurricane base class loss cost is determined by territory group. In addition, a modeled hurricane base class loss cost is developed by territory group for each policy form. The non-hurricane loss costs and modeled hurricane loss costs are combined to develop the indicated base class loss cost by territory group for each policy form. Additional calculations are applied to each territory group to reflect expenses, policyholder dividends, compensation for assessment risk, net cost of reinsurance, and net deviations in a similar manner as applied at a statewide level. The result of these calculations is an indicated rate change by territory group for each MH(F) policy form.

Columns 14 and 15 on pages 6 (Owners) and 17 (Tenants) of Section C show the proposed rate changes by territory group, as selected by the Rate Bureau in capping the indicated rate changes and proposing to implement them over two years.

In my opinion, the methodology used to develop the indicated rate-level change by territory group and by MH(F) policy form is reasonable and is consistent with widely-used actuarial ratemaking practices.

Q. Does the filing review the wind exclusion credits?

A. Yes. Based on the rates being proposed with this filing in territory groups 1 and 2 for each MH(F) policy form, the wind exclusion credits are being updated in a corresponding manner, as can be seen on page 1 of Section D. Using the underlying formula for the statewide rate indication, an adjustment is made to the appropriate components of the indication formula to reflect the non-wind losses as a percent of the total losses. The indicated non-wind rate is subtracted from the indicated overall rate to determine the indicated wind exclusion credit for each territory group.

Q. Does the filing include proposed changes to any rating variables used in the mobile homeowners MH(F) rating plan?

- A. Yes. With this filing, the Rate Bureau is proposing revisions to the wind exclusion credits as discussed above.
- Q. I understand that you are not providing an opinion concerning the underwriting profit (profit) provision or the development of the net cost of reinsurance (NCOR) provision. If I ask you to assume that the provisions for profit and NCOR are reasonable and actuarially sound, then in your opinion, is the overall rate indication shown in the mobile homeowners MH(F) filing by the North Carolina Rate Bureau reasonable?**
- A. Yes, if I assume that the provisions for profit and NCOR are reasonable, then in my opinion, the overall mobile homeowners MH(F) rate indication shown by the Rate Bureau, and the rate indications for each policy form, are reasonable and actuarially sound.
- Q. Again, assuming that the provisions for profit and NCOR are reasonable, do you have an opinion whether the proposed rates, as capped and proposed to be implemented in the filing, reasonably provide for the expected costs for mobile homeowners MH(F) insurance in North Carolina?**
- A. If I assume that the provisions for profit and NCOR are reasonable, then in my opinion, the proposed rates in this filing reasonably reflect the expected costs for mobile homeowners MH(F) insurance, except to the extent that the proposed rates have been capped and implemented over two years instead of one year. Where the Rate Bureau has capped and implemented the rates over two years in this filing to mitigate the impact on affected policyholders, the proposed rates do not reflect all expected costs. The expected costs that can be quantified by the difference between a territory group's indicated rate change and its capped rate change are not reflected in the proposed rates. In addition, to the extent the loss trends and premium trends are not projected to the time period reflected by the year 2 change, the proposed rates may not reflect all expected costs for year 2. The expected costs for year 2 can be quantified by projecting the loss trends and premium trends to dates further in the future that correspond to year 2 and comparing the resulting indicated rate changes to the indicated rate changes included in this filing.
- Q. Assuming that the provisions for profit and NCOR are reasonable, in your opinion, are the proposed mobile homeowners MH(F) rates not excessive, inadequate, or unfairly discriminatory?**
- A. If I assume that the provisions for profit and NCOR are reasonable, then in my opinion, the proposed mobile homeowners MH(F) rates in this filing are not excessive or unfairly discriminatory. However, where the Rate Bureau is proposing to cap the effect of this filing, the proposed rates continue to be inadequate by the difference between the indicated rate change and the capped rate change. In

addition, to the extent the loss trends and premium trends are not projected to the time period reflected by the year 2 change, and to the extent the selected projection period trends remain appropriate for year 2, the proposed rates are at risk of being slightly inadequate at the time the year 2 change is implemented

Q. Does this conclude your testimony?

A. Yes, it does.

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SUMMARY

Property & Casualty (P&C) actuary with more than 29 years of experience in actuarial applications and related fields including ratemaking, product development, predictive modeling, state pricing, field proposals, rate filings, actuarial and statistical research, classification analysis, data analytics, and economic modeling. Experienced in Private Passenger Automobile (including preferred, standard, and non-standard), Personal Property (including homeowners, renters, condominium owners, mobile home, and dwelling), other miscellaneous Personal Lines (including boats, motorcycles, recreational vehicles, and personal umbrella), and various Commercial Lines of Business. Has sound knowledge of product development, product pricing, product implementation, and project management for Personal Lines products. Has working knowledge of other key insurance functions including claims, corporate finance, marketing, reinsurance, sales, and underwriting. Has demonstrated the ability to lead and manage teams of employees to achieve desired business results in various capacities. Has unique combination of analytic ability, business intuition, project management, leadership, and communication skills.

EMPLOYMENT HISTORY

Milliman, Inc. 2007 - Present
Brookfield, Wisconsin

Principal and Consulting Actuary

Specialize in personal lines insurance company clients and predictive analytics of both personal and commercial lines of insurance. Experience has included ratemaking and pricing analyses for insurance companies, product development and implementation, classification analysis using multivariate statistical techniques, catastrophe reinsurance analysis, loss reserving, segmentation analysis to support sales and marketing initiatives, impact analysis of proposed state and federal legislation, and merger and acquisition analysis. Has also provided expert testimony to support Auto and Property regulatory issues.

Allstate Insurance Company 1993 - 2007
Northbrook, Illinois

Senior Manager – Auto & Property Pricing (2006-2007)

Oversaw and directed all personal lines Auto and Property pricing, rate filings, and other actuarial work related to the pricing function for 10 states accounting for over \$4 billion of premium. Assisted in the oversight of all personal lines actuarial work related to the pricing function for an additional 12 states. Served as the primary department expert on all Property pricing initiatives. Directly managed a staff of 10 to 12 employees and participated in the leadership team that oversaw the management of a department with more than 130 employees.

Team Leader – Property & Specialty Lines Research (2005-2006)

Managed all research projects for personal lines Property and for Specialty Lines, all of which were completed using multivariate statistical analyses. Measured the impact of rating algorithm changes as they were implemented in various states. Oversaw the enhancement and improvement of analysis techniques used within the team. Led a team of 8 to 10 staff.

Research Manager (1999-2001, 2003-2005)

At different times, managed research teams for personal lines Auto, Economics & Modeling, and personal lines Property. Oversaw the development of countrywide pricing models based on multivariate statistical techniques, the evaluation of risk characteristics to be used as new rating elements, and the development of implementation tools to be used by pricing teams. Oversaw the development of Auto and Property economic models that measured the lifetime profitability of personal lines insurance customers. Led teams of staff ranging in size from 3 to 6 analysts.

Pricing Manager (1997-1999, 2001-2003)

Managed all personal lines Auto and Property pricing, rate filings, and other actuarial work related to the pricing function for California. Managed all personal lines Property pricing, rate filings, and other actuarial work related to the pricing function for 14 states including Alabama, Florida, Louisiana, and Mississippi. Led teams of staff ranging in size from 3 to 6 analysts.

Pricing Analyst, Research Analyst (1993-1997)

Produced rate proposals, rate filings, and quarterly rate-level indications for various states. Retrieved, manipulated, and analyzed large volumes of data to evaluate countrywide rating plans using multivariate statistical analyses.

EXPERT WITNESS EXPERIENCE

Pre-filed Expert Testimony – Various Private Passenger Automobile and Residential Property Insurance Rate Filings submitted by the North Carolina Rate Bureau

- *2022 Dwelling Insurance Filing*
- *2021 Mobile Homeowners MH(C) Insurance Filing*
- *2021 Mobile Homeowners MH(F) Insurance Filing*
- *2020 Dwelling Insurance Filing*
- *2020 Homeowners Insurance Filing*
- *2019 Dwelling Insurance Filing*
- *2019 Mobile Homeowners MH(C) Insurance Filing*
- *2019 Mobile Homeowners MH(F) Insurance Filing*
- *2019 Private Passenger Automobile Insurance Filing*
- *2018 Homeowners Insurance Filing*
- *2018 Dwelling Insurance Filing*
- *2017 Homeowners Insurance Filing*
- *2016 Dwelling Insurance Filing*

EDUCATION

BS in Actuarial Science from Drake University, Des Moines, Iowa

PROFESSIONAL QUALIFICATIONS

Certified Specialist in Predictive Analytics (CSPA), 2018
Fellow of the Casualty Actuarial Society (FCAS), 2002
Member of the American Academy of Actuaries (MAAA), 2002
Associate of the Casualty Actuarial Society (ACAS), 1998
Member of the Midwest Actuarial Forum, 1998

PROFESSIONAL ACTIVITIES

Volunteer Chairperson, CAS Crash Course Seminar Task Force, 2021 - Present
Member, CAS Volunteer Resources Task Force, 2021 - Present
Chairperson, CAS Crash Course in Vehicle Technology & Driverless Cars Committee, 2020 - 2021
Member, CAS Volunteer Resources Advisory Committee, 2020 - 2021
Member, CAS Participation Survey Task Force, 2018 - 2019
Member, Vehicle Technology & Impact on Loss Trends Planning Committee, 2017 - 2018
Member, iCAS Predictive Analytics Syllabus Committee, 2017 - 2018
Member, CAS Volunteer Resources Committee, 2013 - 2020
Member, CAS Volunteer Support Task Force, 2012 - 2013
Member, CAS Examination Committee, 2004 - 2006

PUBLICATIONS

"Keep on trucking: COVID-19 and its impact on commercial auto," *Milliman Insight*, April 2020.
"PIP PIP hooray! The changing Michigan auto market," *Milliman Insight*, April 2020.
"Nowhere to drive: The impact of COVID-19 on the auto insurance industry," *Milliman Insight*,
March 2020.
"Better Visibility: Predictive modeling helps to steady medical malpractice underwriting," *Best's Review*,
February 2008.

PRESENTATIONS

Numerous presentations at Casualty Actuarial Society (CAS) and other Property & Casualty insurance industry meetings and seminars from 2007 through the present with a focus on personal lines Auto and Property issues, as well as predictive analytics topics.

**NORTH CAROLINA
MOBILE HOMEOWNERS MH(F) INSURANCE**

Development of Compensation for Assessment Risk Provision

(1) Rate Review Season	(2) NCRB Rate Filing	(3) Date Submitted	(4) Compensation for Assessment Risk Provision
2020-2021	2021 MH(C)	2/26/21	2.9%
	2021 MH(F)	2/26/21	
	2020 Dwelling	12/14/20	
	2020 HO	11/9/20	
2019-2020	2019 Dwelling	8/14/19	3.4%
2018-2019	2019 MH(C)	2/13/19	2.8%
	2019 MH(F)	2/13/19	
	2018 HO	12/20/18	
2017-2018	2018 Dwelling	2/7/18	3.8%
	2017 HO	11/17/17	
(5) Average Historical Compensation for Assessment Risk Provision			3.2%
(6) Estimated Market Share of Companies that Retain Exposure to NCIUA & NCJUA Assessments			50.0%
(7) Compensation for Assessment Risk Provision			1.6%

(3), (4) From historical NCRB rate filings

(5) = Average of column (4)

(6) Estimated based on judgment

(7) = (5) x (6)

**NORTH CAROLINA
MOBILE HOMEOWNERS MH(F) INSURANCE**

Estimated Impact of Delays in Rate Filing Process

NCRB Rate Filing	Policy Type / Coverage	Premium Weight	(1)	(2)	(3)	(4)	(5)	(6)
			Assumed Effective Date	Actual Effective Date	# of Months of Delay	Selected Loss Trend	Selected Premium Trend	Estimated Impact of Delay in Filing Process
2020 HO	Owners	\$2,161,073,789	8/1/21	6/1/22	10	6.0%	1.1%	4.0%
	Tenants	76,318,464	8/1/21	6/1/22	10	0.5%	-2.0%	2.1%
	Condos	31,251,398	8/1/21	6/1/22	10	5.0%	0.0%	4.1%
	Total	\$2,268,643,651						4.0%
2021 MH(C)	Mobile Home Structures	\$55,402,780	11/1/21	5/1/22	6	-2.0%	2.7%	-2.3%
	Adjacent Structures	4,435,898	11/1/21	5/1/22	6	10.2%	4.4%	2.7%
	Personal Effects	10,600,963	11/1/21	5/1/22	6	-2.0%	4.4%	-3.1%
	Liability	2,198,331	11/1/21	5/1/22	6	8.0%	0.7%	3.5%
	Total	\$72,637,972						-1.9%
2021 MH(F)	Owners	\$41,984,133	11/1/21	5/1/22	6	1.0%	2.7%	-0.8%
	Tenants	95,516	11/1/21	5/1/22	6	-2.0%	1.0%	-1.5%
	Total	\$42,079,649						-0.8%
2020 Dwelling	Fire	\$71,555,474	9/1/21	11/1/21	2	0.0%	1.2%	-0.2%
	EC	229,061,439	9/1/21	11/1/21	2	9.0%	1.5%	1.2%
	Total	\$300,616,913						0.9%
2019 Dwelling	Fire	\$83,923,771	7/1/20	7/1/20	0	2.0%	1.1%	0.0%
	EC	241,506,295	7/1/20	7/1/20	0	3.2%	0.8%	0.0%
	Total	\$325,430,066						0.0%
2019 MH(C)	Mobile Home Structures	\$52,069,226	2/1/20	6/1/20	4	3.5%	1.6%	0.6%
	Adjacent Structures	4,212,665	2/1/20	6/1/20	4	4.0%	2.8%	0.4%
	Personal Effects	10,255,303	2/1/20	6/1/20	4	2.0%	4.1%	-0.7%
	Liability	2,410,058	2/1/20	6/1/20	4	5.0%	n/a	1.6%
	Total	\$68,947,252						0.5%
2019 MH(F)	Owners	\$51,661,941	2/1/20	6/1/20	4	0.7%	-0.5%	0.4%
	Tenants	66,881	2/1/20	6/1/20	4	2.0%	2.1%	0.0%
	Total	\$51,728,822						0.4%
2018 HO	Owners	\$2,017,285,314	10/1/19	5/1/20	7	4.6%	1.0%	2.0%
	Tenants	72,370,871	10/1/19	5/1/20	7	-3.1%	-1.4%	-1.0%
	Condos	29,047,171	10/1/19	5/1/20	7	1.9%	0.2%	1.0%
	Total	\$2,118,703,356						1.9%
2018 Dwelling	Fire	\$102,088,428	6/1/18	2/1/19	8	0.2%	2.3%	-1.3%
	EC	187,663,877	6/1/18	2/1/19	8	0.4%	2.1%	-1.1%
	Total	\$289,752,305						-1.2%
2017 HO	Owners	\$2,010,516,565	6/1/18	10/1/18	4	3.1%	1.1%	0.7%
	Tenants	62,551,401	6/1/18	10/1/18	4	-3.1%	-1.0%	-0.7%
	Condos	24,591,783	6/1/18	10/1/18	4	1.9%	0.5%	0.5%
	Total	\$2,097,659,749						0.6%
2014 HO	Owners	\$2,257,970,589	7/1/14	6/1/15	11	5.3%	2.3%	2.7%
	Tenants	45,065,871	7/1/14	6/1/15	11	2.9%	-1.0%	3.6%
	Condos	22,629,842	7/1/14	6/1/15	11	5.4%	0.0%	5.0%
	Total	\$2,325,666,302						2.7%
2014 MH(C)	Property	\$77,349,418	6/1/15	10/1/15	4	3.0%	2.8%	0.1%
	Liability	1,546,804	6/1/15	10/1/15	4	2.8%	n/a	0.9%
	Total	\$78,896,222						0.1%
2014 MH(F)	Owners	\$44,750,216	6/1/15	10/1/15	4	4.6%	2.2%	0.8%
	Tenants	100,658	6/1/15	10/1/15	4	2.5%	-0.2%	0.9%
	Total	\$44,850,874						0.8%
2012 HO	Owners	\$2,168,814,729	6/1/13	7/1/13	1	5.4%	3.0%	0.2%
	Tenants	32,405,190	6/1/13	7/1/13	1	4.0%	0.0%	0.3%
	Condos	18,252,996	6/1/13	7/1/13	1	4.0%	2.0%	0.2%
	Total	\$2,219,472,915						0.2%
2011 Dwelling	Fire	\$84,664,174	6/1/11	4/1/13	22	3.6%	2.9%	1.3%
	EC	150,823,062	6/1/11	4/1/13	22	4.1%	2.8%	2.3%
	Total	\$235,487,236						2.0%
2008 HO	Owners	\$1,498,766,325	1/1/09	5/1/09	4	4.4%	3.9%	0.2%
	Tenants	24,074,875	1/1/09	5/1/09	4	0.2%	2.7%	-0.8%
	Condos	13,213,524	1/1/09	5/1/09	4	0.2%	2.9%	-0.9%
	Total	\$1,536,054,724						0.1%
2008 MH(C)	Property	\$76,284,985	10/1/07	12/1/08	14	7.5%	2.4%	5.9%
	Liability	1,161,840	10/1/07	12/1/08	14	4.0%	n/a	4.7%
	Total	\$77,446,825						5.9%
2008 MH(F)	Owners	\$43,659,180	10/1/07	12/1/08	14	6.6%	5.8%	0.9%
	Tenants	158,638	10/1/07	12/1/08	14	0.4%	-4.1%	5.5%
	Total	\$43,817,818						0.9%

Average Estimated Impact of Delays in Filing Process: 0.9%

(1), (3), (4) From historical NCRB rate filings
 (2) From historical NCRB settlement agreements or circulars
 (5) = $\frac{1 + (3)}{1 + (4)} \wedge \left(\frac{(2) - (1)}{365} \right) - 1$

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PRE-FILED DIRECT TESTIMONY OF MINCHONG MAO
2022 MOBILE HOMEOWNERS INSURANCE RATE FILINGS
by the
NORTH CAROLINA RATE BUREAU

Q. Please state your full name and business address for the record.

A. My name is Minchong Mao. My business address is Aon, 200 East Randolph Street, 11th Floor, Chicago, Illinois 60601.

Q. What is your involvement in this matter?

A. My employer, Aon, has been retained by the North Carolina Rate Bureau (NCRB) to provide catastrophe and reinsurance analytics with respect to the expected hurricane losses and net cost of reinsurance provisions utilized in the NCRB 2022 Mobile Homeowners Insurance MH(C) and MH(F) rate filings. I manage the catastrophe analytics team at Aon that performed these services.

Q. Who is Aon, and what are your primary responsibilities for them?

A. Aon is a leading global professional services firm that provides advice and solutions to clients focused on risk, retirement, and health. Aon is one of the world's largest reinsurance brokers and has extensive experience in catastrophe

1 modeling. I am a Senior Managing Director and a Catastrophe Actuary at Aon's
2 Reinsurance Solutions - Catastrophe Risk Analytics group. I manage an analytics
3 group within the Catastrophe Management area which focuses on catastrophe
4 actuarial and predictive analytics as it relates to ratemaking and underwriting.
5 I advise clients on catastrophe actuarial services, such as rate indications, rate
6 filing strategy, underwriting strategy, and use of catastrophe models in risk
7 management. I am responsible for Aon's compliance with ASOP 38 regarding
8 use of catastrophe models. I am a consulting actuary for Aon's in-house model,
9 Impact Forecasting, LLC. I work with a group of catastrophe modelers to provide
10 catastrophe modeling support for reinsurance placements. Our client services
11 include but are not limited to: support for multi-model analytics, customized view
12 of risks, catastrophe pricing, catastrophe risk selections, data augmentation,
13 model evaluation, real-time event response, portfolio optimization, actuarial
14 support, reinsurance cost allocations, and rating agency questionnaire support.

15

16 **Q. Describe your professional and educational background.**

17

18 A. I have been with Aon since September 2018. Prior to joining Aon, I worked at
19 State Farm Insurance Companies for over 17 years from 2001 to 2018 where I
20 led the catastrophe modeling functions since 2005. During my tenure at State
21 Farm, I was responsible for State Farm's use of catastrophe models in pricing,
22 underwriting, claims, reinsurance, securitization, enterprise risk management,
23 and rating agency reporting.

24

1

2 I have 2 years of ratemaking experience as a pricing actuary for Homeowner
3 lines at State Farm. I am familiar with the development and implementation of
4 property insurance rates and rules. I understand the challenges for an insurer to
5 balance rate adequacy, competitiveness, and meet financial objectives at the
6 same time.

7

8 I have a Bachelor's degree in Biochemical Engineering from Beijing University of
9 Chemical Technology, a Master's degree in Chemistry from Eastern Illinois
10 University, and a Master's degree in Computer Science from the University of
11 Missouri - Columbia.

12

13 **Q. Are you a member of any professional actuarial organizations?**

14

15 A. Yes. I am a Fellow of the Casualty Actuarial Society (FCAS) and a Member of
16 the American Academy of Actuaries (MAAA). I am a Certified Catastrophe Risk
17 Management Professional (CCRMP), a new designation created by the CAS
18 Institute (iCAS) and International Society of Catastrophe Managers (ISCM). I am
19 currently serving on the Casualty Actuarial Society's Climate Change Committee,
20 the American Academy of Actuaries' Extreme Event Risk Committee, and on the
21 advisory board for CCRMP designation. I am in good standing with the
22 requirements of these organizations.

23

1 I am part of a working group that authored the following monographs for the
2 American Academy of Actuaries:

- 3 • The National Flood Insurance Program: Challenges and Solutions (2017)
- 4 • Uses of Catastrophe Model Output (2018)
- 5 • Wildfire: An Issue Paper - Lessons Learned from the 2017–2018
6 California Events (2019)

7 I am one of the recipients of the Casualty Actuarial Society's Above and Beyond
8 Achievement Award in 2019 to recognize my leadership and contributions to
9 establish the CCRMP designation for the insurance industry.

10

11 **Q. Please describe your relevant experience and qualifications for this**
12 **proceeding.**

13

14 A. I started practicing in the catastrophe risk management field in 2005. During
15 my tenure at State Farm, I managed State Farm's catastrophe modeling function
16 from 2005 to 2018. I managed vendor relationships with AIR, EQECAT, ARA,
17 and RMS. I provided filing support and helped my employer through many
18 regulatory challenges related to the use of models in insurance operations. I
19 provided actuarial opinions on State Farm's use of catastrophe models. I
20 established the due diligence and model validation framework to ensure
21 catastrophe modeling practices at State Farm met the actuarial standards and
22 complied with laws and regulatory requirements. My team provided various
23 catastrophe risk measures and analytics for State Farm Fire and affiliates for

1 ratemaking, exposure management, claims, ERM, rating agency reporting,
2 reinsurance and securitization purposes.

3

4 From 2010 to 2013, I was a member of an advisory group to the Insurance
5 Bureau of Canada (IBC) and the Office of the Superintendent of Financial
6 Institutions (OSFI) to provide expert opinions on insurance and the economic
7 impact of major earthquakes in Canada. From 2011 to 2013, I was a member of
8 an advisory group for IBC and OSFI to revise OSFI Guideline B-9 (Earthquake
9 Exposure Management Sound Practice Guideline for insurance companies). I
10 led a State Farm team to establish the compliance framework to meet OSFI B-9
11 regulation requirements.

12

13 In January 2015, I was appointed by Florida CFO Jeff Atwater to serve on the
14 Florida Commission on Hurricane Loss Projection Methodology (FCHLPM) as
15 the industry actuary. From January 2015 to September 2018, I represented the
16 property insurance industry on the FCHLPM to review and accept hurricane
17 models for use in ratemaking in the State of Florida. My term on the FCHLPM
18 ended in September 2018 due to my job change.

19

20 **Q. Are the hurricane models used in these filings certified by the FCHLPM?**

21

22 A. Yes. The hurricane models used for these rate filings, AIR Touchstone V9
23 (a.k.a Touchstone 2021) and RMS RiskLink V21, are both certified by FCHLPM.
24 FCHLPM has scrutinized hurricane models over many years and authorized their

1 use in Florida rate filings. FCHLPM retains experts in relevant fields who review
2 the meteorological, wind engineering, damageability, claims, statistical, computer
3 programming, economic and other aspects of modeling in great detail. Over the
4 years, FCHLPM has recognized advancements in various scientific disciplines
5 related to hurricane modeling and has required modelers to incorporate such
6 advancements. FCHLPM approves only those models that meet its rigorous
7 standards.

8

9 **Q. Please describe how ASOP 38 is applicable in these rate filings?**

10

11 A. The Actuarial Standard of Practice Number 38 (ASOP 38), included as Exhibit
12 RB-11, has been in effect since December 2000. ASOP 38 was created, to
13 some extent, to address the use of stochastic computer hurricane simulation
14 models in the insurance ratemaking process. ASOP 38 established certain
15 requirements for actuaries who use output from a model that is outside of that
16 actuary's area of expertise. Hurricane models are developed by a group of
17 experts including meteorologists, structural engineers, actuaries, statisticians,
18 and computer scientists. Some model components are outside of the area of
19 expertise of actuaries. Due to the models' complexity and reliance on different
20 science disciplines, many actuaries are not as knowledgeable about these
21 models as they are about traditional ratemaking methodologies.

22

1 Hurricane models are utilized to establish the hurricane loss costs and
2 reinsurance cost allocations for these NCRB filings. Therefore, compliance with
3 ASOP 38 is relevant to these filings.

4

5 **Q. Is Aon's use of catastrophe models in compliance with ASOP 38?**

6

7 A. Yes. Aon's catastrophe modeling practice in general and as it relates to these
8 NCRB filings is in compliance with ASOP 38. ASOP 38 provides guidance to the
9 actuary in using models that incorporate specialized knowledge outside the
10 actuary's own area of expertise when developing an actuarial work product.

11 When using such a model, the standard requires that the actuary perform five
12 specific tasks:

13

- 14 a. Determine appropriate reliance on experts;
- 15 b. Have a basic understanding of the model;
- 16 c. Evaluate whether the model is appropriate for the intended application;
- 17 d. Determine that appropriate validation has occurred; and
- 18 e. Determine the appropriate use of the model.

19

20 In addition to relying on vendors' experts, Aon has an in-house model evaluation
21 team. This team consists of members with advanced degrees in meteorology,
22 structural engineering, and statistics. Soon after models are released, the model
23 evaluation team performs sensitivity testing to identify key drivers of model
24 changes and potential anomalies. I work closely with the model evaluation team

1 at Aon to ensure the sensitivity testing covers all aspects of ASOP 38
2 requirements. I review the testing results through an analytics dashboard. I
3 document my reviews for each peril model. Upon completion of the review, I sign
4 an ASOP 38 attestation. Copies of the current ASOP 38 attestations for the AIR
5 and RMS models are included in these filings as Exhibits RB-12 and RB-13,
6 respectively.

7

8 **Q. Describe the role of Aon Reinsurance Solutions Analytics and**
9 **Catastrophe Risk Analytics.**

10

11 A. Aon Reinsurance Solutions Analytics (a.k.a Reinsurance Analytics) provides
12 consultative services to Aon's clients who place catastrophe reinsurance through
13 Aon. These clients are primary insurers selling property insurance products in
14 catastrophe prone areas. Aon Reinsurance Analytics provides a value-added
15 service that is above and beyond reinsurance brokering transactions. Our client
16 services include but are not limited to: support for multi-model analytics,
17 customized view of risks, catastrophe pricing, catastrophe risk selections, data
18 augmentation, model evaluation, real-time event response, portfolio optimization,
19 reinsurance cost allocations, actuarial support, and rating agency questionnaire
20 support.

21

22 Within the Reinsurance Analytics division, there is a team specialized in
23 catastrophe risk analytics. I am part of the Catastrophe Risk Analytics team that

1 provides clients with catastrophe risk management information and assists them
2 with their reinsurance purchasing decisions.

3

4 **Q. Describe your experience with catastrophe models.**

5

6 A. From 2005 to 2006, I performed the catastrophe modeling analyst's role at
7 State Farm, which includes hands-on experience with multiple models - from
8 data preparation to running the models to post model aggregation. My daily work
9 involved data preparation and converting exposure data into model input files. I
10 gained knowledge about how different models handle building characteristics and
11 insurance terms. I used RMS RiskLink, AIR Clasic/2, and EQECAT models on a
12 daily basis. I developed an understanding of the models' back-end database and
13 output. I performed post model analysis and wrote computer programs to
14 develop risk metrics such as probable maximum loss (PMLs), average annual
15 losses (AALs), and total value at risk (TVaR) to help State Farm assess and
16 manage catastrophe risks. Later in my career, I supervised many modeling tasks
17 that were delegated to my colleagues. I continued to provide guidance and
18 managed the day-to-day work of the catastrophe modeling unit.

19

20 **Q. Describe your experience with catastrophe reinsurance.**

21

22 A. My experience with reinsurance started in 2005 at State Farm. State Farm is
23 a reinsurance buyer, and I was a part of the company's reinsurance buying team.
24 I supported the reinsurance function at multiple levels. My work included using

1 catastrophe model output and financial information to help my employer in
2 structuring reinsurance, conducting technical pricing, drafting and reviewing
3 reinsurance contracts, and participating in reinsurance buying trips. I evaluated
4 catastrophe risks and cost of capital from both ceding and assuming parties. I
5 worked closely with our reinsurance broker to validate our view of risks using
6 external benchmarks. At Aon, I work directly with our clients who are seeking to
7 purchase catastrophe reinsurance. Output from models is used by our brokers,
8 clients, and capital markets to determine the reinsurance structure and pricing.
9 We customize reinsurance solutions based on clients' risk appetite and risk
10 profile.

11

12 **Q. Do you speak on topics pertaining to catastrophe modeling?**

13

14 A. Yes. I have presented at CAS Ratemaking, Product and Modeling
15 Conferences. I am a frequent speaker at Reinsurance Association of America's
16 annual catastrophe modeling conference. My topics have included model
17 blending, model regulation, and wildfire modeling, among others. From 2012 to
18 2018, I was a visiting instructor for the Illinois State University Math Department
19 Actuarial Science program. I presented catastrophe modeling and regulatory
20 topics to actuarial students. From 2016 to 2018, I was a member of the planning
21 committee for the Reinsurance Association of America's annual catastrophe
22 modeling conference. I organized and moderated panels and engaged speakers
23 to cover a variety of catastrophe topics.

24

1 **Q. What was Aon's role in these filings with respect to expected hurricane**
2 **losses?**

3

4 A. Aon performed data validation and shared control totals with NCRB. Aon's
5 catastrophe modelers ran the AIR Touchstone V9 and RMS RiskLink V21
6 models based on exposure data provided by NCRB. Aon blended the model
7 results for NCRB based on well-established methodology and provided the
8 modeled average annual loss to NCRB. Aon conducted industry research,
9 recommended, and applied catastrophe loss adjustment factors for NCRB.

10

11 Let me add that the storm surge components of the models were included for
12 these filings. This is appropriate because the Mobile Homeowners MH(C) and
13 MH(F) programs provide insurance coverage for the flood peril.

14

15 **Q. Are catastrophe simulation models commonly used by insurers for**
16 **ratemaking in catastrophe-exposed lines and jurisdictions?**

17

18 A. Yes. Hurricane losses are so extreme and volatile that, for many years now,
19 the accepted actuarial procedure for estimating catastrophe risk in rate filings
20 and in the reinsurance market has been through the use of catastrophe models
21 rather than actual hurricane losses. Such volatility is greatly compounded in
22 hurricane prone states such as North Carolina. In North Carolina and other
23 hurricane prone states, a significant percentage of the prospective long-term
24 average annual losses in certain territories of the state are caused by intense
25 hurricanes, which are relatively infrequent but are devastating when they do

1 occur. It would be actuarially unsound to rely on a few years of actual hurricane
2 losses to estimate prospective hurricane losses because of the volatility of these
3 losses driven by low frequency and high severity. We have provided data and
4 analysis from catastrophe simulation models for Aon clients to use in their rate
5 filings in multiple states.

6

7 **Q. Did the NCRB ask Aon to run the AIR and RMS models?**

8

9 A. Yes. Aon ran AIR Touchstone and RMS RiskLink for the NCRB at the
10 NCRB's request. AIR and RMS are the most commonly used catastrophe
11 models in the insurance and reinsurance industries. Aon runs these two models
12 on all of Aon clients' exposure data pertinent to reinsurance transactions. The
13 majority of Aon's clients use one or both of these two models when evaluating
14 their catastrophe risk.

15

16 **Q. Why did the NCRB ask Aon to run two models?**

17

18 A. My understanding is that the NCRB has been using two models since 2016
19 and also that running two models complies with N.C.G.S. 58-36-10(3), which
20 became effective in 2017 and requires the NCRB to present data from more than
21 one model if it presents modeled hurricane losses based upon a commercial
22 hurricane simulation model. The NCRB weights the results of each model
23 equally.

24

1 **Q. How are losses from the two models blended?**

2

3 A. Model results are blended by taking a straight average toward the end of the
4 process. This means that we run the individual models and determine the
5 appropriate loss costs and reinsurance cost allocation independently for each
6 model. Then the outcome from the two models is averaged.

7

8 **Q. Is it common that modeled losses will differ between the various model**
9 **vendors?**

10

11 A. Yes. Catastrophe models are complex. When modeling vendors develop a
12 hurricane model, they start with similar underlying information, such as the
13 National Hurricane Center's historical hurricane dataset, land use/land cover
14 database, similar wind engineering principles and statistical theories. However,
15 there are differences between modeling vendors in their approaches to
16 interpreting and supplementing the data to build a robust model. Different
17 assumptions and judgments are made by model developers. Vendors may also
18 use claims data from different data sources to calibrate their model. These
19 varying assumptions, judgments, and methodologies will result in different model
20 results. Model results deviate more at the location level than at the state level.
21 When models generate different results, it does not necessarily mean any model
22 is wrong. The spread among different views of the same risk reflects the
23 inherent uncertainties of catastrophe modeling.

24

1 Given the number of variables involved in the development of a catastrophe
2 model and the degree of uncertainty associated with each variable, we would not
3 expect that two independently developed models would result in the same output
4 or conclusions on a given set of data.

5

6 **Q. Does hurricane modeling produce artificially high rate levels?**

7

8 A. No. Models help stabilize rate levels. Without modeling, rate levels would
9 fluctuate wildly following the occurrence or non-occurrence of significant
10 hurricanes. Modeling is relied upon by all stakeholders in insurance,
11 reinsurance, catastrophe bond, and other financial transactions to give the best
12 and most unbiased projection of future hurricane losses. Different parties to
13 those transactions often have opposing economic interests, but, nevertheless,
14 uniformly rely on models in their negotiations with each other.

15

16 **Q. How do the models change over time?**

17

18 A. Catastrophe models are built based on state-of-the art science and
19 technology. As science continues to evolve and computing powers continue to
20 advance, modeling technology is updated and improved. In addition, research
21 into historical and recent events, updates to building practices and building
22 codes, and data from engineering experiments also provides insight to enable
23 model developers to enhance their models. Each modeling vendor takes a
24 different approach on how frequently it updates its models and which perils and

1 regions will be updated. As noted above, because different assumptions and
2 judgments are made when information is applied, the impact of an update could
3 vary greatly between models. Changes due to model updates are to be
4 expected.

5

6 **Q. Is using multiple models to determine catastrophe risk actuarially**
7 **sound?**

8

9 A. Yes. Using multiple models allows users to incorporate different views of risk
10 into their exposure management. Using multiple models can effectively mitigate
11 modeling volatility and smooth out significant model changes. Using multiple
12 models is a practice endorsed by major rating agencies such as AM Best and
13 S&P.

14

15 **Q. How does the NCRB exposure data impact model output?**

16

17 A. The following data factors impact model output:

- 18 • Changes in coverage and/or policy conditions such as deductible and
19 limits, and the underlying policies-in-force
- 20 • Changes in an insurer's portfolio composition, such as geographic
21 concentration
- 22 • Changes in building characteristics, such as loss mitigation features and
23 age of roof

- 1 • Changes in data quality, such as replacing unknown building
2 characteristics with known building characteristics

3

4 **Q. Please describe the client data that was used as input for the model**
5 **runs?**

6

7 A. The underlying exposure data was provided to Aon by the NCRB. To the best
8 of my knowledge, the data was compiled on behalf of the NCRB by Milliman, Inc.
9 NCRB's exposure data sent to Aon consisted of the aggregate exposure
10 information for all residential Mobile Home risks in North Carolina at program, zip
11 code, county and territory level. Data with invalid zip codes or county
12 designations was disaggregated and reassigned to valid zip codes/counties
13 within the given territory using mobile home unit count by CBG (census block
14 group) from the 2020 American Community Survey maintained by the United
15 States Census Bureau. Territory was populated, except for data that was part of
16 zip codes split across two territories, and the exposure in the split zip code was
17 proportionally assigned to territories based on mobile home unit count by CBG.
18 The number of risks was derived from accrued earned exposures with partial
19 numbers. Any partial numbers of risk count that were greater than zero were
20 rounded to at least 1 because the models require the number of risks to be input
21 as an integer. Rounding up resulted in slight increasing of the risk count. NCRB
22 (through Milliman) provided exposure trend factors to Aon, which Aon applied to
23 the aggregated data provided to Aon by NCRB. NCRB instructed Aon to run the
24 models using the aggregate data at zip code and territory level for the entire

1 North Carolina portfolio in a single model run. Model results were aggregated at
2 the territory level.

3

4 **Q. Please describe what Aon Reinsurance Solutions then did with the data**
5 **provided by the NCRB.**

6

7 A. We reviewed the data for completeness and reasonableness before we input it
8 into the AIR and RMS models. Since the two models have different formats for
9 inputting data, we worked with the NCRB to ensure that the exposure data was
10 properly and consistently mapped in the required format for each model. NCRB
11 provided earned insurance years (EIY), which is the sum of primary coverage
12 amount expressed in thousands, and earned house years (EHY), which is the
13 number of risks. Limit by coverage is calculated from EIY and EHY as instructed
14 by the NCRB. A comparison of this year's data with the data in the last Mobile
15 Homeowners filings was conducted. Any anomalies were investigated.

16

17 The next step was to input the data and run the models. We ran the AIR
18 Standard model using the 100K event catalogue and the RMS Historical model
19 (both are long term views of the hurricane risk) to determine the modeled
20 hurricane loss costs. We also ran the AIR Warm Sea Surface Temperature
21 (WSST) model using the 10K event catalogue and the RMS Medium Term Rate
22 model (both are near term views of hurricane risk) to analyze the cost of
23 reinsurance. It is a standard practice throughout the reinsurance industry to rely

1 upon the models we used to determine modeled hurricane loss costs and
2 reinsurance placements, and this has been true since the 1990s.

3

4 After the models were run, we reviewed each model's output separately to
5 ensure data integrity. We then blended the results of the two models by taking a
6 straight average of the results. Additional reviews were conducted of the
7 blended results to ensure that the blending procedures were correctly performed
8 and that the blended results were reasonable. The blended modeled hurricane
9 loss results were provided to the NCRB for use in its Mobile Homeowners rate
10 review. The NCRB Mobile Homeowners rate review includes separate filings for
11 MH(C) and MH(F), and the model results were utilized for both filings. At the
12 NCRB's request, we also provided the results to Milliman for its use in its work as
13 part of the NCRB's Mobile Homeowners MH(C) and MH(F) rate reviews. Exhibit
14 RB-10 sets forth the blended modeled hurricane losses resulting from the work I
15 have described. Based on my knowledge and experience, and the input data
16 provided by the NCRB, these modeled hurricane losses are reasonable and
17 appropriate projections of expected hurricane losses for use by the NCRB in its
18 Mobile Homeowners rate reviews and rate filings for MH(C) and MH(F).

19

20 Also, we employed the modeled hurricane losses as part of our work in
21 determining and allocating the cost of reinsurance for these rate reviews and rate
22 filings.

23

1 **Q. What are the differences and similarities between using the AIR**
2 **Touchstone's 10K event set and the 100K event set?**

3

4 A. AIR Touchstone's 10K hurricane event set is a subset of the 100K event set.

5 These two event sets are designed to have the same theoretical frequency and

6 intensity distributions in coastal segments, and to produce similar results with

7 minimal variabilities. Using the 10K event set provides benefits in performance

8 and storage. AIR Touchstone's 10K event set is standard for use in a majority of

9 catastrophe modeling exercises – including reinsurance renewal data distribution

10 for quoting and placement purposes. The 100K event set is used to determine

11 hurricane loss costs for ratemaking purposes.

12

13 **Q. Did Aon make adjustments to the modeled results?**

14

15 A. Yes. A 6% catastrophe loss adjustment expense (LAE) factor was applied to

16 modeled losses. This factor was recommended by Aon based on a broad

17 industry study at the state level. The results of that study are shown in Exhibit

18 RB-16. The application of the LAE factor was reviewed and approved by the

19 NCRB, and the 6% catastrophe LAE factor was selected by the NCRB.

20

21 **Q. What is demand surge?**

22

23 A. Demand surge is a social economic phenomenon defined by ASOP 39,

24 Treatment of Catastrophe Losses in Property/Casualty Insurance Ratemaking,

25 as "a sudden and usually temporary increase in the cost of materials, services

1 and labor due to the increased demand for them following a catastrophe.”
2 Demand surge usually occurs after large-scale disasters such as earthquakes,
3 tsunamis, cyclones or flooding. The models incorporate demand surge into their
4 loss estimates.

5

6 **Q. Should model output in the NCRB filings for MH(C) and MH(F) include**
7 **demand surge?**

8

9 A. Yes. All applications of catastrophe model output should reflect demand
10 surge. Demand surge is a real social economic phenomenon. There is no
11 reason to underestimate the impact of large events by ignoring the increase in
12 demand for labor and materials as a result of those events. In our experience,
13 the vast majority of insurance companies run the models with demand surge. In
14 fact, the only times we have ever run a model without demand surge at Aon are
15 to measure the impact of demand surge for testing purposes and where
16 specifically requested. Insurance companies' claims experience includes the
17 effect of demand surge. Excluding demand surge would underestimate
18 catastrophe losses.

19

20 **Q. Does the model output for the NCRB MH(C) and MH(F) filings include**
21 **demand surge?**

22

23 A. Yes. As is the customary and accepted practice in the insurance, reinsurance,
24 and catastrophe bond industries, the models were run with aggregate demand

1 surge (AIR) and loss amplification (RMS) included. The FCHLPM has approved
2 the use of aggregate demand surge and loss amplification for the AIR and RMS
3 models, respectively. These aspects of the models account for the expected
4 additional cost for supplies and labor if a very large hurricane event or series of
5 events occurs. Experience demonstrates that when such catastrophic events
6 have occurred, there is significant increase in demand for the limited supply of
7 plywood, shingles, labor, hotel rooms and other necessities. The high demand
8 for specialized labor often requires contractors to come in from out of state.
9 Fundamental economic principles dictate that such a spike in demand increases
10 prices, and, consequently, results in increased claims payments in the
11 aggregate. Additionally, there are delays in repairing properties, which can
12 directly lead to longer stays in hotels, and there are other increased costs beyond
13 those that occur after smaller hurricanes. Loss amplification also factors in
14 claims inflation. Claims adjusters may not investigate every claim if it is under a
15 certain threshold, given the volume of claims they have to settle post-event in a
16 limited amount of time.

17

18 **Q. Does any state prohibit the inclusion of demand surge in modeled**
19 **losses for rate filings?**

20

21 A. I am not aware of any prohibitions against the use of demand surge in rate
22 filings in any jurisdiction. The South Carolina Department of Insurance Bulletin
23 2014-03 states "Demand surge may be included in the modeled results as long

1 as the company provides the impact it has on the modeled losses.” The
2 FCHLPM’s actuarial standards require hurricane models to incorporate demand
3 surge based on relevant data and actuarially sound methods and assumptions.
4

5 **Q. North Carolina has laws prohibiting “price gouging” following a**
6 **hurricane. Does that eliminate demand surge?**

7

8 A. No. Florida has a similar law (Fla. Stat. Ann. § 501.160). Demand surge
9 occurs due to supply and demand economics in situations that would not be
10 considered price gouging and/or that would not be prevented by statutes
11 prohibiting price gouging.

12

13 **Q. Does it make sense for North Carolina hurricane losses to include**
14 **demand surge for very large events impacting other states even if those**
15 **events were less significant in North Carolina?**

16

17 A. Yes. The intent of the model is to reflect economic conditions that will
18 influence construction prices and other aspects of insured losses (for example,
19 the increased period of time a carrier has to pay for hotel rooms for insureds
20 while their damaged homes are repaired) in the time period shortly after a
21 catastrophe event occurs. Since labor and materials resources are exchanged
22 by people across state lines, it is logical that the effect of demand surge on prices
23 in other states will impact North Carolina.

24

1 **Q. Is the net cost of reinsurance considered in the Filings?**

2

3 A. Yes. Large catastrophe losses present a very real risk to the long-term viability
4 of Mobile Homeowners insurers and their ability to follow through on their
5 promise to policyholders to pay losses when they occur. There are numerous
6 scenarios where the potential losses due to a single hurricane are far greater
7 than the entire premium collected by all the companies for the entire state of
8 North Carolina. To remain viable long-term and protect against insolvency, and
9 thereby to keep their commitment to policyholders, the industry must purchase
10 reinsurance to help cover this risk. The costs associated with such reinsurance
11 are costs of doing business in the state. To reflect the portion of those costs that
12 is not already covered in the MH(C) and MH(F) filings, a provision for the net cost
13 or reinsurance is included in both filings.

14

15 **Q. What is reinsurance?**

16

17 A. Simply, reinsurance is insurance for insurers. When insurers are aware of
18 scenarios in which the potential losses are greater than the company is willing to
19 tolerate or able to absorb, they will frequently purchase reinsurance to mitigate
20 the risk in those situations. Additionally, insurers may issue catastrophe bonds to
21 protect themselves in those situations. Essentially the insurers will use a portion
22 of the premium to purchase reinsurance. This is common across the industry.

23

1 **Q. What was your role in these filings with respect to Net Cost of**
2 **Reinsurance?**

3

4 A. I worked with my colleagues within the Aon Catastrophe Actuarial team to
5 determine a suitable provision for the net cost of reinsurance for the state overall
6 and an allocation of that cost by territory. The net cost of reinsurance provision
7 used exposure data from all the Mobile Home risks in the state, so that a cost
8 provision would be appropriate to use in a uniform rate schedule applicable to all
9 insurers in the state.

10

11 **Q. What is catastrophe reinsurance, who buys it, and why do they buy it?**

12

13 A. Catastrophe reinsurance is a contract purchased by a primary insurance
14 company and sold by a reinsurer, or a group of reinsurers, to transfer risk from
15 loss due to large catastrophic events. The most common type of contract used
16 for catastrophe risk is called "Portfolio Excess of Loss" ("Portfolio XOL"), or just
17 "XOL." A single XOL contract has an "attachment" and a "limit." An XOL covers
18 the amount of portfolio loss caused by a single event in the amount which
19 exceeds the XOL attachment with a maximum equal to the XOL limit. In some
20 instances, there is co-participation, which means that only a percentage of the
21 amount of loss in the XOL layer is covered. Portfolio XOL contracts, which are
22 often referred to as "treaties" since there are typically multiple reinsurers
23 involved, cover the first event within a year of coverage. It is standard for treaties
24 to include a provision for the primary carrier to automatically purchase a

1 “reinstatement” if it has a loss which triggers a reinsurance payment. The
2 reinstatement premium allows for the full limit to be reinstated after the first event
3 exhausts the limit provided. There are cases where a limit is provided, and if an
4 event exhausts that limit, then there is no coverage available for the remainder of
5 the contract period. It is typical for primary carriers to buy multiple treaties that
6 stack on top of each other. In other words, a treaty will have an attachment
7 equal to the attachment plus limit of another treaty. Primary carriers select
8 reinsurance programs that best fit their particular needs and buy reinsurance to
9 ensure that money is available to pay claims and remain financially viable after
10 very large and uncommon to rare events.

11

12 **Q. Are the reasons that member companies purchase reinsurance similar**
13 **to the reasons that the hypothetical one company must purchase**
14 **reinsurance?**

15

16 A. Yes. The hypothetical one company for which the NCRB makes rates in North
17 Carolina must purchase reinsurance for the same reasons that individual carriers
18 purchase reinsurance. That hypothetical one company is faced with numerous
19 realistic hurricane loss scenarios that far exceed its ability to pay.

20

21 The annual earned premium at current manual level for the two filings combined
22 is about \$132 million for the hypothetical one company. There are many
23 scenarios in which hurricane losses are projected to be many multiples of that
24 amount. If an individual company experienced a loss many multiples of its

1 collected premium, it would first look to its surplus and reinsurance to meet its
2 obligations to policyholders. If the surplus and reinsurance were not sufficient,
3 then that company would become insolvent. There has been a history of
4 company insolvencies following major hurricanes in the United States. Following
5 Hurricane Hugo that hit Charleston, South Carolina and Hurricane Andrew that
6 hit Florida, there were multiple insolvencies. It is too soon to know at this point,
7 but there certainly could be company insolvencies as a result of the tremendous
8 catastrophe losses caused by Hurricane Ian in Florida in late September.

9

10 It would be irresponsible and imprudent for the hypothetical one company not to
11 purchase reinsurance. The net cost of reinsurance analysis prepared by Aon
12 reflects the need for that hypothetical one company to purchase and maintain
13 reinsurance.

14

15 **Q. Please describe how the reinsurance program was designed and priced**
16 **for purposes of NCRB rate filings? Do you think it is reasonable?**

17

18 A. Aon advises the Bureau as to the parameters of the reinsurance program that
19 the hypothetical one company for which rates are being made in these filings
20 would reasonably select. The parameters reflect the amount of reinsurance that
21 the hypothetical one company should purchase to protect its solvency. The Aon
22 Catastrophe Actuarial team, under my management, designed the reinsurance
23 program for these rate filings and advised the Bureau as to the parameters of the
24 reinsurance program that the hypothetical one company would reasonably select.

1 The basis of the reinsurance program structure and pricing is determined by an
2 analysis of reinsurance programs placed by Aon for its reinsurance clients. I
3 believe the design and price of the reinsurance program designed for the NCRB
4 is reasonable. Three components of the analysis are described below:

5

6 **Program attachment and total limit** describes the total amount of reinsurance
7 coverage. Since companies vary substantially in size, so does their limit
8 purchase and attachment for their bottom layers. To normalize for company size,
9 we looked at the frequency with which a single event would trigger a recovery
10 and the frequency with which a single event would exhaust the limit of the entire
11 reinsurance program for each company. This was calculated separately for the
12 AIR and the RMS models. We then calculated the median attachment and
13 exhaustion (exhaustion = bottom layer attachment + total program limit)
14 frequencies by model and by region (Southeast and nationwide). The
15 frequencies for attachment and exhaustion were averaged across the regions,
16 which resulted in an attachment and exhaustion frequency by model. We used
17 the portfolio loss distributions by model to calculate the dollar amount of
18 attachment and exhaustion (and therefore limit) by model. The attachment of the
19 reinsurance program in these filings is the average of the AIR indicated
20 attachment and the RMS indicated attachment. The exhaustion of the
21 reinsurance program in these filings is the average of the AIR indicated
22 exhaustion and the RMS indicated exhaustion.

23

1 **Reinsurance Market Pricing Model.** For AIR and RMS, a log-linear regression
2 model was built to calculate the fitted reinsurance price based on modeled
3 expected ceded loss. Using these regression models, an indicated price for any
4 layer can be calculated based on each catastrophe model (AIR and RMS). The
5 selected prices by layer used in these rate filings are the averages of the AIR
6 indicated prices and the RMS indicated prices.

7

8 Note: Because insight into reinsurance market pricing is an important proprietary
9 asset for Aon, the log-linear models are considered a trade secret and, therefore,
10 are not disclosed in these public filings.

11

12 **Program Structure.** After the market pricing model and the program's
13 attachment and limit are determined, the program is then broken into layers. We
14 run an optimization analysis to find the five-layer cat program that has the lowest
15 possible deposit premium. This method is designed to calculate an indicated
16 reinsurance premium that is as low as possible, subject to the market pricing
17 model and program attachment and limit specifications.

18

19 The reinsurance structure determined by the method described above is shown
20 in Exhibit RB-14. The pricing with loss analysis is shown in Exhibit RB-15.

21

22 **Q. Have you done anything different for these filings on reinsurance**
23 **analysis?**

24

1 A. The global reinsurance market has experienced some extraordinary volatilities
2 since 2019. Aon noticed the price of reinsurance has increased significantly in
3 the Southeast region for the past three years. The main driver of the increase is
4 Florida, which has distinct insurance challenges due to things like its one-way
5 attorney fee statute, its high rate of litigated property loss claims, and its wide
6 abuse of the assignment of benefits provision in the insurance policy. For
7 example, from 2019 to 2020, many FL-only insurers' reinsurance Rate on Line
8 increased about 25% for the 6/1/2020 placements. The other non- FL southeast
9 insurers experienced only low to mid-range single digit increases. A similar
10 trend continued in year 2021. We believe it is prudent to apply a smoothing
11 methodology to stabilize North Carolina's reinsurance analysis, so it is not unduly
12 influenced by Florida. The two smoothing techniques we used are:

13

14 **The Program Layers (structure)** used for the 2021 NCRB Mobile Homeowners
15 filings was carried forward to 2022. This decision was made after we evaluated
16 some non-FL insurers' year-over-year reinsurance structures and annual
17 statements.

18

19 **The Rate on Line (ROL) for the 2022 rate filings** was determined by credibility
20 weighting the 2022 and 2021 market pricing parameters. Equal credibility was
21 applied to the ROL used in the 2021 Mobile Homeowners filings and the ROL
22 developed in 2022 based on Reinsurance Market Pricing Model.

23

1 **Q. How was the reinsurance premium allocated?**

2

3 A. Reinsurance premium by layer is allocated to a territory based on that
4 territory's share of expected ceded loss and loss adjustment expense (LAE) by
5 layer. Exhibit RB-15 shows the total expected ceded loss and LAE by layer.
6 Exhibit RB-17 shows the proportion of hurricane peril reinsurance premium,
7 ceded average annual loss, and reinsurance margin ("net cost of reinsurance")
8 allocated to each territory segment for each layer. Other perils were used in the
9 calculation, but because they contributed such a small amount of expected
10 ceded loss, they were not shown on the exhibits. Exhibit RB-18 shows the dollar
11 amount of reinsurance margin allocated by territory.

12

13 **Q. How was the net cost of reinsurance calculated?**

14

15 A. Net cost of reinsurance is Deposit Premium plus Expected Reinstatement
16 Premium less Expected Ceded Loss & Loss Adjustment Expense (LAE). The
17 reinsurance program, the loss distribution from the portfolio as determined by
18 event loss tables (ELTs) from cat models, and the LAE assumptions are input
19 into a DFA (Dynamic Financial Analysis) program to calculate the average ceded
20 loss and LAE and average reinstatement premium over a specified number of
21 simulated years. The loss distribution produced by the AIR model is already in
22 the form of simulated loss experience for 100,000 years. The DFA program
23 calculates for each year the total reinsurance recoveries and reinstatement
24 premium paid. The DFA program then calculates the average annual ceded loss

1 & LAE and the average reinstatement premium. The loss distribution from the
2 RMS model is a list of possible catastrophic events. Unlike the AIR model, which
3 provides the specific year and amount of loss from each event, each event in the
4 RMS model has a parametric distribution for frequency and severity. The DFA
5 program creates a simulation of 1,000,000 years of loss experience to make a
6 table containing year, event id, and specific amount of loss. From that point, the
7 calculation works the same as for the AIR model.

8

9 For the NCRB filings combined, our analysis shows that expected reinsurance
10 premium is \$52,671,773, expected ceded loss & LAE is \$14,353,446, and the net
11 cost of reinsurance is \$38,318,327, as shown on Exhibits RB-15 and RB-18.

12 Allocation by territory is done using the method described in response to the
13 previous question. The net cost of reinsurance amounts for the separate filings
14 are as follows: \$18,237,701 for MH(C) and \$20,080,626 for MH(F).

15

16 **Q. Given your experience in catastrophe reinsurance, do you find this**
17 **approach to be reasonable?**

18

19 A. Yes. Aon's approach is based on detailed information on current reinsurance
20 market rates and the underlying model output. The smoothing techniques we
21 used this year helped stabilize the results.

22

23 **Q. Do you know whether the Rate Bureau has used in its 2022 Mobile**
24 **Homeowners filings the Aon net cost of reinsurance results you provided?**

25

1 A. Yes. I am advised that the Rate Bureau has used in the filings both our
2 statewide net cost of reinsurance results and those results allocated to the
3 territory level.

4

5 **Q. Are you aware of the following North Carolina statute N.C.G.S. 58-36-**
6 **10(7):**

7 *Property insurance rates established under this Article may include a provision to*
8 *reflect the cost of reinsurance to protect against catastrophic exposure within this*
9 *State. Amounts to be paid to reinsurers, ceding commissions paid or to be paid*
10 *to insurers by reinsurers, expected reinsurance recoveries, North Carolina*
11 *exposure to catastrophic events relative to other states' exposure, and any other*
12 *relevant information may be considered when determining the provision to reflect*
13 *the cost of reinsurance.*

14

15 A. Yes, I am. The above North Carolina statute is consistent with ASOP 53,
16 Estimating Future Costs of Prospective Property/Casualty Risk Transfer and Risk
17 Retention, which “applies to actuaries when performing actuarial services with
18 respect to developing or reviewing future cost estimates (commonly known as
19 actuarial indications) for prospective property/casualty risk transfer and risk
20 retention. For example, this standard applies when actuaries are developing
21 future cost estimates underlying product prices, estimating funding requirements
22 for self-insured programs and captives, and developing reinsurance prices.”

23

1 **Q. Do you have an opinion whether the net cost of reinsurance analysis**
2 **you performed on behalf of the Rate Bureau for these filings has**
3 **considered the provisions of that statute?**

4

5 A. Yes. Based on my experience with hurricane models, catastrophe
6 reinsurance, and determining catastrophe reinsurance costs for rate filings, it is
7 my opinion that the net cost of reinsurance analysis for these mobile
8 homeowners filings properly considers all of the items set forth by the statute.
9 Further, based on my experience in the marketplace, it is my opinion that a
10 reasonable and appropriate provision for the net cost of reinsurance must be
11 incorporated into North Carolina Mobile Homeowners insurance rates to properly
12 reflect and protect against the catastrophe exposure in this state.

13

14 **Q. Do you have an opinion regarding the appropriateness of the net cost of**
15 **reinsurance provision incorporated into these Mobile Home filings?**

16

17 A. Yes. Based on my experience with hurricane models, catastrophe
18 reinsurance, and determining catastrophe reinsurance costs for rate filings, it is
19 my opinion that the provision for the net cost of reinsurance in these filings, at the
20 statewide and territory levels, is reasonable and appropriate.

21

22 **Q. Does that conclude your testimony?**

23

24 A. Yes.

Minchong Mao, FCAS, CCRMP, MAAA, Actuary

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Summary

- Over twenty years of experience with insurance, reinsurance, catastrophe risk management, actuarial pricing and management at State Farm Insurance Companies and Aon plc
- Commission Member, actuary representing the property insurance industry on the Florida Commission on Hurricane Loss Projection Methodology (FCHLPM) 2015-2018
- Strong leadership, work ethic, communication and teamwork skills
- Deep knowledge and experience in Insurance operations, including Actuary, Underwriting, and Claims.
- Extensive experience and understanding with catastrophe models, underlying science and methodologies

Experience

Senior Managing Director, Actuary

Aon Reinsurance Solutions

April 2021– Present

Managing Director, Actuary

Aon Reinsurance Solutions

September 2018– April 2021

Major Responsibilities include:

- Manage the catastrophe actuarial and predictive analytics group within Aon Reinsurance Solutions which focuses on supporting Aon clients' ratemaking and underwriting needs.
- Implement and sign off Aon's ASOP 38 compliance framework.
- Provide rate filing support for Aon's clients through regulatory challenges.
- Serve on Impact Forecasting leadership steering committee to oversee Impact Forecasting's product strategies and priorities.
- Serve as Aon Impact Forecasting's signatory actuary during Florida Commission on Hurricane Loss Projection Methodology submissions.
- Manage Homeowner Return on Equity (ROE) Outlook study. Aon's Homeowners ROE Outlook calculates risk-adjusted returns for the US homeowners industry, provides the insurance industry with market reality diagnostics and profitability insights.
- Manage Residual Market Industry study. This product provides a holistic view of the residual market's impact on the property insurance industry and the individual company's risk profile.
- Serve as Aon's key corporate contact for China business development and expansion.

**Catastrophe Modeling Manager, Actuary
State Farm Insurance Companies**

Feb. 2005– Sept. 2018

Major Responsibilities included:

- Manage State Farm’s catastrophe modeling unit. State Farm’s catastrophe modeling practice grew into the industry’s leading practice with high quality and productivity under my leadership.
- Manage vendor relationships with AIR, EQECAT, ARA, and RMS. Negotiate contract terms and conditions, engage vendors’ support through regulatory challenges.
- Provide Actuarial opinions on State Farm’s use of catastrophe models. Oversee the due diligence and model validation work to ensure catastrophe modeling practices at State Farm meet the Actuarial Standards and comply with laws and regulatory requirements.
- Serve as a resource to the Corporate Law department for litigation and legislative issues.
- Provide various catastrophe risk measures and analytics (PML, TVaR, Standard Deviations, etc.) for State Farm Fire and Affiliates for exposure management and reinsurance purposes.
- Provide catastrophe information to rating agencies such as AM Best, S&P and Moody’s.
- Develop and deploy hazard analysis tools across the Enterprise for exposure underwriting and management.
- Utilize catastrophe data in Dynamic Financial Analysis projects to analyze capital adequacy and capital allocation; develop simulation tools to incorporate catastrophe risk into Enterprise Risk Management.
- Provide exposure information, technical support, risk analysis and documentation reviews for all State Farm’s issuances of catastrophe bonds.
- Lead State Farm’s compliance work to meet Office of the Superintendent of Financial Institutions (OSFI) B-9 - Earthquake Sound Practice requirements.
- Monitor modeling regulations in several jurisdictions (FL, LA, SC, HI, MD, etc.). Work with State Farm counsel to provide revisions to bills related to coastal issues and catastrophe risk management during legislative sessions.
- Represent the Actuarial department on State Farm Enterprise Catastrophe Response Team. Provide real time analysis for actual catastrophe events to assist Catastrophe Claims’ resources deployment, Catastrophe Reserving and communicate with Senior Management about the potential impact.
- Serve as a homeowner pricing manager for Mississippi for two years, with major responsibilities including:
 - Manage the development and implementation of rates and rules for several personal lines which satisfy the financial objectives of the enterprise.
 - Coordinate the analyses of actuarial ratemaking process.
 - Review rate proposals.
 - Serve as a key Actuarial resource for Market Areas and regulators.

Actuarial/Statistics/Modeling Analyst

Jan 2001– Feb. 2005

- Conducted homeowner rate revisions for Maine, Kansas, and Mississippi.
- Developed and maintained State Farm’s rate revision tool for property lines.

Other Professional Activities

- 2015 – 2018, Commission Member, Industry Actuary, Florida Commission on

Hurricane Loss Projection Methodology (FCHLPM). I was appointed by Florida CFO Jeff Atwater to this position in Jan. 2015.

- 2010 – 2013, advisory group member to the Insurance Bureau of Canada (IBC) and Office of the Superintendent of Financial Institutions (OSFI) to provide expert opinions on a study for insurance and economic impact of major earthquakes in Canada.
- 2011- 2013, advisory group member for the Insurance Bureau of Canada (IBC) and Office of the Superintendent of Financial Institutions (OSFI) to revise OSFI Guideline B-9 (Earthquake Exposure Management Sound Practice Guideline for insurance companies).
- 2012-2016, organized nine State Farm senior executives delegation (including State Farm’s CEO, COO, CFO, CMO, General Counsel, CTO, CSO) visits to China. Established relationship and set up meetings with Chinese regulators and senior executives of top Chinese insurance companies. Participated in discussions, served as advisor and interpreter for State Farm delegations.
- 2012-2018, visiting instructor for Illinois State University Math Department Actuarial Science program. Present catastrophe modeling and regularity topics to actuarial graduate students.
- 2014- 2018, board member of the International Society of Catastrophe Managers (ISCM). Promote education and career development for Catastrophe Modeling professionals.
- 2016- Present, co-chair of a taskforce to create a credential and certificate program for catastrophe risk management professionals on behalf of Institute of Casualty Actuarial Society (iCAS) and International Society of Catastrophe Managers (ISCM).
- 2016- Present, Member of Property /Casualty Extreme Events Committee, American Academy of Actuaries. This committee identifies issues relevant to the treatment of extreme catastrophe risks including sizing, insurability, pricing, funding, reserving, capital management, and loss mitigation. The committee also monitors federal and state catastrophe legislation and interacts with NAIC on these issues.
- 2016 – 2018, member of planning committee for the Reinsurance Association of America’s annual catastrophe modeling conference.
- 2016 – Present, member of CAS Climate Change Committee. This committee recommends, supports and performs research on climate change and assesses the potential risk management implications for the insurance industry.

Designations

- Fellow of Casualty Actuarial Society (FCAS, 2007)
- Certified Catastrophe Risk Management Professional (CCRMP, 2019)
- Associate of Society of Actuaries (ASA, 2010) - Currently, I am not an active member at SOA.
- Member of American Academy of Actuaries (MAAA,2005)
- Microsoft Certified Solution Developer (MCSD)
- Microsoft Certified Professional (MCP)

Education

- Master’s degree in Computer Science, University of Missouri-Columbia, 2000
- Master’s degree in Chemistry, Eastern Illinois University, 1997
- Bachelor’s degree in Chemical Engineering, Beijing University of Chemical Technology, 1993

Award

- Special Achievement awards for excellent performance and exceptional business achievements, Property and Casualty Actuarial Department, State Farm Insurance in 2002, 2009, 2011, 2012, 2014, 2015, and 2016
- Casualty Actuarial Society (CAS) Above and Beyond Achievement Award in 2019 to recognize my leadership role to establish Certified Catastrophe Risk Management Professional (CCRMP) designation for CAS Institute. The "Above & Beyond Achievement Award" is made annually, to one or more members of the CAS, who have made extraordinary contributions to the society.

Publications

- As a member of the American Academy of Actuaries Flood Working Group, I am one of the authors for the Monograph on Issues Surrounding National Flood Insurance Program - The National Flood Insurance Program: Challenges and Solutions. *American Academy of Actuaries*, April, 2017
- Akram Hazeen, Yan Zhang, Minchong Mao, Kraig A. Wheeler, a and Mark E. McGuire, 6-[(4-Hydroxy-phen-yl)diazonyl]-1,10-phenanthroline-1-ium chloride monohydrate, *US National Library of Medicine, National Institutes of Health (NIH)*, Dec. 1, 2011.
- As a member of the American Academy of Actuaries Flood Working Group, I am one of the authors of the following Monographs:

The National Flood Insurance Program: Challenges and Solutions (2017)
American Academy of Actuaries, April, 2017

Uses of Catastrophe Model Output (2018). American Academy of Actuaries,
July, 2018

Wildfire: An Issue Paper - Lessons Learned from the 2017–2018 California Events (2019), American Academy of Actuaries, June, 2019

Reference

- Available upon request.

NCRB CY21 Mobile Homeowners
Gross Modeled Hurricane Expected Losses Including
Cat LAE and Trend

Territory	MH(C)-A+D	MH(C)-B	MH(C)-C	MH(C)-Total	MH(F)-O	MH(F)-R	MH(F)-Total	MH C+F Total
110	74,155	4,572	18,710	103,283	121,902	0.000	121,902	225,185
120	191,431	9,927	33,752	249,217	668,424	7	668,432	917,648
130	144,580	11,663	36,979	204,816	364,032	106	364,138	568,954
140	902,945	65,393	135,755	1,170,339	2,626,449	655	2,627,103	3,797,442
150	498,092	44,075	101,380	682,161	1,027,159	510	1,027,669	1,709,830
160	439,841	37,923	57,439	567,314	1,101,242	96	1,101,338	1,668,652
170	99,221	9,787	9,664	125,793	116,557	55	116,612	242,405
180	878,513	84,011	88,090	1,113,651	1,055,986	1,229	1,057,215	2,170,866
190	500,149	54,443	53,067	644,118	643,877	931	644,809	1,288,926
200	234,814	19,837	22,512	293,792	524,182	0.000	524,182	817,974
210	310,296	32,607	27,884	393,034	355,710	284	355,993	749,028
220	482,098	43,320	45,020	604,664	649,561	82	649,643	1,254,307
230	490,727	41,965	44,702	612,038	1,054,331	325	1,054,655	1,666,694
240	1,106,135	114,273	93,496	1,392,738	807,388	829	808,217	2,200,955
250	385,486	38,368	33,607	484,910	513,936	520	514,455	999,365
260	438,289	47,646	32,083	549,099	292,154	78	292,232	841,331
270	334,079	30,297	27,051	414,913	222,449	208	222,657	637,571
280	107,866	11,119	8,693	135,339	79,510	90	79,600	214,939
290	144,831	11,165	10,392	176,370	251,269	144	251,413	427,784
300	92,554	7,119	6,825	112,887	189,347	76	189,423	302,310
310	365,456	37,885	28,862	458,135	323,929	184	324,113	782,248
320	448,274	47,598	35,716	563,483	339,476	226	339,702	903,185
330	25,196	2,796	2,102	31,899	27,820	7	27,827	59,726
340	347,373	35,732	27,362	435,095	242,558	207	242,765	677,860
350	236,453	23,551	17,754	294,424	174,193	197	174,389	468,813
360	271,932	26,398	19,811	337,230	248,627	174	248,801	586,031
370	9,030	732	550	10,931	8,823	5	8,827	19,758
380	38,326	3,467	2,569	47,024	34,774	19	34,793	81,817
390	44,541	3,961	2,809	54,389	29,243	20	29,263	83,652
Total	9,642,684	901,631	1,024,637	12,263,089	14,094,908	7,260	14,102,168	26,365,257

Modeled hurricane expected losses for North Carolina Rate Bureau, net of limits and deductibles. Results include demand surge and storm surge. Losses represent 50/50 blend of AIRv9 100k Standard event set and RMS v21 Historical event set. Results also include provisions for LAE and loss trend.



ACTUARIAL STANDARDS BOARD

**Actuarial Standard
of Practice
No. 38**

Revised Edition

**Catastrophe Modeling
(for All Practice Areas)**

**Developed by the
Catastrophe Modeling Task Force of the
General Committee of the
Actuarial Standards Board**

**Adopted by the
Actuarial Standards Board
July 2021**

Doc. No. 201

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July 2021

TO: Members of Actuarial Organizations Governed by the Standards of Practice of the Actuarial Standards Board and Other Persons Interested in Catastrophe Modeling (for All Practice Areas)

FROM: Actuarial Standards Board (ASB)

SUBJ: Actuarial Standard of Practice (ASOP) No. 38

This document contains the revision of ASOP No. 38, *Catastrophe Modeling (for All Practice Areas)*.

History of the Standard

The ASB first began work on a standard for modeling in the late 1990s. Motivated primarily to address the role catastrophe modeling of earthquakes and hurricanes played in casualty ratemaking, this work was focused on the use of specialized models where the actuary would have to rely on a model that was developed by professionals other than actuaries. As a result of this work, the ASB approved ASOP No. 38, *Using Models Outside the Actuary's Area of Expertise*, in June 2000 with the scope of the standard limited to the Property/Casualty area of practice. At the time, this was the only ASOP that specifically addresses modeling.

Over the ensuing years, the number and importance of modeling applications in actuarial science has increased, with the results of actuarial models often entering financial statements directly. Recognizing this trend, the ASB asked the Life Committee in 2010 to begin work on an ASOP focused on modeling. The Life Committee formed a task force to address this issue and, in February 2012, a discussion draft titled *Modeling in Life Insurance and Annuities* was released. Nineteen comment letters were received.

Based upon this feedback and numerous other discussions on the topic of modeling, in December 2012 the ASB created two multidisciplinary task forces under the direction of the General Committee: i) a general Modeling Task Force, charged with developing an ASOP to address modeling applications in all practice areas, and ii) a Task Force to consider expanding ASOP No. 38 to all practice areas while focusing exclusively on using catastrophe models.

An exposure draft titled *Modeling* was released in June 2013 with a scope that provides guidance to actuaries when selecting, designing, building, modifying, developing, or using models when performing actuarial services. ASOP No. 56, *Modeling*, was adopted by the ASB in December 2019. Changes have been made to this exposure draft of ASOP No. 38 to be consistent with ASOP No. 56 and other recent ASOPs.

The exposure draft of this revision of ASOP No. 38 was the work of the Catastrophe Modeling Task Force, whose membership has experience in life insurance, health insurance, property/casualty insurance, and enterprise risk management.

At the direction of the ASB, this standard was developed to apply to all practice areas and all forms of catastrophe models, including natural catastrophes such as hurricanes, earthquakes, and severe convective storms, and other catastrophes such as terrorist acts and pandemics.

Exposure Draft

The exposure draft was approved in September 2020 with a comment deadline of January 15, 2021. Four comment letters were received and considered in making changes that were reflected in the final ASOP.

Notable Changes from the Exposure Draft

Notable changes made to the exposure draft are summarized below. Additional changes were made to improve readability, clarity, or consistency.

1. Section 1.2, Scope, was revised to provide additional guidance to actuaries whose actuarial services involve reviewing or evaluating models.
2. In section 2, Definitions, the definition of “catastrophe model” was expanded to include a definition of model.
3. Section 3.2, Appropriate Reliance on Experts (now titled Catastrophe Models Developed by Experts), was revised to adopt language from ASOP No. 56, section 3.5(b).
4. An existing ASOP No. 38 example regarding validation to evaluate results derived from other models was reinserted into section 3.5.
5. A disclosure requirement for the extent of reliance on experts was added to section 4.1(b) and (c).

Notable Changes from the Existing ASOP

A cumulative summary of the notable changes from the existing ASOP are summarized below. Notable changes do not include additional changes made to improve readability, clarity, or consistency.

1. The ASOP was revised to apply to catastrophe models only and to all practice areas.
2. The scope was expanded to include the activities “selecting, reviewing, and evaluating” models in addition to the existing activity of “using” a model when performing actuarial services.
3. The scope was expanded to clarify that if the actuary determines that the guidance in the ASOP conflicts with the guidance in ASOP No. 56, the guidance of this ASOP will govern.

4. A new section specifically addressing reliance on data or other information supplied by others (section 3.8) was added.
5. The guidance on documentation (section 3.9) was updated and expanded to be consistent with current ASOPs.

The ASB thanks everyone who took the time to contribute comments and suggestions on the exposure draft.

The ASB would like to posthumously thank Martin M. Simons for his contribution to the ASOP No. 38 task force.

The ASB voted in July 2021 to adopt this standard.

Catastrophe Modeling Task Force

Shawna S. Ackerman, Chairperson

David A. Brentlinger

Bradley J. Davis

General Committee of the ASB

Susan E. Pantely, Chairperson

Geoff Bridges

Brian J. Mullen

Andrew M. Erman

Keith A. Passwater

Julianne H. Fried

Hal Tepfer

Robert S. Miccolis

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Darrell D. Knapp, Chairperson

Elizabeth K. Brill

Cande J. Olsen

Robert M. Damler

Kathleen A. Riley

Kevin M. Dyke

Judy K. Stromback

David E. Neve

Patrick B. Woods

The Actuarial Standards Board (ASB) sets standards for appropriate actuarial practice in the United States through the development and promulgation of Actuarial Standards of Practice (ASOPs). These ASOPs describe the procedures an actuary should follow when performing actuarial services and identify what the actuary should disclose when communicating the results of those services.

ACTUARIAL STANDARD OF PRACTICE NO. 38

CATASTROPHE MODELING
(FOR ALL PRACTICE AREAS)

STANDARD OF PRACTICE

Section 1. Purpose, Scope, Cross References, and Effective Date

- 1.1 Purpose—This actuarial standard of practice (ASOP or standard) provides guidance to actuaries when performing actuarial services with respect to selecting, using, reviewing, or evaluating **catastrophe models**.
- 1.2 Scope—This ASOP applies to actuaries in any practice area when performing actuarial services with respect to selecting, using, reviewing, or evaluating **catastrophe models** to assess risk, including but not limited to **models** of hurricanes, earthquakes, severe convective storms, terrorist acts, and pandemics. This standard applies to the selection, use, review, or evaluation of **catastrophe models**, whether or not they are proprietary in nature.

If the actuary's actuarial services involve reviewing or evaluating **catastrophe models**, the reviewing or evaluating actuary should apply the guidance in this standard to the extent practicable within the scope of the actuary's assignment.

In addition to this standard, the actuary should follow the guidance in ASOP No. 56, *Modeling*, when selecting, using, reviewing, or evaluating **catastrophe models**. If the actuary determines that the guidance in this ASOP conflicts with the guidance in ASOP No. 56, the guidance of this ASOP will govern.

This standard does not apply to **models** of operational risks. This standard also does not apply to **models** of economic risks that deal with instances of extreme events such as hyperinflation or a stock market collapse.

This standard also does not apply when the actuary is only designing, developing, or modifying a **catastrophe model** (or a portion of a **catastrophe model**).

If the actuary departs from the guidance set forth in this ASOP in order to comply with applicable law (statutes, regulations, and other legally binding authority), or for any other reason, the actuary should refer to section 4. If a conflict exists between this standard and applicable law, the actuary should comply with applicable law.

- 1.3 Cross References—When this ASOP refers to the provisions of other documents, the reference includes the referenced documents as they may be amended or restated in the future, and any successor to them, by whatever name called. If any amended or restated document differs materially from the originally referenced document, the actuary should consider the guidance in this ASOP to the extent it is applicable and appropriate.
- 1.4 Effective Date—This standard is effective for work performed on or after December 1, 2021.

Section 2. Definitions

The terms below are defined for use in this actuarial standard of practice and appear in bold throughout the ASOP.

- 2.1 Assumption—A type of explicit **input** to a **catastrophe model** that is derived from **data**, represents possibilities based on professional judgment, or may be prescribed by law or others. When derived from **data**, an **assumption** may be statistical, financial, economic, mathematical, or scientific in nature, and may be described as a **parameter**.
- 2.2 Catastrophe Model—A **model** of low-frequency events with high-severity or widespread potential effects. **Catastrophe models** may be used to explain a system, to study effects of different components, or to derive estimates.
- 2.3 Data—Facts or information that are either direct **input** to a **catastrophe model** or inform the selection of **input**. **Data** may be collected from sources such as records, experience, experiments, surveys, observations, benefit plan or policy provisions, or **output** from other **models**.
- 2.4 Expert—One who is qualified by knowledge, skill, experience, training, or education to render an opinion concerning the matter at hand.
- 2.5 Input—**Data** or **assumptions** used in a **catastrophe model** to produce **output**.
- 2.6 Intended Purpose—The goal or question, whether generalized or specific, addressed by the **catastrophe model** within the context of the assignment.
- 2.7 Model—A simplified representation of relationships among real world variables, entities, or events using statistical, financial, economic, mathematical, non-quantitative, or scientific concepts and equations. A **model** consists of three components: an information **input** component, which delivers **data** and **assumptions** to the **model**; a processing

component, which transforms **input** into **output**; and a results component, which translates the **output** into useful business information.

- 2.8 Output—The results of the **catastrophe model** including, but not limited to, point estimates, likely or possible ranges, and **data** or **assumptions** (as **input** for other **models**), behavioral expectations, or qualitative criteria on which decisions could be based.
- 2.9 Parameter—A type of statistical, financial, economic, mathematical, or scientific value that is used as **input** to **catastrophe models**. Examples of **parameters** include expected values in probability distributions and coefficients of formula variables.

Section 3. Analysis of Issues and Recommended Practices

- 3.1 Introduction—In performing actuarial services, the actuary may find it appropriate to select, use, review, or evaluate **catastrophe models**. When selecting, using, reviewing or evaluating a **catastrophe model**, the actuary should do the following:
- a. determine the appropriate level of reliance on **experts**;
 - b. have a basic understanding of the **catastrophe model**;
 - c. evaluate whether the **catastrophe model** is appropriate for the **intended purpose**;
 - d. determine that appropriate validation of the **catastrophe model** and **output** has occurred; and
 - e. determine the appropriate use of the **catastrophe model** and **output**.

The actuary's level of effort in understanding and evaluating a **catastrophe model** should be consistent with the **intended purpose** and the **catastrophe model output's** materiality to the results of the actuarial analysis.

- 3.2 Catastrophe Models Developed by Experts—When selecting, using, reviewing, or evaluating a **catastrophe model** developed by **experts**, the actuary should take into account the following:
- a. whether the individual or individuals who developed the **catastrophe model** are **experts** in the applicable field;
 - b. the extent to which the **catastrophe model** has been reviewed or validated by **experts** in the applicable field, including known differences of opinion among

experts concerning aspects of the **catastrophe model** that could be material to the actuary's use of the **catastrophe model**; and

- c. whether there are industry or regulatory standards that apply to the **catastrophe model** or to the testing or validation of the **catastrophe model**, and whether the **catastrophe model** has been certified as having met such standards.

The actuary may rely on **experts** in the applicable field in the evaluation of items in section 3.2(a)-(c) and should disclose the extent of such reliance.

- 3.3 Understanding of the Catastrophe Model—The actuary should be familiar with the basic components of the **catastrophe model** and understand both the user **input** and the **catastrophe model output**, as discussed below.

- 3.3.1 Catastrophe Model Components—The actuary should be familiar with the basic components of the **catastrophe model** and have an understanding of how such components interrelate within the **catastrophe model**. In addition, the actuary should identify which fields of expertise were used in developing or updating the **catastrophe model** and should make a reasonable effort to determine if the **catastrophe model** is based on generally accepted practices within the applicable fields of expertise. The actuary should also be familiar with how the **catastrophe model** was tested or validated and the level of independent **expert** review and testing.

- 3.3.2 User Input—The actuary should take reasonable steps to confirm that the precision and accuracy of the user **input** are consistent with the **intended purpose** and should refer, as applicable, to ASOP No. 23, *Data Quality*, when selecting, using, or evaluating **data** used in the **catastrophe model**. Certain user **input** may be required to produce **catastrophe model output** for the specific application. User **input** can include **assumptions** or **data**. If the **catastrophe model** requires user **input**, the actuary should evaluate the reasonableness of the user **input** and should have an understanding of the relationship between the user **input** and **catastrophe model output**.

- 3.3.3 Catastrophe Model Output—The actuary should determine that the **catastrophe model output** is consistent with the **intended purpose**.

- 3.4 Appropriateness of the Catastrophe Model for the Intended Purpose—The actuary should evaluate whether the **catastrophe model** is appropriate for the **intended purpose** and take into account the following:

- 3.4.1. Applicability of Historical Data—To the extent historical **data** are used in the development of the **catastrophe model** or the establishment of **catastrophe model parameters**, the actuary should take into account the adequacy of the historical **data** in representing the range of reasonably expected outcomes consistent with current knowledge about the phenomena being analyzed.
- 3.4.2. Developments in Relevant Fields—The actuary should make a reasonable effort to be aware of significant developments in relevant fields of expertise that are likely to materially affect the **catastrophe model**.
- 3.5 Output Validation— The actuary should validate that the **output** reasonably represents that which is being modeled. Depending on the **intended purpose**, **output** validation may include the following:
- a. comparing **output** to those of an alternative **model(s)**, where appropriate;
 - b. comparing the **output** produced by the **catastrophe model** with historical observations, if applicable;
 - c. comparing the consistency and reasonableness of relationships within the **output**; and
 - d. evaluating the reasonableness of changes in the **output** due to variations in the user **input**.
- 3.6 Appropriate Use of the Catastrophe Model and Output—The actuary should evaluate the reasonableness of the **catastrophe model output**, considering the **input** and the **intended purpose**. The actuary should take into account the limitations of the **catastrophe model** and use professional judgment to determine whether it is appropriate to use the **catastrophe model output**. The actuary should also use professional judgment to determine whether any adjustments to the **catastrophe model output** are needed to meet the **intended purpose**. The actuary should disclose any such adjustments in accordance with section 4.1.
- 3.7 Reliance on Another Actuary—The actuary may rely on another actuary who has selected, used, reviewed, or evaluated the **catastrophe model**. However, the relying actuary should be reasonably satisfied that the other actuary is qualified to select, use, review, or evaluate the **catastrophe model** in accordance with applicable ASOPs, and the **catastrophe model** is appropriate for the **intended purpose**. The actuary should disclose the extent of any such reliance.

- 3.8 Reliance on Data or Other Information Supplied by Others—When relying on **data** or other information supplied by others, the actuary should refer to ASOP No. 23 and ASOP No. 41, *Actuarial Communications*, for guidance.
- 3.9 Documentation—The actuary should consider preparing and retaining documentation to support compliance with the requirements of section 3 and the disclosure requirements of section 4. If preparing documentation, the actuary should prepare such documentation in a form such that another actuary qualified in the same practice area could assess the reasonableness of the actuary’s work and should document the steps taken to comply with this standard in light of proprietary aspects of the **catastrophe model**, if any. The degree of such documentation should be based on the professional judgment of the actuary and may vary with the complexity and purpose of the actuarial services. In addition, the actuary should refer to ASOP No. 41 for guidance related to the retention of file material other than that which is to be disclosed under section 4.

Section 4. Communications and Disclosures

- 4.1 Required Disclosures in an Actuarial Report—When issuing an actuarial report to which this standard applies, the actuary should refer to ASOP Nos. 23, 41, and 56. In addition, the actuary should disclose the following in such actuarial reports, as appropriate:
- a. the **catastrophe model** used and the **intended purpose**;
 - b. the methodology used to validate the **catastrophe model** developed by **experts** (see section 3.2);
 - c. the extent of reliance on **experts** (see section 3.2);
 - d. a description of the user **input** that was incorporated into the **catastrophe model** (see section 3.3.2);
 - e. a description of adjustments made to the **catastrophe model output** (see section 3.6); and
 - f. the extent of any reliance placed upon the work of another actuary (see section 3.7).
- 4.2 Additional Disclosures in an Actuarial Report—The actuary also should include disclosures in accordance with ASOP No. 41 in an actuarial report for the following circumstances:
- a. if any material **assumption** or method was prescribed by applicable law;

- b. if the actuary states reliance on other sources and thereby disclaims responsibility for any material **assumption** or method selected by a party other than the actuary; and
 - c. if in the actuary’s professional judgment, the actuary has deviated materially from the guidance of this ASOP.
- 4.3 Confidential Information—Nothing in this ASOP is intended to require the actuary to disclose confidential information.

Appendix 8

Background and Current Practices

Note: This appendix is provided for informational purposes and is not part of the standard of practice.

Background

Hurricane Andrew in 1992 and the Northridge Earthquake in 1994 led actuaries involved in evaluating hurricane and earthquake exposures to recognize the severe inadequacy of the traditional, empirical actuarial methods used for ratemaking for these exposures. Recognizing the need to replace these methods, many actuaries began using stochastic computer simulation models for their actuarial analysis of hurricane and earthquake exposure. Computer simulation models had been commonly used for some time by actuaries and others for the purpose of evaluating probable maximum loss but had not been widely used for ratemaking.

Over time, the output from catastrophe models became commonly used by property/casualty actuaries in developing rates for catastrophic perils as well as many other risk management purposes.

Current Practices

Catastrophe models are now widely used by actuaries in all practice areas for risk management analyses and calculating expected losses due to hurricanes, earthquakes, and terrorist acts. More recently, catastrophe models have also been developed to simulate wildfires, severe convective storms, tsunamis, and pandemics.

In addition, due to changes in regulations and financial reporting requirements, the number and importance of modeling applications in actuarial science has increased, with the results of actuarial models often entering financial statements directly.

Lastly, due to the evolution of enterprise risk management (ERM) practices and regulations, there has been increased use of catastrophe modeling as part of insurer stress testing and risk management across all practice areas. This trend is likely to continue to evolve and heighten in light of the emergence of the novel coronavirus and the COVID-19 pandemic.

Appendix 2

Comments on the Exposure Draft and Responses

The exposure draft of the proposed revision of ASOP No. 38, *Catastrophe Modeling (for All Practice Areas)*, was issued in September 2020 with a comment deadline of January 15, 2021. Four comment letters were received, some of which were submitted on behalf of multiple commentators, such as by firms or committees. For purposes of this appendix, the term “commentator” may refer to more than one person associated with a particular comment letter. The ASOP No. 38 Task Force carefully considered all comments received, and the ASB reviewed (and modified, where appropriate) the changes proposed by the ASOP No. 38 Task Force and the ASB General Committee.

Summarized below are the significant issues and questions contained in the comment letters and the responses. Minor wording or punctuation changes that were suggested but not significant are not reflected in the appendix, although they may have been adopted.

The term “reviewers” in appendix 2 includes the ASOP No. 38 Task Force, the ASB General Committee, and the ASB. Also, the section numbers and titles used in appendix 2 refer to those in the exposure draft, which are then cross referenced with those in the final ASOP.

SECTION 1. PURPOSE, SCOPE, CROSS REFERENCES, AND EFFECTIVE DATE	
Section 1.2, Scope	
Comment	One commentator requested a clearer definition of what is excluded from the scope of ASOP No. 38, noting that catastrophe models can be used to infer economic impacts beyond direct claims and that novel catastrophic perils may fall into a gray area in which ASOP No. 38 may or may not apply.
Response	The reviewers believe the guidance is appropriate and made no change in response to this comment. The reviewers note that section 1.2 does not limit the reason why a catastrophe model is used to perform actuarial services or whether the catastrophe model is a mature or novel catastrophe model.
Comment	One commentator suggested that section 1.2 should state that the guidance in the standard applies to the extent practicable within the scope of the actuary’s assignment when the actuary is reviewing or evaluating a catastrophe model.
Response	The reviewers agree and made the change.
Comment	One commentator suggested that “review or evaluation” be removed from the scope of the standard or alternatively that the scope be changed to exclude an actuary performing a regulatory review.
Response	The reviewers believe the revised guidance is appropriate and made no change in response to this comment.

Comment	One commentator recommended that section 1.2 should state that the application of the standard be based on the actuary’s professional judgement as to the materiality of the model output for the intended user.
Response	The reviewers believe the guidance is appropriate and made no change in response to this comment. The reviewers note that section 3.1 addresses materiality.
Comment	One commentator recommended that section 1.2 should state that the guidance in the standard applies only to the extent of the actuary’s responsibilities and adopt the language from ASOP No. 56 section 1.2.
Response	The reviewers believe the guidance is appropriate and made no change in response to this comment.
Comment	One commentator suggested that the scope of the standard be expanded to include elements similar to ASOP No. 56.
Response	The reviewers believe the revised guidance is appropriate and made no change in response to this comment.
Comment	Several commentators questioned what constituted a conflict between ASOP No. 38 and ASOP No. 56 versus what constituted a difference and asked how potential conflicts are meant to be resolved.
Response	The reviewers believe the revised guidance is appropriate and made no change in response to this comment. The reviewers note that ASOP No. 1, <i>Introductory Standard of Practice</i> , section 4.4, states, “When an actuary believes that multiple ASOPs have conflicting provisions when applied to a specific situation and none provide explicit guidance concerning which governs, the actuary should apply professional judgment and may wish to contact the ABCD for confidential guidance on appropriate practice.”
SECTION 2. DEFINITIONS	
Section 2.2, Catastrophe Model	
Comment	Two commentators suggested clarifying the definition of catastrophe model.
Response	The reviewers agree and made changes similar to those suggested by the commentators to improve clarity.
Comment	One commentator suggested a definition for “model” be added to ASOP No. 38.
Response	The reviewers agree and made the change.
SECTION 3. ANALYSIS OF ISSUES AND RECOMMENDED PRACTICES	
Section 3.1, Introduction	
Comment	One commentator suggested that the use of the term “validation” used in sections 3.1(d) and 3.5 be clarified to distinguish if the terms are being used differently.
Response	The reviewers believe the guidance is appropriate and made no change in response to this comment. The reviewers note section 3.1 introduces validation and section 3.5 provides details on the validation of catastrophe model output.

Section 3.2, Appropriate Reliance on Experts (now titled Catastrophe Models Developed by Experts)	
Comment	One commentator recommended changing “should consider” to “may consider” regarding the appropriate level of reliance on experts to be consistent with the corresponding language in ASOP No. 56, section 3.5.
Response	The reviewers believe the guidance is appropriate and made no change in response to this comment.
Comment	One commentator recommended changing the language in section 3.2(b) to mirror ASOP No. 56, section 3.5(b).
Response	The reviewers agree and made the change.
Comment	One commentator noted that this section, does not include the language of ASOP No. 56, section 3.5(d), which considers whether the science underlying the expertise is likely to produce useful models for the intended purpose.
Response	The reviewers believe the guidance is appropriate and made no change in response to this comment.
Comment	One commentator recommended that ASOP No. 38 be expanded to require disclosure of reliance on experts.
Response	The reviewers agree and made the change.
Comment	One commentator suggested that the ASOP be expanded to explicitly allow reliance on an expert to select, use, review, or evaluate the catastrophe model.
Response	The reviewers believe the guidance is appropriate and consistent with the suggestion, and made no change in response to this comment.
Section 3.5, Appropriate Validation (now titled Output Validation)	
Comment	One commentator requested that results derived from alternate models or methods, where available and appropriate, which is part of current ASOP No. 38, be added.
Response	The reviewers partially agree and modified the language.
Section 3.7, Reliance on Another Actuary	
Comment	One commentator suggested that ASOP No. 56 be added to the requirements for reliance on another actuary.
Response	The reviewers believe the revised guidance is appropriate and made no change in response to this comment.



Statement of Compliance with Actuarial Standard of Practice 38

Minchong Mao, FCAS, MAAA

Background

Actuarial Standard of Practice 38 provides guidance to the actuary in using models that incorporate specialized knowledge outside the actuary's own area of expertise when developing an actuarial work product. When using such a model, the standard requires that the actuary perform five specific tasks, as described below using the numbering system of the standard. This document certifies that Minchong Mao, FCAS, MAAA, has performed these tasks for the catastrophe loss model(s) relied upon in the actuarial work product to which it is attached. It is intended that actuaries utilizing the actuarial work product in their insurance ratemaking efforts can rely on my model evaluation in accordance with Section 3.7 of the standard of practice. In July 2021, Actuarial Standards Board(ASB) adopted revision of ASOP No. 38. This document reflected the most current requirements in the 2021 revision.

Model Versions Covered by this document

- AIR Hurricane model for the United States v1.0.0 utilized in Touchstone versions 2020, 2021 and later, released in 2021
- AIR Severe Thunderstorm Model for the United States v7.0 implemented in Touchstone version 5, 6, 7, 8, 2020, 2021 and later
- AIR Winter Storm Model for the United States v1.5 implemented in Touchstone version 5, 6, 7, 8, 2020, 2021 and later
- AIR Wildfire Model for the United States v2 implemented in Touchstone version 6, 7, 8, 2020, 2021 and later
- AIR Earthquake and Fire Following Model for the United States v10.1 implemented in Touchstone version 6, 7, 8, 2020, 2021 and later. This version included Time Dependent Earthquake Hazard Adjustment.

3.2 Appropriate Reliance on Experts

Catastrophe Models Developed by Experts—When selecting, using, reviewing, or evaluating a catastrophe model developed by experts, the actuary should take into account the following:

- a. whether the individual or individuals who developed the catastrophe model are experts in the applicable field;*
- b. the extent to which the catastrophe model has been reviewed or validated by experts concerning aspects of the catastrophe model that could be material to the actuary's use of the catastrophe model; and*
- c. whether there are industry or regulatory standards that apply to the catastrophe model or to the testing or validation of the catastrophe model, and whether the catastrophe model has been certified as having met such standards.*



For those aspects of the model that are outside my area of expertise, I have relied on the list of experts provided by the modeler. Please see the modeler's ASOP 38 document and supporting documentation for additional information.

- a. The individuals listed as employees of the modeler appear to be experts in their respective fields.
- b. The modeler has provided documentation of reviews by outside experts. Many of these reviewers are well-recognized experts in their fields. I have reviewed the findings of the outside experts and found no significant differences of opinion with respect to the validity of the model.
- c. Standards for catastrophe loss models have been promulgated by a few states. Most notably, the Florida Commission on Hurricane Loss Projection Methodology was created to review catastrophe loss models. The model(s) used in this work product, or derivatives thereof, have been certified by the Florida Commission on Hurricane Loss Projection Methodology.

3.3 Understanding of the Model

The actuary should be familiar with the basic components of the catastrophe model and understand both the user input and the catastrophe model output, as discussed below.

I have reviewed the modeler's ASOP 38 document and supporting documentation describing the model's components, input, and output, as well as other documentation, to comply with this requirement. In addition, I have specialized in actuarial applications of catastrophe model output since 2005.

3.3.1 Catastrophe Model Components—The actuary should be familiar with the basic components of the catastrophe model and have an understanding of how such components interrelate within the catastrophe model. In addition, the actuary should identify which fields of expertise were used in developing or updating the catastrophe model and should make a reasonable effort to determine if the catastrophe model is based on generally accepted practices within the applicable fields of expertise. The actuary should also be familiar with how the catastrophe model was tested or validated and the level of independent expert review and testing.

I am reasonably familiar with the basic components of the model and have a basic understanding of how such components interrelate with in the model. I have identified the fields of expertise used in developing and updating the model and have determined that the model is based on generally accepted practices within the applicable fields of expertise. I am reasonably familiar with how the model was validated and have reviewed the documentation of reviews by outside experts.

3.3.2 User Input—The actuary should take reasonable steps to confirm that the precision and accuracy of the user input are consistent with the intended purpose and should refer, as applicable, to ASOP No. 23, Data Quality, when selecting, using, or evaluating data used in the catastrophe model. Certain user input may be required to produce catastrophe model output for the specific application. User input can include assumptions or data. If the catastrophe model requires user input, the actuary should evaluate the reasonableness of the user input and should have an understanding of the relationship between the user input and catastrophe model output.

I understand the user input required to produce model output, including the level of detail required to produce results that are consistent with insurance ratemaking and risk management applications.



3.3.3 Catastrophe Model Output—The actuary should determine that the catastrophe model output is consistent with the intended purpose.

I have determined that the model output is consistent with the insurance ratemaking applications for which it was used. We most often use event loss detail in our work, so we are always careful that our results balance to the model's prepared exhibits.

3.4 Appropriateness of the Model for the Intended Application

The actuary should evaluate whether the catastrophe model is appropriate for the intended purpose and take into account the following:

3.4.1. Applicability of Historical Data—To the extent historical data are used in the development of the catastrophe model or the establishment of catastrophe model parameters, the actuary should take into account the adequacy of the historical data in representing the range of reasonably expected outcomes consistent with current knowledge about the phenomena being analyzed.

3.4.2. Developments in Relevant Fields—The actuary should make a reasonable effort to be aware of significant developments in relevant fields of expertise that are likely to materially affect the catastrophe model.

The catastrophe model(s) we have relied upon were developed for purposes related to the management of risk. I have evaluated the model(s) in light of available alternatives and determined that the catastrophe loss model is the most appropriate method of estimating expected catastrophe loss distributions for insurance ratemaking.

Some additional considerations include the following:

3.4.1. Applicability of Historical Data: Historical data is relied upon extensively in the development and validation of catastrophe loss models. Smoothing procedures are applied in cases where reasonably foreseeable events are underrepresented in the historical data.

3.4.2. Developments in Relevant Fields: Catastrophe loss models are typically updated on an annual basis in order to incorporate the most current scientific research and information from recent catastrophe events.

I have made a reasonable effort to be aware of significant developments in the relevant fields of expertise. In particular, meteorological studies related to the current period of elevated hurricane activity are important in determining which of a model's frequency assumptions should be utilized in insurance ratemaking applications involving hurricane-exposed risk portfolios. Aon maintains a documentation library containing current research in the science of catastrophe perils.

3.5 Output Validation

The actuary should validate that the output reasonably represents that which is being modeled. Depending on the intended purpose, output validation may include the following:



- a. comparing output to those of an alternative model(s), where appropriate;*
- b. comparing the output produced by the catastrophe model with historical observations, if applicable;*
- c. comparing the consistency and reasonableness of relationships within the output; and*
- d. evaluating the reasonableness of changes in the output due to variations in the user input.*

a. Aon conducts extensive testing of each model that we license whenever a new model is released. Output from Model output is checked for reasonability against other models and for consistency with the modeler's representations as to changes incorporated in the current version. I have reviewed the results of these tests and found the model used in this analysis to provide reasonable output.

b. Catastrophes, by their nature, involve significant uncertainty in the amount of insured losses they produce. In light of this uncertainty, the model has been shown to produce reasonable estimates of losses incurred from historical events.

I have reviewed the modeler's ASOP 38 document and supporting documentation describing comparisons of model output to historical observations and found that the model produces reasonable estimates.

c. I have reviewed the relationships among output results and found them to be consistent and reasonable.

d. Aon conducts extensive testing of each model that we license with respect to the sensitivity of model output to variations in the user input and model assumptions. I have reviewed the results of these tests and obtained an understanding of the model's sensitivity.

3.6 Appropriate Use of the Model

The actuary should evaluate the reasonableness of the catastrophe model output, considering the input and the intended purpose. The actuary should take into account the limitations of the catastrophe model and use professional judgment to determine whether it is appropriate to use the catastrophe model output. The actuary should also use professional judgment to determine whether any adjustments to the catastrophe model output are needed to meet the intended purpose. The actuary should disclose any such adjustments in accordance with section 4.1.

In my professional judgment, it is appropriate to use the model results, without adjustment, for the purposes of the actuarial work product to which this document is attached.

3.7 Reliance on Another Actuary

The actuary may rely on another actuary who has selected, used, reviewed, or evaluated the catastrophe model. However, the relying actuary should be reasonably satisfied that the other actuary is qualified to select, use, review, or evaluate the catastrophe model in accordance with applicable ASOPs, and the



catastrophe model is appropriate for the intended purpose. The actuary should disclose the extent of any such reliance.

Actuaries utilizing the actuarial work product to which this document is attached can rely on my complete evaluation of the model(s) used as described above. In doing so, they should document the extent of such reliance in their work.

Minchong Mao FCAS, MAAA

A handwritten signature in black ink that reads "Minchong Mao". The signature is written in a cursive style.

Nov. 1 2021



Statement of Compliance with Actuarial Standard of Practice 38

Minchong Mao, FCAS, MAAA

Background

Actuarial Standard of Practice 38 provides guidance to the actuary in using models that incorporate specialized knowledge outside the actuary's own area of expertise when developing an actuarial work product. When using such a model, the standard requires that the actuary perform five specific tasks, as described below using the numbering system of the standard. This document certifies that Minchong Mao, FCAS, MAAA, has performed these tasks for the catastrophe loss model(s) relied upon in the actuarial work product to which it is attached. It is intended that actuaries utilizing the actuarial work product in their insurance ratemaking efforts can rely on my model evaluation in accordance with Section 3.7 of the standard of practice. In July 2021, Actuarial Standards Board(ASB) adopted revision of ASOP No. 38. This document reflected the most current requirements in the 2021 revision.

Model Versions Covered by this document

- RMS North Atlantic Hurricane Model v21, released in 2021, implemented in RiskLink V21
- RMS North America Earthquake Model v17.0, released in 2017, implemented in RiskLink V17, 18, 18.1 and 21
- RMS Sever Convective Strom Model for the United States, released in 2014, implemented in RiskLink V17,18, 18.1 and 21
- RMS Winter Storm Model for the United States, release in 2013, implemented in RiskLink V17,18, 18.1 and 21

3.2 Appropriate Reliance on Experts

Catastrophe Models Developed by Experts—When selecting, using, reviewing, or evaluating a catastrophe model developed by experts, the actuary should take into account the following:

a. whether the individual or individuals who developed the catastrophe model are experts in the applicable field;

b. the extent to which the catastrophe model has been reviewed or validated by experts concerning aspects of the catastrophe model that could be material to the actuary's use of the catastrophe model; and

c. whether there are industry or regulatory standards that apply to the catastrophe model or to the testing or validation of the catastrophe model, and whether the catastrophe model has been certified as having met such standards.

For those aspects of the model that are outside my area of expertise, I have relied on the list of experts provided by the modeler. Please see the modeler's ASOP 38 document and supporting documentation for additional information.

a. The individuals listed as employees of the modeler appear to be experts in their respective fields.



b. The modeler has provided documentation of reviews by outside experts. Many of these reviewers are well-recognized experts in their fields. I have reviewed the findings of the outside experts and found no significant differences of opinion with respect to the validity of the model.

c. Standards for catastrophe loss models have been promulgated by a few states. Most notably, the Florida Commission on Hurricane Loss Projection Methodology was created to review catastrophe loss models. The model(s) used in this work product, or derivatives thereof, have been certified by the Florida Commission on Hurricane Loss Projection Methodology.

3.3 Understanding of the Model

The actuary should be familiar with the basic components of the catastrophe model and understand both the user input and the catastrophe model output, as discussed below.

I have reviewed the modeler's ASOP 38 document and supporting documentation describing the model's components, input, and output, as well as other documentation, to comply with this requirement. In addition, I have specialized in actuarial applications of catastrophe model output since 2005.

3.3.1 Catastrophe Model Components—The actuary should be familiar with the basic components of the catastrophe model and have an understanding of how such components interrelate within the catastrophe model. In addition, the actuary should identify which fields of expertise were used in developing or updating the catastrophe model and should make a reasonable effort to determine if the catastrophe model is based on generally accepted practices within the applicable fields of expertise. The actuary should also be familiar with how the catastrophe model was tested or validated and the level of independent expert review and testing.

I am reasonably familiar with the basic components of the model and have a basic understanding of how such components interrelate within the model. I have identified the fields of expertise used in developing and updating the model and have determined that the model is based on generally accepted practices within the applicable fields of expertise. I am reasonably familiar with how the model was validated and have reviewed the documentation of reviews by outside experts.

3.3.2 User Input—The actuary should take reasonable steps to confirm that the precision and accuracy of the user input are consistent with the intended purpose and should refer, as applicable, to ASOP No. 23, Data Quality, when selecting, using, or evaluating data used in the catastrophe model. Certain user input may be required to produce catastrophe model output for the specific application. User input can include assumptions or data. If the catastrophe model requires user input, the actuary should evaluate the reasonableness of the user input and should have an understanding of the relationship between the user input and catastrophe model output.

I understand the user input required to produce model output, including the level of detail required to produce results that are consistent with insurance ratemaking and risk management applications.

3.3.3 Catastrophe Model Output—The actuary should determine that the catastrophe model output is consistent with the intended purpose.

I have determined that the model output is consistent with the insurance ratemaking applications for which it was used. We most often use event loss detail in our work, so we are always careful that our results balance to the model's prepared exhibits.



3.4 Appropriateness of the Model for the Intended Application

The actuary should evaluate whether the catastrophe model is appropriate for the intended purpose and take into account the following:

3.4.1. Applicability of Historical Data—To the extent historical data are used in the development of the catastrophe model or the establishment of catastrophe model parameters, the actuary should take into account the adequacy of the historical data in representing the range of reasonably expected outcomes consistent with current knowledge about the phenomena being analyzed.

3.4.2. Developments in Relevant Fields—The actuary should make a reasonable effort to be aware of significant developments in relevant fields of expertise that are likely to materially affect the catastrophe model.

The catastrophe model(s) we have relied upon were developed for purposes related to the management of risk. I have evaluated the model(s) in light of available alternatives and determined that the catastrophe loss model is the most appropriate method of estimating expected catastrophe loss distributions for insurance ratemaking.

Some additional considerations include the following:

3.4.1. Applicability of Historical Data: Historical data is relied upon extensively in the development and validation of catastrophe loss models. Smoothing procedures are applied in cases where reasonably foreseeable events are underrepresented in the historical data.

3.4.2. Developments in Relevant Fields: Catastrophe loss models are typically updated on an annual basis in order to incorporate the most current scientific research and information from recent catastrophe events.

I have made a reasonable effort to be aware of significant developments in the relevant fields of expertise. In particular, meteorological studies related to the current period of elevated hurricane activity are important in determining which of a model's frequency assumptions should be utilized in insurance ratemaking applications involving hurricane-exposed risk portfolios. Aon maintains a documentation library containing current research in the science of catastrophe perils.

3.5 Output Validation

The actuary should validate that the output reasonably represents that which is being modeled. Depending on the intended purpose, output validation may include the following:

- a. comparing output to those of an alternative model(s), where appropriate;*
- b. comparing the output produced by the catastrophe model with historical observations, if applicable;*
- c. comparing the consistency and reasonableness of relationships within the output; and*



d. evaluating the reasonableness of changes in the output due to variations in the user input.

a. Aon conducts extensive testing of each model that we license whenever a new model is released. Output from Model output is checked for reasonability against other models and for consistency with the modeler's representations as to changes incorporated in the current version. I have reviewed the results of these tests and found the model used in this analysis to provide reasonable output.

b. Catastrophes, by their nature, involve significant uncertainty in the amount of insured losses they produce. In light of this uncertainty, the model has been shown to produce reasonable estimates of losses incurred from historical events.

I have reviewed the modeler's ASOP 38 document and supporting documentation describing comparisons of model output to historical observations and found that the model produces reasonable estimates.

c. I have reviewed the relationships among output results and found them to be consistent and reasonable.

d. Aon conducts extensive testing of each model that we license with respect to the sensitivity of model output to variations in the user input and model assumptions. I have reviewed the results of these tests and obtained an understanding of the model's sensitivity.

3.6 Appropriate Use of the Model

The actuary should evaluate the reasonableness of the catastrophe model output, considering the input and the intended purpose. The actuary should take into account the limitations of the catastrophe model and use professional judgment to determine whether it is appropriate to use the catastrophe model output. The actuary should also use professional judgment to determine whether any adjustments to the catastrophe model output are needed to meet the intended purpose. The actuary should disclose any such adjustments in accordance with section 4.1.

In my professional judgment, it is appropriate to use the model results, without adjustment, for the purposes of the actuarial work product to which this document is attached.

3.7 Reliance on Another Actuary

The actuary may rely on another actuary who has selected, used, reviewed, or evaluated the catastrophe model. However, the relying actuary should be reasonably satisfied that the other actuary is qualified to select, use, review, or evaluate the catastrophe model in accordance with applicable ASOPs, and the catastrophe model is appropriate for the intended purpose. The actuary should disclose the extent of any such reliance.

Actuaries utilizing the actuarial work product to which this document is attached can rely on my complete evaluation of the model(s) used as described above. In doing so, they should document the extent of such reliance in their work.



Minchong Mao FCAS, MAAA

Minchong Mao

Nov. 1 2021

Support for Selected Reinsurance Structure

Layer	Return Periods	
	Attachment	Exhaustion
201M XS 461M	97	202
175M XS 286M	42	97
100M XS 186M	22	42
75M XS 111M	12	22
50M XS 61M	7	12

The table above shows the All Peril 50/50 RMSv21 Historical/TSv9 Standard blend attachment and exhaustion points with Catastrophe LAE for the North Carolina Rate Bureau portfolio, along with the selected reinsurance program.

Reinsurance Program Summary

Reinsurance Layer	Rate-On-Line	Deposit Premium	Reinstatement Premium	Expected Total Premium	Expected Ceded Loss	Net Cost of Reinsurance
201M XS 461M	4.48%	9,004,800	68,899	9,073,699	1,555,775	7,517,923
175M XS 286M	6.82%	11,935,000	177,388	12,112,388	2,643,023	9,469,364
100M XS 186M	10.06%	10,060,000	271,604	10,331,604	2,772,362	7,559,242
75M XS 111M	13.99%	10,492,500	473,011	10,965,511	3,517,673	7,447,839
50M XS 61M	18.99%	9,495,000	693,571	10,188,571	3,864,612	6,323,958
Total		50,987,300	1,684,473	52,671,773	14,353,446	38,318,327

The table above shows indicated rates-on-line for the filing's reinsurance structure along with analysis of modeled catastrophe losses. Rate-on-Line values have been selected using the current Loss-On-Line approach, which is a benchmarking analysis done using reinsurance treaties placed by Aon.

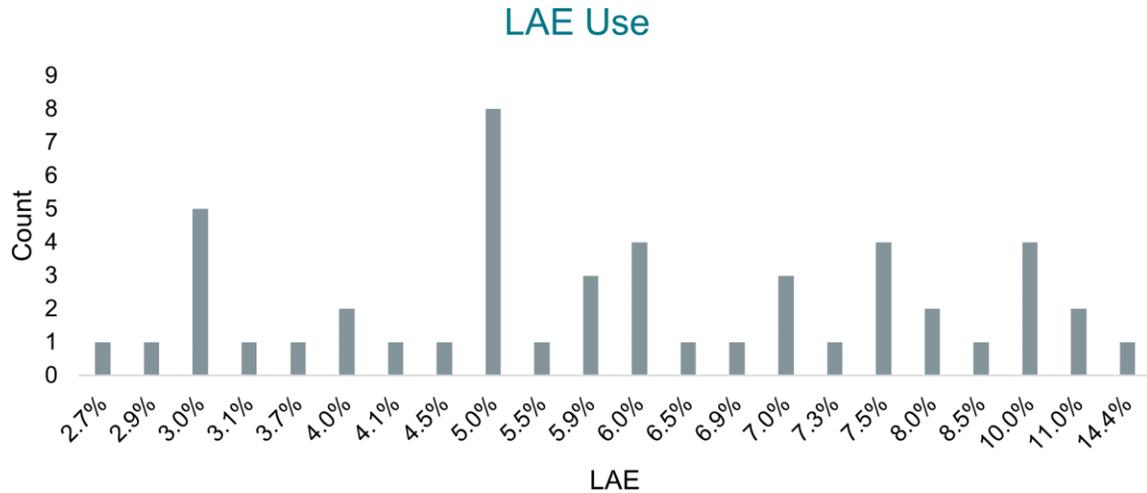
Deposit Premium is Rate-On-Line * Layer Limit

Expected Ceded Loss and Expected Reinstatement premium are the average annual amounts of each based on a simulation of catastrophe losses subject to the reinsurance program.

Expected Total Premium = Deposit Premium + Expected Reinstatement Premium

Net Cost of Reinsurance = Expected Total Premium - Expected Ceded Loss

North Carolina Rate Bureau Mobile Home Insurance Rate Filing Support for Selected Catastrophe LAE Factor



This chart shows Catastrophe LAE factors applied to modeled catastrophe event losses in AM Best SRQ Submissions by Aon clients in 2021.

- Factors were rounded to the nearest 0.5
- A weighted average was used where factors varied by peril
- Multiple factors were counted where factors varied by company within a group
- Reflects all clients that included a provision for LAE

The mean factor is 6.40%, the median is 6.00%, and the mode is 5.00%.

North Carolina Rate Bureau
Reinsurance Cost Allocation
CY 2021
RMSv21/TSv9

Layer 1: 50M XS 61M

Peril/territory	MH(C)			MH(F)		
	Premium	Ceded AAL	Reins Margin	Premium	Ceded AAL	Reins Margin
HU	43.51%	43.63%	43.44%	49.29%	49.60%	49.11%
110	0.16%	0.17%	0.16%	0.19%	0.19%	0.18%
120	0.66%	0.68%	0.65%	1.89%	1.95%	1.85%
130	0.45%	0.46%	0.45%	0.83%	0.85%	0.82%
140	3.89%	4.01%	3.82%	8.79%	9.09%	8.60%
150	1.96%	2.00%	1.93%	3.01%	3.07%	2.97%
160	2.00%	2.02%	1.99%	3.97%	4.02%	3.94%
170	0.47%	0.47%	0.47%	0.44%	0.44%	0.43%
180	4.39%	4.35%	4.41%	4.13%	4.12%	4.15%
190	2.56%	2.53%	2.58%	2.55%	2.52%	2.56%
200	1.17%	1.14%	1.19%	2.08%	2.03%	2.12%
210	1.56%	1.55%	1.57%	1.41%	1.39%	1.41%
220	2.29%	2.24%	2.32%	2.45%	2.41%	2.48%
230	2.33%	2.29%	2.35%	3.99%	3.93%	4.02%
240	5.31%	5.26%	5.35%	3.10%	3.07%	3.12%
250	1.80%	1.76%	1.82%	1.92%	1.87%	1.95%
260	2.00%	2.01%	2.00%	1.06%	1.06%	1.06%
270	1.51%	1.50%	1.52%	0.81%	0.81%	0.82%
280	0.46%	0.46%	0.45%	0.27%	0.27%	0.27%
290	0.63%	0.62%	0.64%	0.91%	0.89%	0.92%
300	0.41%	0.40%	0.41%	0.69%	0.68%	0.70%
310	1.49%	1.53%	1.47%	1.06%	1.08%	1.05%
320	1.90%	1.93%	1.88%	1.14%	1.16%	1.14%
330	0.11%	0.11%	0.10%	0.09%	0.09%	0.09%
340	1.52%	1.54%	1.50%	0.84%	0.86%	0.83%
350	1.04%	1.07%	1.01%	0.62%	0.64%	0.60%
360	1.14%	1.20%	1.10%	0.84%	0.88%	0.81%
370	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%
380	0.14%	0.16%	0.14%	0.11%	0.12%	0.10%
390	0.14%	0.15%	0.13%	0.08%	0.08%	0.07%
EQFF	0.23%	0.20%	0.24%	0.00%	0.00%	0.00%
OW	0.76%	0.87%	0.69%	0.55%	0.63%	0.50%
SS	2.12%	1.92%	2.24%	3.46%	3.09%	3.68%
WT	0.05%	0.04%	0.05%	0.04%	0.03%	0.04%
Grand Total	46.66%	46.65%	46.67%	53.34%	53.35%	53.33%

North Carolina Rate Bureau
Reinsurance Cost Allocation
CY 2021
RMSv21/TSv9

Layer 2: 75M XS 111M

Peril/territory	MH(C)			MH(F)		
	Premium	Ceded AAL	Reins Margin	Premium	Ceded AAL	Reins Margin
HU	44.76%	45.01%	44.64%	49.52%	50.08%	49.26%
110	0.12%	0.12%	0.12%	0.14%	0.14%	0.14%
120	0.59%	0.61%	0.58%	1.69%	1.78%	1.65%
130	0.37%	0.38%	0.36%	0.68%	0.70%	0.67%
140	3.62%	3.81%	3.54%	8.24%	8.70%	8.02%
150	1.72%	1.77%	1.69%	2.66%	2.75%	2.62%
160	1.96%	2.01%	1.94%	3.92%	4.03%	3.87%
170	0.42%	0.42%	0.42%	0.39%	0.39%	0.39%
180	4.36%	4.34%	4.37%	4.09%	4.09%	4.09%
190	2.58%	2.57%	2.59%	2.57%	2.57%	2.58%
200	1.17%	1.14%	1.19%	2.09%	2.03%	2.11%
210	1.61%	1.60%	1.62%	1.46%	1.45%	1.46%
220	2.46%	2.41%	2.48%	2.63%	2.59%	2.65%
230	2.45%	2.41%	2.47%	4.19%	4.15%	4.22%
240	5.76%	5.70%	5.79%	3.33%	3.30%	3.35%
250	1.98%	1.93%	2.00%	2.11%	2.04%	2.14%
260	2.24%	2.24%	2.23%	1.20%	1.19%	1.20%
270	1.71%	1.70%	1.72%	0.92%	0.91%	0.93%
280	0.53%	0.54%	0.53%	0.31%	0.31%	0.31%
290	0.71%	0.69%	0.72%	1.03%	0.99%	1.04%
300	0.44%	0.43%	0.44%	0.75%	0.73%	0.76%
310	1.73%	1.77%	1.72%	1.24%	1.25%	1.23%
320	2.12%	2.15%	2.10%	1.29%	1.30%	1.29%
330	0.12%	0.12%	0.12%	0.10%	0.11%	0.10%
340	1.60%	1.62%	1.58%	0.89%	0.91%	0.89%
350	1.02%	1.06%	1.00%	0.61%	0.63%	0.60%
360	1.10%	1.17%	1.06%	0.81%	0.86%	0.79%
370	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%
380	0.13%	0.14%	0.12%	0.09%	0.10%	0.09%
390	0.11%	0.12%	0.11%	0.06%	0.06%	0.06%
EQFF	0.17%	0.14%	0.19%	0.00%	0.00%	0.00%
OW	0.14%	0.17%	0.12%	0.09%	0.12%	0.08%
SS	2.00%	1.70%	2.14%	3.29%	2.76%	3.55%
WT	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Grand Total	47.08%	47.03%	47.11%	52.92%	52.97%	52.89%

North Carolina Rate Bureau
Reinsurance Cost Allocation
CY 2021
RMSv21/TSv9

Layer 3: 100M XS 186M

Peril/territory	MH(C)			MH(F)		
	Premium	Ceded AAL	Reins Margin	Premium	Ceded AAL	Reins Margin
HU	45.60%	45.93%	45.49%	49.38%	50.18%	49.09%
110	0.09%	0.09%	0.09%	0.10%	0.10%	0.10%
120	0.52%	0.55%	0.50%	1.49%	1.60%	1.45%
130	0.30%	0.30%	0.30%	0.56%	0.58%	0.55%
140	3.34%	3.60%	3.25%	7.65%	8.29%	7.42%
150	1.50%	1.55%	1.48%	2.34%	2.44%	2.31%
160	1.89%	1.98%	1.85%	3.81%	4.00%	3.74%
170	0.37%	0.37%	0.38%	0.34%	0.34%	0.35%
180	4.26%	4.25%	4.26%	3.98%	4.00%	3.98%
190	2.56%	2.58%	2.55%	2.56%	2.58%	2.55%
200	1.16%	1.13%	1.17%	2.07%	2.02%	2.08%
210	1.63%	1.62%	1.63%	1.47%	1.47%	1.48%
220	2.60%	2.56%	2.61%	2.77%	2.74%	2.78%
230	2.54%	2.52%	2.55%	4.36%	4.33%	4.37%
240	6.07%	5.99%	6.10%	3.49%	3.44%	3.51%
250	2.14%	2.07%	2.16%	2.27%	2.18%	2.31%
260	2.43%	2.42%	2.43%	1.31%	1.29%	1.32%
270	1.88%	1.85%	1.89%	1.01%	0.99%	1.02%
280	0.60%	0.61%	0.60%	0.36%	0.36%	0.36%
290	0.78%	0.76%	0.79%	1.14%	1.09%	1.16%
300	0.48%	0.46%	0.48%	0.81%	0.77%	0.82%
310	1.99%	2.02%	1.98%	1.42%	1.43%	1.42%
320	2.35%	2.36%	2.34%	1.45%	1.44%	1.45%
330	0.13%	0.13%	0.13%	0.12%	0.12%	0.12%
340	1.69%	1.71%	1.69%	0.96%	0.96%	0.95%
350	1.02%	1.06%	1.00%	0.60%	0.62%	0.60%
360	1.07%	1.14%	1.04%	0.79%	0.84%	0.77%
370	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%
380	0.11%	0.11%	0.10%	0.08%	0.09%	0.08%
390	0.09%	0.09%	0.09%	0.05%	0.05%	0.05%
EQFF	0.11%	0.08%	0.12%	0.00%	0.00%	0.00%
OW	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%
SS	1.84%	1.45%	1.98%	3.06%	2.36%	3.32%
Grand Total	47.55%	47.46%	47.59%	52.45%	52.54%	52.41%

North Carolina Rate Bureau
Reinsurance Cost Allocation
CY 2021
RMSv21/TSv9

Layer 4: 175M XS 286M

Peril/territory	MH(C)			MH(F)		
	Premium	Ceded AAL	Reins Margin	Premium	Ceded AAL	Reins Margin
HU	46.19%	46.62%	46.07%	49.12%	50.05%	48.86%
110	0.07%	0.07%	0.07%	0.08%	0.07%	0.08%
120	0.45%	0.49%	0.44%	1.30%	1.42%	1.27%
130	0.25%	0.25%	0.25%	0.47%	0.48%	0.46%
140	3.06%	3.37%	2.97%	7.03%	7.79%	6.82%
150	1.32%	1.37%	1.31%	2.08%	2.17%	2.06%
160	1.82%	1.94%	1.79%	3.69%	3.95%	3.62%
170	0.34%	0.32%	0.34%	0.31%	0.30%	0.32%
180	4.14%	4.15%	4.13%	3.86%	3.89%	3.85%
190	2.53%	2.58%	2.52%	2.54%	2.59%	2.52%
200	1.15%	1.12%	1.16%	2.05%	2.00%	2.07%
210	1.62%	1.62%	1.62%	1.47%	1.47%	1.47%
220	2.71%	2.69%	2.72%	2.88%	2.88%	2.89%
230	2.64%	2.61%	2.64%	4.53%	4.49%	4.54%
240	6.28%	6.24%	6.29%	3.60%	3.56%	3.61%
250	2.27%	2.21%	2.29%	2.42%	2.30%	2.45%
260	2.57%	2.57%	2.57%	1.40%	1.38%	1.41%
270	2.01%	2.00%	2.01%	1.08%	1.07%	1.09%
280	0.67%	0.68%	0.67%	0.40%	0.40%	0.40%
290	0.86%	0.83%	0.86%	1.25%	1.18%	1.27%
300	0.51%	0.49%	0.52%	0.87%	0.81%	0.88%
310	2.23%	2.26%	2.22%	1.60%	1.60%	1.60%
320	2.56%	2.55%	2.56%	1.59%	1.57%	1.60%
330	0.14%	0.14%	0.14%	0.13%	0.13%	0.13%
340	1.77%	1.76%	1.77%	1.00%	1.00%	1.01%
350	1.00%	1.02%	0.99%	0.59%	0.60%	0.59%
360	1.04%	1.09%	1.02%	0.77%	0.80%	0.75%
370	0.03%	0.04%	0.03%	0.03%	0.03%	0.03%
380	0.09%	0.10%	0.09%	0.07%	0.07%	0.07%
390	0.07%	0.07%	0.07%	0.04%	0.04%	0.04%
EQFF	0.07%	0.04%	0.08%	0.00%	0.00%	0.00%
SS	1.71%	1.24%	1.85%	2.91%	2.04%	3.15%
Grand Total	47.98%	47.90%	48.00%	52.02%	52.10%	52.00%

North Carolina Rate Bureau
Reinsurance Cost Allocation
CY 2021
RMSv21/TSv9

Layer 5: 201M XS 461M

Peril/territory	MH(C)			MH(F)		
	Premium	Ceded AAL	Reins Margin	Premium	Ceded AAL	Reins Margin
HU	46.72%	47.26%	46.60%	48.93%	49.85%	48.74%
110	0.05%	0.05%	0.05%	0.06%	0.06%	0.06%
120	0.40%	0.43%	0.40%	1.17%	1.27%	1.15%
130	0.21%	0.21%	0.21%	0.40%	0.40%	0.40%
140	2.84%	3.13%	2.77%	6.54%	7.27%	6.39%
150	1.18%	1.20%	1.18%	1.88%	1.93%	1.87%
160	1.77%	1.90%	1.75%	3.61%	3.89%	3.55%
170	0.31%	0.29%	0.32%	0.29%	0.26%	0.29%
180	4.03%	4.01%	4.03%	3.76%	3.76%	3.76%
190	2.50%	2.55%	2.49%	2.52%	2.57%	2.51%
200	1.13%	1.09%	1.14%	2.02%	1.96%	2.03%
210	1.61%	1.60%	1.62%	1.47%	1.46%	1.47%
220	2.80%	2.81%	2.80%	2.98%	3.02%	2.97%
230	2.68%	2.67%	2.68%	4.62%	4.61%	4.62%
240	6.48%	6.44%	6.48%	3.70%	3.65%	3.71%
250	2.38%	2.35%	2.39%	2.53%	2.43%	2.55%
260	2.68%	2.69%	2.68%	1.47%	1.45%	1.47%
270	2.12%	2.13%	2.12%	1.15%	1.14%	1.15%
280	0.73%	0.75%	0.73%	0.43%	0.44%	0.43%
290	0.92%	0.90%	0.92%	1.34%	1.28%	1.35%
300	0.54%	0.51%	0.54%	0.91%	0.85%	0.92%
310	2.42%	2.48%	2.41%	1.74%	1.75%	1.74%
320	2.75%	2.77%	2.75%	1.72%	1.71%	1.73%
330	0.15%	0.16%	0.15%	0.13%	0.14%	0.13%
340	1.82%	1.83%	1.82%	1.04%	1.04%	1.04%
350	0.98%	1.01%	0.97%	0.58%	0.59%	0.58%
360	1.03%	1.10%	1.02%	0.76%	0.80%	0.75%
370	0.03%	0.04%	0.03%	0.03%	0.03%	0.03%
380	0.09%	0.09%	0.09%	0.07%	0.07%	0.06%
390	0.06%	0.06%	0.06%	0.03%	0.03%	0.03%
EQFF	0.07%	0.03%	0.08%	0.00%	0.00%	0.00%
SS	1.57%	1.07%	1.68%	2.71%	1.78%	2.90%
Grand Total	48.36%	48.37%	48.36%	51.64%	51.63%	51.64%

**North Carolina Rate Bureau
Reinsurance Margin Allocation
CY 2021
RMSv21/TSv9**

Territory	MH(C)-A+D	MH(C)-B	MH(C)-C	MH(C)-Total	MH(F)-O	MH(F)-R	MH(F)-Total	MH C+F Total
110	37,646	2,452	9,124	49,223	59,159	0	59,159	108,381
120	229,501	11,908	45,683	287,092	775,205	7	775,212	1,062,304
130	152,976	12,979	46,815	212,770	385,640	71	385,711	598,481
140	1,118,289	80,260	189,551	1,388,100	3,106,719	947	3,107,666	4,495,766
150	659,676	58,631	161,343	879,650	1,353,471	851	1,354,322	2,233,972
160	622,559	53,952	80,383	756,894	1,488,183	150	1,488,333	2,245,227
170	130,917	12,832	15,244	158,992	146,788	81	146,869	305,861
180	1,382,724	132,130	150,447	1,665,300	1,560,041	2,026	1,562,067	3,227,367
190	799,422	87,028	89,836	976,286	972,179	1,550	973,729	1,950,014
200	378,428	31,882	39,421	449,731	797,477	0	797,477	1,247,209
210	516,985	54,309	48,150	619,444	559,904	481	560,385	1,179,829
220	845,236	75,773	80,247	1,001,256	1,061,026	147	1,061,173	2,062,429
230	832,649	71,007	78,655	982,311	1,676,419	550	1,676,969	2,659,280
240	1,952,340	202,026	167,200	2,321,566	1,334,275	1,478	1,335,753	3,657,319
250	696,657	69,401	61,304	827,361	881,203	936	882,139	1,709,500
260	787,043	85,292	58,333	930,667	504,569	141	504,709	1,435,376
270	612,861	55,539	49,156	717,556	387,293	370	387,663	1,105,219
280	196,741	20,268	15,377	232,386	137,394	157	137,550	369,937
290	266,395	20,506	18,998	305,900	445,212	259	445,471	751,371
300	161,456	12,411	12,036	185,904	315,272	130	315,402	501,305
310	650,001	67,316	50,244	767,561	549,164	311	549,475	1,317,036
320	767,842	81,598	60,866	910,306	560,805	390	561,195	1,471,500
330	42,165	4,676	3,452	50,292	44,236	11	44,247	94,539
340	552,157	56,696	43,913	652,766	367,504	336	367,840	1,020,606
350	330,587	32,928	25,312	388,828	228,684	282	228,966	617,794
360	359,517	35,097	29,200	423,814	308,099	257	308,356	732,170
370	11,358	918	671	12,946	10,470	5	10,475	23,422
380	36,704	3,338	2,695	42,737	31,064	18	31,082	73,819
390	34,031	3,016	3,015	40,062	21,210	21	21,230	61,292
Total	15,164,862	1,436,169	1,636,669	18,237,701	20,068,663	11,963	20,080,626	38,318,327

**PREFILED TESTIMONY
OF
GEORGE ZANJANI**

**MOBILE HOMEOWNERS MH(F) INSURANCE RATE FILING
NORTH CAROLINA RATE BUREAU
OCTOBER, 2022**

I. Qualifications and Summary

Q: What is your name, occupation, and business address?

A: My name is George Zanjani. I am Professor of Finance and the holder of the Frank Park Samford Chair of Insurance at the University of Alabama. My business address is 1074 Alderwood Lane NE, Marietta, Georgia 30068.

Q: Please describe your educational and employment background.

A: A complete curriculum vitae is attached as Exhibit RB-20 with this testimony. To summarize, my undergraduate studies were at Stanford University from 1987-1990, where I earned an A.B./B.S. in Economics and Biology. I joined the commercial lines actuarial department of Fireman's Fund Insurance Companies in 1990 as an Assistant Actuarial Analyst. Upon leaving in 1994, I was a Senior Actuarial Analyst, an Associate of the Casualty Actuarial Society, and the head of the company's Workers Compensation actuarial unit. I did my graduate studies in Economics at the University of Chicago, earning a Ph.D. in 2000. I joined the Research Department of the Federal Reserve Bank of New York in the Capital Markets Function as a Research Economist in 2000, leaving as a Senior Economist in 2008. I joined the Robinson College of Business of Georgia State University in 2008 as an Associate Professor of Risk Management and Insurance and was honored as the inaugural holder of the AAMGA Distinguished Chair in Risk Management and Insurance in 2011. I started my current position in 2017.

Q: Please elaborate on some of your professional activities.

A: My professional career has been focused on insurance. After four years of actuarial work in commercial lines insurance, my dissertation addressed the economics of insurance pricing. I specialized on insurance issues while at the Federal Reserve Bank of New York. In particular, I served for the Bank on the Presidential Working Group on Financial Markets during its review of the renewal of the Terrorism Risk Insurance Act in 2006 and on the Committee on the Global Financial System Task Force on Institutional Investors, Global Savings, and Asset Allocation.

My academic service activities include 1) service as referee for various academic journals, 2) service as an associate editor of the *Journal of Insurance Issues*, and 3) (current) service as a senior editor for the *Journal of Risk and Insurance* and as an associate editor for *Insurance: Mathematics and Economics*. In addition, I have served on the Board of the American Risk and Insurance Association and served as President of that association. I have also served as

President of the Risk Theory Society. I currently serve on the International Research Advisory Board of National Chengchi University.

As an academic, I continue to write on insurance pricing, participate in academic conferences on insurance, and engage in various sponsored research and consulting activities related to insurance. The latter activities include two research projects on capital allocation sponsored by the Casualty Actuarial Society during the last decade and a project on the financial crisis and the insurance industry sponsored by the Society of Actuaries in 2009. In addition, I have taught various courses at the undergraduate and graduate levels over the past decade, including classes on financial risk management, risk modeling, and property-casualty insurance.

Q: Have you published any papers or books?

A: Yes. I have published various articles, book chapters, reviews, and white papers on insurance pricing and other aspects of insurance markets. Published or forthcoming work includes articles on insurance topics in the *American Economic Review*, *Insurance: Mathematics and Economics*, the *Journal of Banking and Finance*, the *Journal of Financial Economics*, the *Journal of Public Economics*, the *Journal of Risk and Insurance*, *Management Science*, *North American Actuarial Journal*, and *Variance*. My co-authors and I have two chapters in the 2013 edition of the Handbook of Insurance, one on capital allocation for insurance companies, and the other on the financial pricing of insurance. Two papers have won awards for their contributions to the field of actuarial science: I received the 2010 ARIA award from the Casualty Actuarial Society and shared the 2015 Charles A. Hachemeister Prize (also from the Casualty Actuarial Society) with a co-author.

Q: Are you a member of any professional organizations?

A: I am a member of the American Economic Association, the American Finance Association, the American Risk and Insurance Association, and the Risk Theory Society. I am also an Associate of the Casualty Actuarial Society. I served on the Board of Directors of the American Risk and Insurance Association from 2007 to 2014 and served as President in 2012-2013. I served as President of the Risk Theory Society in 2012.

Q: Have you ever testified in insurance rate regulatory proceedings?

A: Yes. I have offered testimony in Workers Compensation insurance rate filings in Florida (2015 and 2017), Massachusetts (2020 and 2022), and Virginia (2016). In addition, I have supplied testimony for various rate filings in North Carolina starting in 2019, including Workers Compensation, Private Passenger Auto, Homeowners, Mobile Homeowners, Flood, and Dwelling.

Q: What was the nature of your testimony in those previous cases?

A: In the Florida, Massachusetts, and Virginia cases, I offered testimony on the underwriting profit factors used in the rates. Specifically, I evaluated the suitability of the methods and assumptions used to develop those factors, as well as whether the rate of return on capital implied by those factors was reasonable. For the North Carolina filings, I estimated the rate of

return on capital implied by the selected underwriting profit factors and assessed whether that rate of return was reasonable.

Q: What is the purpose of your testimony in this proceeding?

A: I was asked by the North Carolina Rate Bureau, as a financial economist with expertise in insurance, 1) to assist the Bureau committee with the underwriting profit factor selection, 2) to determine the expected return on insurance net worth implicit in the filing, and 3) to assess whether the expected return on net worth constitutes a reasonable rate of return and thus whether the selected underwriting profit factor satisfies North Carolina's statutory requirements.

Q: Please summarize the main findings of your testimony.

A: The first task was to determine the range for a reasonable rate of return on capital. I started by creating a set of estimates of the cost of insurance equity relevant for the North Carolina Mobile Homeowners insurance market. I consulted various third party estimates of the cost of equity for the property-casualty insurance industry. I also generated my own estimates using a single-factor risk premium approach, where the cost of equity was determined by 1) the historical excess return of the overall stock market over bonds, 2) the historical correlation of the equity prices of the firms serving the North Carolina Mobile Homeowners market with the overall stock market, and 3) the current level of bond yields. Finally, I adjusted the cost of equity to account for the significant presence of private companies in the North Carolina market. The cost of equity estimates resulting from this exercise ranged from about 6.9% to 18.5%.

Next, I calculated a weighted average cost of capital (WACC) by estimating the fraction of debt in the typical insurance holding company capital structure and weighting together the cost of equity with cost of debt based on this fraction. The resulting range for the WACC was about 6.2% to 15.6%.

The next task was to determine the projected rate of return on capital associated with the selected underwriting profit provision. Using a pro forma return model similar to that used in previous filings, I analyzed how the selected underwriting profit provisions used in the filing translate into expected returns on net worth. Consistent with previous filings, and with North Carolina law stipulating that the investment income earned on capital and surplus is not to be considered in determining the appropriate rate of return for the insurance industry, I refer to the expected return on net worth without including investment income on capital and surplus as the *statutory return*. When calculating the expected return on net worth including investment income earned on capital and surplus, I refer to the figure as the *total return*. My calculations for Mobile Homeowners (F) are detailed in Exhibit RB-21 and are summarized below:

Return Definition	Return on Net Worth
Statutory Return	6.91%
Total Return	10.32%

I next considered two adjustments to the model that I believe produce a more accurate representation of the rate of return produced by the selected underwriting profit factor. First, I adjusted the asset portfolio allocations (across bonds, stocks, and various other investments) to reflect the allocations actually supporting North Carolina Mobile Homeowners business, rather than the overall average industry allocations. Second, I adjusted the prospective portfolio yields to reflect current market conditions, as opposed to the average of current market yields and embedded yields. The combined effect of these changes is to reduce the statutory return to 6.83% and the total return to 9.92%.

I then compared the projected returns on capital associated with the selected underwriting factor with the cost of equity and WACC ranges described above. The projected statutory return and the projected total return both fell within the range of cost of equity estimates, and they also fell within the range of WACC estimates. This conclusion still largely holds after adjusting the portfolio allocations and prospective yields as described above: The statutory return was seven basis points below the lower bound of the cost of equity range, but I do not regard this as a material difference. I therefore conclude that the expected returns implied by the underwriting profit provision used in the filing are reasonable and not excessive.

II. Expected Return on Net Worth

Q: In general terms, how did you determine the expected return on net worth implied by the underwriting profit provision used in the filing?

A: I used a *pro forma* return model similar to that used in previous filings in North Carolina. The model accounts for underwriting income, installment payment income, investment income on unearned premium and loss/loss adjustment expense (LAE) reserves, and taxes as a percentage of premium. Total after-tax income from these sources (as a percentage of premium) is then related to net worth (as a percentage of premium) to obtain an expected return on net worth.

Q: What do you mean by *pro forma*?

A: The model is *pro forma* in the sense that it assumes 1) that the indicated rate change will be implemented and 2) that all loss, expense, and investment return realizations will coincide with their projected expected values.

The results of the model and supporting information are presented in Exhibit RB-21.

Q: Could you state what you mean by “net worth”?

A: Net worth is the book value of equity of a company under Generally Accepted Accounting Principles (GAAP) rather than Statutory Accounting Principles (SAP).

Q: Did you account for investment income on capital and surplus in calculating the expected return?

A: It is my understanding that North Carolina law provides that insurance rates are to be set such that those rates are expected to provide a return to insurers that is equal to the returns of industries of comparable risk and that, in calculating that expected return, the investment income on capital and surplus is to be excluded from consideration. Therefore, I present the expected return projected to result from the selected underwriting profit provision excluding investment income on capital and surplus. However, for informational purposes, I also present the expected return projected to result from the selected underwriting profit provision including investment income on capital and surplus.

Q: Would you please elaborate on the elements of the return and how they are calculated?

A: The return is composed of underwriting profit (Line 2 of Exhibit RB-21, Pages 1 and 1A), installment fee income (Line 3 of Exhibit RB-21, Pages 1 and 1A) and investment gain on insurance transaction (Line 7 of Exhibit RB-21, Pages 1 and 1A). In the calculation that includes investment income on surplus for informational purposes, I additionally include investment gain on surplus (Line 8 of Exhibit RB-21, Page 1A). (Please note that, in my exhibits and sometimes in my testimony, I refer to investment income on surplus as a shorthand reference to investment income on capital and surplus.) All of the foregoing income components are adjusted for taxes. The components are discussed in greater detail below:

Underwriting profit and installment fee income - As a matter of arithmetic and definition, the underwriting profit as a percentage of premium matches the underwriting profit provision selected by the NCRB. It is the percentage of premium left over after accounting for the loss and expense provisions, with the projected loss and LAE ratio and fixed expense ratios being adjusted to reflect the indicated rate change. Installment fee income is based on the average installment charges as a percentage of premium over the past five years (Exhibit RB-21, Page 3). The underwriting profit income and installment fee income are both assumed to be taxed at the current corporate rate of 21% (Line 4 of Exhibit RB-21, Pages 1 and 1A), as revised in the Tax Cut and Jobs Act of 2017. I also account for additional tax liabilities relating to IRS rules regarding the treatment of unearned premium reserves and of loss reserves (Line 5 of Exhibit RB-21, Pages 1 and 1A). Details of the calculation of these additional tax liabilities are found on Pages 4 to 6 of Exhibit RB-21.

Net Investment Gain on Insurance Transaction – This portion of the return reflects investment income on investible funds generated by the insurance transaction. Specifically, this quantity is calculated as the product of an investment yield and the average loss/LAE and unearned premium reserves that are actually held at the insurance company. An adjustment is made for investment income on agents balances (specifically, to account for the fact that agents balances, which are premiums held by agents and not yet remitted to the company, are not available for investment by the insurance company). I also adjust for investment income on reinsurance balances, accounting for the additional income that the company receives on funds that have not yet been remitted to the reinsurer, as well as the investment income that it is not able to collect on funds that have not yet been recovered from the reinsurer. The details of the estimation of investible reserves and the investment income generated from those reserves are found on Pages 7 to 9 of Exhibit RB-21, with the adjustments for balances shown on Pages 1 and

2. The tax liability is based on a weighted average of estimated tax rates on the different sources of investment income, with the weights based on the composition of the overall property-casualty industry portfolio.

Investment Gain on Surplus – This portion of the return would reflect investment income generated from surplus. The investment yield is applied to investible surplus, the amount of which is based on the ten-year average premium-to-surplus ratio for groups writing Mobile Homeowners insurance in North Carolina from Page 14 of Exhibit RB-21. The tax liability is again based on a weighted average of estimated tax rates on the different sources of investment income, with the weights based on the composition of the overall North Carolina industry portfolio.

These components of after-tax return, all denominated as a percent of premium, are then summed and related to net worth. This is accomplished by multiplying the returns as a percent of premium by the product of the premium-to-surplus ratio from Page 14 of Exhibit RB-21 and the inverse of the industry-wide net worth-to-surplus ratio from Page 15 of Exhibit RB-21.

Q: Please explain how the investment yield is calculated.

A: My understanding is that the accepted approach in North Carolina, based on a decision by the Commissioner in the 1990's, is to estimate the investment yield as an average of the "embedded yield" based on the industry statutory annual statement reports and a "current yield" based on current market rates. I have followed this convention in the analysis presented in Exhibit RB-21, though I contemplate the consequences of this convention in more detail later in my testimony.

For the current yield, I start with the overall weighted average invested asset portfolio for the North Carolina insurance market (using total North Carolina DPW for weights) and use various sources to estimate the current market yields for those assets. Sources for current market rates, and a summary of the overall calculation, are provided on Page 11 of Exhibit RB-21. For each of the bond subcategories, I obtain a maturity distribution for the North Carolina industry portfolio in that subcategory from the Schedule D summary exhibits and match each maturity level from the exhibits to a corresponding bond yield of similar maturity, so that the average yield shown on Page 11 is a weighted average across maturities according to the North Carolina industry portfolio. The overall pre-tax current yield on the industry portfolio as thus determined is 4.70%. The embedded yield calculations, based on the actual investment income reported by the industry, are shown on Pages 12 and 13 of Exhibit RB-21; the pre-tax embedded yield is 3.32%. For the pro forma calculations, I average these two figures to obtain 4.01% (shown on Page 10 of Exhibit RB-21).

The tax liability for investment income is determined for each asset class, reflecting tax advantages as appropriate on municipal bond interest, preferred and common stock dividends, and capital gains on stock. The expected return on equity is split into a capital gain and dividend component, for tax purposes, based on the experience of the S&P 500 over the 1998-2021 period.

Q: What is the expected return on net worth?

A: To calculate the implied return on insurance company equity, components of after-tax return are summed and related to net worth, which, as a percentage of premium, is calculated based on the product of the premium-to-surplus ratio from Page 14 of Exhibit RB-21 and the inverse of the industry-wide net worth-to-surplus ratio from Page 15 of Exhibit RB-21. This approach indicates that the selected underwriting profit factor of 6.5%, if achieved, would yield an expected statutory return on net worth of 6.91% (without including investment income on surplus) and a total return on net worth of 10.32% (when including investment income on surplus).

Q: Have you considered the impact of any other alternative assumptions on your estimates?

A: Yes, I have considered the impact of an alternative investment yield calculation.

Specifically, I considered the combined impact of two changes.

First, I based the asset distribution on a premium-weighted average of the portfolio allocations used by the companies writing Mobile Homeowners insurance in North Carolina. The pro forma model relied on the weighted average invested asset distribution for the North Carolina insurance industry. While I have followed this convention in Exhibit RB-21, the assumption may not be suitable for the case of Mobile Homeowners because the North Carolina industry portfolio reflects heavy common stock allocations by certain personal lines carriers and other companies that do not underwrite Mobile Homeowners. The high common stock allocation tends to inflate the estimated investment yields, particularly current yields, where the expected rate of return on common stock is much higher than typical bond yields (see Page 11 of Exhibit RB-21). Basing the allocation assumption on the portfolios of the companies actually writing Mobile Homeowners business in North Carolina, in my opinion, offers a much closer approximation to the average investment portfolio supporting North Carolina Mobile Homeowners underwriting.

Second, I based the investment yield solely on the current yield. The practice of averaging embedded yields with current yields makes little difference when the yields are relatively close together. But there is a significant divergence between the current yields on investments and embedded yields, with the pre-tax current yield being nearly 140 basis points higher than the embedded yield. The current yield, in my opinion, is the better indicator of investment yields for a prospective ratemaking exercise, where the relevant questions concern the terms on which money will be invested today and in the future.

The combined effect of these two changes is to drop the statutory return to 6.83% and the total return to 9.92% (including investment income on surplus).

Q: How was the underwriting profit factor determined?

A: The Bureau selected the 6.5% provision. I participated in the Bureau's Mobile Home Subcommittee meeting for the discussion of the profit portion of the rate review. I described for the committee my pro forma profit analysis and provided an array of underwriting profit provisions and their associated returns on net worth, both without including investment income

on surplus and including investment income on surplus. The returns shown in that array spanned the range for the cost of capital that I had provided. Following my presentation and the committee discussion, the committee selected the underwriting profit factor.

III. Rate of Return on Capital

Q: What steps did you take in the course of assessing whether the returns described above would produce a reasonable rate of return on equity?

A: I first established ranges for reasonable estimates of the cost of capital. I then compared the estimated statutory and total returns on net worth determined in Section II above to these cost of capital ranges.

Q: How did you establish ranges for reasonable estimates of the cost of capital?

A: The cost of capital for an industry is a difficult figure to pin down, and part of my approach is based on a belief in the wisdom of crowds. I started by gathering various third-party estimates of the cost of capital for property-casualty firms associated with publicly traded holding companies. I also made an independent set of estimates of the same tailored specifically for the North Carolina Mobile Homeowners market. I then made adjustments to all of these estimates to account for the presence of private companies in the North Carolina market.

Q: Please describe the third-party estimate sources and methodologies.

A: Kroll (formerly Duff & Phelps) and Damodaran Online (an open-access website maintained by Aswath Damodaran, a valuation expert affiliated with New York University) both publish estimates for the property-casualty industry. Kroll updates the estimates quarterly (the estimates reported below are from 6/30/2022), while Damodaran Online updates the estimates annually (1/1/2022).

Kroll reports estimates from a variety of methodologies. Some estimates are produced using factor models, where the industry's sensitivity to a pricing factor (or sensitivities to a set of factors) are measured and used to generate a cost of capital. For example, single factor models (such as the CAPM) typically mark the overall stock market return in excess of a "base" fixed income return as the pricing factor. The cost of capital is generated in this case by estimating a risk premium for each factor, adjusting that risk premium to account for the sensitivity of the industry in question to that factor, and then adding the adjusted risk premium to the current yield of the "base" fixed income instrument to produce a cost of capital. In addition to CAPM estimates, Kroll also reports a "CAPM + size premium" estimate to recognize the higher cost of capital endured by smaller firms and thus correct for the average size of firms within an industry. The "Buildup Method" employs a related approach, adding a size premium and an industry premium to the standard market risk premium. The Fama-French-5-factor model extends the single risk factor framework of the CAPM to a five factor risk framework, thus pricing an industry's equity on the basis of its sensitivity to four additional factors in addition to overall market returns. Kroll also utilizes discounted cash flow (DCF) models, where free cash flow or dividends are forecasted into the future, with the cost of capital estimate being the implied discount rate on the future cash flows that explains the current equity valuation. In

general, the two classes of methods---factor models and DCF models---are perhaps the two most widely accepted and widely deployed methods for estimating the cost of equity.

Damodaran reports estimates from a single-factor CAPM model. However, rather than estimating the risk premium associated with the stock market on the basis of simple averages of historical excess returns (as is typically done), he attempts to modify the premium to account for the current level of stock market valuation. This distinction is one example of the substantial variation in implementation of factor models, which can have significant effects on the estimates. There is also substantial methodological variation in implementation of the DCF model, which is estimated with different time period stages, with time-varying growth rates. All of this underscores the importance of consulting multiple sources of estimates and testing sensitivities where possible.

The approaches described above all produce estimates of the cost of equity. This cost of equity is then weighted together with an estimated cost of debt for the industry to produce a WACC for publicly traded firms. The weights are based on the composition of the capital structure (equity versus debt) for the industry.

Q: Please describe how you derived your independent estimates of the cost of equity capital for publicly traded firms.

A: I used a single factor model, also referred to as a “risk premium” approach in previous filings in North Carolina. This approach estimates the cost of equity as

$$r + \beta * (ERP)$$

where r is the current yield on a reference fixed income instrument, ERP is the estimated expected excess return of the stock market over that fixed income yield, and β is the estimated covariation between the equity of the property-casualty industry and the overall stock market (more precisely, the covariance of property-casualty equities with the S&P 500, divided by the variance of the S&P 500).

For the reference interest rate, I tried four different fixed income assets---the 3-month Treasury Bill, the 10-year Treasury Note, the Moody’s Seasoned Aaa Corporate Bond Index, and the Moody’s Seasoned Baa Corporate Bond Index. In each case, I estimated the equity risk premium as the average excess return of the S&P 500 over the return on the reference fixed income asset over the 1928-2021 period. To calculate the average returns, I used the formula from Blume (1974)¹ by weighting together the arithmetic average and the geometric average, as in:

$$\left[\frac{N - T}{N - 1} (1 + \pi_A) + \frac{T - 1}{N - 1} (1 + \pi_G) \right]^{\frac{1}{T}}$$

¹ Blume, M.E. (1974), “Unbiased Estimates of Long-Run Expected Rates of Return,” *Journal of the American Statistical Association* (September), pp. 634-8.

where N is the sample size, T is the return horizon (corresponding to the maturity of the fixed income asset), π_A is the arithmetic average return in the sample, and π_G is the geometric average return in the sample.

For β (beta), I estimated a weighted average beta for the North Carolina Mobile Homeowners market. For each publicly traded holding company associated with an operating subsidiary underwriting Mobile Homeowners insurance in North Carolina in 2021, I pulled the beta provided by S&P Global (based on 1-year and 3-year daily returns). I then calculated a weighted average based on 2021 North Carolina Mobile Homeowners DPW.

Given current yields for the reference fixed income assets and estimates for the equity risk premium and beta, I then calculate a cost of equity according to the formula given above.

Next, I estimated a WACC for the North Carolina market. For the capital structure, I estimated a weighted average debt percentage for the North Carolina Mobile Homeowners market. For each publicly traded holding company, I calculated the percentage of debt in the capital structure based on the latest fiscal year report. For the cost of debt, I used the figure from Damodaran Online, based on a 2.84% 10-year Treasury rate.

Q: What were the results?

A: The following table lists the cost of equity and the WACC for publicly traded companies, including the estimates I produced and those reported by Kroll and Damodaran Online for the property-casualty industry.

Cost of Capital for Publicly Traded Companies								
Source	Method	Current Yield (8/12/2022)	Equity Risk Premium	Cost of Equity		WACC		
Kroll	CAPM			7.6%		6.8%		
Kroll	CAPM + Size Premium			8.0%		7.1%		
Kroll	Build-Up			8.8%		7.7%		
Kroll	Fama-French 5-factor			7.5%		6.7%		
Kroll	DCF (1-stage)			15.4%		13.1%		
Kroll	DCF (3-stage)			17.5%		14.8%		
Damodaran Online	Implied Premium			6.49%		5.88%		
					Low	High	Low	High
Zanjani	Risk Premium over T-Bill	2.63%	8.49%	9.08%	11.49%	7.94%	9.88%	
Zanjani	Risk Premium over T-Note	2.84%	6.57%	7.82%	9.69%	6.93%	8.43%	
Zanjani	Risk Premium over Aaa Bond	4.07%	5.74%	8.42%	10.05%	7.42%	8.73%	
Zanjani	Risk Premium over Baa Bond	5.16%	4.49%	8.57%	9.84%	7.53%	8.56%	

I have also shown the current yield and equity risk premium elements for each of my own estimates to facilitate reconstruction. Other parameters I used were calculated as described above: 1) the weighted average beta for the North Carolina industry (0.7589 to 1.0432), 2) the cost of debt (3.28%), and 3) the percentage of debt in the capital structure (19.60%).

To illustrate, the higher cost of equity for my "Risk Premium over T-Bill" method is:

$$2.63\% + 1.0432 \times 8.49\% = 11.49\%,$$

and the WACC is:

$$(1 - .1960) \times 11.49\% + .1960 \times 3.28\% = 9.88\%.$$

Note that the estimates for capital structure and the cost of debt differ across sources, so the relationship between the cost of equity and the WACC for Kroll and Damodaran Online will not follow the exact formula listed above.

Q: Do you believe any adjustments are necessary to the estimated cost of equity in the context of this filing?

A: Yes. All of the foregoing estimates are based on the data of publicly traded companies, which have the easiest access to financing and thus the lowest costs of capital. However, I found that operating companies affiliated with publicly traded holding companies wrote only 82.3% of the 2021 Mobile Homeowners direct premiums written for North Carolina. The remainder was underwritten by companies associated with private, often mutual, ownership---a segment well known to have more difficulty in accessing the capital markets. The industry average cost of equity needs to be adjusted upward to account for this non-public ownership.

Q: How much higher is the cost of equity for non-public firms?

A: Research dating back at least as far as the 1960's has demonstrated that private equity trades at a substantial discount to public equity. The discount is thought to derive from a variety of factors, including the illiquid nature of private equity stakes (also known as a "lack of marketability") as well as information, monitoring, and control issues. The discount translates into a higher cost of equity. For example, if a public firm's cost of equity is estimated at 10% and the equity of a comparable private firm is selling at a 20% discount to that of the public firm, the private firm's cost of equity would be estimated as:

$$12.5\% = 10\% / (1 - 20\%)$$

The discount is difficult to estimate. Exhibit RB-22 summarizes some of the academic research on the private firm discount. Studies have taken a variety of approaches to measurement. "IPO" studies compare the prices of pre-IPO share transactions in a private company with post-IPO share prices after the company is public. "Acquisition" studies compare the valuations of acquired private companies versus the valuations of acquired public companies. "Restricted stock" and "private placement" studies compare the prices of restricted stock issued by public companies with the prices of their traded shares.

All the approaches have their flaws. IPO studies, for example, are thought to have a bias toward overstating the discount because of the differences in timing of transactions. Restricted stock and private placement studies tend to understate the discount: Since they confine their attention to public companies, they do not account for factors other than the discount for lack of marketability (DLOM), and, moreover, the actual restrictions on marketability for private

placements have been loosened significantly over the years by the Securities and Exchange Commission.

On balance, however, the studies point to a substantial discount. For purposes of this testimony, I use a discount of 25%, which is somewhat below the average of the averages of the three groups in Exhibit RB-22 (when taking the midpoint of the ranges for the studies with ranges of estimates).

Q: How would this affect the estimated cost of equity for the industry?

A: Assuming a 25% private company discount and a 17.7% market share for non-public companies, I calculate adjusted estimates of the private cost of equity and the public cost of equity:

$$17.7\% * \left(\frac{COE}{(1 - 0.25)} \right) + (82.3\%) * (COE),$$

where *COE* is the estimated cost of equity for public companies. The adjusted estimates are as follows:

Cost of Capital, Adjusted for Non-Public Ownership					
Source	Method	Cost of Equity		WACC	
Duff & Phelps	CAPM	8.0%		7.2%	
Duff & Phelps	CAPM + Size Premium	8.5%		7.5%	
Duff & Phelps	Build-Up	9.3%		8.1%	
Duff & Phelps	Fama-French 5-factor	7.9%		7.1%	
Duff & Phelps	DCF (1-stage)	16.3%		13.8%	
Duff & Phelps	DCF (3-stage)	18.5%		15.6%	
Damodaran Online	Implied Premium	6.87%		6.19%	
		Low	High	Low	High
Zanjani	Risk Premium over T-Bill	9.61%	12.17%	8.37%	10.43%
Zanjani	Risk Premium over T-Note	8.28%	10.26%	7.30%	8.89%
Zanjani	Risk Premium over Aaa Bond	9.07%	10.42%	7.82%	9.20%
Zanjani	Risk Premium over Baa Bond	8.92%	10.65%	7.94%	9.02%

Q: How do these figures speak to the issue of whether or not the pro forma expected return on net worth is reasonable?

A: There are at least two schools of thought on this issue.

The first is that the “net worth” in the pro forma return exhibit should be interpreted as an equity investment akin to the equity considered in the cost of equity analysis. Thus, it should be entitled to a similar rate of return. Under this school of thought, the return on net worth calculated in the previous section should be compared directly with the figures in the table

above. If one does this, the projected returns are, in my opinion, clearly not excessive, even when including investment income on surplus in the calculation of the return. Even before making the adjustments to the investment return projections that I believe are appropriate for the North Carolina Mobile Homeowners market, the projected total return of 10.32% is within the span of estimates, which range from 6.9% to 18.5%. If one instead focuses on the statutory return by excluding investment income on surplus, the projected return of 6.91% falls toward the lower end of the range of estimates. When testing robustness by 1) adjusting the investment portfolio to the allocations matched to the North Carolina Mobile Homeowners market and 2) substituting current yields for embedded yields, the total return and statutory return both drop slightly and still fall within the range.

A second school of thought is that, although the capital of the operating subsidiaries may be fully financed by equity, the holding companies are the source of that equity. Thus, one should "look through" the operating subsidiaries to the level of the holding companies to determine a cost of capital, which is important because the holding companies---unlike the insurance subsidiaries---typically hold significant debt in the capital structure. Holding companies that are typically classified as property-casualty companies have, in recent history and on average, had in the neighborhood of 20% debt. Thus, the cost of capital for the holding company is, under this school of thought, calculated as a weighted average of the cost of equity and the cost of debt, with the weights based on each component's share of the capital structure. The result is the WACC discussed above, which, as can be seen above, is typically lower than the cost of equity due to the lower cost of debt.

On the other hand, the market value of the capital of the holding company will be different from the book value of the capital invested in the insurance subsidiaries. Thus, a particular return on net worth at the level of the operating subsidiary will translate into a lower (higher) return on holding company capital if the market value of the holding company capital exceeds (is less than) the net worth of the insurance subsidiaries.

Stock market valuations at current levels put the market-to-net worth ratio of the public companies that own the major underwriters of Mobile Homeowners insurance in North Carolina, on average, well above one. However, even if one assumes that the market value of holding company capital is equal to the net worth of the operating subsidiaries, the table demonstrates that a total return on net worth of 10.32% is reasonable and not excessive; it falls toward the middle of the span of estimates (6.2% to 15.6%). The same characterization---of reasonable and not excessive---applies to a statutory return on net worth of 6.91%, which falls toward the lower end of the span of estimates. Similar conclusions apply after adjusting projected returns to account for the investment portfolio of companies serving the North Carolina Mobile Homeowners market and the current level of investment yields.

In summary, the expected return on net worth calculated in Section II is, in my opinion, consistent with a reasonable and not excessive return on invested capital.

IV. Conclusion

Q: Based on your knowledge and experience and on the studies and analyses you have performed, have you come to any conclusions regarding the underwriting profit factor selected by the Bureau and used in its indicated rate level calculations in this filing?

A: Yes. Based on my pro forma return analysis detailed in Exhibit RB-21, I found that the expected statutory return on net worth implied by the selected 6.5% underwriting profit factor was 6.91% (not including investment income on surplus). The expected total return on net worth was 10.32% (including investment income on surplus). When making adjustments that I regard as appropriate to account for the asset distribution relevant for this line of business and the yields currently in the marketplace, the expected statutory and total returns fell to 6.83% and 9.92% respectively. After reviewing the cost of capital estimates for the industry produced by third parties and producing my own estimates tailored to the North Carolina market, I found the expected returns on net worth resulting from the selected underwriting profit factors to be consistent with a reasonable and not excessive return on invested capital. Thus, I believe that the selected underwriting profit factor is reasonable and not excessive.

An important caveat to this analysis, however, is that all conclusions are predicated on the assumption that the indicated rate level is achieved. In the event that a lower rate level is implemented, the expected rate of return could be inadequate.

Q: Does that conclude your testimony?

A: Yes.

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Publications: Refereed Scholarly

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"Dynamic Capital Allocation in General Insurance," (with Daniel Bauer and Qiheng Guo), working paper, 2022

"The Ignorance of Crowds: Understanding Reserving Errors in the Liability Crisis of 1997-2001," (with Eren Cifci, Qianlong Liu, Steve Mildenhall, Lars Powell, and Kenny Wunder), working paper, 2022

- "Market Discipline and Guaranty Funds in Life Insurance," (with Martin Grace, Shinichi Kamiya, and Robert W. Klein), working paper, 2019
- "The Effect of Government Guarantees on Market Discipline in the Property-Casualty Insurance Industry," (with Yiling Deng, Ty Leverty, and Kenny Wunder), working paper, 2019
- "An Integrated Approach to Measuring Asset and Liability Risks in Financial Institutions," (with Daniel Bauer), working paper, 2019
- "Optimal Insurance Contracts with Insurer Background Risk," (with Xiaohu Ping), working paper, 2015
- "The Effect of Banking Crises: Evidence from Non-Life Insurance Consumption," (with Shinichi Kamiya and Jackie Li), working paper, 2015
- "Bankruptcy in the Core and Periphery of Financial Groups: The Case of the Property-Casualty Insurance Industry" working paper, 2010
- "The Rise and Fall of the Fraternal Life Insurer: Law and Organizational Form in U.S. Life Insurance, 1870-1920," working paper, (*revise and resubmit, Journal of Law & Economics*), 2007
- "Organizational Form and the Underwriting Cycle: Theory with Evidence from the Pennsylvania Fire Insurance Market, 1873-1909," working paper, 2004
- "Consumption versus Production of Insurance," (with Tomas Philipson), *NBER Working Paper #6225*, 1997

External Research Projects and Consulting

- 2022 Expert Witness, Insurance Rate Filings, North Carolina
- 2021 Expert Witness, Golson v. Provident Life, Alabama
- 2021 Expert Witness, Workers' Compensation Rate Filings, Massachusetts
- 2021 Expert Witness, Insurance Rate Filings, North Carolina
- 2020 Expert Witness, Insurance Rate Filings, North Carolina
- 2019 NCCI Review of Cost of Capital Methodology
- 2019 Expert Witness, Workers' Compensation Rate Filings, Massachusetts
- 2019 Expert Witness, Insurance Rate Filings, North Carolina
- 2018 NCCI Review of TCJA
- 2017 Expert Witness, Workers' Compensation Rate Hearing, Florida
- 2016 Expert Witness, Assigned Risk Workers' Compensation Rate Hearing, Virginia
- 2015 Expert Witness, Workers' Compensation Rate Hearing, Florida
- 2015 NCCI Revision of Underwriting Profit and Contingency Internal Rate of Return Model
- 2015 An Extension of the Project on the Costs of Holding Capital, sponsored by the CAS
- 2013 Microinsurance Centre Lessons from History Project
- 2012 Allocation of the Costs of Holding Capital, sponsored by the CAS,
- 2011 CRO Risk Index Project, co-sponsored by SOA and Bloomberg, co-founder

2009 "The Financial Crisis and Lessons for Insurers," \$50,000 SOA grant, role: report co-author

Papers Presented at Professional Meetings

- 2022 "Understanding Loss Reserving Errors in the Liability Catastrophe of 1997-2001," Conference in Honor of J.David Cummins and Mary Weiss, Temple University, Philadelphia
- 2020 "Life Insurance and Annuity Pricing During the Financial Crisis, Revisited" WRIEC, virtual meeting
- 2019 "An Integrated Approach to Measuring Asset and Liability Risks in Financial Institutions," EGRIE Annual Meeting, Rome, Italy
- 2019 "An Integrated Approach to Measuring Asset and Liability Risks in Financial Institutions," ARIA Annual Meeting, San Francisco, CA
- 2019 "An Integrated Approach to Measuring Asset and Liability Risks in Financial Institutions," RTS Annual Seminar, Tuscaloosa, AL
- 2017 "The Effect of Government Guarantees on Market Discipline in the Property-Casualty Insurance Industry," NBER Insurance Project Workshop, Boston, MA
- 2015 "The Marginal Cost of Risk in a Multi-Period Model," NBER Insurance Project Workshop, Stanford, CA
- 2015 "The Marginal Cost of Risk in a Multi-Period Model," CAS Annual Meeting, Philadelphia, PA
- 2015 "Dynamic Capital Allocation," IME Annual Conference, Liverpool UK
- 2015 "What Drives Tort Reform Legislation? Economics and Politics of the State Decisions to Restrict Liability Torts," ASSA Annual Meeting, Boston, MA
- 2014 "The Marginal Cost of Risk in a Multi-Period Model," CAS Centennial, New York, NY
- 2014 "Market Discipline and Guaranty Funds in Life Insurance," EGRIE Annual Seminar, St. Gallen, CH
- 2014 "Dynamic Capital Allocation with Irreversible Investments," EGRIE Annual Seminar, St. Gallen, CH
- 2014 "What Drives Tort Reform Legislation? Economics and Politics of the State Decisions to Restrict Liability Torts," ARIA Annual Meeting, Seattle, WA
- 2014 "The Marginal Cost of Risk in a Multi-Period Model," ARIA Annual Meeting, Seattle, WA
- 2014 "Market Discipline and Guaranty Funds in Life Insurance," ARIA Annual Meeting, Seattle, WA
- 2014 "The Marginal Cost of Risk in a Multi-Period Model," IME Conference, Shanghai, CN
- 2014 "The Effect of Banking Crises: Evidence from Non-Life Insurance Consumption," Risk Theory Seminar, Munich, Germany
- 2013 "The Effect of Banking Crises: Evidence from Non-Life Insurance Consumption," ASSA Annual Meeting, Philadelphia, PA
- 2013 "Optimal Insurance Contracts with Insurer Background Risk," EGRIE Annual Meeting, Paris, FR
- 2013 "The Effect of Banking Crises: Evidence from Non-Life Insurance Consumption," ARIA Annual Meeting, Washington D.C.
- 2013 "The Marginal Cost of Risk, Risk Measures, and Capital Allocation," IRFRC Catastrophe Risk Conference, Singapore
- 2013 "Optimal Insurance Contracts with Insurer Background Risk," ARIA Annual Meeting, Washington D.C.
- 2013 "The Marginal Cost of Risk, Risk Measures, and Capital Allocation," CEAR/ETH Indices of Risk and New Risk Measures Conference, Zurich, CH
- 2012 "The Marginal Cost of Risk, Risk Measures, and Capital Allocation," CAS Spring Meeting, Phoenix, AZ
- 2012 "The Marginal Cost of Risk, Risk Measures, and Capital Allocation," Symposium: Risk and Catastrophic Events, State College, PA
- 2012 "The Marginal Cost of Risk, Risk Measures, and Capital Allocation," ASSA Annual Meeting, Chicago, IL
- 2011 "The Marginal Cost of Risk, Risk Measures, and Capital Allocation," NBER Insurance Project Workshop, Cambridge, MA
- 2010 "Bankruptcy in the Core and Periphery of Financial Groups: The Case of the Property-Casualty Insurance Industry," ASSA Annual Meeting, Atlanta, GA
- 2009 "Bankruptcy in the Core and Periphery of Financial Groups: The Case of the Property-Casualty Insurance Industry," Risk Management and Corporate Governance Conference, Loyola University of Chicago
- 2009 "Bankruptcy in the Core and Periphery of Financial Groups: The Case of the Property-Casualty Insurance Industry," ARIA Annual Meeting, Providence, RI
- 2008 "An Economic Approach to Capital Allocation," Risk Theory Society, Annual Meeting, Fort Collins, CO

- 2007 “Federal Financial Exposure to Catastrophic Risk,” ARIA Annual Meeting, Quebec City, CA
2007 “Catastrophe Bonds, Reinsurance, and the Optimal Collateralization of Risk Transfer,” EFMA Annual Meeting, Vienna, AT
2007 “Catastrophe Bonds, Reinsurance, and the Optimal Collateralization of Risk Transfer,” 5th Infiniti Conference on International Financial Integration, Dublin, IE
2007 “Federal Financial Exposure to Catastrophic Risk,” NBER Conference on Measuring and Managing Federal Financial Risk, Evanston, IL
2006 Insuring Catastrophic Losses: The Status of TRIA and Proposed Natural Disaster Backstops, Wash., D.C.
2006 “Catastrophe Bonds, Reinsurance, and the Optimal Collateralization of Risk Transfer,” Risk Theory Society, Annual Meeting, Richmond, VA
2006 “Public versus Private Underwriting of Catastrophe Risk: Lessons from the California Earthquake Authority,” Berkeley Symposium on Real Estate, Catastrophic Risk, and Public Policy
2006 “Catastrophe Bonds, Reinsurance, and the Optimal Collateralization of Risk Transfer,” NBER Insurance Project Workshop, Cambridge, MA
2005 “Regulation, Capital, and the Evolution of Organizational Form in U.S. Life Insurance,” NBER Insurance Project Workshop, Cambridge, MA
2004 “The Rise and Fall of the Fraternal Life Insurer: Law and Organizational Form in U.S. Life Insurance,” NBER Insurance Project Workshop, Cambridge, MA
2004 “Regulation, Capital, and the Evolution of Organizational Form in U.S. Life Insurance,” American Finance Association, Annual Meeting, San Diego, CA
2003 “Insurance, Self-Protection, and the Economics of Terrorism,” Risk Theory Society, Annual Meeting, Atlanta, GA
2003 “Terrorism Insurance Policy and the Public Good,” St. John’s Journal of Legal Commentary 10th Annual Legal Symposium: Terrorism and its Impact on Insurance: Legislative Responses and Coverage Issues, Queens, NY
2003 “Insurance, Self-Protection, and the Economics of Terrorism,” NBER Insurance Project Workshop, Cambridge, MA
2002 “Pricing and Capital Allocation in Catastrophe Insurance,” CAS Risk and Capital Management Seminar, Toronto, CA
2002 “Market Discipline and Government Guarantees in U.S. Life Insurance,” Risk Theory Society, Annual Meeting, Urbana-Champaign, IL
2001 “Pricing and Capital Allocation in Catastrophe Insurance,” Risk Theory Society, Annual Meeting, Montreal

Other Conferences Talks and Panel Participation

- 2018 Surplus Lines Automation Conference, Florida
2017 International Conference on Business Sciences, Cairo University, Egypt
2016 IIF Insurance Colloquium, Basel, Switzerland
2016 Surplus Lines Association of California, California (keynote)
2014 Surplus Lines Automation Conference, Florida
2011 PRMIA Annual Risk Leadership Conference, Atlanta, GA
2011 7th International Microinsurance Conference, Rio de Janeiro, Brazil
2010 Property Loss Research Bureau Eastern Adjusters Conference, Atlanta, GA (keynote)
2008 NCOIL Annual Meeting, Duck Key, FL
2007 Capital Markets Symposium on Securitizing Insurance Risk, New York, NY
2006 Insuring Catastrophic Losses: The Status of TRIA and Proposed Natural Disaster Backstops, Wash., D.C.
2006 Catastrophe Bonds and Insurance Linked Securities Summit, New York, NY
2005 12th Annual International Conference Promoting Business Ethics, New York, NY

Service Activities in Academic and Professional Organizations

Senior Editor, *Journal of Risk and Insurance* (2019-)
Associate Editor, *Insurance: Mathematics and Economics* (2022-)

International Research Advisory Board, Risk and Insurance Research Center, NCCU, Taiwan
American Risk & Insurance Association President (2012-13)
Risk Theory Society President (2011-2012)
American Risk & Insurance Association Board Member (2007-2014)
Editorial Board, *Journal of Insurance Issues* (2012-2014)
Huebner Colloquium Panelist (2016-2019)

External Committees

American Risk & Insurance Association Program Committee, various years; ARIA Nominations Committee, 2015, 2016, 2018; Kulp-Wright Book Award Committee, 2005

Discussant: *ARIA Annual Meeting, Los Angeles, 2022; WRIEC 2020; EGRIE Annual Meeting, Rome, 2019; ARIA Annual Meeting, San Francisco, 2019; ARIA Annual Meeting, Chicago, 2018; ARIA Annual Meeting, Boston, 2016; SIFR Insurance Conference, Stockholm, 2015; EGRIE Annual Seminar, St. Gallen, 2014; ARIA Annual Meeting, Seattle, 2014; ARIA Annual Meeting, San Diego, 2011; CEAR Workshop on Insurance for the Poor, Atlanta, 2010; CEAR Workshop on Risk Perception and Subjective Beliefs, Atlanta, 2010; Midwest Finance Association Annual Meeting, Chicago, 2009; 5th Infiniti Conference, Dublin, 2007; EFMA Annual Meeting, Vienna, 2007; AEA Annual Meeting, San Diego, 2004*

Session Chair: *ARIA Annual Meeting, Chicago, 2018, ARC, Atlanta, 2017; IME, Atlanta, 2017; ARIA Annual Meeting, San Diego, 2011; Midwest Finance Association Annual Meeting, Chicago, 2009; ARIA Annual Meeting, Quebec City, 2007; EFMA Annual Meeting, Vienna, 2007;*

Referee for *Asia-Pacific Journal of Risk and Insurance, Astin Bulletin, Australian Social Monitor, Contemporary Economic Policy, Current Issues in Economics and Finance, Defense and Peace Economics, European Economic Review, Financial Review, Geneva Papers: Issues and Practice, Geneva Risk and Insurance Review, Health Affairs, Insurance: Mathematics and Economics, Journal of Banking and Finance, Journal of Business, Journal of Finance, Journal of Financial Intermediation, Journal of Financial Services Research, Journal of Law and Economics, Journal of Mathematical Economics, Journal of Money, Credit, and Banking, Journal of Political Economy, Journal of Risk and Insurance, Management Science, Mathematical Social Sciences, North American Actuarial Journal, Proceedings of the National Academy of Sciences, Review of Financial Studies, Risk Management and Insurance Review, Scandinavian Actuarial Journal, and Science.*

Working Group Participation

Committee on the Global Financial System, Working Group on Institutional Investors, Global Savings, and Asset Allocation (2006); Presidential Working Group on Financial Markets, Working Group on Terrorism Insurance (2006)

Continuing Education Activities

- | | |
|-----------|--|
| 2004-2007 | Central Banking Seminar, Federal Reserve Bank of New York, Topics: Introduction to U.S. Financial Markets; Introduction to Non-bank Financial Institutions |
| 2009 | Texas Farm Bureau Program, Georgia State University, Topic: Securitization, the Insurance Industry, and the Panic of 2007 |
| 2009-2012 | Horst K. Jannott Visiting Fellows Program, Georgia State University, Topics: Securitization, the Insurance Industry, and the Panic of 2007; Introduction to Statistics |

NCRB - Pro Forma Statutory Rate of Return MOBILE HOMEOWNERS MH(F) INSURANCE			
	Pre-Tax	Tax Liability	Post-Tax
1 Premiums	100.00%		
Loss & LAE	43.98%		
Commissions	17.70%		
Other Acquisition & General	6.27%		
Taxes, Licenses, & Fees	3.00%		
Policyholder Dividends	0.45%		
Net Cost of Reinsurance	21.28%		
Compensation for Assessment Risk	0.81%		
2 Pro Forma Underwriting Profit	6.50%		
3 Installment Fee Income	0.21%		
4 Regular Tax		1.41%	
5 Additional Tax Due to IRS Treatment of Reserves		0.02%	
6 Total Return from Underwriting Post-Tax			5.28%
7 Investment Gain on Insurance Transaction	1.47%		
Less Investment Income on Agent and Reinsurance Balances	0.55%		
Net Investment Gain on Insurance Transaction	0.92%	0.15%	0.77%
8 Total Return as a Percent of Premium (post-tax)			6.05%
9 Premium-to-Net Worth Ratio			1.14
10 Total Return as a Percent of Net Worth (post-tax)			6.91%

Lines (1) to (8) are expressed as a percentage of premium.

Assumptions and Parameters

(a) Underwriting Income Tax Rate	21.00%
(b) Investment Income Tax Rate	16.44%
(c) Pre-tax Investment Yield	4.01%
(d) Premium-to-Surplus Ratio	1.3
(e) Net Worth-to-Surplus Ratio	1.137
(f) Installment Fee Income	0.21%
(g) Additional Tax Due to IRS Treatment of Loss Reserves and UEPR	0.02%
(h) Net Cost of Reinsurance	21.28%
(i) Compensation for Assessment Risk	0.81%

Notes to Exhibit RB-21 Page 1

- 1 The expense provisions are those used in Exhibit RB-1, adjusted for the indicated rate change.
- 2 Selected by North Carolina Rate Bureau
- 3 See Exhibit RB-21, Page 3
- 4 $[(2) + (3)] \times (a)$
- 5 See Exhibit RB-21, Pages 4-6
- 6 $(2) + (3) - (4) - (5)$
- 7 Investment income on agents balances is calculated as $0.165 \times 1.021 \times (c)$, where 0.165 is a factor for agents balances held for less than 90 days and 1.021 is a factor to correct for overdue balances. The figures are based on the Homeowners line and are sourced from ISO. We then deduct investment income on net reinsurance balances, which we estimate at 0.105 of the total cost of reinsurance times (c). The estimate for net reinsurance balances is based on ceded balances payable plus funds held plus other amounts due reinsurers minus reinsurance recoverables. These amounts are taken from the aggregated Schedule F in the latest available edition of A.M. Best's Aggregates & Averages.
- 8 $(6) + (7)$
- 9 $(d) / (e)$
- 10 $(8) \times (9)$

Assumptions

- (a) Current corporate tax rate, based on the Tax Cut and Jobs Act of 2017.
- (b) See Exhibit RB-21, Pages 11-13. Calculated as 1- average post-tax yield/average pre-tax yield.
- (c) See Exhibit RB-21, Page 10
- (d) See Exhibit RB-21, Page 14
- (e) See Exhibit RB-21, Page 15
- (f) See Exhibit RB-21, Page 3
- (g) See Exhibit RB-21, Pages 4-6
- (h) Net Cost of Reinsurance based on the analysis of Aon and incorporated in the filing, adjusted for the indicated rate change.
- (i) Compensation for Assessment Risk based on the analysis of Milliman incorporated in the filing, adjusted for the indicated rate change.

NCRB - Pro Forma Total Rate of Return (Including Investment Income on Surplus) MOBILE HOMEOWNERS MH(F) INSURANCE			
	Pre-Tax	Tax Liability	Post-Tax
1 Premiums	100.00%		
Loss & LAE	43.98%		
Commissions	17.70%		
Other Acquisition & General	6.27%		
Taxes, Licenses, & Fees	3.00%		
Policyholder Dividends	0.45%		
Net Cost of Reinsurance	21.28%		
Compensation for Assessment Risk	0.81%		
2 Pro Forma Underwriting Profit	6.50%		
3 Installment Fee Income	0.21%		
4 Regular Tax		1.41%	
5 Additional Tax Due to IRS Treatment of Reserves		0.02%	
6 Total Return from Underwriting Post-Tax			5.28%
7 Investment Gain on Insurance Transaction	1.47%		
Less Investment Income on Agent and Reinsurance Balances	0.55%		
Net Investment Gain on Insurance Transaction	0.92%	0.15%	0.77%
8 Investment Gain on Surplus	3.57%	0.59%	2.98%
9 Total Return as a Percent of Premium (post-tax)			9.03%
10 Premium-to-Net Worth Ratio			1.14
11 Total Return as a Percent of Net Worth (post-tax)			10.32%

Lines (1) to (8) are expressed as a percentage of premium.

Assumptions and Parameters

(a) Underwriting Income Tax Rate	21.00%
(b) Investment Income Tax Rate	16.44%
(c) Pre-tax Investment Yield	4.01%
(d) Premium-to-Surplus Ratio	1.30
(e) Net Worth-to-Surplus Ratio	1.137
(f) Installment Fee Income	0.21%
(g) Additional Tax Due to IRS Treatment of Loss Reserves and UEPR	0.02%
(h) Net Cost of Reinsurance	21.28%
(i) Compensation for Assessment Risk	0.81%

Notes to Exhibit RB-21 Page 1A

- 1 The expense provisions are those used in Exhibit RB-1, adjusted for the indicated rate change.
- 2 Selected by North Carolina Rate Bureau
- 3 See Exhibit RB-21, Page 3
- 4 $[(2) + (3)] \times (a)$
- 5 See Exhibit RB-21, Pages 4-6
- 6 $(2) + (3) - (4) - (5)$
- 7 Investment income on agents balances is calculated as $0.165 \times 1.021 \times (c)$, where 0.165 is a factor for agents balances held for less than 90 days and 1.021 is a factor to correct for overdue balances. The figures are based on the Homeowners line and are sourced from ISO. We then deduct investment income on net reinsurance balances, which we estimate at 0.105 of the total cost of reinsurance times (c). The estimate for net reinsurance balances is based on ceded balances payable plus funds held plus other amounts due reinsurers minus reinsurance recoverables. These amounts are taken from the aggregated Schedule F in the latest available edition of A.M. Best's Aggregates & Averages.
- 8 $(c) \times [1 / (d) + 0.2334 \times 0.519]$, where 0.2334 is the prepaid expense ratio minus the total cost of reinsurance from Page 7 and 0.519 is the UEPR ratio from Page 7.
- 9 $(6) + (7) + (8)$
- 10 $(d) / (e)$
- 11 $(9) \times (10)$

Assumptions

- (a) Current corporate tax rate, based on the Tax Cut and Jobs Act of 2017.
- (b) See Exhibit RB-21, Pages 11-13. Calculated as 1- average post-tax yield/average pre-tax yield.
- (c) See Exhibit RB-21, Page 10
- (d) See Exhibit RB-21, Page 14
- (e) See Exhibit RB-21, Page 15
- (f) See Exhibit RB-21, Page 3
- (g) See Exhibit RB-21, Pages 4-6
- (h) Net Cost of Reinsurance based on the analysis of Aon and incorporated in the filing, adjusted for the indicated rate change.
- (i) Compensation for Assessment Risk based on the analysis of Milliman incorporated in the filing, adjusted for the indicated rate change.

**NORTH CAROLINA
MOBILE HOMEOWNERS MH(F) INSURANCE
INSTALLMENT PAYMENT INCOME**

Year	Installment Charges	Mobile Home Written Premium	Percentage
2021	98,292	130,201,079	0.08%
2020	194,677	122,868,273	0.16%
2019	317,709	118,284,427	0.27%
2018	327,136	117,915,910	0.28%
2017	333,749	115,100,136	0.29%
Selected Value			0.21%

Source: NCRB

**North Carolina
MOBILE HOMEOWNERS MH(F) INSURANCE
Calculation of Additional Tax Liability**

1. Collected Earned Premium for Current Year	100.00%
2. Unearned (Net) Premium Reserve 12/31/Current	38.29%
3. Unearned (Net) Premium Reserve 12/31/Prior	37.63%
4. Increase: (2) - (3)	0.67%
5. 20% of Increase = Taxable Income	0.13%
6. Additional Tax Liability due to Unearned Premium Reserve	0.03%
7. Unpaid Loss Current Year	11.43%
8. Discounted Unpaid Loss Prior Year	10.85%
9. Unpaid Loss Prior Year	11.23%
10. Discounted Unpaid Loss Prior Year	10.63%
11. Additional Income	-0.02%
12. Additional Tax Liability due to Loss Reserve Discounting	0.00%
13. Total Additional Tax Liabilities (6) + (12)	0.02%

**NORTH CAROLINA
MOBILE HOMEOWNERS MH(F) INSURANCE
Calculation of Taxable Income**

Calculation of Unpaid Loss for Current Accident Year (AY)					Calculation of Discounted Unpaid Loss for Current AY			Calculation of Discounted Unpaid Loss for Prior AY				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
AY Avg Acc Date	AY Pay Pattern	Percent Unpaid	Total Losses	Unpaid Losses	AY at 12/31 yr t	Discount Factor	Discounted Unpaid Loss	AY at 12/31/yr t-1	Unpaid Losses	Discount Factor	Discounted Unpaid Loss	
0.5	75.79%	24.21%	43.981	10.65	2021	0.954554	10.1650					
1.5	94.14%	5.86%	43.216	2.53	2020	0.933939	2.3663	2020	10.464	0.950975	9.9510	
2.5	98.58%	1.42%	42.465	0.60	2019	0.936815	0.5647	2019	2.490	0.933741	2.3247	
3.5	99.66%	0.34%	41.728	0.14	2018	0.932041	0.1337	2018	0.592	0.939651	0.5566	
4.5	99.92%	0.08%	41.002	0.03	2017	0.914064	0.0312	2017	0.141	0.932041	0.1314	
5.5	99.98%	0.02%	40.290	0.01	2016	0.916039	0.0074	2016	0.034	0.914064	0.0306	
6.5	100.00%	0.00%	39.590	0.00	2015	0.913154	0.0018	2015	0.008	0.916039	0.0073	
7.5	100.00%	0.00%	38.902	0.00	2014	0.910177	0.0000	2014	0.002	0.913154	0.0017	
					2013			2013	0.000	0.910177	0.0000	
Totals				13.97	13.27			13.73				13.00

Notes to Pages 4 and 5

Page 4

- 2 Page 8, line (2) divided by Page 8, line (1) times one minus the Cost of Reinsurance from Page 7
- 3 (2) divided by 1 plus the 10 year average growth rate of MHF premiums in North Carolina
- 4 (2) - (3)
- 5 (4) x 20%
- 6 (5) x current corporate tax rate
- 7 Unpaid current-year net losses at year-end as a percent of current year premium.
Sum of Page 5, Column (5) x (ratio of the net loss and LAE ratio from Page 7 to the direct loss and LAE ratio from Page 1)
- 8 Discounted unpaid current-year losses at year-end as a percent of current year premium.
Sum of Page 5, Column (8) x (ratio of the net loss and LAE ratio from Page 7 to the direct loss and LAE ratio from Page 1)
- 9 Unpaid prior-year losses at year-end as a percent of current year premium.
Sum of Page 5, Column (10) x (ratio of the net loss and LAE ratio from Page 7 to the direct loss and LAE ratio from Page 1)
- 10 Discounted unpaid prior-year losses at year-end as a percent of current year premium.
Sum of Page 5, Column (12) x (ratio of the net loss and LAE ratio from Page 7 to the direct loss and LAE ratio from Page 1)
- 11 Change in loss reserve discount: [(7) - (8)] - [(9) - (10)]
- 12 (11) x current corporate tax rate
- 13 (6) + (12)

Page 5

- 1 Midpoint of number of years since end of accident period
- 2 Homeowners accident year payout pattern developed from North Carolina policy year losses (Source: ISO)
- 3 1 - (2)
- 4 Latest period losses are based on projected loss ratio from Page 1. For previous years,
losses are detrended at the 10 year average premium growth rate for MHF in North Carolina.
- 5 (3) x (4)
- 6 Accident Year at current year end
- 7 IRS discount factors for Multiple Peril Lines from IRS Bulletin 2021-52
- 8 (5) x (7)
- 9 Accident Year at prior year end
- 10 Column (3), previous period x Column (4), current period
- 11 IRS discount factors for Multiple Peril Lines from IRS Revenue Procedure 2020-48
- 12 (10) x (11)

**NCRB Investment Income Calculation
MOBILE HOMEOWNERS MH(F) INSURANCE**

**Projected Investment Earnings on Loss, Loss
Adjustment Expense and Unearned Premium Reserves**

A. UNEARNED PREMIUM RESERVES

1. Direct Earned Premiums		1,000,000
2. Mean Unearned Premium Reserve	51.90%	518,963
3. Deductions for Prepaid Expenses		
Commissions & Brokerage	17.70%	
Taxes, Licenses, & Fees (5/6)	2.50%	
Other Acquisition & General (1/2)	3.14%	
Cost of Reinsurance	29.29%	
Total	52.63%	
4. Deduction for Prepaid Expense: (2) x (3)		273,138
5. Net Unearned Premium Reserve Subject to Investment (2) - (4)		245,824

B. Loss and Loss Expense Reserves

1. Direct Earned Premiums		1,000,000
2. Expected Net Incurred Loss & LAE-to- Direct Premium Ratio	35.97%	359,666
3. Expected Mean Loss and LAE Reserve-to-Incurred Ratio	33.73%	121,315

C. Net Policyholder Funds Subject to Investment (A5 + B3) 367,139

D. Average Rate of Return 4.01%

E. Investment Earnings from Net Reserves: (C) x (D) 14,728

F. Average Rate of Return as a Percent of Direct Earned Premiums: (E) / (A1) 1.47%

**NORTH CAROLINA
MOBILE HOMEOWNERS MH(F) INSURANCE**

**ESTIMATED INVESTMENT EARNINGS ON UNEARNED
PREMIUM RESERVES AND ON LOSS RESERVES**

EXPLANATORY NOTES

Line A-1

Calculations displayed are per million of direct earned premiums.

Line A-2

The mean unearned premium reserve (UEPR) is determined by multiplying the direct earned premiums in line (1) by the ratio of the mean unearned premium reserve to the direct earned premium for the current calendar year ended 12/31/21. The data are for North Carolina Homeowners (NC HO) insurance (from statutory Page 14 of the Annual Statement) for all companies which wrote Mobile Homeowners F in the most recent calendar year. Volume amounts are in thousands of dollars.

1 NC HO Direct Earned Premium for most recent calendar year	1,113,852
2 NC HO UEPR at end of most recent calendar year	603,225
3 NC HO UEPR at end of previous calendar year	552,870
4 Mean NC HO UEPR	578,048
5 Ratio [(4) / (1)]	51.90%

Line A-3

Deduction for prepaid expenses

Certain production expenses, such as commissions and reinsurance, are assumed to be incurred when the policy is written and before the premium is paid. In addition, half of Other Acquisition and General expenses and 5/6 of Taxes, Licenses and Fees are assumed to be prepaid.

**NORTH CAROLINA
MOBILE HOMEOWNERS MH(F) INSURANCE**

**ESTIMATED INVESTMENT EARNINGS ON UNEARNED
PREMIUM RESERVES AND ON LOSS RESERVES**

EXPLANATORY NOTES

Line B-2

Ratio is calculated as the expected direct loss and LAE ratio from Page 1 minus the difference between the total cost of reinsurance from Line A-3 and the net cost of reinsurance from Page 1.

Line B-3

The mean loss reserve is calculated by multiplying the incurred losses in (2) by the ratio for mean loss reserves to incurred losses. The latter figures are based on total statutory Page 14 figures for North Carolina Homeowners direct losses incurred and direct losses unpaid for all companies writing Mobile Homeowners F in North Carolina in each year. The adjustment for loss expense reserves is based on nationwide industry aggregates for the HO line. Volume amounts are in thousands of dollars.

6 Direct Losses Incurred	2017	478,549
7 Direct Losses Incurred	2018	878,952
8 Direct Losses Incurred	2019	576,563
9 Direct Losses Incurred	2020	720,974
10 Direct Losses Incurred	2021	574,252
11 Direct Losses Unpaid	2016	187,316
12 Direct Losses Unpaid	2017	152,655
13 Direct Losses Unpaid	2018	251,499
14 Direct Losses Unpaid	2019	186,352
15 Direct Losses Unpaid	2020	220,506
16 Direct Losses Unpaid	2021	196,446
17 Mean Loss Reserve	2017	169,985
18 Mean Loss Reserve	2018	202,077
19 Mean Loss Reserve	2019	218,925
20 Mean Loss Reserve	2020	203,429
21 Mean Loss Reserve	2021	208,476
22 Ratio	2017	35.52%
23 Ratio	2018	22.99%
24 Ratio	2019	37.97%
25 Ratio	2020	28.22%
26 Ratio	2021	36.30%
27 Average Loss Reserve		32.20%
28 Ratio of LAE Reserves to Loss Reserves		0.191
29 Ratio of Incurred LAE to Incurred Loss		0.137
30 Loss & LAE Reserve [(27) x (1+(28))/(1+(29))]		0.337

**NORTH CAROLINA
MOBILE HOMEOWNERS MH(F) INSURANCE**

**ESTIMATED INVESTMENT EARNINGS ON UNEARNED
PREMIUM RESERVES AND ON LOSS RESERVES**

EXPLANATORY NOTES

Line E

The average rate of return is the average of the pretax current yield calculated on Page 11 and the pretax embedded yield. The embedded yield (see Page 12) is the sum of the ratio of investment income to invested assets for the most recent year plus the ten year average ratio of capital gains to invested assets (see Page 13). The current yield is the estimated currently available rate of return (including both income and capital gains) on the industry investment portfolio (see Page 11).

Embedded Yield	3.32%
Current Yield	4.70%
Average	4.01%

Portfolio Yield and Tax Rate - Current Yield					
Investable Asset	Percent of Assets	Estimated Prospective Pre-Tax Return	Tax Rate	Estimated Prospective Post-Tax Return	
Bonds					
US Gov't	8.47%	3.16%	21.00%	2.50%	
Municipal	21.43%	2.04%	5.25%	1.94%	
Industrial	33.42%	3.82%	21.00%	3.02%	
Preferred Stock	0.51%	5.61%	13.13%	4.87%	
Common Stock	20.82%	10.68%	19.60%	8.59%	
Mortgage Loans	1.30%	5.37%	21.00%	4.24%	
Real Estate	0.80%	6.71%	21.00%	5.30%	
Cash & Short-term Investments	5.48%	2.19%	21.00%	1.73%	
Other Long-Term Investments	7.78%	6.30%	18.78%	5.12%	
Rate of Return Before Expenses	100.00%	4.97%	18.72%	4.04%	
Investment Expenses		0.27%	21.00%	0.21%	
Portfolio Rate of Return		4.70%	18.59%	3.83%	

Sources

Preferred Stock	Current yield on iShares Preferred Stock Index ETF, 8/12/2022
Real Estate	REIT Sector WACC; source: Damodaran Online
Cash	3 month Treasury rate, averaged over 3 months (source: US Treasury)
Municipal	Maturity weighted avg of 3 month avg MBIS Investment Grade yield curve; linearly interpolated
Industrial	Three month average of HQM par yields (source: FRED); linearly interpolated
Treasury	Three month average of Treasury yields; linearly interpolated (source: US Treasury)
Common Stock	0.0849 ERP (source: Damodaran Online) plus 3 month average T-Bill Rate
Other LTI	Average of yields on bond portfolio, preferred stock, common stock, mortgages, and real estate.
Investment Expenses	Investment Expenses from statutory Page 12 of the Annual Statement (Exhibit of Net Investment Income) divided by Cash and Invested Assets from statutory Page 2 of the Annual Statement (Assets), as compiled in the 2022 edition of A.M. Best's Aggregates and Averages.

Portfolio Yield and Tax Rate		
Embedded Yield		
	Income	Tax Rate
Bonds		
Taxable	27,541,921	21.00%
Non-Taxable	6,758,270	5.25%
Stocks		
Taxable	9,208,921	13.13%
Non-Taxable	3,215,338	5.25%
Mortgage Loans	1,149,755	21.00%
Real Estate	1,995,863	21.00%
Contract Loans	91	21.00%
Cash & Short Term Inv	138,807	21.00%
All Other	12,716,678	21.00%
Total	62,725,644	17.34%
Inv. Expenses	6,106,110	21.00%
Net Inv. Income	56,619,534	16.95%
Mean Invested Assets	2,156,355,790	
Inv. Inc. Yield Rate	2.63%	16.95%
Capital Gains (10 yr. avg.) (% of Inv. Assets)	0.70%	0.00%
Invest. Yield Rate (pre-tax)	3.32%	13.39%
Invest. Yield Rate (post-tax)	2.88%	

Source: A.M. Best's Aggregates and Averages, 2022 Edition, Page 12 - Exhibit of Net Investment Income (Column 2 - Earned During Year). For capital gains, see Exhibit RB-21, Page 13.

**Realized Capital Gains or Losses
As a Percentage of Mean Invested Assets
(Amounts in Thousands of Dollars)**

Calendar Year	Mean Invested Assets	Realized Capital Gains Amount	Percent
2012	1,400,656,619	9,035,405	0.65%
2013	1,473,600,834	12,163,890	0.83%
2014	1,543,882,375	12,093,078	0.78%
2015	1,567,611,077	9,887,732	0.63%
2016	1,596,937,470	8,086,268	0.51%
2017	1,676,831,258	15,725,303	0.94%
2018	1,733,729,297	10,825,733	0.62%
2019	1,822,857,949	11,238,484	0.62%
2020	1,975,605,647	10,933,304	0.55%
2021	2,156,355,790	18,153,320	0.84%
Total	16,948,068,313	118,142,517	0.70%

"Mean Invested Assets" is the average of current and prior year values for Total Invested Assets (Page 2). Source for data is 2012-2022 editions of A.M. Best's Aggregates and Averages. Figures are net of capital gains taxes.

North Carolina**MOBILE HOMEOWNERS MH(F) INSURANCE****Premium-to-Surplus Ratios**

Year	Ratio
2021	1.34
2020	1.27
2019	1.36
2018	1.45
2017	1.38
2016	1.25
2015	1.23
2014	1.24
2013	1.20
2012	1.23
Average	1.30

Data from NAIC Statutory Filings and from A.M. Best's Aggregates and Averages, various years, for all groups writing Mobile Homeowners insurance in North Carolina, weighted by North Carolina Mobile Homeowners premiums.

North Carolina
MOBILE HOMEOWNERS MH(F) INSURANCE
Calculation of Ratio of GAAP Net Worth to Statutory Surplus

	2016	2017	2018	2019	2020
Policyholder Surplus	700,833,588,840	750,700,298,191	742,079,084,495	847,278,658,173	910,066,482,410
+ Deferred Acquisition Costs	33,046,102,666	34,674,341,556	43,991,738,565	46,002,606,289	48,118,482,109
+ Non-Admitted DTA Provision	11,544,280,333	5,482,491,430	6,314,927,861	6,045,409,090	6,001,020,602
+ Non-admitted Assets (non-tax part)	43,722,898,341	46,932,629,941	46,502,063,197	50,520,441,190	51,971,123,366
+ Provision for Reinsurance	2,185,395,913	2,595,884,443	2,737,598,756	2,944,031,835	3,290,710,172
+ Provision for FASB 115(after-tax)	10,015,172,605	14,432,773,013	912,505,274	32,483,869,271	57,249,505,836
- Surplus Notes	(12,027,889,160)	(11,859,500,848)	(11,660,367,237)	(11,606,263,627)	(13,225,869,920)
GAAP-adjusted Net Worth	789,319,549,538	842,958,917,726	830,877,550,911	973,668,752,221	1,063,471,454,574
Ratio of Net Worth to Surplus	1.13	1.12	1.12	1.15	1.17
Five Year Average	1.137				

Source: ISO

Sample of Findings on the Private Company Discount

Study	Years	Discount	Type
Emory (1994)	1992-1993	45%	IPO
Willamette Management Associates (various)	1975-1997	29% to 60%	IPO
Garland and Reilly (2004)	1998-2002	35%	IPO
Larcker et al. (2018)	2017	39% to 47%	IPO
Koeplin et al. (2000)	1984-1998	20% to 30%	Acquisitions
Block (2007)	1999-2006	20% to 25%	Acquisitions
Officer (2007)	1979-2003	15% to 30%	Acquisitions
Paglia and Harjoto (2010)	1993-2008	65% to 70%	Acquisitions
Jaffe et al. (2018)	1985-2014	0%	Acquisitions
Lohrey (2020)	2005-2015	48% to 62%	Acquisitions
Silber (1991)	1981-1988	34%	Restricted Stock
Johnson (1999)	1991-1995	20%	Restricted Stock
Bajaj et al. (2001)	1990-1995	7%	Private placements
Comment (2012)	2004-2010	5% to 6%	Private placements
Finnerty (2013)	1991-1997	21%	Private placements
Finnerty (2013)	1997-2007	15%	Private placements
Chen et al. (2015)	1999-2012	10%	Private placements

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* The Willamette research studies were unpublished but reported in *Business Valuation Discounts and Premiums*, Chapter 5, by Shannon Pratt (New York: John Wiley & Sons, Inc., p. 85).