September 1, 2021

The Honorable Mike Causey
Commissioner
North Carolina Dept. of Insurance
1201 Mail Service Center
Raleigh, NC 27699-1201

Re: Workers Compensation Insurance
2021 Residual Market Rate Filing

Dear Commissioner Causey:

Pursuant to the provisions of Article 36, Chapter 58 of the General Statutes of North Carolina, enclosed is the filing for residual market workers compensation insurance rates, rating values and miscellaneous values to become effective in accordance with the following rule of application:

> Revised residual market rates shall become effective as of April 1, 2022 and shall be applied to all residual market policies as of the first normal anniversary rating date which is on or after April 1, 2022, but shall not otherwise be available to outstanding policies. No policy may be canceled and rewritten to take advantage of or to avoid application of this rule.

The enclosed memoranda, exhibits, testimony and other supporting data explain the calculations supporting the loss cost multiplier; this filing makes reference to the September 1, 2021 Loss Cost Filing for the voluntary market to support the change in loss costs. Combined, the two filings support an average increase in the overall premium for residual market workers compensation insurance of 4.9%.

This premium level change includes a 5.3% decrease in loss costs detailed in the 2021 loss cost filing and a 10.8% increase in the loss cost multiplier detailed in this filing.

By industry group, the changes are: Manufacturing, 6.7% increase; Contracting, 3.7% increase; Office and Clerical, 4.5% increase; Goods & Services, 5.5% increase; and Miscellaneous, 3.6% increase. Within each industry group the change will vary from the average by classification depending upon the volume and character of the particular classification experience.

The residual market rates for classifications which contemplate exposure under the United States Longshore and Harbor Workers' Compensation Act ("F" classifications) are also included. This filing proposes a decrease of 5.4% to the overall residual market premium level of the "F" classifications.

Information and statistical data required pursuant to NCGS §58-36-15 and 11 NCAC 10.1111 are submitted. Additionally, the pre-filed testimony of (a) Raymond F. Evans, Jr., CPCU, General Manager - North Carolina Rate Bureau, (b) Brett Foster, FCAS, MAAA - National Council on Compensation Insurance, Inc. (c) Mark Mulvaney, FCAS, MAAA - Milliman, Inc., and (d) Dr. George Zanjani – University of Alabama and exhibits referenced therein are enclosed.

Sincerely,

Joanna Biliouris

Joanna Biliouris
Chief Operating Officer

JB:ko
Enclosures

NORTH CAROLINA - ASSIGNED RISK

SUMMARY

Proposed Effective Date April 1, 2022

I. Industrial Classifications

Overall Proposed Change in Rate Level

- New and Renewal Policies +4.9%

By Industry Group

Manufacturing	+6.7%
Contracting	+3.7%
Office and Clerical	+4.5%
Goods and Services	+5.5%
Miscellaneous	+3.6%
Overall	+4.9%

II. Federal Classifications

Overall Proposed Change in Rate Level

- New and Renewal Policies -5.4%

III. Summary of Miscellaneous Changes

	Current	Proposed
- USL&HW %	58%	58%
- Experience Rating Split Point	$18,000	$18,500
- Experience Rating Premium Eligibility Thresholds		
Column A	$11,500	$12,000
Column B	$5,750	$6,000

NORTH CAROLINA – ASSIGNED RISK

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*Sections incorporated by reference to the Loss Cost Filing

NORTH CAROLINA

EXHIBIT I

Determination of Indicated Rate Level Change

Section A - Policy Year 2019 Experience

Premium:

(1)	Standard Earned Premium Developed to Ultimate (Appendix A-II)	$902,080,473
(2)	Premium On-level Factor (Appendix A-I)	0.770
(3)	Premium Available for Benefit Costs = (1) x (2)	$694,601,964

Indemnity Benefit Cost:

(4)	Limited Indemnity Losses Developed to Ultimate (Appendix A-II)	$334,508,868
(5)	Indemnity Loss On-level Factor (Appendix A-I)	1.000
(6)	Factor to Include Loss Adjustment Expense (Exhibit II)	1.200
(7)	Composite Adjustment Factor = (5) x (6)	1.200
(8)	Adjusted Limited Indemnity Losses = (4) x (7)	$401,410,642
(9)	Adjusted Limited Indemnity Cost Ratio excluding Trend and Benefits = (8) / (3)	0.578
(10)	Factor to Reflect Indemnity Trend (Appendix A-III)	0.874
(11)	Projected Limited Indemnity Cost Ratio = (9) x (10)	0.505
(12)	Factor to Adjust Indemnity Cost Ratio to an Unlimited Basis (Appendix A-II)	1.010
(13)	Projected Indemnity Cost Ratio = (11) x (12)	0.510
(14)	Factor to Reflect Proposed Changes in Indemnity Benefits (Appendix C)	1.000
(15)	Projected Indemnity Cost Ratio including Benefit Changes = (13) x (14)	0.510

Medical Benefit Cost:

(16)	Limited Medical Losses Developed to Ultimate (Appendix A-II)	$266,782,881
(17)	Medical Loss On-level Factor (Appendix A-I)	1.005
(18)	Factor to Include Loss Adjustment Expense (Exhibit II)	1.200
(19)	Composite Adjustment Factor = (17) x (18)	1.206
(20)	Adjusted Limited Medical Losses = (16) x (19)	$321,740,154
(21)	Adjusted Limited Medical Cost Ratio excluding Trend and Benefits = (20) / (3)	0.463
(22)	Factor to Reflect Medical Trend (Appendix A-III)	0.889
(23)	Projected Limited Medical Cost Ratio = (21) x (22)	0.412
(24)	Factor to Adjust Medical Cost Ratio to an Unlimited Basis (Appendix A-II)	1.010
(25)	Projected Medical Cost Ratio = (23) x (24)	0.416
(26)	Factor to Reflect Proposed Changes in Medical Benefits (Appendix C)	1.015
(27)	Projected Medical Cost Ratio including Benefit Changes = (25) x (26)	0.422

Total Benefit Cost:

(28)	Indicated Change Based on Experience, Trend and Benefits = (15) + (27)	0.932

NORTH CAROLINA

EXHIBIT I

Determination of Indicated Rate Level Change

Section B - Policy Year 2018 Experience

Premium:

(1)	Standard Earned Premium Developed to Ultimate (Appendix A-II)	$982,803,234
(2)	Premium On-level Factor (Appendix A-I)	0.657
(3)	Premium Available for Benefit Costs = (1) x (2)	$645,701,725

Indemnity Benefit Cost:

(4)	Limited Indemnity Losses Developed to Ultimate (Appendix A-II)	$327,442,527
(5)	Indemnity Loss On-level Factor (Appendix A-I)	1.000
(6)	Factor to Include Loss Adjustment Expense (Exhibit II)	1.200
(7)	Composite Adjustment Factor = (5) x (6)	1.200
(8)	Adjusted Limited Indemnity Losses = (4) x (7)	$392,931,032
(9)	Adjusted Limited Indemnity Cost Ratio excluding Trend and Benefits = (8) / (3)	0.609
(10)	Factor to Reflect Indemnity Trend (Appendix A-III)	0.839
(11)	Projected Limited Indemnity Cost Ratio = (9) x (10)	0.511
(12)	Factor to Adjust Indemnity Cost Ratio to an Unlimited Basis (Appendix A-II)	1.010
(13)	Projected Indemnity Cost Ratio = (11) x (12)	0.516
(14)	Factor to Reflect Proposed Changes in Indemnity Benefits (Appendix C)	1.000
(15)	Projected Indemnity Cost Ratio including Benefit Changes = (13) x (14)	0.516

Medical Benefit Cost:

(16)	Limited Medical Losses Developed to Ultimate (Appendix A-II)	$268,627,176
(17)	Medical Loss On-level Factor (Appendix A-I)	1.016
(18)	Factor to Include Loss Adjustment Expense (Exhibit II)	1.200
(19)	Composite Adjustment Factor = (17) x (18)	1.219
(20)	Adjusted Limited Medical Losses = (16) x (19)	$327,456,528
(21)	Adjusted Limited Medical Cost Ratio excluding Trend and Benefits = (20) / (3)	0.507
(22)	Factor to Reflect Medical Trend (Appendix A-III)	0.858
(23)	Projected Limited Medical Cost Ratio = (21) x (22)	0.435
(24)	Factor to Adjust Medical Cost Ratio to an Unlimited Basis (Appendix A-II)	1.010
(25)	Projected Medical Cost Ratio = (23) x (24)	0.439
(26)	Factor to Reflect Proposed Changes in Medical Benefits (Appendix C)	1.015
(27)	Projected Medical Cost Ratio including Benefit Changes = (25) x (26)	0.446

Total Benefit Cost:

(28)	Indicated Change Based on Experience, Trend and Benefits = (15) + (27)	0.962

NORTH CAROLINA

EXHIBIT I

Determination of Indicated Rate Level Change

Section C - Indicated Change Based on Experience, Trend, and Benefits

(1)	Policy Year 2019 Indicated Change Based on Experience, Trend, and Benefits	0.932 (-6.8%)
(2)	Policy Year 2018 Indicated Change Based on Experience, Trend, and Benefits	0.962 (-3.8%)
(3)	Indicated Change Based on Experience, Trend, and Benefits = [(1)+(2)] / 2	0.947 (-5.3%)

Section D - Application of the Proposed Change in the Loss Cost Multiplier

(1) Indicated Loss Cost Level Change	0.947 (-5.3%)
(2) Proposed Change in the Assigned Risk Loss Cost Multiplier = [Exhibit I-A, Sheet 1, Line (9) / Exhibit I-A, Sheet 2, Line (9)]	1.108 (+10.8%)
(3) Indicated Assigned Risk Rate Level Change = (1) x (2)	1.049 (+4.9%)

Section E - Distribution of Overall Rate Level Change to Industry Groups

Industry Group Differentials (Appendix A-V):

Manufacturing	1.017
Contracting	0.989
Office & Clerical	0.996
Goods & Services	1.006
Miscellaneous	0.988

Applying these industry group differentials to the final overall rate level change produces the changes in rate level proposed for each group as shown:

Industry Group	(1) Final Overall Rate Level Change	(2) Industry Group Differential	(3) = (1) x (2) Final Rate Level Change by Industry Group	
Manufacturing	1.049	1.017	1.067	(+6.7%)
Contracting	1.049	0.989	1.037	(+3.7%)
Office & Clerical	1.049	0.996	1.045	(+4.5%)
Goods & Services	1.049	1.006	1.055	(+5.5%)
Miscellaneous	1.049	0.988	1.036	(+3.6%)
Overall	1.049	1.000	1.049	(+4.9%)

North Carolina Department of Insurance

Summary of Supporting Information Form
Calculation of INDICATED Assigned Risk Loss Cost Multiplier
Effective April 1, 2022

1.	Does this filing apply uniformly to all workers compensation classes? (If no, identify exception and provide justification for variations.)	Yes	
2.	Loss Cost Modification:		
	A. The insurer hereby files to adopt the prospective loss costs in the North Carolina Rate Bureau reference filing (Check one):		
	☐ Without modification (factor = 1.000)		
	☒ With the following modification(s): 1.992 (see attached) Cite the nature and percent modification. Attach supporting data and/or rationale for the modification(s).		
	B. Loss Cost Modification Factor:	1.992	See Exhibit I-A, Sheet 3
	Example (i): If your loss cost modification is -10%, the factor is .90 (1.00 - .10). Example (ii): If your loss cost modification is +15%, the factor is 1.15 (1.00 + .15).		
3.	Selected Expenses: (Attach Expense Provisions Exhibit)		See Exhibit II
	A. Commission and Brokerage	5.0%	
	B. Other Acquisition	23.5%	
	C. General Expenses	Incl. in B	
	D. Taxes, Licenses, Fees & Loss Based Assessments	2.66%	
	E. Profit, Contingencies and Investment Income	5.0%	
	F. Uncollectible Premium Provision	7.7%	
	G. Total (A + B + C + D + E + F)	43.9%	
4.	Development of Expected Loss & Loss Adjustment Expense* (Target Cost) Ratio: (Expressed in decimal form: 1.000 - 3G)	0.561	
5.	Overall impact of expense constant & minimum premiums: (Expressed in decimal form: i.e., 1.2% overall impact would be 1.012)	1.177	See Exhibit II
6.	Overall impact of size-of-risk discounts plus expense gradation recognition in retrospective rating: (Expressed in decimal form: i.e., 8.6% average discount would be 0.914)	1.000	
7.	Provision for loss based assessments	0.000	
8.	Formula Loss Cost Multiplier : 2B x (1.0 - 7) / ((6 - 3G) x 5)	3.018	
9.	Selected Loss Cost Multiplier: (Explain any differences between 8 and 9, other than rounding)	3.018	
10.	Rate Level Changes for the Coverages to which this page applies	4.9%	
11.	Are you amending:		
	the minimum premium formula?	No	
	the expense constant(s) ?	No	See Exhibit II-D
	the premium discount schedules?	No	
	If yes, attach documentation showing (i) premium level impact and (ii) current and proposed minimum premium formula, minimum premium multipliers, maximum minimum premiums, expense constants and/or premium discount schedules.		

* The ratio displayed on line 4 does not include any provision for loss adjustment expense.

North Carolina Department of Insurance

Summary of Supporting Information Form
Calculation of CURRENT Assigned Risk Loss Cost Multiplier
Effective April 1, 2021

1.	Does this filing apply uniformly to all workers compensation classes? (If no, identify exception and provide justification for variations.)	Yes
2.	Loss Cost Modification:	
	A. The insurer hereby files to adopt the prospective loss costs in the North Carolina Rate Bureau reference filing (Check one):	
	☐ Without modification (factor = 1.000)	
	☒ With the following modification(s): 1.872 Cite the nature and percent modification. Attach supporting data and/or rationale for the modification(s).	
	B. Loss Cost Modification Factor:	1.872
	Example (i): If your loss cost modification is -10%, the factor is .90 (1.00 - .10). Example (ii): If your loss cost modification is +15%, the factor is 1.15 (1.00 + .15).	
3.	Selected Expenses: (Attach Expense Provisions Exhibit)	
	A. Commission and Brokerage	5.0%
	B. Other Acquisition	22.0%
	C. General Expenses	Incl. in B
	D. Taxes, Licenses, Fees & Loss Based Assessments	2.66%
	E. Profit, Contingencies and Investment Income	5.0%
	F. Uncollectible Premium Provision	7.1%
	G. Total (A + B + C + D + E + F)	41.8%
4.	Development of Expected Loss & Loss Adjustment Expense (Target Cost) Ratio: (Expressed in decimal form: 1.000 - 3G)	0.582
5.	Overall impact of expense constant & minimum premiums: (Expressed in decimal form: i.e., 1.2% overall impact would be 1.012)	1.180
6.	Overall impact of size-of-risk discounts plus expense gradation recognition in retrospective rating: (Expressed in decimal form: i.e., 8.6% average discount would be 0.914)	1.000
7.	Provision for premium taxes, licenses, fees and loss based assessments	0.000
8.	Formula Loss Cost Multiplier : 2B x (1.0 - 7) / ((6 - 3G) x 5)	2.725
9.	Selected Lost Cost Multiplier	2.725

North Carolina - Assigned Risk

Calculation of Loss Cost Modification Factor

1.	Current Assigned Risk Differential	2.247
2.	Proposed Change in Assigned Risk Differential (See Exh. II-E, Sheet 1)	1.064
3.	Proposed Assigned Risk Differential (1) x (2)	2.391
4.	Selected loss adjustment expense provision (See Exhibit II-A, Sheet 1)	1.200
5.	Factor to Adjust Loss Costs to Avoid Double Counting Servicing Carrier LAE 1 / (4)	0.833
6.	Loss Cost Modification Factor (3) x (5)	1.992

North Carolina - Assigned Risk

Summary of Expense Provisions

1. Standard Assigned Risk Commission and Brokerage (Res. Mkt. Plan Admin Rules)		5.0%
2. Loss Adjustment Expense (included in Loss Costs) (See Exhibit II-A, Sheet 1)		20.0%
Factor to adjust loss costs to avoid double counting Servicing Carrier LAE (See Exhibit I-A, Sheet 3)	0.833	
3. Other Acquisition, General Expense * and LAE (See Exhibit II-B)		23.5%
4. Uncollectible Premium Provision (See Exhibit II-F, Sheet 1)		10.5%
5. Underwriting Profit and Contingencies		5.0%
a. Underwriting Profit (See Exhibits RB-11 and RB-13)	5.0%	
b. Contingencies	--	
6. Taxes, Licenses, and Fees		
TLF Including Regulatory Surcharge (2.5% x 1.065)		2.66%
Miscellaneous Tax (judgmentally selected)		0.0%
Total Including Miscellaneous Tax		2.66%
7. Effect of Expense Constant and Minimum Premiums (See Exhibit II-D) (Expense Constant of $160)		17.7%

* Excludes commission and brokerage, taxes, licenses and fees.

North Carolina

Derivation of Loss Adjustment Expense Provision

(1) Calendar/ Accident Year	(2) Calendar Year LAE Ratio*	(3) Accident Year Developed AOE Ratio+	(4) Policy Year	(5) Policy Year Developed DCCE Ratio^
2016	21.6%	8.5%	2015	11.1%
2017	22.9%	9.1%	2016	11.3%
2018	23.4%	9.1%	2017	11.2%
2019	21.7%	9.4%	2018	11.0%
2020	18.1%	9.8%	2019	10.8%

Current North Carolina Loss Adjustment Expense Provision	20.0%
Selected North Carolina Loss Adjustment Expense Provision	20.0%

* Source: NCCI Call for Calendar Year Expense (Financial Call 14)
\+ Source: NCCI Call for Loss Adjustment Expense (See Exhibit RB-4)
^ Exhibit II-A, Sheet 2.

North Carolina

Selection of DCCE Provision

Policy Year	(1) Reported Ratio of Paid DCCE to Paid Losses	(2) Age to Ultimate Development Factor	(3) Ultimate DCCE Ratio (1) x (2)
2015	11.1%	0.998	11.1%
2016	11.4%	0.988	11.3%
2017	11.3%	0.987	11.2%
2018	11.1%	0.991	11.0%
2019	10.2%	1.058	10.8%

Summary of Paid DCCE to Paid Loss Ratio Development Factors

Report	(1) DCCE Ratio Development To Next Report	(2) DCCE Ratio Development To Ultimate
1st	1.068	1.058
2nd	1.004	0.991
3rd	0.999	0.987
4th	0.990	0.988
5th	0.997	0.998
6th	1.000	1.001
7th	1.000	1.001
8th	0.999	1.001
9th	0.998	1.002
10th	1.000	1.004
11th	1.000	1.004
12th	0.999	1.004
13th	1.000	1.005
14th	1.001	1.005
15th	1.000	1.004
16th	1.001	1.004
17th	1.002	1.003
18th	1.001	1.001
19th		1.000*

(1) Selected two-year average
(2) = Cumulative upward product of column (1)
* Selection

North Carolina - Assigned Risk

Expense Provision
Other Acquisition, General Expense and LAE

1.	Weighted-Average of 1/1/2021 Three-Year Servicing Carrier Allowances* (Includes LAE)	21.99%
2.	Pool Administration Expenses (See Exhibit II-C)	1.5%
3.	Expense provision, excluding taxes, licenses and fees and loss-based assessments and including servicing carrier LAE (1) + (2)	23.5%

* Source: North Carolina Rate Bureau. Excludes commission and brokerage, taxes, licenses and fees.

North Carolina - Assigned Risk

Pool Expense Provision*

Data Valued as of 12/31/2020

Calendar Year	Gross Written Premium^	Administrative & Separately Reimbursable Expense	Expenses as a % of GWP
2011	40,318,050	1,101,386	2.7%
2012	53,131,693	1,033,100	1.9%
2013	71,745,849	1,041,196	1.5%
2014	82,035,932	998,280	1.2%
2015	84,398,595	1,163,942	1.4%
2016	82,281,086	1,119,973	1.4%
2017	77,799,928	1,109,597	1.4%
2018	90,297,741	978,036	1.1%
2019	82,024,442	1,317,532	1.6%
2020	72,923,547	1,401,088	1.9%
		Weighted Average	1.5%

* Source: Data collected by NCCI, Inc.
^ Includes premium for both servicing carriers and direct assignment carriers.

Exhibit II-D

North Carolina - Assigned Risk

Effect of Expense Constant and Minimum Premiums

Based on Assigned Risk Market Data

Minimum Premium Program Parameters		**Current**		**Proposed**
(1) Minimum Premium Multiplier (MPM)		200		200
(2) Maximum Minimum Premium (MMP)	$	1,500	$	1,500
(3) Standard Premium Generated by MPM and MMP *	$	2,871,446	$	2,871,446
(4) Standard Premium Including Additional Premium Generated by MPM and MMP *	$	29,667,360	$	29,667,360
(5) Impact of MPM and MMP = (3) / (4)		0.097		0.097
(6) Expense Constant		160		160
(7) Standard Premium Including Expense Constant Premium and Balance to Minimum Premium **	$	71,959,066	$	71,959,066
(8) Standard Premium Excluding Expense Constant Premium and Balance to Minimum Premium **	$	61,157,830	$	61,157,830
(9) Premium Generated from Expense Constant and Balance to Minimum Premium = (7) - (8)	$	10,801,236	$	10,801,236
(10) Effect of Expense Constant and Minimum Premiums = (9) / (8)				0.177

* Source: Unit Statistical Data for policy years 2010 through 2017.
** Source: Policy Data collected by the NCRB for policy years 2018 through 2020.

North Carolina - Assigned Risk
Indicated Change in the Assigned Risk Differential
Based on Paid Losses

Policy Year	(1) Standard Pure Premium *	(2) Paid Losses **	(3) = (2) / (1) Ratio of Losses to Premium	(4) Indicated Assigned Risk Pure Prem. Diff.^ (Std Basis)
I. Residual Market Experience Valued as of 12/31/2020				
2010	$7,870,429	$17,018,312	2.162	
2011	7,556,896	26,251,628	3.474	
2012	10,657,478	31,205,946	2.928	
2013	13,704,851	42,760,431	3.120	
2014	14,383,350	39,579,466	2.752	
2015	15,204,896	44,049,110	2.897	
2016	16,110,212	39,878,626	2.475	
2017	16,455,959	36,783,371	2.235	
2018	19,073,275	50,097,985	2.627	
2019	20,339,863	38,106,631	1.873	
II. Statewide Experience Valued as of 12/31/2020				
2010	$425,720,402	$678,983,656	1.595	1.355
2011	438,697,271	672,559,846	1.533	2.266
2012	446,249,907	618,964,168	1.387	2.111
2013	466,828,350	594,720,582	1.274	2.449
2014	492,521,683	582,371,319	1.182	2.328
2015	525,390,432	567,075,532	1.079	2.685
2016	562,285,321	549,556,717	0.977	2.533
2017	598,910,797	558,701,300	0.933	2.395
2018	646,459,696	605,900,127	0.937	2.804
2019	697,095,902	598,449,297	0.858	2.183
			Average Differential ^	2.311

(a)	Indicated Differential in Standard Pure Premium Based on Experience	2.311
(b)	Current Impact of Standard Pure Premium Programs@	2.265
(c)	Indicated Change in Assigned Risk Pure Premium Differential Based on Paid Losses = (a) / (b)	1.020
(d)	Indicated Change in Assigned Risk Pure Premium Differential Based on Paid+Case Losses [See Exhibit II-E, Sheet 4, Item (c)]	1.108
(e)	Selected Change in Assigned Risk Pure Premium Differential (Proposed Assigned Risk Pure Premium Differential = 2.391)	1.064

* Developed to fifth report and brought to the 4/1/2021 pure premium level.
** Developed to ultimate and brought to the 1/1/2020 benefit level.
^ This is the indicated pure premium differential based on loss experience, calculated by comparing the ratio of assigned risk losses to premium to the ratio of statewide losses to premium.
@ This is composed of an ARAP impact equal to 0.8% and a differential of 2.247. ARAP impact from Exhibit II-E, Sheet 9.

North Carolina - Assigned Risk

(Residual Market)

Policy Year	(1) Standard Premium*	(2) On-level Factor^	(3) Effect of Current Standard Premium Programs#	(4) = (1) x ((2) / (3)) Stand. Pure Prem. at Current Level
2010	$41,423,308	0.434	2.283	$7,870,429
2011	40,411,208	0.430	2.301	7,556,896
2012	55,507,700	0.442	2.303	10,657,478
2013	72,130,794	0.440	2.319	13,704,851
2014	78,597,542	0.422	2.312	14,383,350
2015	81,746,755	0.428	2.305	15,204,896
2016	84,790,589	0.435	2.287	16,110,212
2017	81,063,839	0.461	2.274	16,455,959
2018	82,927,282	0.523	2.276	19,073,275
2019	75,054,846	0.613	2.265	20,339,863

Policy Year	(5) Ind. Losses Paid	(6) Development Factor	(7) On-level Factor^	(8) = ((5) x (6)) x (7) Adjusted Ind. Losses
2010	$10,013,576	1.052	0.981	$10,334,131
2011	11,409,427	1.061	0.997	12,069,086
2012	13,704,452	1.073	1.000	14,704,877
2013	20,991,536	1.085	1.000	22,775,817
2014	20,267,601	1.097	1.000	22,233,558
2015	19,425,705	1.120	1.000	21,756,790
2016	17,248,889	1.166	1.000	20,112,205
2017	16,981,462	1.253	1.000	21,277,772
2018	17,155,551	1.542	1.000	26,453,860
2019	6,845,023	2.908	1.000	19,905,327

Policy Year	(9) Med. Losses Paid	(10) Development Factor	(11) On-level Factor^	(12) = ((9) x (10)) x (11) Adjusted Med. Losses
2010	$6,405,418	1.087	0.960	$6,684,181
2011	13,409,612	1.096	0.965	14,182,542
2012	15,398,879	1.107	0.968	16,501,069
2013	18,268,340	1.114	0.982	19,984,614
2014	15,444,366	1.122	1.001	17,345,908
2015	19,104,111	1.134	1.029	22,292,320
2016	16,416,339	1.169	1.030	19,766,421
2017	12,457,058	1.212	1.027	15,505,599
2018	17,928,950	1.298	1.016	23,644,125
2019	10,857,764	1.668	1.005	18,201,304

* Developed to a fifth report. See Exhibit II-E, Sheet 7.

^ See Appendix A-I for the derivation of the factors for policy years 2018 and 2019. Factors for the remaining years are calculated in a similar manner.

This is composed of a differential of 2.247 and year-specific ARAP impacts which are displayed on Exhibit II-E, Sheet 9.

North Carolina - Assigned Risk

(Statewide Market)

Policy Year	(1) Voluntary Standard Premium*	(2) Assigned Risk Standard Premium**	(3) = (1) + (2) Standard Pure Premum On-level
2010	$417,849,973	$7,870,429	$425,720,402
2011	431,140,375	7,556,896	438,697,271
2012	435,592,429	10,657,478	446,249,907
2013	453,123,499	13,704,851	466,828,350
2014	478,138,333	14,383,350	492,521,683
2015	510,185,536	15,204,896	525,390,432
2016	546,175,109	16,110,212	562,285,321
2017	582,454,838	16,455,959	598,910,797
2018	627,386,421	19,073,275	646,459,696
2019	676,756,039	20,339,863	697,095,902

Policy Year	(4) Ind. Losses Paid	(5) Development Factor	(6) On-level Factor^	(7) = ((4) x (5)) x (6) Adjusted Ind. Losses
2010	$352,936,454	1.052	0.981	$364,234,656
2011	331,707,932	1.061	0.997	350,886,290
2012	295,743,950	1.073	1.000	317,333,258
2013	291,798,418	1.085	1.000	316,601,284
2014	281,092,165	1.097	1.000	308,358,105
2015	266,868,620	1.120	1.000	298,892,854
2016	253,097,278	1.166	1.000	295,111,426
2017	243,252,157	1.253	1.000	304,794,953
2018	213,874,239	1.542	1.000	329,794,077
2019	115,625,066	2.908	1.000	336,237,692

Policy Year	(8) Med. Losses Paid	(9) Development Factor	(10) On-level Factor^	(11) = ((8) x (9)) x (10) Adjusted Med. Losses
2010	$301,622,394	1.087	0.960	$314,749,000
2011	304,142,767	1.096	0.965	321,673,556
2012	281,483,451	1.107	0.968	301,630,910
2013	254,234,478	1.114	0.982	278,119,298
2014	243,974,577	1.122	1.001	274,013,214
2015	229,827,660	1.134	1.029	268,182,678
2016	211,321,012	1.169	1.030	254,445,291
2017	203,986,062	1.212	1.027	253,906,347
2018	209,366,659	1.298	1.016	276,106,050
2019	156,419,107	1.668	1.005	262,211,605

* Developed to a fifth report and on current premium level. See Exhibit II-E, Sheet 8.
** Developed to a fifth report and on current premium level. See Exhibit II-E, Sheet 2.
^ See Appendix A-I for the derivation of the factors for policy years 2018 and 2019.
Factors for the remaining years are calculated in a similar manner.

North Carolina - Assigned Risk
Indicated Change in the Assigned Risk Differential
Based on Paid+Case Losses

Policy Year	(1) Standard Pure Premium *	(2) Paid+Case Losses **	(3) = (2) / (1) Ratio of Losses to Premium	(4) Indicated Assigned Risk Pure Prem. Diff.^ (Std Basis)
I. Residual Market Experience Valued as of 12/31/2020				
2010	$7,870,429	$16,319,289	2.073	
2011	7,556,896	24,840,652	3.287	
2012	10,657,478	29,561,945	2.774	
2013	13,704,851	40,484,045	2.954	
2014	14,383,350	37,736,197	2.624	
2015	15,204,896	42,995,650	2.828	
2016	16,110,212	44,035,543	2.733	
2017	16,455,959	41,889,670	2.546	
2018	19,073,275	63,493,655	3.329	
2019	20,339,863	46,387,947	2.281	
II. Statewide Experience Valued as of 12/31/2020				
2010	$425,720,402	$679,077,430	1.595	1.300
2011	438,697,271	650,859,952	1.484	2.215
2012	446,249,907	600,280,473	1.345	2.062
2013	466,828,350	566,442,008	1.213	2.435
2014	492,521,683	560,188,367	1.137	2.308
2015	525,390,432	542,777,960	1.033	2.738
2016	562,285,321	522,752,730	0.930	2.939
2017	598,910,797	532,548,975	0.889	2.864
2018	646,459,696	594,835,348	0.920	3.618
2019	697,095,902	606,802,028	0.870	2.622
			Average Differential ^	2.510

(a)	Indicated Differential in Standard Pure Premium Based on Experience	2.510
(b)	Current Impact of Standard Pure Premium Programs@	2.265
(c)	Indicated Change in Assigned Risk Pure Premium Differential = (a)/(b)	1.108

* Developed to fifth report and brought to the 4/1/2021 pure premium level.
** Developed to ultimate and brought to the 1/1/2020 benefit level.
^ This is the indicated pure premium differential based on loss experience, calculated by comparing the ratio of assigned risk losses to premium to the ratio of statewide losses to premium.
@ This is composed of an ARAP impact equal to 0.8% and a differential of 2.247. ARAP impact from Exhibit II-E, Sheet 9.

North Carolina - Assigned Risk

(Residual Market)

Policy Year	(1) Standard Premium*	(2) On-level Factor^	(3) Effect of Current Standard Premium Programs#	(4) = (1) x ((2) / (3)) Stand. Pure Prem. at Current Level
2010	$41,423,308	0.434	2.283	$7,870,429
2011	40,411,208	0.430	2.301	7,556,896
2012	55,507,700	0.442	2.303	10,657,478
2013	72,130,794	0.440	2.319	13,704,851
2014	78,597,542	0.422	2.312	14,383,350
2015	81,746,755	0.428	2.305	15,204,896
2016	84,790,589	0.435	2.287	16,110,212
2017	81,063,839	0.461	2.274	16,455,959
2018	82,927,282	0.523	2.276	19,073,275
2019	75,054,846	0.613	2.265	20,339,863

Policy Year	(5) Ind. Losses Paid+Case	(6) Development Factor	(7) On-level Factor^	(8) = ((5) x (6)) x (7) Adjusted Ind. Losses
2010	$10,033,495	1.022	0.981	$10,059,402
2011	11,428,280	1.024	0.997	11,667,451
2012	13,855,629	1.027	1.000	14,229,731
2013	21,469,673	1.032	1.000	22,156,703
2014	20,828,530	1.037	1.000	21,599,186
2015	20,343,256	1.045	1.000	21,258,703
2016	18,223,381	1.063	1.000	19,371,454
2017	19,596,765	1.090	1.000	21,360,474
2018	22,885,425	1.177	1.000	26,936,145
2019	14,624,731	1.508	1.000	22,054,094

Policy Year	(9) Med. Losses Paid+Case	(10) Development Factor	(11) On-level Factor^	(12) = ((9) x (10)) x (11) Adjusted Med. Losses
2010	$6,405,418	1.018	0.960	$6,259,887
2011	13,409,612	1.018	0.965	13,173,201
2012	15,543,733	1.019	0.968	15,332,214
2013	18,297,334	1.020	0.982	18,327,342
2014	15,789,314	1.021	1.001	16,137,011
2015	20,710,138	1.020	1.029	21,736,947
2016	23,779,262	1.007	1.030	24,664,089
2017	19,909,841	1.004	1.027	20,529,196
2018	36,492,699	0.986	1.016	36,557,510
2019	25,247,955	0.959	1.005	24,333,853

* Developed to a fifth report. See Exhibit II-E, Sheet 7.
^ See Appendix A-I for the derivation of the factors for policy years 2018 and 2019. Factors for the remaining years are calculated in a similar manner.
# This is composed of a differential of 2.247 and year-specific ARAP impacts which are displayed on Exhibit II-E, Sheet 9.

North Carolina - Assigned Risk

(Statewide Market)

Policy Year	(1) Voluntary Standard Premium*	(2) Assigned Risk Standard Premium**	(3) = (1) + (2) Standard Pure Premum On-level
2010	$417,849,973	$7,870,429	$425,720,402
2011	431,140,375	7,556,896	438,697,271
2012	435,592,429	10,657,478	446,249,907
2013	453,123,499	13,704,851	466,828,350
2014	478,138,333	14,383,350	492,521,683
2015	510,185,536	15,204,896	525,390,432
2016	546,175,109	16,110,212	562,285,321
2017	582,454,838	16,455,959	598,910,797
2018	627,386,421	19,073,275	646,459,696
2019	676,756,039	20,339,863	697,095,902

Policy Year	(4) Ind. Losses Paid+Case	(5) Development Factor	(6) On-level Factor^	(7) = ((4) x (5)) x (6) Adjusted Ind. Losses
2010	$363,576,575	1.022	0.981	$364,515,330
2011	335,060,879	1.024	0.997	342,073,033
2012	300,884,906	1.027	1.000	309,008,798
2013	296,681,868	1.032	1.000	306,175,688
2014	290,314,751	1.037	1.000	301,056,397
2015	278,381,634	1.045	1.000	290,908,808
2016	269,000,263	1.063	1.000	285,947,280
2017	269,939,848	1.090	1.000	294,234,434
2018	276,203,039	1.177	1.000	325,090,977
2019	220,676,421	1.508	1.000	332,780,043

Policy Year	(8) Med. Losses Paid+Case	(9) Development Factor	(10) On-level Factor^	(11) = ((8) x (9)) x (10) Adjusted Med. Losses
2010	$321,875,102	1.018	0.960	$314,562,100
2011	314,328,531	1.018	0.965	308,786,919
2012	295,289,981	1.019	0.968	291,271,675
2013	259,840,182	1.020	0.982	260,266,320
2014	253,548,577	1.021	1.001	259,131,970
2015	239,971,372	1.020	1.029	251,869,152
2016	228,310,034	1.007	1.030	236,805,450
2017	231,124,713	1.004	1.027	238,314,541
2018	269,266,154	0.986	1.016	269,744,371
2019	284,315,633	0.959	1.005	274,021,985

* Developed to a fifth report and on current premium level. See Exhibit II-E, Sheet 8.
** Developed to a fifth report and on current premium level. See Exhibit II-E, Sheet 5.
^ See Appendix A-I for the derivation of the factors for policy years 2018 and 2019.
Factors for the remaining years are calculated in a similar manner.

North Carolina - Assigned Risk
(Residual Market)

Section A - Assigned Risk Premium Development Factors

Policy Year	Standard Premium for Matching Companies		Development Factor
	1st Report	2nd Report	
2016	83,925,000	84,140,477	1.003
2017	80,145,819	81,029,350	1.011
2018	81,927,327	82,679,244	1.009
Average			1.008
	2nd Report	3rd Report	
2015	81,882,459	81,844,849	1.000
2016	84,140,477	84,946,953	1.010
2017	81,029,350	81,144,984	1.001
Average			1.004
	3rd Report	4th Report	
2014	78,725,308	78,621,367	0.999
2015	81,844,849	81,759,768	0.999
2016	84,946,953	84,790,589	0.998
Average			0.999
	4th Report	5th Report	
2013	72,125,998	72,139,877	1.000
2014	78,621,367	78,601,500	1.000
2015	81,759,768	81,746,755	1.000
Average			1.000

Three-year average premium development factors

1st/5th	2nd/5th	3rd/5th	4th/5th
1.011	1.003	0.999	1.000

Section B - Calculation of Developed Assigned Risk Standard Premium

Policy Year	Standard Premium	Development Factor	Developed Premium
2010	41,423,308	1.000	41,423,308
2011	40,411,208	1.000	40,411,208
2012	55,507,700	1.000	55,507,700
2013	72,130,794	1.000	72,130,794
2014	78,597,542	1.000	78,597,542
2015	81,746,755	1.000	81,746,755
2016	84,790,589	1.000	84,790,589
2017	81,144,984	0.999	81,063,839
2018	82,679,244	1.003	82,927,282
2019	74,238,226	1.011	75,054,846

North Carolina - Assigned Risk
(Statewide Market)

Section A - Voluntary Premium Development Factors

Policy Year	Standard Premium for Matching Companies		Development Factor
	1st Report	2nd Report	
2016	1,014,120,852	1,026,347,626	1.012
2017	897,261,014	909,857,235	1.014
2018	884,797,976	900,123,990	1.017
Average			1.014
	2nd Report	3rd Report	
2015	1,042,193,383	1,043,465,807	1.001
2016	992,363,252	991,850,965	0.999
2017	953,472,994	953,281,240	1.000
Average			1.000
	3rd Report	4th Report	
2014	998,444,624	998,506,077	1.000
2015	1,015,451,907	1,015,604,942	1.000
2016	1,025,148,762	1,024,718,778	1.000
Average			1.000
	4th Report	5th Report	
2013	948,221,047	948,337,230	1.000
2014	973,558,209	973,367,415	1.000
2015	1,043,618,818	1,043,324,204	1.000
Average			1.000

Three-year average premium development factors

1st/5th	2nd/5th	3rd/5th	4th/5th
1.014	1.000	1.000	1.000

Section B - Calculation of Developed and On-leveled Voluntary Standard Premiur

Policy Year	Standard Premium	Development Factor	Voluntary On-level Factor*	Voluntary Prem Dev't & On-level
2010	906,399,074	1.000	0.461	417,849,973
2011	911,501,850	1.000	0.473	431,140,375
2012	922,865,316	1.000	0.472	435,592,429
2013	947,957,110	1.000	0.478	453,123,499
2014	998,201,112	1.000	0.479	478,138,333
2015	1,043,324,204	1.000	0.489	510,185,536
2016	1,024,718,778	1.000	0.533	546,175,109
2017	953,281,240	1.000	0.611	582,454,838
2018	900,123,990	1.000	0.697	627,386,421
2019	818,910,757	1.014	0.815	676,756,039

* See Appendix A-I for the derivation of the figures for policy years 2018 and 2019.

North Carolina - Assigned Risk

Impact of the Assigned Risk Adjustment Program*

Based on Assigned Risk Data for Policies with Effective Dates in 2020

Type of Risk	(1) Experience Modified Premium	(2) ARAP Premium	(3) ARAP Impact (2) / (1)
Risks with Credit Mods	$3,936,200	$3,936,200	1.000
Risks with Debit Mods	2,820,620	3,415,564	1.211
Risks with Mods of 1.00	4,057	4,057	1.000
Risks with No Mods	65,166,236	65,166,236	1.000
Totals	$71,927,113	$72,522,057	1.008

Historical Impacts of the Assigned Risk Adjustment Program

Policy Year	ARAP Impact
2010	1.016
2011	1.024
2012	1.025
2013	1.032
2014	1.029
2015	1.026
2016	1.018
2017	1.012
2018	1.013
2019	1.008

* Source: North Carolina Rate Bureau

North Carolina - Assigned Risk

Uncollectible Premium Provision

Section 1 - Gross Premium as of 12/31/2020 - Traumatic Only (000s)

Policy Year	1st	2nd	3rd	4th	5th	6th	7th	8th	Ultimate Gross
2009				37,363	37,388	37,391	37,393	37,393	37,393
2010			27,350	27,460	27,486	27,487	27,494	27,494	27,494
2011		29,958	29,964	29,962	29,960	29,962	29,949	29,949	29,949
2012	44,773	45,425	45,592	45,469	45,430	45,440	45,440	45,440	45,440
2013	61,228	62,178	63,011	62,246	62,181	62,142	62,118		62,118
2014	58,723	58,063	57,964	57,800	57,768	57,770			57,770
2015	62,522	62,941	62,906	62,871	62,871				62,871
2016	59,840	59,795	60,339	60,101					60,041
2017	63,712	62,215	62,644						62,393
2018	63,020	62,710							62,773
2019	57,076								56,791

Policy Year	1 / 2	2 / 3	3 / 4	4 / 5	5 / 6	6 / 7	7 / 8	8 / Ult
2009						1.000	1.000	
2010					1.000	1.000	1.000	
2011				1.000	1.000	1.000	1.000	
2012			0.997	0.999	1.000	1.000	1.000	
2013		1.013	0.988	0.999	0.999	1.000		
2014	0.989	0.998	0.997	0.999	1.000			
2015	1.007	0.999	0.999	1.000				
2016	0.999	1.009	0.996					
2017	0.977	1.007						
2018	0.995							
5-Yr Avg x H/L	0.994	1.005	0.997	0.999	1.000	1.000	1.000	
Selected	0.994	1.005	0.997	0.999	1.000	1.000	1.000	1.000
Ultimate	0.995	1.001	0.996	0.999	1.000	1.000	1.000	1.000

Section 2 - Collected Premium as of 12/31/2020 - Traumatic Only (000s)

Policy Year	1st	2nd	3rd	4th	5th	6th	7th	8th	Ultimate Collected	Uncollected/ Gross
2009				33,482	33,537	33,585	33,581	33,587	33,587	10.2%
2010			25,078	25,124	25,242	25,230	25,339	25,351	25,351	7.8%
2011		27,566	26,525	26,706	26,727	26,752	26,738	26,756	26,756	10.7%
2012	42,451	40,444	41,616	41,757	41,818	41,850	41,751	41,615	41,615	8.4%
2013	58,222	56,917	58,070	57,683	57,661	56,156	55,654		55,654	10.4%
2014	56,754	55,302	55,184	55,141	54,490	52,818			52,766	8.7%
2015	59,850	58,787	59,314	58,232	57,486				56,969	9.4%
2016	57,434	54,132	53,606	52,856					52,169	13.1%
2017	58,251	54,150	54,374						53,286	14.6%
2018	57,965	54,124							53,258	15.2%
2019	53,992								50,482	11.1%

Policy Year	1 / 2	2 / 3	3 / 4	4 / 5	5 / 6	6 / 7	7 / 8	8 / Ult
2009						1.000	1.000	
2010					1.000	1.004	1.000	
2011				1.001	1.001	0.999	1.001	
2012			1.003	1.001	1.001	0.998	0.997	
2013		1.020	0.993	1.000	0.974	0.991		
2014	0.974	0.998	0.999	0.988	0.969			
2015	0.982	1.009	0.982	0.987				
2016	0.943	0.990	0.986					
2017	0.930	1.004						
2018	0.934							
5-Yr Avg x H/L	0.950	1.004	0.993	0.996	0.992	0.999	1.000	
Selected	0.950	1.004	0.993	0.996	0.992	0.999	1.000	1.000
Ultimate	0.935	0.984	0.980	0.987	0.991	0.999	1.000	1.000

3-Yr Avg	13.6%
5-Yr Avg	12.7%
10-Yr Avg	10.9%
Selected	10.5%

Source: Residual Market data reported to NCCI by Pool servicing carriers.

North Carolina - Assigned Risk

Uncollectible Premium Provision

1. Selected Uncollectible Premium Provision	10.5%
2. Expense Components Calculated as a Percentage of Collected Premium	
A. Commission and Brokerage	5.0%
B. Servicing Carrier Allowance	21.99%
C. Total (A + B)	26.99%
3. Uncollectible Premium Provision Adjustment Factor (1.000 - 2C)	0.730
4. Adjusted Uncollectible Premium Provision (1 x 3)	7.7%

North Carolina - Assigned Risk

Factor to Convert Loss Costs to Assigned Risk Rates

For all classification codes, the proposed loss cost multiplier of 3.018 is applied to the advisory loss costs (contained in the Rate Bureau's Loss Costs Reference Filing proposed effective April 1, 2022) in order to convert to assigned risk rates. Please refer to Exhibit I-A, Sheet 1 for more information on the development of this factor.

Effective April 1, 2022

APPLICABLE TO ASSIGNED RISK POLICIES ONLY

CLASS CODE	RATE	MIN PREM	ELR	D RATIO	CLASS CODE	RATE	MIN PREM	ELR	D RATIO	CLASS CODE	RATE	MIN PREM	ELR	D RATIO
0005	4.89	1138	1.16	0.38	2021	4.65	1090	1.07	0.34	2714	5.37	1234	1.28	0.38
0008	3.32	824	0.79	0.38	2039	3.65	890	0.87	0.38	2727X	15.60	1500	3.09	0.25
0016	9.27	1500	1.97	0.30	2041	3.83	926	0.90	0.38	2731	6.04	1368	1.44	0.38
0034	5.34	1228	1.23	0.34	2065	3.44	848	0.79	0.34	2735	6.25	1410	1.49	0.38
0035	3.44	848	0.80	0.34	2070	8.21	1500	1.88	0.34	2759	8.00	1500	1.90	0.38
0036	5.55	1270	1.31	0.38	2081	5.28	1216	1.32	0.42	2790	2.81	722	0.71	0.42
0037	5.64	1288	1.20	0.30	2089	3.65	890	0.87	0.38	2797	7.27	1500	1.83	0.42
0042	7.48	1500	1.73	0.34	2095	5.49	1258	1.27	0.34	2799	9.24	1500	2.12	0.34
0050	9.90	1500	2.09	0.30	2105	5.82	1324	1.46	0.42	2802	7.39	1500	1.70	0.34
0059D	0.54	–	0.05	0.25	2110	3.17	794	0.75	0.38	2835	3.56	872	0.89	0.42
0065D	0.15	–	0.02	0.30	2111	3.32	824	0.79	0.38	2836	4.29	1018	1.07	0.42
0066D	0.15	–	0.02	0.34	2112	6.07	1374	1.44	0.38	2841	6.13	1386	1.46	0.38
0067D	0.15	–	0.02	0.34	2114	3.68	896	0.93	0.42	2881	4.44	1048	1.11	0.42
0079	3.92	944	0.91	0.34	2121	2.20	600	0.55	0.42	2883	5.58	1276	1.32	0.38
0083	6.49	1458	1.50	0.34	2130	3.32	824	0.77	0.34	2913	–	–	1.32	0.38
0106	23.30	1500	4.64	0.25	2131	2.63	686	0.62	0.38	2915	4.53	1066	0.95	0.30
0113	6.85	1500	1.64	0.38	2143	4.01	962	1.00	0.42	2916	6.01	1362	1.27	0.30
0170	3.62	884	0.86	0.38	2157	5.34	1228	1.26	0.38	2923	2.54	668	0.64	0.42
0251	6.49	1458	1.49	0.34	2172	2.50	660	0.52	0.30	2942	–	–	0.35	0.42
0400	–	–	0.96	0.34	2174	4.65	1090	1.11	0.38	2960	6.58	1476	1.52	0.34
0401	13.82	A	2.75	0.25	2211	10.71	1500	2.27	0.30	3004	2.14	588	0.42	0.25
0771N	0.63	–	–	–	2220	3.83	926	0.88	0.34	3018	4.50	1060	0.89	0.25
0908P	275.00	435	63.49	0.34	2286	–	–	0.88	0.34	3022	6.04	1368	1.43	0.38
0913P	785.00	945	180.91	0.34	2288	5.85	1330	1.40	0.38	3027	2.99	758	0.63	0.30
0917	6.13	1386	1.54	0.42	2300	–	–	0.80	0.38	3028	4.23	1006	0.89	0.30
1005	12.77	1500	2.34	0.25	2302	2.84	728	0.66	0.34	3030	7.76	1500	1.63	0.30
1164	5.92	1344	1.09	0.25	2305	3.68	896	0.78	0.30	3040	6.85	1500	1.58	0.34
1165XD	4.71	1102	0.86	0.25	2361	2.57	674	0.60	0.34	3041	5.10	1180	1.18	0.34
1320	3.11	782	0.61	0.26	2362	3.89	938	0.93	0.38	3042	5.58	1276	1.28	0.34
1322	14.34	1500	2.65	0.25	2380	2.90	740	0.69	0.38	3064	5.22	1204	1.20	0.34
1430	7.58	1500	1.61	0.30	2386	–	–	0.80	0.38	3076	4.89	1138	1.16	0.38
1438	7.36	1500	1.54	0.30	2388	2.20	600	0.56	0.42	3081D	5.58	1276	1.27	0.34
1452	3.65	890	0.77	0.30	2402	4.29	1018	0.91	0.30	3082D	5.76	1312	1.20	0.30
1463	14.06	1500	2.62	0.24	2413	4.01	962	0.93	0.34	3085D	7.70	1500	1.74	0.34
1472	3.95	950	0.83	0.30	2416	3.59	878	0.86	0.38	3110	5.95	1350	1.37	0.34
1624D	5.43	1246	1.06	0.26	2417	2.50	660	0.60	0.38	3111	4.01	962	0.95	0.38
1642	3.59	878	0.76	0.30	2501	3.35	830	0.80	0.38	3113	2.84	728	0.65	0.34
1654	15.03	1500	3.14	0.30	2503	1.78	516	0.42	0.38	3114	4.13	986	0.95	0.34
1655	–	–	0.76	0.30	2534	–	–	0.80	0.38	3118	2.66	692	0.67	0.42
1699	3.65	890	0.77	0.30	2570	5.95	1350	1.41	0.38	3119	1.21	402	0.32	0.44
1701	4.29	1018	0.85	0.25	2585	5.07	1174	1.16	0.34	3122	3.26	812	0.82	0.42
1710	8.69	1500	1.83	0.30	2586	4.38	1036	1.04	0.38	3126	2.35	630	0.54	0.34
1741	–	–	0.85	0.25	2587	3.59	878	0.85	0.38	3131	2.50	660	0.58	0.34
1747	2.99	758	0.63	0.30	2589	3.44	848	0.79	0.34	3132	4.01	962	0.96	0.38
1748	6.88	1500	1.46	0.30	2600	6.79	1500	1.59	0.38	3145	2.84	728	0.65	0.34
1803D	11.50	1500	2.22	0.30	2623	8.96	1500	1.89	0.30	3146	2.84	728	0.65	0.34
1852	–	–	0.46	0.24	2651	2.50	660	0.59	0.38	3169	4.26	1012	1.01	0.38
1853	–	–	0.85	0.25	2660	3.59	878	0.90	0.42	3175	–	–	1.01	0.38
1860	–	–	0.77	0.30	2670	–	–	0.87	0.38	3179	2.47	654	0.58	0.38
1924	4.35	1030	1.03	0.38	2683	–	–	0.80	0.38	3180	2.75	710	0.65	0.38
1925	6.22	1404	1.44	0.34	2688	3.65	890	0.87	0.38	3188	2.47	654	0.57	0.34
2002	4.68	1096	1.11	0.38	2702	35.88	1500	6.68	0.24	3220	3.59	878	0.83	0.34
2003	4.16	992	0.95	0.34	2705X*	94.95	1500	18.77	0.26	3223	–	–	0.65	0.38
2014	7.88	1500	1.67	0.30	2709	12.55	1500	2.48	0.26	3224	5.01	1162	1.25	0.42
2016	3.68	896	0.87	0.38	2710	12.62	1500	2.66	0.30	3227	4.26	1012	1.01	0.38

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3240	–	–	0.99	0.38	4036	3.53	866	0.74	0.30	4670	–	–	1.05	0.34
3241	4.59	1078	1.08	0.38	4038	3.83	926	0.95	0.42	4683	4.59	1078	1.05	0.34
3255	3.62	884	0.91	0.42	4053	–	–	0.94	0.34	4686	2.66	692	0.56	0.30
3257	4.16	992	0.99	0.38	4061	–	–	0.94	0.34	4692	1.09	378	0.26	0.38
3270	3.56	872	0.85	0.38	4062	4.07	974	0.94	0.34	4693	1.36	432	0.32	0.38
3300	6.19	1398	1.56	0.42	4101	3.62	884	0.83	0.34	4703	2.11	582	0.48	0.34
3303	3.20	800	0.76	0.38	4109	0.69	298	0.16	0.38	4717	2.93	746	0.74	0.42
3307	4.41	1042	1.02	0.34	4110	1.30	420	0.30	0.38	4720	2.50	660	0.58	0.34
3315	4.77	1114	1.13	0.38	4111	2.50	660	0.59	0.38	4740	1.75	510	0.32	0.24
3334	5.04	1168	1.15	0.34	4113	–	–	0.59	0.38	4741	4.07	974	0.94	0.34
3336	3.35	830	0.77	0.34	4114	4.71	1102	1.08	0.34	4751	3.95	950	0.84	0.30
3365	8.36	1500	1.65	0.26	4130	4.65	1090	1.11	0.38	4771N	3.53	992	0.70	0.25
3372	4.53	1066	1.04	0.34	4131	10.59	1500	2.53	0.38	4777	4.35	1030	0.87	0.25
3373	5.34	1228	1.26	0.38	4133	3.02	764	0.76	0.42	4825	1.21	402	0.26	0.30
3383	2.11	582	0.50	0.38	4149	1.09	378	0.27	0.42	4828	2.87	734	0.57	0.25
3385	1.39	438	0.33	0.38	4206	3.83	926	0.90	0.38	4829	2.14	588	0.42	0.25
3400	4.50	1060	1.07	0.38	4207	3.35	830	0.66	0.26	4902	3.26	812	0.78	0.38
3507	3.14	788	0.72	0.34	4239	3.59	878	0.71	0.26	4923	1.33	426	0.30	0.34
3515	2.90	740	0.67	0.34	4240	4.71	1102	1.19	0.42	5020	9.14	1500	1.81	0.26
3548	1.99	558	0.47	0.38	4243	2.63	686	0.61	0.34	5022	11.11	1500	2.06	0.24
3559	3.47	854	0.80	0.34	4244	3.26	812	0.69	0.30	5037	18.23	1500	3.38	0.24
3574	1.66	492	0.39	0.38	4250	2.60	680	0.60	0.34	5040	14.34	1500	2.66	0.24
3581	1.90	540	0.45	0.38	4251	4.23	1006	1.00	0.38	5057	9.36	1500	1.75	0.24
3612	2.57	674	0.59	0.34	4263	4.23	1006	0.97	0.34	5059	35.07	1500	6.54	0.24
3620	5.16	1192	1.09	0.30	4273	3.95	950	0.91	0.34	5069	–	–	6.54	0.24
3629	2.23	606	0.52	0.34	4279	3.65	890	0.77	0.30	5102	9.57	1500	1.89	0.26
3632	3.32	824	0.77	0.34	4282	–	–	0.77	0.30	5146	7.39	1500	1.55	0.30
3634	2.08	576	0.48	0.34	4283	2.54	668	0.60	0.38	5160	3.80	920	0.71	0.24
3635	2.50	660	0.58	0.34	4299	2.60	680	0.60	0.34	5183	5.67	1294	1.13	0.25
3638	2.66	692	0.63	0.38	4304	6.43	1446	1.48	0.34	5188	5.16	1192	1.02	0.25
3642	2.14	588	0.51	0.38	4307	2.44	648	0.61	0.42	5190	5.31	1222	1.05	0.25
3643	2.54	668	0.53	0.30	4351	2.60	680	0.61	0.38	5191	1.45	450	0.31	0.30
3647	3.62	884	0.83	0.34	4352	2.29	618	0.55	0.38	5192	4.13	986	0.95	0.34
3648	2.11	582	0.53	0.42	4360	–	–	0.19	0.30	5213	10.47	1500	1.95	0.24
3681	1.21	402	0.29	0.38	4361	1.39	438	0.33	0.38	5215	8.72	1500	1.83	0.30
3685	1.51	462	0.36	0.38	4410	4.62	1084	1.09	0.38	5221	6.61	1482	1.31	0.26
3719	1.51	462	0.28	0.25	4420	6.52	1464	1.29	0.26	5222	12.19	1500	2.26	0.24
3724	6.19	1398	1.15	0.24	4431	2.17	594	0.54	0.42	5223	8.66	1500	1.83	0.30
3726	7.64	1500	1.41	0.24	4432	1.39	438	0.35	0.42	5348	6.79	1500	1.43	0.30
3803	3.50	860	0.83	0.38	4439	–	–	0.64	0.34	5402	10.56	1500	2.51	0.38
3807	3.11	782	0.73	0.38	4452	3.44	848	0.79	0.34	5403	9.36	1500	1.85	0.25
3808	7.06	1500	1.61	0.34	4459	3.95	950	0.84	0.30	5437	9.66	1500	1.91	0.25
3821	8.87	1500	1.87	0.30	4470	3.29	818	0.76	0.34	5443	6.79	1500	1.57	0.34
3822X	5.34	1228	1.27	0.38	4484	3.80	920	0.90	0.38	5445	14.76	1500	2.75	0.24
3824X	6.01	1362	1.42	0.38	4493	3.62	884	0.83	0.34	5462	9.96	1500	2.09	0.30
3826	1.12	384	0.26	0.34	4511	0.72	304	0.17	0.34	5472	12.25	1500	2.28	0.24
3827	2.54	668	0.60	0.38	4557	3.47	854	0.73	0.30	5473	17.41	1500	3.24	0.24
3830	2.05	570	0.47	0.34	4558	2.78	716	0.64	0.34	5474	11.38	1500	2.12	0.24
3851	3.02	764	0.72	0.38	4568	2.81	722	0.59	0.30	5478	5.76	1312	1.13	0.26
3865	3.86	932	0.97	0.42	4581	1.54	468	0.31	0.25	5479	10.05	1500	2.11	0.30
3881	4.95	1150	1.14	0.34	4583	7.39	1500	1.47	0.25	5480	10.62	1500	2.09	0.26
4000	7.51	1500	1.48	0.26	4611	1.36	432	0.32	0.38	5491	3.47	854	0.69	0.25
4021	6.04	1368	1.39	0.34	4635	5.22	1204	1.03	0.26	5506	9.72	1500	1.92	0.26
4024D	5.79	1318	1.21	0.30	4653	3.08	776	0.72	0.38	5507	6.16	1392	1.22	0.25
4034	8.87	1500	1.87	0.30	4665	9.33	1500	1.96	0.30	5508	–	–	1.22	0.25

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5535	12.07	1500	2.25	0.24	7050M	12.25	1500	2.22	0.24	7710	6.13	1386	1.21	0.25
5537	7.33	1500	1.54	0.30	7090M	8.51	1500	1.61	0.24	7711	6.13	1386	1.21	0.25
5551	25.50	1500	4.76	0.24	7098M	11.35	1500	2.11	0.24	7720X	4.86	1132	1.03	0.30
5606	1.60	480	0.30	0.24	7099M	16.36	1500	2.91	0.24	7723X	3.41	842	0.68	0.25
5610	8.93	1500	1.89	0.30	7133	7.09	1500	1.41	0.25	7855	6.22	1404	1.30	0.30
5645	27.74	1500	5.18	0.24	7151M	8.63	1500	1.72	0.25	8001	4.16	992	0.99	0.38
5703	25.50	1500	5.38	0.30	7152M	13.79	1500	2.63	0.25	8002	3.26	812	0.78	0.38
5705	38.81	1500	8.22	0.30	7153M	9.57	1500	1.91	0.25	8006	3.77	914	0.95	0.42
5951	0.63	286	0.15	0.38	7219	14.03	1500	2.76	0.26	8008	2.11	582	0.54	0.42
6003	9.99	1500	1.97	0.26	7222X	14.06	1500	2.76	0.26	8010	2.78	716	0.66	0.38
6005	10.56	1500	2.22	0.30	7225	13.91	1500	2.91	0.30	8013	0.57	274	0.13	0.34
6017	–	–	1.95	0.24	7228	–	–	2.76	0.26	8015	1.15	390	0.26	0.34
6018	4.59	1078	0.95	0.31	7229	–	–	2.76	0.26	8017	2.23	606	0.56	0.42
6045	8.18	1500	1.71	0.30	7230X	14.85	1500	3.40	0.34	8018	4.56	1072	1.08	0.38
6204	12.28	1500	2.43	0.26	7231	14.85	1500	3.39	0.34	8021	3.62	884	0.86	0.38
6206	4.68	1096	0.86	0.25	7232X	20.40	1500	3.99	0.26	8031	3.59	878	0.85	0.38
6213	2.93	746	0.54	0.25	7309F	19.13	1500	3.16	0.22	8032	3.05	770	0.72	0.38
6214	2.81	722	0.55	0.26	7313F	8.51	1500	1.40	0.22	8033	2.72	704	0.69	0.42
6216	9.30	1500	1.72	0.25	7317F	17.08	1500	2.82	0.22	8037	2.32	624	0.60	0.44
6217	7.33	1500	1.36	0.24	7327F	36.76	1500	6.06	0.22	8039	2.47	654	0.62	0.42
6229	8.54	1500	1.80	0.30	7333M	5.43	1246	1.00	0.25	8044	4.35	1030	1.03	0.38
6233	3.68	896	0.68	0.25	7335M	6.04	1368	1.11	0.25	8045	1.18	396	0.28	0.38
6235	9.02	1500	1.67	0.25	7337M	8.69	1500	1.53	0.25	8046	4.01	962	0.95	0.38
6236	10.68	1500	2.24	0.30	7350F	22.91	1500	3.93	0.23	8047	1.27	414	0.30	0.38
6237	2.47	654	0.48	0.26	7360	6.58	1476	1.38	0.30	8058	4.07	974	0.97	0.38
6251D	7.00	1500	1.37	0.26	7370	7.45	1500	1.76	0.38	8072	1.06	372	0.26	0.42
6252D	5.28	1216	0.97	0.25	7380	9.33	1500	1.95	0.30	8102	2.63	686	0.63	0.38
6260	–	–	1.37	0.26	7382	7.30	1500	1.68	0.34	8103	4.13	986	0.96	0.34
6306	7.61	1500	1.51	0.25	7390	6.49	1458	1.53	0.38	8105	–	–	1.08	0.38
6319	6.16	1392	1.14	0.24	7394M	5.55	1270	1.03	0.25	8106	6.43	1446	1.35	0.30
6325	5.25	1210	0.98	0.24	7395M	6.16	1392	1.14	0.25	8107	4.62	1084	0.91	0.26
6400	7.64	1500	1.60	0.30	7398M	8.87	1500	1.57	0.25	8111	3.02	764	0.69	0.34
6503	3.71	902	0.88	0.38	7402	0.18	196	0.04	0.38	8116	3.32	824	0.77	0.34
6504	4.74	1108	1.13	0.38	7403	7.48	1500	1.77	0.38	8203	10.26	1500	2.35	0.34
6702M*	7.55	1500	1.58	0.30	7405N	2.99	958	0.70	0.38	8204	7.36	1500	1.70	0.34
6703M*	12.10	1500	2.42	0.30	7420	12.31	1500	2.25	0.25	8209	5.31	1222	1.26	0.38
6704M*	8.39	1500	1.76	0.30	7421	1.36	432	0.29	0.30	8215	5.34	1228	1.13	0.30
6801F	8.45	1500	1.51	0.29	7422	2.29	618	0.45	0.26	8227	5.98	1356	1.18	0.26
6811	9.30	1500	1.96	0.30	7425	3.47	854	0.68	0.26	8232	7.24	1500	1.52	0.30
6824F	15.39	1500	2.75	0.29	7431N	2.05	708	0.40	0.26	8233	4.35	1030	0.90	0.31
6826F	7.85	1500	1.40	0.29	7445N	1.00	–	–	–	8235	6.76	1500	1.55	0.34
6834	4.83	1126	1.15	0.38	7453N	0.69	–	–	–	8236X	8.33	1500	1.65	0.25
6836	6.34	1428	1.47	0.34	7502	3.17	794	0.66	0.30	8263	10.29	1500	2.37	0.34
6843F	19.62	1500	3.24	0.22	7515	1.60	480	0.30	0.24	8264	6.88	1500	1.45	0.30
6845F	13.88	1500	2.29	0.22	7520	4.50	1060	1.03	0.34	8265	8.48	1500	1.68	0.25
6854	8.33	1500	1.65	0.26	7529X	19.44	1500	3.60	0.24	8279	8.72	1500	1.74	0.25
6872F	18.95	1500	3.13	0.22	7538	7.51	1500	1.40	0.24	8288	9.84	1500	2.28	0.34
6874F	35.40	1500	5.84	0.22	7539	2.81	722	0.56	0.26	8291X	5.34	1228	1.23	0.34
6882	5.43	1246	1.08	0.25	7540	6.25	1410	1.17	0.24	8292X	5.40	1240	1.28	0.38
6884	5.92	1344	1.16	0.26	7580	4.98	1156	1.05	0.30	8293X	12.25	1500	2.90	0.38
7016M	7.30	1500	1.35	0.25	7590	5.40	1240	1.14	0.30	8304	7.67	1500	1.52	0.25
7024M	8.12	1500	1.50	0.25	7600	9.33	1500	1.95	0.30	8350	12.98	1500	2.57	0.25
7038M	7.67	1500	1.45	0.24	7605	4.29	1018	0.85	0.25	8380	3.50	860	0.80	0.34
7046M	10.20	1500	1.90	0.24	7610	0.94	348	0.19	0.30	8381	2.96	752	0.68	0.34
7047M	11.71	1500	2.07	0.25	7705	7.94	1500	1.82	0.34	8385	3.68	896	0.85	0.34

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APPLICABLE TO ASSIGNED RISK POLICIES ONLY

CLASS CODE	RATE	MIN PREM	ELR	D RATIO	CLASS CODE	RATE	MIN PREM	ELR	D RATIO	CLASS CODE	RATE	MIN PREM	ELR	D RATIO
8392	3.38	836	0.85	0.42	9058	2.35	630	0.61	0.44					
8393	2.47	654	0.52	0.30	9060	2.05	570	0.52	0.42					
8500	9.30	1500	1.96	0.30	9061	1.66	492	0.41	0.42					
8601	0.48	256	0.10	0.26	9062	1.87	534	0.47	0.42					
8602	1.99	558	0.42	0.30	9063	1.24	408	0.31	0.42					
8603	0.12	184	0.03	0.38	9077F	6.37	1434	1.22	0.37					
8606	2.81	722	0.55	0.25	9082	1.81	522	0.47	0.44					
8709F	9.24	1500	1.52	0.22	9083	1.84	528	0.48	0.44					
8719	3.26	812	0.65	0.25	9084	2.02	564	0.51	0.42					
8720	1.72	504	0.34	0.25	9089	1.48	456	0.38	0.42					
8721	0.60	280	0.13	0.30	9093	1.90	540	0.48	0.42					
8723	0.24	208	0.06	0.34	9101	5.01	1162	1.26	0.42					
8725	3.65	890	0.77	0.30	9102	5.01	1162	1.16	0.34					
8726F	4.86	1132	0.87	0.29	9154	2.63	686	0.62	0.38					
8734M	0.66	292	0.14	0.30	9156	3.38	836	0.84	0.42					
8737M	0.57	274	0.12	0.30	9170	12.89	1500	2.56	0.25					
8738M	0.94	348	0.19	0.30	9178	9.54	1500	2.53	0.44					
8742	0.48	256	0.10	0.30	9179	26.65	1500	6.92	0.44					
8745	5.40	1240	1.25	0.34	9180	7.33	1500	1.70	0.34					
8748	1.00	360	0.20	0.26	9182	3.20	800	0.76	0.38					
8755	0.51	262	0.11	0.30	9186	21.34	1500	4.26	0.25					
8799	0.69	298	0.16	0.38	9220	8.36	1500	1.93	0.34					
8800	2.23	606	0.53	0.38	9402	8.84	1500	1.75	0.26					
8803	0.09	178	0.02	0.30	9403	12.28	1500	2.43	0.26					
8805M	0.24	208	0.06	0.38	9410	4.10	980	0.97	0.38					
8810	0.18	196	0.04	0.38	9501	4.62	1084	0.97	0.30					
8814M	0.21	202	0.05	0.38	9505	6.55	1470	1.51	0.34					
8815M	0.36	232	0.07	0.38	9516	4.16	992	0.95	0.34					
8820	0.21	202	0.04	0.30	9519	6.37	1434	1.34	0.30					
8824	3.47	854	0.90	0.44	9521	5.34	1228	1.12	0.30					
8825	–	–	0.77	0.42	9522	2.78	716	0.69	0.42					
8826	3.05	770	0.77	0.42	9534	8.45	1500	1.56	0.25					
8831	1.84	528	0.48	0.44	9554	16.09	1500	3.19	0.25					
8832	0.48	256	0.11	0.38	9586	0.69	298	0.17	0.42					
8833	1.60	480	0.38	0.38	9600	3.53	866	0.83	0.38					
8835	3.41	842	0.80	0.38	9620	2.35	630	0.50	0.30					
8842X	3.53	866	0.92	0.44										
8848	–	–	0.90	0.44										
8849	–	–	0.90	0.44										
8855	0.21	202	0.05	0.38										
8856	0.97	354	0.23	0.38										
8864X	1.81	522	0.45	0.42										
8868	0.75	310	0.19	0.42										
8869	1.75	510	0.44	0.42										
8871	0.12	184	0.03	0.38										
8901	0.33	226	0.07	0.30										
9012	1.48	456	0.31	0.30										
9014	4.56	1072	1.08	0.38										
9015	4.10	980	0.94	0.34										
9016	3.29	818	0.79	0.38										
9019	4.23	1006	0.90	0.30										
9033	3.05	770	0.70	0.34										
9040	4.77	1114	1.20	0.42										
9044	1.72	504	0.43	0.42										
9052	2.44	648	0.61	0.42										

* Refer to the Footnotes Page for additional information on this class code.

Effective April 1, 2022
APPLICABLE TO ASSIGNED RISK POLICIES ONLY

FOOTNOTES

A Minimum Premium $100 per ginning location for policy minimum premium computation.

D Rate for classification already includes the specific disease loading shown in the table below. See ***Basic Manual*** Rule 3-A-7.

Code No.	Disease Loading	Symbol	Code No.	Disease Loading	Symbol	Code No.	Disease Loading	Symbol
0059D	0.54	S	1624D	0.03	S	4024D	0.06	S
0065D	0.15	S	1803D	0.97	S	6251D	0.03	S
0066D	0.15	S	3081D	0.09	S	6252D	0.03	S
0067D	0.15	S	3082D	0.09	S			
1165XD	0.06	S	3085D	0.15	S			

S=Silica

F Rate provides for coverage under the United States Longshore and Harbor Workers Compensation Act and its extensions. Rate includes a provision for USL&HW Assessment.

M Risks are subject to Admiralty Law or Federal Employers Liability Act (FELA). However, the published rate is for risks that voluntarily purchase standard workers compensation and employers liability coverage. A provision for the USL&HW Assessment is included for those classifications under Program II USL Act. The listed codes of 6702, 6703, 6704, 7151, 7152, 7153, 8734, 8737, 8738, 8805, 8814, and 8815 under the Federal Employers' Liability Act (FELA) for employees of interstate railroads are not applicable in the residual market.

N This code is part of a ratable / non-ratable group shown below. The statistical non-ratable code and corresponding rate are applied in addition to the basic classification when determining premium.

Class Code	Non-Ratable Element Code
4771	0771
7405	7445
7431	7453

P Classification is computed on a per capita basis.

X Refer to special classification phraseology in these pages which is applicable in this state.

*** Class Codes with Specific Footnotes**

2705 An upset payroll of $4.00 per cord shall be used for premium computation purposes in all instances.

6702 Rate and rating values only appropriate for laying or relaying of tracks or maintenance of way - no work on elevated railroads. Otherwise, assign appropriate construction or erection code rate and elr each x 1.215.

6703 Rate and rating values only appropriate for laying or relaying of tracks or maintenance of way - no work on elevated railroads. Otherwise, assign appropriate construction or erection class rate x 1.945 and elr x 1.863.

6704 Rate and rating values only appropriate for laying or relaying of tracks or maintenance of way - no work on elevated railroads. Otherwise, assign appropriate construction or erection class rate and elr each x 1.35.

Effective April 1, 2022

APPLICABLE TO ASSIGNED RISK POLICIES ONLY

MISCELLANEOUS VALUES

Basis of premium applicable in accordance with ***Basic Manual*** footnote instructions for Code 7370 -- "Taxicab Co.":

Employee operated vehicle	$78,100
Leased or rented vehicle	$52,100

Catastrophe (other than Certified Acts of Terrorism) - (Assigned Risk) $0.01

Expense Constant applicable in accordance with ***Basic Manual*** Rule 3-A-10 $160

Loss Sensitive Rating Plan (LSRP) - The factors which are used in the calculation of the LSRP are as follows:

Basic Premium Factor	0.40
Minimum Premium Factor	0.75
Maximum Premium Factor	1.75
Loss Conversion Factor	1.2
Tax Multiplier	1.027

Loss Development Factors	
1st Adjustment	0.15
2nd Adjustment	0.09
3rd Adjustment	0.06
4th Adjustment	0.05

Maximum Minimum Premium $1,500

Maximum Weekly Payroll applicable in accordance with ***Basic Manual*** Rule 2-E-1 -- "Executive Officers" and the ***Basic Manual*** footnote instructions for Code 9178 -- "Athletic Sports or Park: Non-Contact Sports," and Code 9179 -- "Athletic Sports or Park: Contact Sports" $2,000

Minimum Premium Multiplier 200

Minimum Weekly Payroll applicable in accordance with ***Basic Manual*** Rule 2-E-1 -- "Executive Officers" $1,000

Premium Determination for Partners and Sole Proprietors in accordance with ***Basic Manual*** Rule 2-E-3 (Annual Payroll) $52,100

Premium Reduction Percentages - The following percentages are applicable by deductible amount and hazard group for total losses on a per claim basis:

	Total Losses						
Deductible	**HAZARD GROUP**						
Amount	**A**	**B**	**C**	**D**	**E**	**F**	**G**
$100	1.0%	0.8%	0.6%	0.5%	0.3%	0.2%	0.1%
$200	1.8%	1.5%	1.0%	0.8%	0.6%	0.4%	0.3%
$300	2.5%	2.0%	1.5%	1.2%	0.8%	0.5%	0.4%
$400	3.2%	2.5%	1.8%	1.5%	1.0%	0.7%	0.5%
$500	3.7%	2.9%	2.2%	1.8%	1.2%	0.8%	0.6%
$1,000	5.9%	4.6%	3.5%	2.9%	2.1%	1.5%	1.1%
$1,500	7.5%	5.8%	4.6%	3.8%	2.8%	2.0%	1.6%
$2,000	8.7%	6.9%	5.4%	4.5%	3.4%	2.5%	2.0%
$2,500	9.8%	7.8%	6.2%	5.2%	3.9%	2.9%	2.3%
$5,000	14.0%	11.3%	9.3%	8.0%	6.2%	4.8%	4.0%

Terrorism - (Assigned Risk) $0.01

Effective April 1, 2022
APPLICABLE TO ASSIGNED RISK POLICIES ONLY

MISCELLANEOUS VALUES (cont.)

United States Longshore and Harbor Workers' Compensation Coverage Percentage applicable only in connection with ***Basic Manual*** Rule 3-A-4…… 58%

(Multiply a Non-F classification rate by a factor of 1.58 to adjust for differences in benefits and loss-based expenses. This factor is the product of the adjustment for differences in benefits (1.50) and the adjustment for differences in loss-based expenses (1.052).)

Experience Rating Eligibility

A risk is eligible for experience rating when the payrolls or other exposures developed in the last year or last two years of the experience period produced a premium of at least $12,000. If more than two years, an average annual premium of at least $6,000 is required. These amounts are applicable for ratings effective April 1, 2022, and subsequent. The ***Experience Rating Plan Manual*** should be referenced for the latest approved eligibility amounts by state.

Effective April 1, 2022

TABLE OF WEIGHTING VALUES
APPLICABLE TO ALL POLICIES

Experience Rating Program - ERA

Expected Losses			Weighting Values	Expected Losses			Weighting Values
0	--	2,418	0.04	1,363,928	--	1,439,161	0.44
2,419	--	9,777	0.05	1,439,162	--	1,518,751	0.45
9,778	--	17,294	0.06	1,518,752	--	1,603,087	0.46
17,295	--	24,972	0.07	1,603,088	--	1,692,607	0.47
24,973	--	32,819	0.08	1,692,608	--	1,787,806	0.48
32,820	--	54,893	0.09	1,787,807	--	1,889,243	0.49
54,894	--	81,711	0.10	1,889,244	--	1,997,552	0.50
81,712	--	105,565	0.11	1,997,553	--	2,113,458	0.51
105,566	--	128,791	0.12	2,113,459	--	2,237,788	0.52
128,792	--	152,020	0.13	2,237,789	--	2,371,497	0.53
152,021	--	175,535	0.14	2,371,498	--	2,515,689	0.54
175,536	--	199,496	0.15	2,515,690	--	2,671,648	0.55
199,497	--	224,010	0.16	2,671,649	--	2,840,876	0.56
224,011	--	249,158	0.17	2,840,877	--	3,025,142	0.57
249,159	--	275,010	0.18	3,025,143	--	3,226,546	0.58
275,011	--	301,626	0.19	3,226,547	--	3,447,594	0.59
301,627	--	329,063	0.20	3,447,595	--	3,691,311	0.60
329,064	--	357,378	0.21	3,691,312	--	3,961,371	0.61
357,379	--	386,628	0.22	3,961,372	--	4,262,291	0.62
386,629	--	416,870	0.23	4,262,292	--	4,599,683	0.63
416,871	--	448,167	0.24	4,599,684	--	4,980,605	0.64
448,168	--	480,580	0.25	4,980,606	--	5,414,064	0.65
480,581	--	514,177	0.26	5,414,065	--	5,911,735	0.66
514,178	--	549,031	0.27	5,911,736	--	6,489,029	0.67
549,032	--	585,216	0.28	6,489,030	--	7,166,718	0.68
585,217	--	622,816	0.29	7,166,719	--	7,973,486	0.69
622,817	--	661,917	0.30	7,973,487	--	8,950,095	0.70
661,918	--	702,616	0.31	8,950,096	--	10,156,489	0.71
702,617	--	745,014	0.32	10,156,490	--	11,684,583	0.72
745,015	--	789,223	0.33	11,684,584	--	13,682,853	0.73
789,224	--	835,363	0.34	13,682,854	--	16,407,759	0.74
835,364	--	883,566	0.35	16,407,760	--	20,343,728	0.75
883,567	--	933,976	0.36	20,343,729	--	26,528,810	0.76
933,977	--	986,748	0.37	26,528,811	--	37,661,946	0.77
986,749	--	1,042,055	0.38	37,661,947	--	63,639,242	0.78
1,042,056	--	1,100,085	0.39	63,639,243	--	193,525,657	0.79
1,100,086	--	1,161,046	0.40	193,525,658		AND OVER	0.80
1,161,047	--	1,225,166	0.41				
1,225,167	--	1,292,700	0.42				
1,292,701	--	1,363,927	0.43				

(a) G	11.55
(b) State Per Claim Accident Limitation	$288,500
(c) State Multiple Claim Accident Limitation	$577,000
(d) USL&HW Per Claim Accident Limitation	$625,500
(e) USL&HW Multiple Claim Accident Limitation	$1,251,000
(f) Employers Liability Accident Limitation	$55,000
(g) Primary/Excess Loss Split Point	$18,500
(h) USL&HW Act -- Expected Loss Factor -- Non-F Classes	1.50

(Multiply a Non-F classification ELR by the USL&HW Act - Expected Loss Factor of 1.50.)

Effective April 1, 2022

TABLE OF BALLAST VALUES
APPLICABLE TO ALL POLICIES

Experience Rating Plan - ERA

Expected Losses			Ballast Values	Expected Losses			Ballast Values	Expected Losses			Ballast Values
0	--	62,125	28,875	1,993,542	--	2,051,258	231,000	4,014,206	--	4,071,947	433,125
62,126	--	106,923	34,650	2,051,259	--	2,108,977	236,775	4,071,948	--	4,129,689	438,900
106,924	--	158,397	40,425	2,108,978	--	2,166,698	242,550	4,129,690	--	4,187,431	444,675
158,398	--	212,698	46,200	2,166,699	--	2,224,420	248,325	4,187,432	--	4,245,173	450,450
212,699	--	268,321	51,975	2,224,421	--	2,282,144	254,100	4,245,174	--	4,302,916	456,225
268,322	--	324,641	57,750	2,282,145	--	2,339,869	259,875	4,302,917	--	4,360,659	462,000
324,642	--	381,369	63,525	2,339,870	--	2,397,595	265,650	4,360,660	--	4,418,402	467,775
381,370	--	438,354	69,300	2,397,596	--	2,455,322	271,425	4,418,403	--	4,476,145	473,550
438,355	--	495,510	75,075	2,455,323	--	2,513,050	277,200	4,476,146	--	4,533,888	479,325
495,511	--	552,787	80,850	2,513,051	--	2,570,780	282,975	4,533,889	--	4,591,632	485,100
552,788	--	610,151	86,625	2,570,781	--	2,628,510	288,750	4,591,633	--	4,649,376	490,875
610,152	--	667,580	92,400	2,628,511	--	2,686,241	294,525	4,649,377	--	4,707,120	496,650
667,581	--	725,059	98,175	2,686,242	--	2,743,973	300,300	4,707,121	--	4,764,864	502,425
725,060	--	782,577	103,950	2,743,974	--	2,801,705	306,075	4,764,865	--	4,822,608	508,200
782,578	--	840,127	109,725	2,801,706	--	2,859,439	311,850	4,822,609	--	4,880,352	513,975
840,128	--	897,702	115,500	2,859,440	--	2,917,173	317,625	4,880,353	--	4,938,096	519,750
897,703	--	955,298	121,275	2,917,174	--	2,974,907	323,400	4,938,097	--	4,995,841	525,525
955,299	--	1,012,911	127,050	2,974,908	--	3,032,642	329,175	4,995,842	--	5,053,586	531,300
1,012,912	--	1,070,539	132,825	3,032,643	--	3,090,378	334,950	5,053,587	--	5,111,331	537,075
1,070,540	--	1,128,179	138,600	3,090,379	--	3,148,114	340,725	5,111,332	--	5,169,075	542,850
1,128,180	--	1,185,830	144,375	3,148,115	--	3,205,851	346,500	5,169,076	--	5,226,820	548,625
1,185,831	--	1,243,490	150,150	3,205,852	--	3,263,588	352,275	5,226,821	--	5,284,566	554,400
1,243,491	--	1,301,158	155,925	3,263,589	--	3,321,326	358,050	5,284,567	--	5,342,311	560,175
1,301,159	--	1,358,832	161,700	3,321,327	--	3,379,064	363,825	5,342,312	--	5,400,056	565,950
1,358,833	--	1,416,513	167,475	3,379,065	--	3,436,802	369,600	5,400,057	--	5,457,802	571,725
1,416,514	--	1,474,199	173,250	3,436,803	--	3,494,541	375,375	5,457,803	--	5,515,125	577,500
1,474,200	--	1,531,890	179,025	3,494,542	--	3,552,280	381,150				
1,531,891	--	1,589,586	184,800	3,552,281	--	3,610,020	386,925				
1,589,587	--	1,647,285	190,575	3,610,021	--	3,667,760	392,700				
1,647,286	--	1,704,987	196,350	3,667,761	--	3,725,500	398,475				
1,704,988	--	1,762,693	202,125	3,725,501	--	3,783,240	404,250				
1,762,694	--	1,820,401	207,900	3,783,241	--	3,840,981	410,025				
1,820,402	--	1,878,112	213,675	3,840,982	--	3,898,722	415,800				
1,878,113	--	1,935,825	219,450	3,898,723	--	3,956,463	421,575				
1,935,826	--	1,993,541	225,225	3,956,464	--	4,014,205	427,350				

For Expected Losses greater than $5,515,125, the Ballast Value can be calculated using the following formula (rounded to the nearest 1):

Ballast = (0.10)(Expected Losses) + 2500(Expected Losses)(11.55) / (Expected Losses + (700)(11.55))

G = 11.55

NORTH CAROLINA

APPENDIX E

Assigned Risk Rates Comparison

Class Code	Current 04/01/21	Proposed 04/01/22	Percent Change
0005	4.71	4.89	3.8%
0008	3.11	3.32	6.8%
0016	9.13	9.27	1.5%
0034	4.61	5.34	15.8%
0035	3.30	3.44	4.2%
0036	5.59	5.55	-0.7%
0037	5.48	5.64	2.9%
0042	7.79	7.48	-4.0%
0050	8.53	9.90	16.1%
0059	0.52	0.54	3.8%
0065	0.14	0.15	7.1%
0066	0.14	0.15	7.1%
0067	0.14	0.15	7.1%
0079	3.73	3.92	5.1%
0083	5.89	6.49	10.2%
0106	24.28	23.30	-4.0%
0113	6.81	6.85	0.6%
0170	3.19	3.62	13.5%
0251	6.13	6.49	5.9%
0401	13.92	13.82	-0.7%
0771	0.60	0.63	5.0%
0908	245.00	275.00	12.2%
0913	777.00	785.00	1.0%
0917	5.97	6.13	2.7%
1005	12.54	12.77	1.8%
1164	6.19	5.92	-4.4%
1165	4.57	4.71	3.1%
1320	3.00	3.11	3.7%
1322	12.92	14.34	11.0%
1430	6.65	7.58	14.0%
1438	6.95	7.36	5.9%
1452	3.35	3.65	9.0%
1463	13.27	14.06	6.0%
1472	3.57	3.95	10.6%
1624	5.45	5.43	-0.4%
1642	3.08	3.59	16.6%
1654	16.40	15.03	-8.4%
1699	3.60	3.65	1.4%
1701	4.58	4.29	-6.3%
1710	8.67	8.69	0.2%
1747	2.81	2.99	6.4%
1748	6.21	6.88	10.8%
1803	10.13	11.50	13.5%
1924	4.14	4.35	5.1%

NORTH CAROLINA

APPENDIX E

Assigned Risk Rates Comparison

Class Code	Current 04/01/21	Proposed 04/01/22	Percent Change
1925	5.83	6.22	6.7%
2002	3.82	4.68	22.5%
2003	3.84	4.16	8.3%
2014	7.17	7.88	9.9%
2016	3.62	3.68	1.7%
2021	3.84	4.65	21.1%
2039	3.46	3.65	5.5%
2041	3.57	3.83	7.3%
2065	3.13	3.44	9.9%
2070	7.49	8.21	9.6%
2081	4.85	5.28	8.9%
2089	3.65	3.65	0.0%
2095	5.34	5.49	2.8%
2105	5.26	5.82	10.6%
2110	2.56	3.17	23.8%
2111	3.27	3.32	1.5%
2112	5.26	6.07	15.4%
2114	3.65	3.68	0.8%
2121	2.07	2.20	6.3%
2130	2.89	3.32	14.9%
2131	2.67	2.63	-1.5%
2143	3.68	4.01	9.0%
2157	5.04	5.34	6.0%
2172	2.23	2.50	12.1%
2174	4.14	4.65	12.3%
2211	10.22	10.71	4.8%
2220	3.24	3.83	18.2%
2288	5.07	5.85	15.4%
2302	2.43	2.84	16.9%
2305	3.22	3.68	14.3%
2361	2.48	2.57	3.6%
2362	3.27	3.89	19.0%
2380	2.67	2.90	8.6%
2388	2.29	2.20	-3.9%
2402	4.39	4.29	-2.3%
2413	4.09	4.01	-2.0%
2416	3.00	3.59	19.7%
2417	2.13	2.50	17.4%
2501	3.02	3.35	10.9%
2503	1.69	1.78	5.3%
2570	5.53	5.95	7.6%
2585	4.58	5.07	10.7%
2586	4.17	4.38	5.0%
2587	3.22	3.59	11.5%

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Assigned Risk Rates Comparison

Class Code	Current 04/01/21	Proposed 04/01/22	Percent Change
2589	3.13	3.44	9.9%
2600	5.80	6.79	17.1%
2623	8.83	8.96	1.5%
2651	2.45	2.50	2.0%
2660	3.30	3.59	8.8%
2688	3.43	3.65	6.4%
2702	32.51	35.88	10.4%
2705	94.26	94.95	0.7%
2709	12.51	12.55	0.3%
2710	11.99	12.62	5.3%
2714	5.04	5.37	6.5%
2727	15.07	15.60	3.5%
2731	5.94	6.04	1.7%
2735	5.31	6.25	17.7%
2759	7.66	8.00	4.4%
2790	2.37	2.81	18.6%
2797	7.14	7.27	1.8%
2799	9.24	9.24	0.0%
2802	7.17	7.39	3.1%
2835	3.16	3.56	12.7%
2836	3.68	4.29	16.6%
2841	5.67	6.13	8.1%
2881	4.33	4.44	2.5%
2883	4.93	5.58	13.2%
2915	4.61	4.53	-1.7%
2916	5.18	6.01	16.0%
2923	2.62	2.54	-3.1%
2960	6.19	6.58	6.3%
3004	1.93	2.14	10.9%
3018	4.20	4.50	7.1%
3022	6.02	6.04	0.3%
3027	2.83	2.99	5.7%
3028	3.82	4.23	10.7%
3030	7.71	7.76	0.6%
3040	6.73	6.85	1.8%
3041	5.01	5.10	1.8%
3042	5.15	5.58	8.3%
3064	5.07	5.22	3.0%
3076	4.33	4.89	12.9%
3081	5.59	5.58	-0.2%
3082	5.72	5.76	0.7%
3085	6.49	7.70	18.6%
3110	5.78	5.95	2.9%
3111	3.68	4.01	9.0%

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Class Code	Current 04/01/21	Proposed 04/01/22	Percent Change
3113	2.51	2.84	13.1%
3114	3.98	4.13	3.8%
3118	2.64	2.66	0.8%
3119	1.06	1.21	14.2%
3122	3.00	3.26	8.7%
3126	2.15	2.35	9.3%
3131	2.34	2.50	6.8%
3132	3.76	4.01	6.6%
3145	2.75	2.84	3.3%
3146	3.00	2.84	-5.3%
3169	4.14	4.26	2.9%
3179	2.23	2.47	10.8%
3180	2.64	2.75	4.2%
3188	2.40	2.47	2.9%
3220	3.00	3.59	19.7%
3224	4.31	5.01	16.2%
3227	4.01	4.26	6.2%
3241	4.61	4.59	-0.4%
3255	3.30	3.62	9.7%
3257	3.98	4.16	4.5%
3270	3.65	3.56	-2.5%
3300	5.18	6.19	19.5%
3303	3.11	3.20	2.9%
3307	4.39	4.41	0.5%
3315	4.74	4.77	0.6%
3334	4.47	5.04	12.8%
3336	3.30	3.35	1.5%
3365	7.79	8.36	7.3%
3372	4.36	4.53	3.9%
3373	5.04	5.34	6.0%
3383	2.04	2.11	3.4%
3385	1.23	1.39	13.0%
3400	4.33	4.50	3.9%
3507	3.05	3.14	3.0%
3515	2.89	2.90	0.3%
3548	1.64	1.99	21.3%
3559	3.22	3.47	7.8%
3574	1.28	1.66	29.7%
3581	1.80	1.90	5.6%
3612	2.34	2.57	9.8%
3620	5.20	5.16	-0.8%
3629	2.07	2.23	7.7%
3632	3.46	3.32	-4.0%
3634	2.07	2.08	0.5%

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Class Code	Current 04/01/21	Proposed 04/01/22	Percent Change
3635	2.67	2.50	-6.4%
3638	2.45	2.66	8.6%
3642	1.74	2.14	23.0%
3643	2.32	2.54	9.5%
3647	3.27	3.62	10.7%
3648	1.96	2.11	7.7%
3681	1.09	1.21	11.0%
3685	1.42	1.51	6.3%
3719	1.64	1.51	-7.9%
3724	5.20	6.19	19.0%
3726	6.98	7.64	9.5%
3803	3.02	3.50	15.9%
3807	3.02	3.11	3.0%
3808	6.73	7.06	4.9%
3821	8.09	8.87	9.6%
3822	4.50	5.34	18.7%
3824	5.59	6.01	7.5%
3826	1.09	1.12	2.8%
3827	2.48	2.54	2.4%
3830	1.80	2.05	13.9%
3851	3.00	3.02	0.7%
3865	3.13	3.86	23.3%
3881	4.82	4.95	2.7%
4000	6.89	7.51	9.0%
4021	6.35	6.04	-4.9%
4024	5.25	5.79	10.3%
4034	8.56	8.87	3.6%
4036	3.49	3.53	1.1%
4038	3.62	3.83	5.8%
4062	4.01	4.07	1.5%
4101	3.60	3.62	0.6%
4109	0.65	0.69	6.2%
4110	1.25	1.30	4.0%
4111	2.23	2.50	12.1%
4114	4.61	4.71	2.2%
4130	4.52	4.65	2.9%
4131	10.00	10.59	5.9%
4133	2.64	3.02	14.4%
4149	1.09	1.09	0.0%
4206	3.41	3.83	12.3%
4207	3.22	3.35	4.0%
4239	3.13	3.59	14.7%
4240	4.69	4.71	0.4%
4243	2.56	2.63	2.7%

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Class Code	Current 04/01/21	Proposed 04/01/22	Percent Change
4244	3.05	3.26	6.9%
4250	2.37	2.60	9.7%
4251	3.49	4.23	21.2%
4263	3.49	4.23	21.2%
4273	3.79	3.95	4.2%
4279	3.27	3.65	11.6%
4283	2.23	2.54	13.9%
4299	2.37	2.60	9.7%
4304	6.10	6.43	5.4%
4307	2.43	2.44	0.4%
4351	2.26	2.60	15.0%
4352	2.13	2.29	7.5%
4361	1.34	1.39	3.7%
4410	4.20	4.62	10.0%
4420	7.22	6.52	-9.7%
4431	2.02	2.17	7.4%
4432	1.28	1.39	8.6%
4452	3.11	3.44	10.6%
4459	3.65	3.95	8.2%
4470	2.94	3.29	11.9%
4484	3.35	3.80	13.4%
4493	3.35	3.62	8.1%
4511	0.71	0.72	1.4%
4557	3.02	3.47	14.9%
4558	2.51	2.78	10.8%
4568	2.56	2.81	9.8%
4581	1.42	1.54	8.5%
4583	6.76	7.39	9.3%
4611	1.12	1.36	21.4%
4635	4.69	5.22	11.3%
4653	2.62	3.08	17.6%
4665	9.13	9.33	2.2%
4683	4.63	4.59	-0.9%
4686	2.56	2.66	3.9%
4692	1.01	1.09	7.9%
4693	1.25	1.36	8.8%
4703	2.07	2.11	1.9%
4717	2.81	2.93	4.3%
4720	2.37	2.50	5.5%
4740	1.83	1.75	-4.4%
4741	3.49	4.07	16.6%
4751	2.97	3.95	33.0%
4771	3.35	3.53	5.4%
4777	4.14	4.35	5.1%

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Class Code	Current 04/01/21	Proposed 04/01/22	Percent Change
4825	1.20	1.21	0.8%
4828	2.64	2.87	8.7%
4829	1.88	2.14	13.8%
4902	3.11	3.26	4.8%
4923	1.25	1.33	6.4%
5020	9.13	9.14	0.1%
5022	10.98	11.11	1.2%
5037	19.43	18.23	-6.2%
5040	14.03	14.34	2.2%
5057	9.37	9.36	-0.1%
5059	33.16	35.07	5.8%
5102	9.84	9.57	-2.7%
5146	6.89	7.39	7.3%
5160	4.06	3.80	-6.4%
5183	5.20	5.67	9.0%
5188	5.12	5.16	0.8%
5190	4.96	5.31	7.1%
5191	1.31	1.45	10.7%
5192	4.20	4.13	-1.7%
5213	9.86	10.47	6.2%
5215	8.58	8.72	1.6%
5221	6.46	6.61	2.3%
5222	11.36	12.19	7.3%
5223	9.35	8.66	-7.4%
5348	6.73	6.79	0.9%
5402	8.91	10.56	18.5%
5403	9.16	9.36	2.2%
5437	8.64	9.66	11.8%
5443	6.65	6.79	2.1%
5445	13.38	14.76	10.3%
5462	9.48	9.96	5.1%
5472	11.25	12.25	8.9%
5473	15.42	17.41	12.9%
5474	10.90	11.38	4.4%
5478	5.23	5.76	10.1%
5479	9.89	10.05	1.6%
5480	10.00	10.62	6.2%
5491	3.46	3.47	0.3%
5506	9.89	9.72	-1.7%
5507	6.00	6.16	2.7%
5535	10.95	12.07	10.2%
5537	7.09	7.33	3.4%
5551	25.86	25.50	-1.4%
5606	1.55	1.60	3.2%

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Class Code	Current 04/01/21	Proposed 04/01/22	Percent Change
5610	8.12	8.93	10.0%
5645	26.38	27.74	5.2%
5703	23.49	25.50	8.6%
5705	39.13	38.81	-0.8%
5951	0.55	0.63	14.5%
6003	10.30	9.99	-3.0%
6005	10.60	10.56	-0.4%
6018	4.36	4.59	5.3%
6045	7.52	8.18	8.8%
6204	11.53	12.28	6.5%
6206	4.63	4.68	1.1%
6213	2.32	2.93	26.3%
6214	2.78	2.81	1.1%
6216	8.77	9.30	6.0%
6217	7.44	7.33	-1.5%
6229	9.05	8.54	-5.6%
6233	3.65	3.68	0.8%
6235	8.15	9.02	10.7%
6236	10.60	10.68	0.8%
6237	2.40	2.47	2.9%
6251	6.68	7.00	4.8%
6252	5.66	5.28	-6.7%
6306	7.77	7.61	-2.1%
6319	6.19	6.16	-0.5%
6325	5.37	5.25	-2.2%
6400	7.82	7.64	-2.3%
6503	3.27	3.71	13.5%
6504	4.33	4.74	9.5%
6702	6.98	7.55	8.2%
6703	11.06	12.10	9.4%
6704	7.77	8.39	8.0%
6801	6.65	8.45	27.1%
6811	7.88	9.30	18.0%
6824	16.32	15.39	-5.7%
6826	8.18	7.85	-4.0%
6834	4.80	4.83	0.6%
6836	6.35	6.34	-0.2%
6843	20.82	19.62	-5.8%
6845	14.74	13.88	-5.8%
6854	8.31	8.33	0.2%
6872	20.11	18.95	-5.8%
6874	37.61	35.40	-5.9%
6882	5.34	5.43	1.7%
6884	5.97	5.92	-0.8%

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Class Code	Current 04/01/21	Proposed 04/01/22	Percent Change
7016	7.30	7.30	0.0%
7024	8.12	8.12	0.0%
7038	7.47	7.67	2.7%
7046	9.95	10.20	2.5%
7047	11.58	11.71	1.1%
7050	11.83	12.25	3.6%
7090	8.28	8.51	2.8%
7098	11.04	11.35	2.8%
7099	15.75	16.36	3.9%
7133	7.03	7.09	0.9%
7151	8.53	8.63	1.2%
7152	13.54	13.79	1.8%
7153	9.48	9.57	0.9%
7219	13.57	14.03	3.4%
7222	12.62	14.06	11.4%
7225	11.28	13.91	23.3%
7230	15.75	14.85	-5.7%
7231	13.92	14.85	6.7%
7232	18.31	20.40	11.4%
7309	20.30	19.13	-5.8%
7313	9.02	8.51	-5.7%
7317	18.12	17.08	-5.7%
7327	39.02	36.76	-5.8%
7333	4.88	5.43	11.3%
7335	5.42	6.04	11.4%
7337	7.74	8.69	12.3%
7350	24.31	22.91	-5.8%
7360	6.38	6.58	3.1%
7370	6.92	7.45	7.7%
7380	8.53	9.33	9.4%
7382	6.87	7.30	6.3%
7390	6.21	6.49	4.5%
7394	5.45	5.55	1.8%
7395	6.05	6.16	1.8%
7398	8.64	8.87	2.7%
7402	0.16	0.18	12.5%
7403	7.98	7.48	-6.3%
7405	3.19	2.99	-6.3%
7420	12.54	12.31	-1.8%
7421	1.20	1.36	13.3%
7422	2.32	2.29	-1.3%
7425	3.22	3.47	7.8%
7431	1.93	2.05	6.2%
7445	1.06	1.00	-5.7%

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Class Code	Current 04/01/21	Proposed 04/01/22	Percent Change
7453	0.65	0.69	6.2%
7502	3.19	3.17	-0.6%
7515	1.61	1.60	-0.6%
7520	4.39	4.50	2.5%
7529	20.11	19.44	-3.3%
7538	8.37	7.51	-10.3%
7539	2.73	2.81	2.9%
7540	6.51	6.25	-4.0%
7580	4.63	4.98	7.6%
7590	5.26	5.40	2.7%
7600	8.26	9.33	13.0%
7605	3.95	4.29	8.6%
7610	0.90	0.94	4.4%
7705	7.98	7.94	-0.5%
7710	5.89	6.13	4.1%
7711	5.89	6.13	4.1%
7720	4.39	4.86	10.7%
7723	3.32	3.41	2.7%
7855	5.75	6.22	8.2%
8001	3.95	4.16	5.3%
8002	3.02	3.26	7.9%
8006	3.62	3.77	4.1%
8008	1.99	2.11	6.0%
8010	2.56	2.78	8.6%
8013	0.57	0.57	0.0%
8015	1.17	1.15	-1.7%
8017	2.26	2.23	-1.3%
8018	4.17	4.56	9.4%
8021	3.38	3.62	7.1%
8031	3.65	3.59	-1.6%
8032	2.86	3.05	6.6%
8033	2.62	2.72	3.8%
8037	2.07	2.32	12.1%
8039	2.23	2.47	10.8%
8044	4.31	4.35	0.9%
8045	1.09	1.18	8.3%
8046	3.35	4.01	19.7%
8047	1.20	1.27	5.8%
8058	3.79	4.07	7.4%
8072	1.04	1.06	1.9%
8102	2.37	2.63	11.0%
8103	3.41	4.13	21.1%
8106	6.08	6.43	5.8%
8107	4.25	4.62	8.7%

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Class Code	Current 04/01/21	Proposed 04/01/22	Percent Change
8111	2.62	3.02	15.3%
8116	3.35	3.32	-0.9%
8203	8.80	10.26	16.6%
8204	6.95	7.36	5.9%
8209	5.12	5.31	3.7%
8215	4.99	5.34	7.0%
8227	5.97	5.98	0.2%
8232	6.81	7.24	6.3%
8233	4.20	4.35	3.6%
8235	6.49	6.76	4.2%
8236	7.82	8.33	6.5%
8263	9.56	10.29	7.6%
8264	6.43	6.88	7.0%
8265	8.12	8.48	4.4%
8279	8.01	8.72	8.9%
8288	8.67	9.84	13.5%
8291	4.82	5.34	10.8%
8292	4.80	5.40	12.5%
8293	11.88	12.25	3.1%
8304	7.30	7.67	5.1%
8350	10.90	12.98	19.1%
8380	3.30	3.50	6.1%
8381	2.94	2.96	0.7%
8385	2.94	3.68	25.2%
8392	3.22	3.38	5.0%
8393	2.26	2.47	9.3%
8500	7.98	9.30	16.5%
8601	0.44	0.48	9.1%
8602	2.07	1.99	-3.9%
8603	0.11	0.12	9.1%
8606	2.86	2.81	-1.7%
8709	9.78	9.24	-5.5%
8719	3.11	3.26	4.8%
8720	1.53	1.72	12.4%
8721	0.60	0.60	0.0%
8723	0.25	0.24	-4.0%
8725	3.87	3.65	-5.7%
8726	5.15	4.86	-5.6%
8734	0.60	0.66	10.0%
8737	0.52	0.57	9.6%
8738	0.84	0.94	11.9%
8742	0.44	0.48	9.1%
8745	4.58	5.40	17.9%
8748	0.87	1.00	14.9%

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Class Code	Current 04/01/21	Proposed 04/01/22	Percent Change
8755	0.44	0.51	15.9%
8799	0.60	0.69	15.0%
8800	2.10	2.23	6.2%
8803	0.08	0.09	12.5%
8805	0.25	0.24	-4.0%
8810	0.19	0.18	-5.3%
8814	0.25	0.21	-16.0%
8815	0.35	0.36	2.9%
8820	0.19	0.21	10.5%
8824	3.41	3.47	1.8%
8826	3.00	3.05	1.7%
8831	1.74	1.84	5.7%
8832	0.46	0.48	4.3%
8833	1.53	1.60	4.6%
8835	3.46	3.41	-1.4%
8842	3.30	3.53	7.0%
8855	0.19	0.21	10.5%
8856	0.82	0.97	18.3%
8864	1.80	1.81	0.6%
8868	0.71	0.75	5.6%
8869	1.58	1.75	10.8%
8871	0.11	0.12	9.1%
8901	0.27	0.33	22.2%
9012	1.34	1.48	10.4%
9014	4.44	4.56	2.7%
9015	3.95	4.10	3.8%
9016	3.27	3.29	0.6%
9019	4.11	4.23	2.9%
9033	2.92	3.05	4.5%
9040	4.44	4.77	7.4%
9044	1.61	1.72	6.8%
9052	2.51	2.44	-2.8%
9058	2.29	2.35	2.6%
9060	1.80	2.05	13.9%
9061	1.55	1.66	7.1%
9062	1.80	1.87	3.9%
9063	1.23	1.24	0.8%
9077	5.01	6.37	27.1%
9082	1.72	1.81	5.2%
9083	1.74	1.84	5.7%
9084	1.91	2.02	5.8%
9089	1.50	1.48	-1.3%
9093	1.85	1.90	2.7%
9101	4.61	5.01	8.7%

NORTH CAROLINA

APPENDIX E

Assigned Risk Rates Comparison

Class Code	Current 04/01/21	Proposed 04/01/22	Percent Change
9102	5.04	5.01	-0.6%
9154	2.59	2.63	1.5%
9156	3.30	3.38	2.4%
9170	11.94	12.89	8.0%
9178	9.46	9.54	0.8%
9179	23.76	26.65	12.2%
9180	7.25	7.33	1.1%
9182	3.00	3.20	6.7%
9186	23.68	21.34	-9.9%
9220	8.28	8.36	1.0%
9402	8.15	8.84	8.5%
9403	11.64	12.28	5.5%
9410	3.79	4.10	8.2%
9501	4.41	4.62	4.8%
9505	7.11	6.55	-7.9%
9516	4.06	4.16	2.5%
9519	5.80	6.37	9.8%
9521	5.20	5.34	2.7%
9522	2.45	2.78	13.5%
9534	8.56	8.45	-1.3%
9554	15.94	16.09	0.9%
9586	0.65	0.69	6.2%
9600	3.32	3.53	6.3%
9620	1.96	2.35	19.9%

NORTH CAROLINA – ASSIGNED RISK

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Supplemental Material

North Carolina G.S. 58-36-15(h) specifies that the following information must be included in all policy form, rule and rate filings filed under Article 36. 11 NCAC 10.1111 specifies that additional detail be provided under each of these items.

* Sections incorporated by reference to the Loss Cost Filing

11 NCAC 10.1111 - WORKERS COMPENSATION

Item

8 For assigned risk rate filings, the filer shall include support for a reasonable margin for underwriting profit and contingencies and investment income, including realized capital gains.

Response

See the prefiled testimony and exhibits of G. Zanjani (Exhibits RB-6 through RB-9).

11 NCAC 10.1111 - WORKERS COMPENSATION

Item

9 For assigned risk rate filings, the filer shall provide investment earnings on capital and surplus. Given the selected underwriting profit and contingencies provision contained in the filing, the filer shall indicate the resulting rates of return (including consideration of investment income) on equity capital, on statutory surplus, and on total assets. The filer shall show the derivation of all factors used in producing these calculations and justify the fairness and reasonableness of these rates of return.

Response

As respects this filing, after-tax investment earnings on capital and surplus (including an adjustment for prepaid expenses and under the projections of investment yields in Exhibit RB-8) are expected to be 3.66% of premium. Given the 5.0% underwriting profit provision and the other expenses shown in the filing, the pro forma return on net worth (equity capital), including underwriting profit and investment income on reserves and surplus, is shown in the prefiled testimony and exhibits of G. Zanjani (Exhibits RB-6 through RB-9); it ranges from 7.48% to 10.73%, depending on the assumptions made about future investment returns. Also shown therein is the ratio of net worth to surplus of 1.13. Accordingly, the corresponding return on statutory surplus would range from 8.45% to 12.12%. Based on data from SNL Global, the 5-year average of each year's premium-weighted ratio of surplus to assets (based on 2020 North Carolina Workers Compensation direct premiums written) is .313. Accordingly, the corresponding return on assets would range from 2.65% to 3.80%. If 5.0% is not in fact earned as underwriting profit, the resulting returns would be correspondingly lower.

See also the pre-filed testimony of G. Zanjani (Exhibit RB-6).

EXHIBIT RB-2

PRE-FILED TESTIMONY
OF
RAYMOND F. EVANS

NORTH CAROLINA WORKERS COMPENSATION INSURANCE
2021 RESIDUAL MARKET RATE FILING
BY THE NORTH CAROLINA RATE BUREAU

Q. Would you state your full name and business address?

A. Raymond F. Evans, Jr. CPCU, 2910 Sumner Boulevard, Raleigh, North Carolina.

Q. Are you employed by the North Carolina Rate Bureau ("Bureau")?

A. Yes.

Q. In what capacity?

A. I am the General Manager.

Q. How long have you been employed by the Bureau?

A. Since September 2000.

Q. Would you summarize your educational background?

A. I graduated from Ohio State University with a Bachelor of Science Degree in Accounting. I also have the designation of Chartered Property Casualty Underwriter.

Q. What was your work experience after graduation and prior to your employment by the Bureau?

A. From March 1966 to July 2000, I was employed by the State Auto Insurance Companies, Columbus, Ohio in various capacities, including the position of Executive Vice President of a subsidiary.

Q. Can you identify Exhibits RB-1 through RB-9?

A. Yes. Exhibit RB-1 is an exhibit setting forth the filed final rates for the workers compensation insurance residual market in North Carolina, as well as the data and calculations underlying those rates. RB-1 also includes the 11 NCAC 10.1111 data and exhibits required. Exhibits RB-2 through RB-9 contain the required accompanying pre-filed testimony and exhibits. Together, these materials constitute a filing (the "Filing") that is dated September 1, 2021 submitted by the Bureau to the Honorable Mike Causey, Commissioner of Insurance, with respect to workers compensation insurance assigned risk rates in North Carolina.

Q. Does the Bureau have actuaries on its staff?

A. Yes, the Bureau has an actuary on its staff. However, the Bureau continues to obtain actuarial expertise for preparation of the Filing from the Workers Compensation Committee, the National Council on Compensation Insurance, Inc. and from Milliman, Inc.

Q. Would you describe briefly the workers compensation insurance residual market mechanism for North Carolina?

A. Yes. North Carolina General Statute 58-36-1(5) requires every insurer that writes workers compensation insurance in North Carolina to insure and accept any eligible workers compensation insurance risk that has been certified to be "difficult to place" by a licensed fire and casualty insurance agent. The Commissioner of Insurance has approved the North Carolina Workers Compensation Insurance Plan which describes the rules and procedures for assigning applicant employers to an insurance company. The designated insurer must issue the standard Workers Compensation and Employers Liability Insurance Policy for each assigned employer and provide the usual and customary service to their insureds.

Q. Do all insurance companies receive assignments?

A. No. Many insurance companies have opted to meet their residual market participation requirements by becoming a member of the National Workers Compensation Reinsurance Association ("National Pool"). Under the pool arrangement all assignments for those members of the National Pool are made to insurers designated as "servicing carriers" of the pool. Insurers who do not elect to participate in the National Pool are designated as direct assignment carriers for North Carolina and applicant employers are assigned to the direct assignment carriers on the basis of their voluntary workers compensation insurance premium writings in North Carolina.

Q. How many servicing carriers are there and how are they selected?

A. There are currently three servicing carriers who were selected through a competitive bid process.

Q. How many direct assignment carriers are there?

A. At this time there are eight companies or company groups that have been approved as direct assignment carriers.

Q. What will be the residual market quota shares of the direct assignment carriers compared to the servicing carriers?

A. On the basis of 2020 premium writings, the direct assignment carriers will receive approximately 28% of the assigned risk premium during 2020 and the servicing carriers will be assigned approximately 72% of the premium.

Q. How many insurance companies were licensed to write workers compensation insurance in North Carolina during 2020?

A. Five hundred sixty-four (564) insurance companies.

Q. How many insurance companies were actually writing workers compensation insurance in North Carolina during 2020?

A. Three hundred and seventeen (317) insurance companies.

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 from the statistical data 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.

EXHIBIT RB-3

PREFILED TESTIMONY
OF
BRETT S. FOSTER

2021 NORTH CAROLINA WORKERS COMPENSATION
LOSS COST AND ASSIGNED RISK RATE FILINGS
PROPOSED TO BE EFFECTIVE ON APRIL 1, 2022

Q. *Please state your name, title, employer, and position you hold.*

A. My name is Brett Foster, and I am a Director and Actuary for the National Council on Compensation Insurance, Inc. ("NCCI") in Boca Raton, Florida. My current responsibilities include oversight of the actuarial function, including the preparation of rate filings and presentation of actuarial testimony, for three jurisdictions (including North Carolina).

Q. *Would you outline your academic and professional training?*

A. I have a Bachelor of Science degree with majors in mathematics and economics from Missouri State University, in Springfield, Missouri. I am a Fellow of the Casualty Actuarial Society and a Member of the American Academy of Actuaries and am in good standing with both of those organizations.

Q. *How long have you been employed by NCCI?*

A. I have worked for NCCI since June of 2012, during which time I have contributed in various areas of NCCI's Actuarial and Economic Services division, including class ratemaking, individual risk rating, legislative analysis, and aggregate ratemaking. In addition to overseeing the actuarial function for three jurisdictions, I am currently responsible for leading NCCI's individual risk rating research area.

Q. *Would you briefly describe the principal functions of NCCI?*

A. NCCI is the major data collector of workers compensation statistics and is recognized as the expert organization in workers compensation data collection, ratemaking, and research. NCCI's principal functions are to

collect and process statistical data, inspect and administer a detailed classification system and develop prices for workers compensation insurance that are not excessive, inadequate or unfairly discriminatory. It prepares manual loss costs, manual rates, rating plans and policy forms for use by its members and subscribers, and files this information with various supervisory authorities on their behalf.

Q. *Who belongs to NCCI?*

A. NCCI is an organization of some 600 members and subscribers who are insurance companies and self-insured funds writing workers compensation insurance.

Q. *Are you familiar with the filings for revised workers compensation loss costs and assigned risk rates by the North Carolina Rate Bureau (the "Filings") of which this testimony is a part?*

A. Yes, I am.

Q. *Did you supervise the production of the Filings?*

A. Yes, I did. NCCI has contracted with the North Carolina Rate Bureau as an actuarial services vendor in connection with these Filings.

Q. *What is the purpose and scope of your testimony?*

A. I will provide testimony on the key actuarial issues and components in the Filings. Specifically, my testimony will discuss the (i) development of the overall average loss cost level indication, (ii) assigned risk differential analysis, and (iii) various expense components contained in the voluntary loss costs and assigned risk rates.

Q. *Could you briefly describe the purpose of the Filings that have been submitted to the North Carolina Department of Insurance?*

A. Yes. One of the Filings proposes revised loss costs and rating values for the voluntary market. The other Filing proposes revised rates and rating values for the Workers Compensation Insurance Plan, which is the assigned risk market.

Q. *What is the voluntary market and what is the assigned risk market?*

A. When insurers elect to provide employers workers compensation coverage in North Carolina's competitive marketplace, incorporating their own underwriting guidelines and expense needs, the group of policies issued to those employers constitutes the "voluntary market."

Because workers compensation insurance is required by law for most employers in North Carolina, an employer unable to secure workers compensation insurance in the voluntary market obtains coverage through the Workers Compensation Insurance Plan, which is also called the "assigned risk" or "residual" market. This "market of last resort" provides a method for those employers not written voluntarily to obtain coverage.

Q. *For the voluntary market, you mentioned a revision to the current loss costs has been filed. What is the difference between a loss cost and a rate?*

A. The term loss cost is used because, in general, it represents only that portion of the full rate that provides for loss and loss adjustment expenses. The North Carolina loss costs are not final rates because they do not include provisions for any of the remaining expenses (including production expenses, profit, contingencies, etc.) of an insurer.

In the North Carolina voluntary market, each carrier is responsible for considering its individual expense needs, developing a loss cost multiplier (LCM), and determining its final rates. The carrier-specific LCM is the expense loading (providing for all carrier expenses other than loss adjustment expense) an insurer applies to a set of loss costs to build its final rates. In this process, a carrier may elect to base its final rates on the loss costs in the Loss Cost filing.

Q. *If this loss cost revision were approved as filed, would all employers insured in the voluntary market receive a loss cost change equal to the overall average proposed change?*

A. No. The proposed loss cost indication represents the overall average change for the voluntary market. The actual percentage loss cost change

will vary between individual classification codes—some above and others below this average.

The proposed overall average change is equitably distributed to the various industry groups and then to the more than 500 individual classification codes during the ratemaking process. The final premium charged to a particular employer not only depends on the specific class codes in which the employer conducts business, but also on the individual insurer issuing the policy. Since in the voluntary market each insurer is responsible for determining its final rates, after reviewing its own expense needs, underwriting guidelines, etc., the final premium charged to any particular employer may vary among insurers.

Q. *Please give us an overview of the process used to develop the Filings.*

A. The latest available premium and loss data is collected by NCCI and NCRB from insurance companies and verified. Using this data, the expected costs associated with writing workers compensation insurance in North Carolina during the period April 1, 2022 through March 31, 2023 are determined. In this process, expenses are analyzed and provisions for these components are included. The expected future costs determine the extent to which the currently approved overall loss cost and rate levels should change.

Q. *Do the Filings include data for all companies writing workers compensation business in North Carolina?*

A. Not necessarily. There are several reasons that would prevent a carrier's data from being included in a filing, including (i) data that was not reported prior to the filing and (ii) quality issues that exist with the reported data. While it would be preferable to include all carriers' data in the filing, it is critical that the data be of the highest quality possible. Carriers with a premium market share greater than 0.1% and whose data is not contained in the Filings' experience period are listed in Appendix A-IV.

NCCI has the following processes in place to provide all carriers the incentive to submit aggregate data in a timely and accurate manner:

(i) Aggregate Data Quality Incentive Program (ADQIP): In response to carriers reporting late and/or inaccurate data, they are subject to financial assessments levied by NCCI.

(ii) Financial Data Escalation Process: During the data collection and validation process, data issues are discussed with insurance carrier personnel at progressively increasing levels of authority until the issues are resolved.

The data goes through a series of three validation procedures implemented by NCCI: (i) arithmetic checks, (ii) reasonableness checks, and (iii) a reconciliation report.

The first check, the arithmetic check, is used to make sure that the data submitted to NCCI in the various rows and columns of the aggregate financial data reports sum to the correct totals as stated by the carriers in those submissions.

The second check, the reasonableness check, is used to make sure that all unusual fluctuations in a carrier's data are explained. For example, a company reporting $100,000 in premium in 2019 and then $10 million in 2020 would be questioned about the large change in premium amounts.

The third test is reconciliation. The North Carolina data submitted to NCCI is reconciled with the NAIC Annual Statement data submitted by companies to the North Carolina Department of Insurance.

NCRB also has a variety of procedures in place to encourage timely and accurate data reporting, and NCCI does additional validation of the data it receives from NCRB.

Q. *Does the data used in the Filings reflect any effects of the COVID-19 pandemic?*

A. The overall average loss cost/rate level change proposed in the Filings is based on premium and loss experience for Policy Years 2018 and 2019 evaluated as of December 31, 2020. Policy Year 2019 consists of policies becoming effective between January 1, 2019 and December 31, 2019—the last of which expired in December 2020, well into the pandemic. However, much of the exposure associated with Policy Year 2019 occurred prior to the start of the pandemic, so only a portion of this data is subject to any direct or indirect effects of the pandemic.

Changes at the classification code level are based on five years of Unit Statistical Plan Data, which is the audited exposure, premium, and loss information reported to NCCI on a policy level. The Unit Statistical Plan Data used in the Filings includes policies with expiration dates through December 2019. Therefore, the individual classification code experience does not reflect potential direct or indirect effects of the COVID-19 pandemic.

Q. *Has an adjustment been made to the data on account of COVID-19?*

A. Reported COVID-19-related claims have been excluded from the data on which this filing is based, consistent with the handling of the COVID-19 pandemic as a catastrophic event. After an in-depth review and analysis, the NCRB's Workers Compensation Committee determined that in general the standard ratemaking methodologies continue to remain appropriate for use in this year's filing.

The standard approach for the trend analysis is to consider frequency and severity values that have been adjusted to a common wage level before analyzing trends that may be present in those values. In NC and across the country, the observed 2020 average weekly wage was impacted by COVID-19-related shifts in employment across industry sectors. In this year's analysis the 2020 AWW value was adjusted to exclude the estimated impact of the pandemic-related, industry-sector mix change. In

North Carolina, the unadjusted increase in average weekly wage from 2019 to 2020 is +6.3%. The adjusted wage increase is +4.8%.

Other indirect impacts of the COVID-19 pandemic may be reflected in the data but were not necessarily subject to an adjustment (e.g., lower payroll amounts due to the pandemic related economic slowdown).

Q. Do the Filings contemplate catastrophic events that may exceed $50 million in losses?

A. Yes, using established ratemaking procedures, the Filings are based on data that excludes the impact of catastrophic events (which may include pandemics) that may exceed $50 million in losses countrywide. The Catastrophe (other than Certified Acts of Terrorism) Provision is intended to contemplate the exposure to all such events or perils.

Due to the uncertainty surrounding quantifying the impact future pandemics could have on the workers compensation system, it is appropriate to contemplate all catastrophic perils, including pandemics, within the Catastrophe (other than Certified Acts of Terrorism) definition without a change in the current value (0.01). This handling recognizes that there are additional catastrophic exposures (which may include pandemics) on workers compensation system costs that should be considered in adherence with Actuarial Standard of Practice 39 (Treatment of Catastrophe Losses in Property/Casualty Insurance Ratemaking).

Q. *Has an adjustment been made to the premium development factors on account of COVID-19?*

A. In past economic downturns, changes to audit premium patterns have disrupted premium development. It is expected that the effects of COVID-19 could decrease the PY 2019 1st to 2nd premium development factor in North Carolina. As a result, a selection of 1.01 was applied for the 1st to 2nd premium development factor displayed in Appendix A-II (Section B), rather than the 3-year average used in prior years.

Q. *Are the data used in the Filings reasonable and reliable for determining voluntary loss costs and assigned risk rates in North Carolina?*

A. Yes, in my opinion, the data as collected and validated provides an actuarially appropriate, reasonable, and credible dataset on which to base the Loss Cost and Assigned Risk rate Filings.

Q. *What overall average change does the Loss Cost filing propose?*

A. The Loss Cost filing seeks an overall average decrease of 5.3% from the current loss cost level for the industrial classifications.

Q. *What overall average rate level change does the Assigned Risk filing propose?*

A. The Assigned Risk rate filing seeks an overall average rate level increase of 4.9% for the industrial classifications.

Q. *What is the proposed effective date for the Filings?*

A. The Loss Cost and Assigned Risk rate Filings are both proposed to apply to new and renewal policies becoming effective on or after April 1, 2022. The actual use of the loss costs is subject to individual company actions to adopt the filed loss costs.

Q. *Would you please briefly describe the method used in the Filings to determine the overall average changes?*

A. Yes. In very general terms, the overall changes are determined by taking the latest available aggregate financial data and adjusting it to reflect conditions that are expected to exist for policies becoming effective during the period April 1, 2022 through March 31, 2023. The result indicates the adequacy of the current loss costs for policies to be written during that period. This process requires the application of actuarial judgment and projections because ratemaking is prospective in nature and future outcomes are unknown.

As presented in Exhibit I of the Filings, the process begins with two blocks of historical North Carolina aggregate financial data. The first block

reflects the experience from all policies with effective dates during 2019 and is commonly referred to as "Policy Year 2019" data. The second block of data reflects the experience from all policies with effective dates during 2018 and is referred to as "Policy Year 2018" data. This data consists of earned premiums and losses during these periods reported by those companies writing workers compensation insurance in North Carolina. "Losses" is simply another term for the benefits carriers provide to or on behalf of injured workers. They can be in the form of medical services or indemnity (lost wage) payments. While several years of data were reviewed in connection with this year's actuarial analysis, data for Policy Years 2018 and 2019 serve as the selected experience period in the Filings.

Loss cost level indications were determined based on an average of (i) paid losses and (ii) paid losses plus case reserves for each of Policy Years 2019 (Exhibit I, Section A) and 2018 (Exhibit I, Section B). An average of the separate Policy Year 2018 and 2019 loss cost level indications (Exhibit I, Section C) serves as the basis for the Rate Bureau's filed overall average voluntary loss cost level change.

In calculating the overall loss cost level change, the premium from these two policy years is the first focus. The premiums that have been collected must be "developed" to reflect future payroll audits (line 1 of Exhibit I, Sections A and B). Since the final premium totals for the recent policy years will not be known until all payroll audits have been completed, the application of premium development factors provides a projection of the amount by which the currently-reported premium totals will change when the final results are known.

Additionally, the premiums are brought to the current loss cost level and the portion that covers expenses is removed (line 2). These adjustments are necessary because we are trying to determine how much premium will be available for benefits, and the historical premium data still reflects old rates and includes the portion covering expenses. Since the current loss costs are being analyzed and updated, the reported historical premium is

adjusted to this current loss cost level. Once the historical premium has been adjusted to the latest approved loss cost level, one may opine on the adequacy of the current set of loss costs in terms of providing for future losses.

Q. *Would you now describe the adjustments to the policy year indemnity and medical losses?*

A. Yes. The losses from these two blocks of data are reviewed. Indemnity and medical losses are analyzed separately. Initially, losses are limited to mitigate the impact of individual large workers compensation claims. Medical reserves for example can extend into the multi-million dollar range on extremely severe cases. At this stage, limiting such claims is appropriate in determining future loss costs and rates.

Next, the limited losses must be developed to their ultimate level (lines 4 and 16). This is especially necessary for workers compensation insurance because it takes many years before some losses are finally paid. For example, depending on the nature and seriousness of a work-related injury, indemnity payments may extend many years into the future. Further, since even the conditions giving rise to some of these losses may take many years to manifest themselves, several years may pass before some claims are even known to the insurer, let alone settled. Asbestosis claims are an example of this type of loss.

Next, since we are trying to estimate future losses and the data reflects historical benefit levels, the reported losses are adjusted to reflect the impact of any subsequent changes in the level of workers compensation benefits. This is accomplished in two steps (lines 5, 14, 17, and 26). The losses are then increased by 20.0% so that the final loss costs will include a provision for loss adjustment expense (lines 6 and 18).

The resulting loss figures (lines 8 and 20) are compared to the total estimated premium (line 3) that would be available to fund these losses. Next, the indemnity and medical cost ratios data must be trended to account for inflationary pressures between the time period of the historical

data and the period when the loss costs will be in effect (lines 10 and 22). Trend adjusts the historical data to account for the differential impact of inflation on losses and premiums. If losses were changing at the same rate as payrolls, trend would not be needed since the change in losses would be exactly matched by a corresponding change in payrolls and, therefore, premiums. On the other hand, if losses have been changing at a different rate than payroll, trend is necessary if historical data is to be used as a predictor of future losses.

The trend factors selected by the Rate Bureau and applied in these Filings are -4.0% per year for indemnity losses and -3.5% per year for medical losses.

The final step is to adjust the developed and limited cost ratios to an unlimited basis. This is accomplished in lines 12 and 24. The employed methodology involves replacing the amount of actual reported individual claim losses in excess of a North Carolina-specific dollar threshold with an excess loss provision. The excess provision represents the expected volume of losses in excess of the threshold. This procedure serves to smooth out the impact of large losses.

Q. *What are the final steps in determining the overall average voluntary loss cost level change?*

A. Indicated loss cost level changes for each of Policy Years 2018 and 2019 are calculated by summing the respective indemnity and medical cost ratios (line 28). These individual-year changes are then averaged, resulting in an indicated overall average decrease of 5.3% to the current voluntary loss cost level (Exhibit I, Section C).

Q. *What loss development methodologies were analyzed and utilized in connection with the Filings?*

A. The financial data were analyzed in order to select the most actuarially sound loss development projection methodology to be used in determining experience indications. This analysis involves identifying changes in the level of reserve adequacy and trends in development that could skew the

results of one or more of the loss development projection methods. In addition, the base to which the loss development factors will be applied is analyzed in conjunction with the factors themselves.

The loss development projection methods examined in this year's analysis were based on (i) paid losses and (ii) paid losses plus case reserves. Results based on an average of these two loss development methodologies were chosen as being most appropriate for this year's Filings.

Q. *After identifying the most appropriate loss development methodology, what is the next step in the process to compute the actual loss development factors?*

A. After identifying the most appropriate loss development methodology, prior years' losses are examined to determine how they evolve from the time they are first reported to the time they are finally settled.

For inclusion in the Filings, (i) final paid loss development factors were derived based on an average of the two most recent historical factors at each age-to-age interval and (ii) final paid plus case loss development factors were derived based on an average of the five most recent historical factors at each age-to-age interval. Statewide loss development (tail) factors were used to develop losses from a nineteenth report to an ultimate basis. The tail factors used in the Filings are based on an average of the most recent ten historical factors at a nineteenth report.

Q. *Please explain the tail factor methodology included in the Filings.*

A. In workers compensation, payments and loss reserve changes persist for extended periods of time. The ultimate losses of a policy year are determined by multiplying the current reported losses by the expected loss development factor. This expected loss development factor is calculated as the product of individual age-to-age development factors (link ratios). However, due to data constraints, it is not possible to calculate all of the required individual link ratios. Therefore, it is necessary to aggregate all loss development that occurs after a nineteenth report into a single (tail)

factor. Tail factors are calculated separately for indemnity and medical losses by comparing the changes in the volume of policy year paid plus case losses after a nineteenth report to the volume of policy year paid plus case losses as of a nineteenth report, along with the application of a growth adjustment factor.

Q. *Will you please describe how the final indemnity and medical annual trend factors were determined for the Filings?*

A. Yes. The final trend factors were judgmentally selected by the NCRB after reviewing the results of several different trend estimates, including (i) a North Carolina frequency/severity trend analysis and (ii) indicated annual loss ratio trend factors.

A North Carolina-specific frequency/severity analysis was performed to separately examine changes in the frequency of workers compensation claims being filed and changes in their average cost per case. Indicated loss ratio trend factors based on both paid and paid plus case losses were also examined in order to review trend estimates that are independent of possible fluctuations in carrier-reported claim counts from year to year.

Q. *Has the trending procedure been adjusted to account for the expected impact of COVID-19?*

A. The standard methodology is to adjust frequency and severity values included in Appendix A-III to a common wage level before analyzing trends that may be present in those values. This practice enables us to analyze trends above and beyond changes that may be due solely to wage inflation. More specifically, this year the frequency and severity adjustments would have incorporated the state's estimated Calendar Year 2020 average weekly wage (AWW) level using data from the Bureau of Labor Statistics' Quarterly Census of Employment and Wages (QCEW).

In addition to the traditional growth in wages/salaries that may be expected to occur each year, the observed change in the 2019-to-2020 AWW was also impacted by COVID-19-related shifts in employment across industry sectors. While a change in industry-sector mix occurs to a

small degree each year, its impact on the 2020 AWW change was unusually large, due to pandemic related job losses in relatively low wage industries, and ignoring this effect would otherwise distort the intended nature of the adjustment. Therefore, in this year's ratemaking analysis the 2020 AWW value was adjusted to exclude the estimated impact of the pandemic-related, industry sector mix change. This adjustment is reflected in the frequency and severity values shown in Appendix A-III. The impact of the AWW adjustment is expected to be immaterial.

Q. *Please explain how the loss adjustment expense provision was determined.*

A. Both historical North Carolina-specific and countrywide loss adjustment expense information was reviewed as part of this year's rate filing analysis (See Exhibit II-A, Sheet 1). Based on that information, the NCRB judgmentally selected a 20.0% loss adjustment expense provision for use in the Filings.

Q. *Did you review the process used to allocate the overall average loss cost level change to the five industry groups and to the individual classification codes?*

A. Yes.

Q. *Do the Filings contain a description of the manner in which the overall change is distributed to the individual classifications?*

A. Yes. Appendices A-V and B-I through B-V of the Loss Cost filing provide extensive descriptions and documentation of the methods that are used to distribute the overall change among the various classifications.

Q. *How was the overall average change for the Assigned Risk filing determined?*

A. The Assigned Risk filing begins with the loss costs resulting from the analyses just described. Then two additional analyses were performed. The first of these compares the assigned risk market experience to the statewide market experience. This analysis supported the proposed change to the current assigned risk loss cost differential. The second

analysis involves the assigned risk expense need. Both of these analyses are documented in Exhibit II of the Assigned Risk filing.

The results of these two analyses are incorporated in the formula Loss Cost Multiplier (Exhibit I-A, Sheet 1 of the Assigned Risk filing). After combining the indicated change in the loss cost level and the proposed change in the Loss Cost Multiplier, the final Assigned Risk rate level increase of 4.9% results (Exhibit I, Section D of the Assigned Risk filing).

Q. *Please explain the purpose and concept of the assigned risk differential.*

A. The primary purpose of the differential is to ensure equity between the assigned risk and voluntary markets. In order to help ensure a self-funded assigned risk market—one that does not require subsidization by participants in the voluntary market—the adequacy of the assigned risk differential is reviewed.

In North Carolina, as is usually the case, the combined experience for those employers in the assigned risk market is worse than the combined experience for those in the voluntary market. Therefore, during the assigned risk ratemaking process, the assigned risk differential is applied to recognize this disparity.

Q. *Please explain how this year's proposed change in the assigned risk differential was determined.*

A. As documented in Exhibit II-E of the Assigned Risk filing, ten years of indicated loss cost differentials based on each of (i) paid and (ii) paid plus case data were reviewed. The selected change to the current loss cost differential is based on an average of the changes indicated by both the paid and paid plus case experience (Exhibit II-E, Sheet 1, line (e)).

Q. *Please briefly describe the provisions for the various assigned risk expense components contained in the Assigned Risk filing.*

A. The underlying detail and supporting calculations in connection with the various expense provisions contained in this year's proposed assigned

risk rates are fully documented in Exhibit II of the Assigned Risk filing. As a summary, a brief description of each expense component is as follows:

(i) Commission and brokerage – The 5.0% provision is the commission payable on assigned risk business, as required by the Workers Compensation Insurance Plan.

(ii) Loss adjustment expense (LAE) – The selection of this component was discussed earlier in connection with the proposed voluntary loss cost level change.

(iii) Other acquisition and general expense – This category includes provisions for various carrier expense items such as premium collection, underwriting, policy processing, advertising, and company operational and administrative expenses.

(iv) Uncollectible premium provision – This provision recognizes the fact that not all premium earned by the carriers is collected (Exhibit II-F).

(v) Underwriting profit – The underwriting profit analysis was conducted by Dr. Zanjani.

(vi) Taxes, licenses, and fees – This includes a 2.66% provision for the premium tax, including the regulatory surcharge (equal to 6.5% of the premium tax).

(vii) Effect of expense constant and minimum premiums – It is expected that a $160 expense constant, a minimum premium multiplier of 200, and a maximum minimum premium of $1,500 will generate 17.7% of premium in the assigned risk market (Exhibit II-D).

Q. Please describe what is meant by the term "F-classifications."

A. The "F" or "Federal" classifications are those operations conducted on or about navigable waters for which benefit levels and related costs are determined by the United States Longshore and Harbor Workers'

Compensation Act, rather than individual state laws. Typical F-classifications include those covering ship builders and stevedores.

Q. *Please explain the methodology changes proposed for determining the loss costs and assigned risk rates for the Federal classifications ("F-classes")?*

A. The Filings include a new methodology for determining the loss costs and assigned risk rates for F-classes. The new approach has several advantages over the prior methodology that has been in effect, without significant changes, for many years. These advantages include:

- Greater year-to-year stability in loss costs/rates
- A simplified ratemaking approach
- Direct recognition that federal act USL&HW benefits are the same across jurisdictions

For reference, in North Carolina, F-classes compose only about 0.01% of total payroll in NC.

The new F-class approach incorporates a countrywide pure premium based on 10 policy years of F-class data, state-specific benefit relativities, and F-class code relativities. The approach recognizes that F-class experience across all jurisdictions consists primarily of federal act benefits. These benefits are based on a federal benefit structure and are subject to a federal medical fee schedule—neither of which vary by individual jurisdiction. Accordingly, the new methodology leverages this consistency by combining the data at a countrywide level—rather than relying on smaller volumes of state-specific data during the F-class ratemaking process. This change, alongside the expansion to 10 policy years of data, helps increase the stability of these low volume and unique classifications.

The state act benefits portion of the reported F-class experience is initially adjusted to a countrywide level and then back down to a state level using industrial codes' data as a proxy. This allows a greater volume of combined data to be used in the F-class ratemaking process as well as retaining the ability to directly reflect state-specific cost differences.

Q. *What changes are proposed for the Federal classifications ("F-classes")?*

A. Based on the latest available North Carolina F-class experience (contained in Appendix B-V of the Loss Cost filing), the Loss Cost filing proposes an overall average change of -14.5% from the current loss cost level. The Assigned Risk filing proposes an overall average rate level change of -5.4% from the current assigned risk rate level.

Q. *What is your opinion as to whether the proposed loss cost changes for the voluntary market will result in loss costs that are not excessive, inadequate, or unfairly discriminatory?*

A. Based on my analysis, I believe the methodologies employed, the provisions used, and the resulting filed loss cost changes are actuarially sound and reasonable for the time period during which they are proposed to be in effect and will result in loss costs that are not excessive, inadequate, or unfairly discriminatory.

Q. *What is your opinion as to whether the proposed rate changes for the assigned risk market will result in rates that are not excessive, inadequate, or unfairly discriminatory?*

A. As I noted above, the profit analysis was conducted by Dr. Zanjani, and I am relying on his work and opinion as to the appropriateness of the profit provision. Based on my analysis and assuming the profit produced by the proposed rates is reasonable, I believe the methodologies employed, the provisions used, and the resulting filed assigned risk rate changes are actuarially sound and reasonable for the time period during which they are proposed to be in effect and will result in assigned risk market rates that are not excessive, inadequate, or unfairly discriminatory.

Q. *Does this conclude your testimony?*

A. Yes, it does.

NATIONAL COUNCIL ON COMPENSATION INSURANCE
2021 ANNUAL COUNTRYWIDE ADJUSTING AND OTHER EXPENSE REVIEW

Exhibit 1: Ultimate AOE Ratios

Accident Year	Ultimate AOE Ratio Based on Paid Data	Ultimate AOE Ratio Based on Incurred Data	Ultimate AOE Ratio Based on Avg. of Paid and Incurred Data
2016	8.5%	8.5%	8.5%
2017	9.1%	9.0%	9.1%
2018	9.2%	9.0%	9.1%
2019	9.6%	9.2%	9.4%
2020	10.4%	9.2%	9.8%

NATIONAL COUNCIL ON COMPENSATION INSURANCE
2021 ANNUAL COUNTRYWIDE ADJUSTING AND OTHER EXPENSE REVIEW

Exhibit 2: Calculation of Ultimate AOE Ratios—Paid Data

Accident Year	(1) Paid AOE at Current Report	(2) Cumulative Paid AOE Development Factors	(3)=(1)x(2) Estimated Paid AOE Developed to a 10th Report	(4) Paid Losses at Current Report	(5) Cumulative Paid Loss Development Factors	(6)=(4)x(5) Estimated Paid Losses Developed to a 10th Report	(7) 10th Report-to-Ultimate Paid AOE Tail Factor
2016	1,877,466,237	1.092	2,050,193,131	15,879,742,948	1.130	17,944,109,531	0.92
2017	1,911,456,406	1.143	2,184,794,672	15,015,586,251	1.208	18,138,828,191	0.92
2018	1,857,755,012	1.225	2,275,749,890	13,995,848,360	1.360	19,034,353,770	0.92
2019	1,722,318,435	1.401	2,412,968,127	10,903,787,755	1.745	19,027,109,632	0.92
2020	1,066,217,940	2.087	2,225,196,841	4,308,640,438	3.787	16,316,821,339	0.92

Accident Year	(8)=(3)/(6)x(7) Estimated Ultimate AOE Ratio Before Adjustments	(9) Adjustment to Reverse AOE Credits	(10) Adjustment for Losses Associated with TPA Agreements	(11) Adjustment to Convert Losses From Net to Gross of Deductible	(12) Pct. of Reported COVID-19-Related Losses to Total Losses	(13)=[(8)+(9)]x(10)x(11)/[1-(12)] Estimated Ultimate AOE Ratio After Adjustments
2016	10.5%	0.011	1.049	0.70	-	8.5%
2017	11.0%	0.013	1.056	0.70	-	9.1%
2018	11.0%	0.014	1.058	0.70	-	9.2%
2019	11.7%	0.012	1.063	0.70	-	9.6%
2020	12.5%	0.012	1.065	0.70	2.0%	10.4%

NATIONAL COUNCIL ON COMPENSATION INSURANCE
2021 ANNUAL COUNTRYWIDE ADJUSTING AND OTHER EXPENSE REVIEW

Exhibit 3: Calculation of Ultimate AOE Ratios—Incurred Data

Accident Year	(1) Incurred AOE at Current Report	(2) Cumulative Incurred AOE Development Factors	(3)=(1)x(2) Estimated Incurred AOE Developed to a 10th Report	(4) Incurred Losses at Current Report	(5) Cumulative Incurred Loss Development Factors	(6)=(4)x(5) Estimated Incurred Losses Developed to a 10th Report	(7) 10th Report-to-Ultimate Incurred AOE Tail Factor
2016	2,216,009,400	1.015	2,249,249,541	22,775,644,146	0.960	21,864,618,380	1.01
2017	2,355,501,371	1.014	2,388,478,390	23,601,906,879	0.937	22,114,986,746	1.01
2018	2,429,616,009	1.008	2,449,052,937	25,191,363,333	0.911	22,949,331,996	1.01
2019	2,537,961,346	0.989	2,510,043,771	25,841,028,131	0.884	22,843,468,868	1.01
2020	2,260,212,629	0.982	2,219,528,802	23,759,962,651	0.870	20,671,167,506	1.01

Accident Year	(8)=(3)/(6)x(7) Estimated Ultimate AOE Ratio Before Adjustments	(9) Adjustment to Reverse AOE Credits	(10) Adjustment for Losses Associated with TPA Agreements	(11) Adjustment to Convert Losses From Net to Gross of Deductible	(12) Pct. of Reported COVID-19-Related Losses to Total Losses	(13)=[(8)+(9)]x(10)x(11)/[1-(12)] Estimated Ultimate AOE Ratio After Adjustments
2016	10.4%	0.011	1.049	0.70	-	8.5%
2017	10.9%	0.013	1.056	0.70	-	9.0%
2018	10.8%	0.014	1.058	0.70	-	9.0%
2019	11.1%	0.012	1.063	0.70	-	9.2%
2020	10.8%	0.012	1.065	0.70	2.0%	9.2%

PRE-FILED TESTIMONY

OF

MARK MULVANEY

2021 NORTH CAROLINA WORKERS COMPENSATION

ASSIGNED RISK RATE FILING

Q. Please state your name and business address.

A. My name is Mark Mulvaney, my business address is Milliman, Inc., 1400 Wewatta Street, Suite 900, Denver, Colorado, 80202.

Q. Are you an actuary?

A. Yes, I am a Fellow of the Casualty Actuarial Society and a Member of the American Academy of Actuaries and am a member in good standing of both organizations.

Q. Please describe your educational and professional background.

A. I graduated with a Bachelor of Science degree in Mathematics from Georgetown University in 1978. I spent the first 10 years of my career with the National Council on Compensation Insurance. My experience there included the management of the legislative evaluation unit, a division of the National Council responsible for the review and estimation of the cost impact of workers compensation legislation countrywide, management of the "F" classification ratemaking unit, and as regional actuary.

I joined Milliman over 33 years ago, and have remained focused on workers compensation issues, but have broadened my client base to include casualty actuarial consulting services to insurance companies, reinsurers, rating bureaus, insurance regulators, state funds, self-insurance groups and pools, and to individual public and private self-insured employers. Activities include ratemaking, reserving, company formation, merger and acquisition valuation, financial analysis and company modeling, software development, expert testimony, research, and special project work.

Q. What is Milliman?

A. Milliman is among the world's largest independent actuarial and consulting firms. 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 4,500 people, including specialists ranging from clinicians to economists. The firm has consulting practices in healthcare, employee benefits, property and casualty insurance, life insurance, and financial services. Milliman serves the full spectrum of business, financial, government, union, education, and nonprofit organizations.

Q. Were you engaged to provide actuarial services to the North Carolina Rate Bureau (the "Rate Bureau") in connection with its 2021 workers compensation insurance Assigned Risk Rate Filing (the "Filing")?

A. Yes, I was.

Q. What was the scope of that engagement?

A. For this year's filing, the Rate Bureau engaged NCCI to provide the preliminary analysis of the loss data, including preliminary analysis of loss development, trends, and expense levels. My role was to conduct an independent review and work with NCCI to present the data to the Rate Bureau. The scope includes assisting the Rate Bureau in explaining the Filing to regulators, and providing expert testimony concerning the Filing.

Q. Are you providing expert testimony concerning the Underwriting Profit provision?

A. No, I am relying on the work and opinion of Dr. Zanjani as to the Underwriting Profit factor. The scope of my analysis and testimony will concern the other aspects of the Filing.

Q. Did you or your firm physically prepare the filing documents for the Rate Bureau?

A. No, NCCI prepared the filing documents based on the directions of the Rate Bureau; my role was one of input and review.

Q. Is your firm being compensated for this engagement?

A. Yes.

Q. Is that compensation in any way contingent on the provision of favorable testimony in support of the Filing?

A. No, it is not.

Q. Have you completed your review of the Filing?

A. Yes, I have.

Q. Were there any constraints placed on your review, such as limited or delayed access to data or limited time that may have impeded your complete review?

A. No, I was provided all the information that was necessary and had adequate time for a complete review. My review was not limited in any way.

Q. What are assigned risks?

A. Assigned risks refer to those North Carolina employers that cannot find an insurance company in the voluntary market willing to provide a policy of insurance. These employers may apply to the Rate Bureau and, if eligible, have an insurance company designated to provide a policy through the Workers Compensation Insurance Plan. All licensed workers compensation insurers must participate in this plan, either as direct assignment carriers or as members of a pool. A direct assignment carrier accepts a policy assigned to it on a direct basis and writes and services it just as they would any other business, except that they must use the filed Assigned Risk rates and rating plans and pay the agent a commission as designated in the Workers Compensation Insurance Plan. For pool members, one or more servicing carriers will write the policy on a direct basis, again using the same filed Assigned Risk rates and rating plans and paying the same agent commission as the direct assignment carriers. The pool members have a reinsurance arrangement with the servicing carriers and each other whereby all members of the pool will share proportionately in the experience of the pool.

Q. Explain the difference between a Loss Cost Filing and a Rate Filing.

A. By definition, insurance rates (along with the associated rating plans) are to include provisions for all costs associated with the transfer of risk. These costs include losses, expenses, taxes, licenses and fees, and profit and contingencies. Since 1995 in North Carolina, the voluntary market workers compensation filings by the Rate Bureau have included provisions for losses, loss adjustment

expenses, and loss-based assessments only. These are called loss costs. They exclude provision for production expenses, general expenses, dividends, taxes, licenses and fees (since 1999), and profit and contingencies.

For the voluntary market, individual insurance companies will analyze their own books of business along with the approved loss costs, and then make filings with the Insurance Department for loadings that represent an anticipated difference in loss costs (if any), along with their production and general expense, taxes, licenses and fees, and profit and contingency provisions.

For the assigned risk market, the Rate Bureau is responsible for analyzing the experience of the Assigned Risk market and filing for rates that include all costs: losses, expenses, and profit and contingencies.

Q. Does the Rate Bureau's Assigned Risk Rate Filing depend upon the Rate Bureau's voluntary market loss cost filing with the same effective date?

A. Yes, the starting point of the Rate Bureau's Assigned Risk rate analysis is the voluntary market loss cost filing it makes on the same date. This Assigned Risk Rate Filing calculates a factor to apply to the voluntary market loss costs to adjust them to the loss cost level of the Assigned Risk market and to incorporate loadings for production and general expense, taxes, licenses and fees, uncollectible premiums, and profit and contingency provisions. This approach is consistent with the way rates are developed for individual companies in the voluntary market.

Q. Have you reviewed the loss cost filing upon which this Assigned Risk Rate Filing depends?

A. Yes, I have. I provided my opinions on the loss cost filing in my pre-filed testimony included as Exhibit RB-5 in that filing. Rather than repeat that pre-filed testimony here, I will simply incorporate it in its entirety herein by reference.

Q. What were your conclusions concerning the Rate Bureau's loss cost filing?

A. My opinion was that the overall level of the loss costs as filed by the Rate Bureau reasonably reflects the expected level of loss costs for workers compensation insurance in North Carolina, and the filed loss costs by classification are actuarially sound.

Q. What is the overall change in Assigned Risk rates the Rate Bureau is seeking in this filing?

A. The Rate Bureau is filing a 4.9% increase in rate level for the industrial classifications, and a 5.4% decrease in rate level for the Federal ("F") classifications.

Q. Is the change in rates the same for each class code?

A. No, the change in rates arises from the change in the voluntary market loss costs which varies by class code, and the change in the selected loss cost multiplier, which does not. Although the overall rate level change is a 4.9% increase for the industrial classifications and a 5.4% decrease for the F classifications, different class codes will change by different amounts. The industrial classifications are further organized by industry group and the average changes are as follows:

Manufacturing 6.7% increase
Contracting 3.7% increase
Office and Clerical 4.5% increase
Goods and Services 5.5% increase
Miscellaneous 3.6% increase

Q. What is the proposed effective date of the filed Assigned Risk rates?

A. April 1, 2022.

Q. When did the current Assigned Risk rates take effect in North Carolina?

A. The current Assigned Risk rates became effective April 1, 2021.

Q. Can you briefly explain the overall theory underpinning the rate filing?

A. Yes, the first underlying assumption is that the loss costs filed with the voluntary market filing are adequate for the average North Carolina employer. The second assumption is that the collection of direct assignment carriers and servicing carriers is effectively the same as a single aggregate insurance company with a cost structure that is representative of their average. The Assigned Risk rate filing is then equivalent to a rate filing of this single aggregate company underwriting a book of business consisting of Assigned Risk employers.

Q. What is the advantage of looking at the Assigned Risk filing in this manner?

A. It results in considerable simplification. Instead of building each rate from the ground-up, all that is necessary is for the Rate Bureau to calculate a loss cost modification factor that adjusts for differences in loss costs for the Assigned Risk market as compared to the voluntary market, as well as loadings for production and general expenses, taxes, licenses and fees, uncollectible premiums, and profit and contingencies in the exact same manner that insurance companies do for their voluntary books. The combined impact of these provisions results in a loss cost multiplier that is applied to the voluntary loss costs to produce the Assigned Risk rates.

Q. What are the specific steps involved in the calculation of the loss cost multiplier?

A. There are seven steps:

1. Calculate a Loss Cost Modification factor;
2. Determine the provision for Commission and Brokerage;
3. Determine the provision for Other Acquisition and General Expenses combined;
4. Determine the provision for Taxes, Licenses and Fees;
5. Determine the provision for Underwriting Profit and Contingencies;
6. Determine the provision for Uncollectible Premiums; and
7. Determine the impact of the Expense Constant and Minimum Premiums.

Q. How is the Assigned Risk loss cost multiplier calculated?

A. The actual formula is somewhat complex, but the seven provisions above are entered into a formula provided by the North Carolina Insurance Department for use in determining loss cost multipliers. In essence, the loss cost multiplier is the loss cost modification factor (1) divided by the complement of the expense and profit and contingencies ratio (sum of (2) through (6)), with an offset for premium provided by the expense constant and minimum premiums (7). The Assigned Risk plan does not provide for premium discounts by size of insured and North Carolina State-act losses do not have loss-based assessments, so those parts of the Insurance Department's formula are not used.

Q. Is the Insurance Department's formula commonly accepted?

A. Yes, it has been used by voluntary market insurance companies in North Carolina for many years and functionally equivalent formulas exist in almost all the other states that have a similar loss cost rating law.

Q. Is this the same formula used in the current filing?

A. Yes, it is.

Q. Let's now take the Insurance Department's formula components one at a time. What is a loss cost modification factor and how is it calculated?

A. Assigned Risk employers usually experience a level of losses that is higher, on average, than the market as a whole. This makes sense in that insurance underwriters will decline to write an

insurance policy where they view the potential losses as higher than the level at which their individual rates would compensate them. The fact that Assigned Risk loss experience is higher simply means that insurance company underwriters in the exercise of their independent judgment are successful in identifying high-cost employers. The loss cost modification factor represents the amount by which the Assigned Risk loss cost level is expected to exceed the average as represented by the filed loss costs.

It is calculated using the concept of differentials. A differential is usually expressed as a ratio of ratios. The Rate Bureau first calculates a numerator ratio that is based solely on the experience of the Assigned Risk market. That numerator ratio is itself comprised of a numerator of losses developed to ultimate and adjusted to the current benefit level and a denominator consisting of the pure premiums developed to ultimate and adjusted to the 4/1/2021 voluntary loss cost level. Essentially, the numerator ratio is the loss ratio that would have resulted if the Assigned Risks were not charged a fully loaded rate but were instead charged the voluntary market loss costs. The numerator ratio thus represents as a factor the percentage by which Assigned Risk losses either exceed or are short of the voluntary market pure premiums at the 4/1/2021 level.

The denominator ratio is comprised of the same elements as the numerator ratio but is based on the experience of the entire market (both assigned risk and voluntary). This denominator ratio represents as a factor the percentage by which the total market losses either exceed or are short of the voluntary market pure premiums at the 4/1/2021 level.

When taking the ratio of the ratios, the measurement unit in the denominator of each is common, both representing pure premiums at the 4/1/2021 level. They therefore cancel and we are left with a scaled factor representing the relative percentage amount that Assigned Risk losses either exceed or are short of the total market losses. As mentioned earlier, the differentials are expected to exceed 1.000, since Assigned Risk loss costs are anticipated to be higher than the average of all North Carolina employers.

The Rate Bureau calculates a differential as described above for each of the most recent complete ten policy years, 2010 through 2019. Additionally, differentials are calculated using the paid loss development method and the case-incurred loss development method. The ten-year average differential for each method is divided by the current impact of assigned risk pricing programs (the current differential of 2.247 and the impact of ARAP of 1.008) to determine an indicated change for each method. The Rate Bureau gives equal weight to the indicated changes for each method. The average indicated change (1.064) multiplied by the current assigned risk differential results in an indicated assigned risk differential of 2.391.

An adjustment is made to prevent a double counting of the loss adjustment provision included within the servicing carrier allowance. Voluntary market loss costs include a provision for loss adjustment expenses. Loss adjustment expense is also provided to servicing carriers through their

servicing carrier allowance, and the servicing carrier allowance is included in the Assigned Risk rates in a different part of the formula (in the provision for Other Acquisition and General Expenses). Additionally, it is also assumed that the servicing carrier allowance is applicable to direct assignment carriers as well. Therefore, an adjustment needs to be made to the Loss Cost Modification factor to exclude the loss adjustment expenses that are provided through the servicing carrier allowance. This second adjustment is a factor of .833 and is the inverse of the loss adjustment expense factor. The indicated differential of 2.391 multiplied by the adjustment factor of .833 results in the proposed Loss Cost Modification factor of 1.992 and is shown on Exhibit I-A, Sheet 3 of the filing.

Q. Is this the same procedure used in last year's filing?

A. Yes, it is.

Q. In your opinion is the loss cost modification factor of 1.992 reasonable?

A. Yes.

Q. How is the provision for Commission and Brokerage determined?

A. The Workers Compensation Insurance Plan provides for a flat commission of 5% of premium to be used for all Assigned Risks, regardless of whether they are written by direct assignment carriers or servicing carriers.

Q. How is the provision for Other Acquisition and General Expenses determined?

A. It is based on the average servicing carrier allowance (which includes loss adjustment expenses) and is assumed to be applicable to both servicing carriers as well as direct assignment carriers.

The provision is the weighted average of the January 1, 2021 three-year servicing carrier allowances (which include loss adjustment expenses), plus a provision for Assigned Risk Pool administrative expenses. The Assigned Risk Pool administrative expense provision consists of the average over the most recent ten calendar years of the ratio of Pool administrative and separately reimbursable expenses to the gross written premium of servicing carriers and direct assignment carriers combined.

Q. Is this the same procedure used in last year's filing?

A. Yes, it is.

Q. In your opinion, is the provision for Other Acquisition and General Expenses reasonable?

A. Yes.

Q. How is the provision for Taxes, Licenses and Fees determined?

A. The provision for taxes, licenses and fees is based on the North Carolina premium tax rate of 2.5% multiplied by the regulatory surcharge factor (1.065), producing a total of 2.66%. These values are shown on Exhibit II of the filing.

Q. In your opinion, is the provision for Taxes, Licenses and Fees reasonable?

A. Yes.

Q. How is the provision for Underwriting Profit determined?

A. The Underwriting Profit provision was selected by the Rate Bureau based on a cost of capital analysis and a rate of return model provided by Dr. Zanjani. I have not reviewed, nor have I been asked to provide an opinion concerning the Underwriting Profit provision. I am relying on this expert and the Rate Bureau as to the reasonableness of this value.

Q. Is a Contingency provision included in the filing?

A. No, the Rate Bureau considered a Contingency provision, but elected not to include one in this filing.

Q. How is the provision for Uncollectible Premiums determined?

A. The provision for Uncollectible Premium is calculated in Exhibit II-F. It is selected based on a review of the previous eleven-year uncollectible premium ratios after development. There is also an adjustment to reflect the savings resulting from commissions and the servicing carrier allowance that are not paid on uncollectible premiums.

Q. In your opinion, is the provision for Uncollectible Premium the Rate Bureau has included reasonable?

A. Yes, it is.

Q. How is the impact of the Expense Constant and Minimum Premiums determined?

A. Expense constant and minimum premiums provide additional premium revenues apart from those produced by the rates. This additional revenue therefore reduces the rate need, and consequently the loss cost multiplier that would otherwise apply. The Rate Bureau calculates the impact of the expense constant and minimum premiums in Exhibit II-D. The impact of the expense constant is based on the Assigned Risk premiums for policy years 2018 through 2020. The impact of minimum premiums is based on Unit Statistical Data for policy years 2010 to 2017. The combined impact of the expense constant and minimum premiums is 17.7% of assigned risk premium excluding these items. This impact is expressed as a factor (1.177) and used as a divisor in the loss cost multiplier formula to reduce the rates to account for these alternate premium sources.

Q. Has the Rate Bureau changed the formula to determine the impact of the Expense Constant and Minimum Premiums from the prior Assigned Risk rate filing?

A. No, it is the same formula used in the prior Assigned Risk rate filing.

Q. In your opinion, is the impact of the Expense Constant and Minimum Premiums that the Rate Bureau has calculated reasonable?

A. Yes, it is.

Q. In your opinion, is the formula provided by the Insurance Department a reasonable method to determine the Assigned Risk loss cost multiplier?

A. Yes, it is.

Q. What is the Assigned Risk loss cost multiplier filed by the Rate Bureau?

A. It is 3.018 as shown on Exhibit I-A, Sheet 1.

Q. How are the Assigned Risk rates calculated?

A. The filed loss cost multiplier (above) is multiplied by the loss costs by classification code as contained in the voluntary market loss cost filing.

Q. How is the overall change in Assigned Risk rate level calculated?

A. For the industrial classifications, it is derived from the product of the change in the voluntary market loss costs expressed as a factor and the change in the Assigned Risk loss cost multiplier. Since the change in the loss cost multiplier is a constant for every industrial class code, this will hold for each class code and each industry group in addition to the average overall change. The same approach is used to calculate the overall rate level change for the F classifications.

Q. I understand that you are not providing an opinion concerning the Underwriting Profit provision. If I ask you to assume that the Underwriting Profit provision is reasonable and actuarially sound, is the Assigned Risk loss cost multiplier as filed by the Rate Bureau reasonable in your opinion?

A. Yes, if I assume that the Underwriting Profit provision is reasonable, in my opinion, the Assigned Risk loss cost multiplier filed by the Rate Bureau also is reasonable and actuarially sound.

Q. Again, assuming the Underwriting Profit provision is reasonable, do you have an opinion whether the filed Assigned Risk Rates are actuarially sound and reasonably reflect the needed level to cover all costs for Assigned Risk workers compensation insurance in North Carolina?

A. Yes, if I assume that the Underwriting Profit provision is reasonable, it is my opinion that the overall level of the Assigned Risk Rates as filed by the Rate Bureau reasonably reflects the expected level of all costs for workers compensation Assigned Risk insurance in North Carolina, and the rates by classification as contained in that filing are actuarially sound.

Q. Assuming that the Underwriting Profit provision is reasonable, in your opinion are the Assigned Risk Rates included in the filing not excessive, inadequate, or unfairly discriminatory?

A. Yes, if I assume that the Underwriting Profit provision is reasonable, it is my opinion that the Assigned Risk Rates included in the filing are not excessive, inadequate, or unfairly discriminatory.

Q. Does this conclude your testimony?

A. Yes, it does.

PREFILED TESTIMONY
OF
GEORGE ZANJANI

2021 WORKERS COMPENSATION
ASSIGNED RISK INSURANCE RATE FILING
NORTH CAROLINA RATE BUREAU

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-7 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*. 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,* and the *North American Actuarial Journal.* 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 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?

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 selection satisfies North Carolina's statutory requirements.

Q: Can you please summarize your findings?

A: Yes. In general terms, I determined ranges for a reasonable rate of return on capital, looking both at the cost of equity and the weighted average cost of capital; I determined the projected rates of return associated with the 5% underwriting profit provision selected the Bureau; and I then compared those projected rates of return with the cost of equity and weighted average cost of capital ranges and determined that those returns and thus the selected 5% underwriting profit provision are reasonable and not excessive.

I will explain my analyses in much more detail later in my testimony, but I will expand on that general description and summarize my work and findings in a few paragraphs here.

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 Workers Compensation 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 Workers Compensation 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 5.0% to 13.3%.

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 4.6% to 11.3%.

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 consistent with 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, as detailed in Exhibit RB-8, show a statutory return of 8.14% and a total return of 10.73%.

I next considered two adjustments to the pro forma return 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 Workers Compensation 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 5.94% and the total return to 7.48%.

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 holds after adjusting the portfolio allocations and prospective yields as described above. 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, 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-8.

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-8, Pages 1 and 1A) and investment gain on insurance transaction (Line 6 of Exhibit RB-8, Pages 1 and 1A). In the calculation that includes investment income on surplus for informational purposes, I additionally include investment gain on surplus (Line 7 of Exhibit RB-8, 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 - 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. Expenses include Commissions; Taxes, Licenses, and Fees; Servicing Carrier Allowance and an Other Acquisition and General provision attributable to direct writers; and a provision for uncollectible premium. The underwriting profit is assumed to be taxed at the current corporate rate of 21% (Line 3 of Exhibit RB-8, 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 4 of Exhibit RB-8, Pages 1 and 1A). Details of the calculation of these additional tax liabilities are found on Pages 3, 3A, and 3B of Exhibit RB-8.

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 estimated as the product of an investment yield and the average loss/LAE and unearned premium reserves. 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). The details of the estimation of investible reserves and the pre-tax investment income generated from those reserves are found on Pages 4 to 7 of Exhibit RB-8. 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 reflects investment income generated from surplus. The pre-tax 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 Workers Compensation insurance in North Carolina from Page 11 of Exhibit RB-8. 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 property-casualty industry portfolio of invested assets.

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 percent of premium by the product of the premium-to-surplus ratio from Page 11 of Exhibit RB-8 and the inverse of the industry-wide net worth-to-surplus ratio from Page 12 of Exhibit RB-8.

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-8, though I contemplate the consequences of this convention in more detail later in my testimony.

For the current yield, I start with the overall industry invested asset portfolio 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 8 of Exhibit RB-8. For each of the bond subcategories, I obtain a maturity distribution for the 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 8 is a weighted average across maturities according to the industry portfolio. The overall pre-tax current yield on the industry portfolio as thus determined is 2.69%. The embedded yield calculations, based on the actual investment income reported by the industry, are shown on Pages 9 and 10 of Exhibit RB-8; the pre-tax embedded yield is 3.81%. For the pro forma calculations, I average these two figures to obtain 3.25% (shown on Page 6 of Exhibit RB-8).

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 1998-2020 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 11 of Exhibit RB-8 and the inverse of the industry-wide net worth-to-surplus ratio from Page 12 of Exhibit RB-8. This approach indicates that the selected underwriting profit factor of 5.0%, if achieved, would yield an expected statutory return on net worth of 8.14% (without including investment income on surplus) and a total return on net worth of 10.73% (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 alternative investment yield calculations.

First, I considered the impact of basing the asset distribution on a premium-weighted average of the portfolio allocations used by the companies writing Workers Compensation in North

Carolina. The models used to estimate the return on net worth in other NCRB filings in North Carolina rely on the aggregated industry invested asset distribution. While I have followed this convention in Exhibit RB-8, the assumption may not be suitable for the case of Workers Compensation because the industry portfolio reflects heavy common stock allocations by certain personal lines carriers and other companies that do not underwrite Workers Compensation. 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 8 of Exhibit RB-8). Basing the allocation assumption on the portfolios of the companies actually writing business in North Carolina, in my opinion, offers a much closer approximation to the average investment portfolio supporting North Carolina Workers Compensation underwriting.

I tested the sensitivity of the results to replacing the investment portfolio percentages on Page 8 of Exhibit RB-8 with the percentages specifically tailored to North Carolina as described above. Investment expenses were also calculated similarly, based on a premium-weighted average. I used overall industry data to split up the bond allocation between subcategories of bonds. The embedded yields were calculated using an analogous procedure, using the weighted average embedded yield for the North Carolina Workers Compensation market based on investment income from the most recent year plus a 10-year average of realized capital gains.

Relative to Exhibit RB-8, these changes dropped the estimate for the average pre-tax investment yield from 3.25% to 2.67%. If the lower yield were substituted, the returns on net worth shown in Exhibit RB-8 would drop from 8.14% to 7.19% (not including investment income on surplus) and from 10.73% to 9.33% (including investment income on surplus).

Second, I investigated the impact of basing 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. However, there is a significant divergence between the current yields on investments and embedded yields. The gap between the two is significant: when calculated using North Carolina data, the pre-tax current yield is 1.98%, and the pre-tax embedded yield is 3.37%. 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. If we calculate the returns on net worth using the current yield alone rather than the average, the rate of returns drop further to 5.94% (not including investment income on surplus) and 7.48% (including investment income on surplus).

Q: How was the underwriting profit factor determined?

A: The Bureau selected the 5.0% provision. I participated in the Bureau's Workers Compensation Committee 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 ranges for the cost of equity and the WACC that I had established, as I will describe in more detail below, as the numbers that I viewed as being reasonable. 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 capital?

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 Workers Compensation 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: Duff & Phelps (a consultancy that took over the pioneering Ibbotson Cost of Capital franchise) 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. Duff & Phelps update the estimates quarterly (the estimates reported below are from 3/31/2021, while Damodaran Online updates the estimates annually (1/1/2021).

Duff & Phelps 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 that 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, Duff & Phelps 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. Duff & Phelps 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 1928-2020 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:

$$\left[\frac{N-T}{N-1}(1+\pi_A) + \frac{T-1}{N-1}(1+\pi_G)\right]^{\frac{1}{T}}$$

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.

[1] Blume, M.E. (1974), "Unbiased Estimates of Long-Run Expected Rates of Return," *Journal of the American Statistical Association* (September), pp. 634-8.

For β (beta), I estimated a weighted average beta for the North Carolina Workers Compensation market. For each publicly traded holding company associated with an operating subsidiary underwriting Workers Compensation insurance in North Carolina in 2020, I pulled the beta provided by S&P Global (based on 3-year daily returns). I then calculated a weighted average based on 2020 North Carolina Workers Compensation 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 Workers Compensation 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 averaged the values used for the industry by Duff & Phelps and Damodaran Online.

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 Duff & Phelps and Damodaran Online for the property-casualty industry.

Cost of Capital for Publicly Traded Companies

Source	Method	Current Yield (7/8/2021)	Equity Risk Premium	Cost of Equity	WACC
Duff & Phelps	CAPM			6.6%	5.9%
Duff & Phelps	CAPM + Size Premium			6.8%	6.1%
Duff & Phelps	Build-Up			8.1%	7.1%
Duff & Phelps	Fama-French 5-factor			6.8%	6.1%
Duff & Phelps	DCF (1-stage)			5.6%	5.1%
Duff & Phelps	DCF (3-stage)			11.6%	10.0%
Damodaran Online	Implied Premium			4.34%	3.80%
Zanjani	Risk Premium over T-Bill	0.06%	8.28%	7.90%	6.87%
Zanjani	Risk Premium over T-Note	1.30%	6.28%	7.25%	6.34%
Zanjani	Risk Premium over Aaa Bond	2.54%	5.47%	7.72%	6.73%
Zanjani	Risk Premium over Baa Bond	3.21%	4.24%	7.23%	6.32%

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 (0.9472), 2) the cost of debt (2.385%), and 3) the percentage of debt in the capital structure (18.66%).

To illustrate, the cost of equity for my "Risk Premium over T-Bill" method is:

$$.06\% + 0.9472 \times 8.28\% = 7.90\%,$$

and the WACC is:

(1 - .1866) x 7.90% + .1866 x 2.385% = 6.87%.

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 Duff & Phelps 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 about 56% of the 2020 direct premiums written for North Carolina Workers Compensation insurance. The remaining 44% 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-9 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.

None of the approaches is perfect. 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 slightly below the average of the averages of the three groups in Exhibit RB-9 (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 44% market share for non-public companies, I calculate adjusted estimates of the private cost of equity and the public cost of equity:

$$44\% * \left(\frac{COE}{(1-0.25)}\right) + (56\%) * (COE),$$

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	7.6%	6.7%
Duff & Phelps	CAPM + Size Premium	7.8%	6.9%
Duff & Phelps	Build-Up	9.3%	8.1%
Duff & Phelps	Fama-French 5-factor	7.8%	6.9%
Duff & Phelps	DCF (1-stage)	6.4%	5.8%
Duff & Phelps	DCF (3-stage)	13.3%	11.3%
Damodaran Online	Implied Premium	4.97%	4.61%
Zanjani	Risk Premium over T-Bill	9.05%	7.81%
Zanjani	Risk Premium over T-Note	8.31%	7.20%
Zanjani	Risk Premium over Aaa Bond	8.85%	7.64%
Zanjani	Risk Premium over Baa Bond	8.28%	7.18%

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 Workers Compensation market, the projected total return of 10.73% is within the span of estimates, which range from 4.97% to 13.3%. If one instead focuses on the statutory return by excluding investment income on surplus, the projected return is toward the lower end of the range of estimates. When adjusting the investment portfolio to the allocations matched to the North Carolina Workers Compensation market, the total return drops to 9.33% (which is in the middle of the estimate range), and the statutory return drops to 7.19% (which is toward the lower end of the range). When making additional adjustments to account for the gap between current yields and embedded yields, the total return drops further to 7.48%, and the statutory return drops to 5.94%. These latter figures are both toward the lower end of the range of estimates.

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 than 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.

The following table starts with the WACC estimates after adjusting the cost of equity for non-public ownership as described and reported above. It also shows the required return on operating company net worth under different assumptions about the ratio of holding company equity market capitalization to holding company net worth and while using the capital structure percentage estimates underlying each WACC estimate. For example, the required return on operating company net worth for a WACC estimate of 10.0%, a capital structure of 80% equity/20% debt, and a market-to-net-worth ratio of 1.1, would be:

$$10\% * (1.1 / 80\%) = 13.75\%$$

Property-Casualty WACC Estimates, Adjusted for Non-Public Ownership

Source	Method	WACC	Required Return on Net Worth, Assuming Market -to-Net-Worth Ratio of:			
			1.00	1.25	1.5	1.75
Duff & Phelps	CAPM	6.7%	6.7%	10.4%	12.5%	14.5%
Duff & Phelps	CAPM + Size Premium	6.9%	6.9%	10.7%	12.8%	14.9%
Duff & Phelps	Build-Up	8.1%	8.1%	12.5%	15.0%	17.5%
Duff & Phelps	Fama-French 5-factor	6.9%	6.9%	10.7%	12.8%	14.9%
Duff & Phelps	DCF (1-stage)	5.8%	5.8%	9.0%	10.7%	12.5%
Duff & Phelps	DCF (3-stage)	11.3%	11.3%	17.5%	21.0%	24.6%
Damodaran Online	Implied Premium	4.61%	4.61%	7.20%	8.64%	10.08%
Zanjani	Risk Premium over T-Bill	7.81%	7.81%	12.00%	14.40%	16.80%
Zanjani	Risk Premium over T-Note	7.20%	7.20%	11.07%	13.28%	15.49%
Zanjani	Risk Premium over Aaa Bond	7.64%	7.64%	11.74%	14.09%	16.44%
Zanjani	Risk Premium over Baa Bond	7.18%	7.18%	11.03%	13.24%	15.45%

At stock market valuations as of 8/10/2021, the weighted average market-to-net worth ratio of public companies that own the major underwriters of Workers Compensation insurance in North Carolina, using 2020 North Carolina Workers Compensation premiums for weights, is about 1.77. As the table shows, the unadjusted return projections discussed above are clearly not excessive at a market-to-net-worth ratio of 1.75. However, even if one sets this ratio to 1, the table demonstrates that a return on capital of 10.73% (counting investment income on surplus) is reasonable and not excessive; it falls toward the upper end of the span of estimates (4.61% to 11.3%). The same characterization---of reasonable and not excessive---applies to a return on capital of 8.14% (not counting investment income on surplus), which falls toward the middle of the span of estimates. Adjusted projected returns which account for the investment portfolio of companies serving the North Carolina market and the low level of current investment yields (a total return of 7.48% and a statutory return of 5.94%) also fall within the span of estimates, toward the lower end.

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. When using the pro forma return model with inputs selected in a manner consistent with previous filings, I found that the expected statutory return on net worth implied by the selected 5.0% underwriting profit factor was 8.14% (not including investment income on surplus). The expected total return on net worth was 10.73% (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 5.94% and 7.48%, respectively. After reviewing 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 factor 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.

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Education

Ph.D., Economics, University of Chicago, 2000
ACAS, Casualty Actuarial Society, 1994
A.B. / B.S., Economics and Biology, Stanford University, 1990

Work Experience

University of Alabama (Tuscaloosa, Alabama)
Professor of Finance and Frank Park Samford Chair of Insurance, 2017-

Georgia State University (Atlanta, Georgia)
AAMGA Distinguished Chair in Risk Management & Insurance, 2011-2017
Associate Professor, 2008-2017

Nanyang Technological University (Singapore)
Visiting Senior Research Fellow, 2011-12, 2013-2014

Federal Reserve Bank of New York (New York, New York)
Senior Economist, 2006-2008
Economist, 2000-2006

Fireman's Fund Insurance Companies (Novato, California)
Senior Actuarial Analyst, 1993-94
Actuarial Analyst, 1991-1993
Assistant Actuarial Analyst, 1990-1991

Publications: Refereed Scholarly

"Economic Capital and RAROC in a Dynamic Model," (with Daniel Bauer), ***Journal of Banking and Finance***, forthcoming [Winner of Casualty Actuarial Society Hachemeister Prize, 2015]

"Capital Allocation Techniques: Review and Comparison," (with Daniel Bauer and Qiheng Guo), ***Variance***, forthcoming

"Dynamic Capital Allocation with Irreversible Investments," (with Daniel Bauer, Shinichi Kamiya, and Xiaohu Ping), ***Insurance: Mathematics and Economics*** 85: 138-52, (2019)

"What Drives Tort Reform Legislation? Economics and Politics of the State Decisions to Restrict Liability Torts," (with Yiling Deng), ***Journal of Risk & Insurance*** 85: 959-991, (2018)

"Egalitarian Equivalent Capital Allocation," (with Shinichi Kamiya), ***North American Actuarial Journal*** 21: 382-96, (2017)

"The Marginal Cost of Risk, Risk Measures, and Capital Allocation," (with Daniel Bauer), ***Management Science*** 62: 1431-1457 (2016)

"Economic Analysis of Risk and Uncertainty Induced by Health Shocks: A Review and Extension," (with Tomas J. Philipson), in *Handbook of the Economics of Risk and Uncertainty*, Volume 1, Mark J. Machina and W. Kip Viscusi (eds.), North Holland: Elsevier (2014)

"Capital Allocation and Its Discontents," (with Daniel Bauer), in *Handbook of Insurance* (2nd edition), Georges Dionne (ed.), New York: Springer (2013)

"Financial Pricing of Insurance," (with Daniel Bauer and Richard D. Phillips), in *Handbook of Insurance* (2nd edition), Georges Dionne (ed.), New York: Springer (2013)

"Insurance Risk, Risk Measures, and Capital Allocation: Navigating a Copernican Shift," (with Michael R. Powers), ***Annual Review of Financial Economics*** 5: 201-223 (2013)

"Catastrophe Bonds, Reinsurance, and the Optimal Collateralization of Risk Transfer," (with Darius Lakdawalla), ***Journal of Risk & Insurance*** 79**,** pp. 449-76 (2012)

"An Economic Approach to Capital Allocation," ***Journal of Risk and Insurance*** 77, pp. 523-549 (2010) [Winner of Casualty Actuarial Society ARIA Award, 2010]

"Federal Financial Exposure to Catastrophic Risk," (with J. David Cummins and Michael Suher), in *Measuring and Managing Federal Financial Risk,* Deborah Lucas (ed.), Chicago: University of Chicago Press (2010)

"Public versus Private Underwriting of Catastrophe Risk: Lessons from the California Earthquake Authority," in *Risking House and Home: Disasters, Cities, Public Policy,* John M. Quigley and Larry A. Rosenthal (eds.), Berkeley: Berkeley Public Policy Press (2008)

"Regulation, Capital, and the Evolution of Organizational Form in U.S. Life Insurance," ***American Economic Review*** 97, pp. 973-983 (2007)

"Insurance, Self Protection, and the Economics of Terrorism," (with Darius Lakdawalla), ***Journal of Public Economics*** 89, pp. 1891-1905 (2005)

"Terrorism Insurance Policy and the Public Good," (with Darius Lakdawalla), ***St. John's Journal of Legal Commentary*** 18, pp. 463-469 (2004)

"The Production and Regulation of Health Insurance: Limiting Opportunism in Proprietary and Non-Proprietary Organizations," (with Tomas Philipson) in *Individual Decisions for Health*, Bjorn Lindgren (ed.), pp. 194-206, Routledge International Studies in Health Economics, Routledge: London (2003)

"Pricing and Capital Allocation in Catastrophe Insurance," ***Journal of Financial Economics*** 65, pp. 283-305 (2002) [reprinted in *Insurance and Risk Management Volume I: Economics of Insurance Markets*, Gregory Niehaus (ed.), Northampton: Edward Elgar Publishing, (2008)]

Publications: Professional/Practitioner

Book review of "Moral Hazard in Health Insurance," *Journal of Economic Literature* 53, pp. 682-3 (2015)

"Microinsurance Lessons from History," (with Rick Koven), *Microinsurance Learning and Knowledge (MILK)* (2013)

"Institutional Investors and Asset Allocations: Accounting and Regulation of Private Defined Benefit Pension Plans and Other Institutional Investors in the United States, Mexico, and Australia," (with John Broadbent, Michael Palumbo, and Julio Santaella), *CGFS Publication No. 27*, *Working Group on Institutional Investors, Global Savings, and Asset Allocation* (2006)

"An Overview of Political Risk Insurance" (with Kausar Hamdani and Elise Liebers), *CGFS Publication No. 22, Working Group on Foreign Direct Investment in the Financial Sector of Emerging Market Economies* (2005)

Work in Progress

"Life Insurance and Annuity Pricing During the Financial Crisis, Revisited," (with Daniel Bauer, Lars Powell, and Boheng Su), working paper, 2021.

"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 and Ty Leverty), 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

2020 Expert Witness, Homeowners Rate Filings, North Carolina
2020 Expert Witness, Dwelling Rate Filings, North Carolina
2020 Expert Witness, Workers' Compensation Rate Filing, North Carolina
2019 NCCI Review of Cost of Capital Methodology
2019 Expert Witness, Workers' Compensation Rate Filing, Massachusetts
2019 Expert Witness, Flood Rate Filing, North Carolina
2019 Expert Witness, Workers' Compensation Rate Filing, North Carolina
2019 Expert Witness, Dwelling Rate Filings, North Carolina
2019 Expert Witness, Automobile Rate Filing, North Carolina
2019 Expert Witness, Mobile Homeowners 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

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

American Risk & Insurance Association President (2012-13)
Risk Theory Society President (2011-2012)
American Risk & Insurance Association Board Member (2007-2014)
International Research Advisory Board, Risk and Insurance Research Center, NCCU, Taiwan
Editorial Board, *Journal of Insurance Issues* (2012-2014)
Senior Editor, *Journal of Risk and Insurance* (2019-)
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: *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 Money, Credit, and Banking, Journal of Political Economy, Journal of Risk and Insurance, Management Science, 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
Workers Compensation

		Pre-Tax	Tax Liability	Post-Tax
1	**Premiums**	100.00%		
	Loss & LAE	59.73%		
	Commissions	5.00%		
	Other Acquisition & General	3.00%		
	Taxes, Licenses & Fees	2.66%		
	Servicing Carrier Allowance & Other	16.95%		
	Uncollectible Premium	7.67%		
2	**Pro Forma Underwriting Profit**	5.00%		
3	**Regular Tax**		1.05%	
4	**Additional Tax Due to IRS Treatment of Reserves**		0.16%	
5	**Return from Underwriting Post-Tax**			3.79%
6	**Investment Gain on Insurance Transaction**	9.19%	1.48%	7.70%
7	**Statutory Return as a Percent of Premium (post-tax)**			11.49%
8	**Premium-to-Net Worth Ratio**			0.71
9	**Statutory Return as a Percent of Net Worth (post-tax)**			8.14%

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	16.13%
(c)	Pre-tax Investment Yield	3.25%
(d)	Premium-to-Surplus Ratio	0.799
(e)	Net Worth-to-Surplus Ratio	1.13
(f)	Uncollectible Premium (adjusted for expense offsets)	7.67%
(g)	Additional Tax Due to IRS Treatment of Loss Reserves and UEPR	0.16%
(h)	Prepaid Expense Ratio	25.12%
(i)	Unearned Premium Reserve to Premium Ratio	35.41%

Notes to Exhibit RB-8 Page 1

1 Selected expense provisions from the filing. Servicing carrier allowance times servicing carrier market share 0.235 x 0.72121 = 0.1695. Servicing carrier allowance is assumed to be reflective of direct assignment carrier expenses for the same items, with Other Acquisition & General (OA&G) for direct assignment carriers estimated as: 0.10765 x 0.27879 = 0.03, where 0.10765 is the portion of the servicing carrier allowance assigned as OA&G, based on the LAE factor used in the filing. Loss and LAE Ratio is thus the average of the loss ratio for servicing carriers and the loss and LAE ratio for direct assignment carriers.

2 Selected by North Carolina Rate Bureau

3 (2) x (a)

4 See Exhibit RB-8, Page 3

5 (2) - (3) - (4)

6 See Exhibit RB-8, Pages 4-7

7 (5) + (6)

8 (d) / (e)

9 (7) x (8)

Assumptions

(a) Current corporate tax rate, based on the Tax Cut and Jobs Act of 2017.
(b) See Exhibit RB-8, Pages 8-10. Calculated as 1- average post-tax yield/average pre-tax yield.
(c) See Exhibit RB-8, Page 6, with supporting information on Pages 8-10
(d) See Exhibit RB-8, Page 11
(e) See Exhibit RB-8, Page 12
(f) See RB-1, Exhibit II-F
(g) See Exhibit RB-8, Pages 3, 3A, and 3B
(h) See Exhibit RB-8, Page 4
(i) See Exhibit RB-8, Pages 4-5

NCRB - Pro Forma Total Rate of Return
(Including Investment Income on Surplus)
Workers Compensation

		Pre-Tax	Tax Liability	Post-Tax
1	**Premiums**	100.00%		
	Loss & LAE	59.73%		
	Commissions	5.00%		
	Other Acquisition & General	3.00%		
	Taxes, Licenses & Fees	2.66%		
	Servicing Carrier Allowance & Other	16.95%		
	Uncollectible Premium	7.67%		
2	**Pro Forma Underwriting Profit**	5.00%		
3	**Regular Tax**		1.05%	
4	**Additional Tax Due to IRS Treatment of Reserves**		0.16%	
5	**Return from Underwriting Post-Tax**			3.79%
6	**Investment Gain on Insurance Transaction**	9.19%	1.48%	7.70%
7	**Investment Gain on Surplus**	4.36%	0.70%	3.66%
8	**Total Return as a Percent of Premium (post-tax)**			15.14%
9	**Premium-to-Net Worth Ratio**			0.71
10	**Total Return as a Percent of Net Worth (post-tax)**			10.73%

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	16.13%
(c)	Pre-tax Investment Yield	3.25%
(d)	Premium-to-Surplus Ratio	0.80
(e)	Net Worth-to-Surplus Ratio	1.13
(f)	Uncollectible Premium (adjusted for expense offsets)	7.67%
(g)	Additional Tax Due to IRS Treatment of Loss Reserves and UEPR	0.16%
(h)	Prepaid Expense Ratio	25.12%
(i)	Unearned Premium Reserve to Premium Ratio	35.41%

Notes to Exhibit RB-8 Page 1

1 Selected expense provisions from the filing. Servicing carrier allowance times servicing carrier market share 0.235 x 0.72121 = 0.1695. Servicing carrier allowance is assumed to be reflective of direct assignment carrier expenses for the same items, with Other Acquisition & General (OA&G) for direct assignment carriers estimated as: 0.10765 x 0.27879 = 0.03, where 0.10765 is the portion of the servicing carrier allowance assigned as OA&G, based on the LAE factor used in the filing. Loss and LAE Ratio is thus the average of the loss ratio for servicing carriers and the loss and LAE ratio for direct assignment carriers.

2 Selected by North Carolina Rate Bureau

3 (2) x (a)

4 See Exhibit RB-8, Page 3

5 (2) - (3) - (4)

6 See Exhibit RB-8, Pages 4-7

7 (c) x [(1 / (d)) + (h) x (i)]

8 (5) + (6) + (7)

9 (d) / (e)

10 (8) x (9)

Assumptions

(a) Current corporate tax rate, based on the Tax Cut and Jobs Act of 2017.
(b) See Exhibit RB-8, Pages 8-10. Calculated as 1- average post-tax yield/average pre-tax yield.
(c) See Exhibit RB-8, Page 6, with supporting information on Pages 8-10
(d) See Exhibit RB-8, Page 11
(e) See Exhibit RB-8, Page 12
(f) See RB-1, Exhibit II-F
(g) See Exhibit RB-8, Pages 3, 3A, and 3B
(h) See Exhibit RB-8, Page 4
(i) See Exhibit RB-8, Pages 4-5

North Carolina
Workers Compensation
Calculation of Additional Tax Liability

1. Collected Earned Premium for Current Year	100.00%
2. Unearned Premium Reserve 12/31/Current	35.12%
3. Unearned Premium Reserve 12/31/Prior	34.44%
4. Increase: (2) - (3)	0.68%
5. 20% of Increase = Taxable Income	0.14%
6. Additional Tax Liability due to Unearned Premium Reserve	0.03%
7. Unpaid Loss Current Year	135.72%
8. Discounted Unpaid Loss Prior Year	116.71%
9. Unpaid Loss Prior Year	130.20%
10. Discounted Unpaid Loss Prior Year	111.84%
11. Additional Income	0.65%
12. Additional Tax Liability due to Loss Reserve Discounting	0.14%
13. Total Additional Tax Liabilities (6) + (12)	0.16%

NORTH CAROLINA
Workers Compensation
Calculation of Taxable Income

Calculation of Unpaid Loss for Current Accident Year					Calculation of Discounted Unpaid Loss for Current Accident Year			Calculation of Discounted Unpaid Loss for Prior Accident Year			
(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	27.45%	72.55%	59.725	43.33	2020	0.875556	37.9383				
1.5	57.10%	42.90%	58.571	25.13	2019	0.859577	21.5985	2019	42.493	0.875556	37.2052
2.5	74.60%	25.40%	57.439	14.59	2018	0.854517	12.4670	2018	24.641	0.859577	21.1812
3.5	82.20%	17.80%	56.329	10.03	2017	0.839662	8.4190	2017	14.308	0.854517	12.2261
4.5	86.05%	13.95%	55.241	7.71	2016	0.834129	6.4279	2016	9.833	0.839662	8.2563
5.5	88.35%	11.65%	54.173	6.31	2015	0.828905	5.2314	2015	7.557	0.834129	6.3037
6.5	89.55%	10.45%	53.126	5.55	2014	0.832567	4.6222	2014	6.189	0.828905	5.1303
7.5	90.40%	9.60%	52.100	5.00	2013	0.841036	4.2065	2013	5.444	0.832567	4.5329
8.5	91.25%	8.75%	51.093	4.47	2012	0.84715	3.7873	2012	4.905	0.841036	4.1252
9.5	92.15%	7.85%	50.106	3.93	2011	0.865946	3.4060	2011	4.384	0.84715	3.7141
10.5	92.85%	7.15%	49.138	3.51	2010	0.878065	3.0849	2010	3.857	0.865946	3.3402
11.5	93.35%	6.65%	48.188	3.20	2009	0.890414	2.8533	2009	3.445	0.878065	3.0253
12.5	93.75%	6.25%	47.257	2.95	2008	0.902995	2.6670	2008	3.143	0.890414	2.7982
13.5	94.10%	5.90%	46.344	2.73	2007	0.915813	2.5041	2007	2.896	0.902995	2.6155
14.5	94.40%	5.60%	45.448	2.55	2006	0.928867	2.3641	2006	2.681	0.915813	2.4557
15.5	94.70%	5.30%	44.570	2.36	2005	0.942154	2.2256	2005	2.496	0.928867	2.3184
16.5	95.10%	4.90%	43.709	2.14	2004	0.955661	2.0468	2004	2.317	0.942154	2.1826
17.5	95.40%	4.60%	42.864	1.97	2003	0.969334	1.9113	2003	2.100	0.955661	2.0072
18.5	95.60%	4.40%	42.036	1.85	2002	0.982913	1.8180	2002	1.934	0.969334	1.8744
19.5	95.85%	4.15%	41.224	1.71	2001	0.985513	1.6860	2001	1.814	0.982913	1.7828
20.5	96.10%	3.90%	40.427	1.58	2000	0.985513	1.5538	2000	1.678	0.985513	1.6534
21.5	96.35%	3.65%	39.646	1.45	1999	0.985513	1.4261	1999	1.546	0.985513	1.5238
22.5	96.60%	3.40%	38.880	1.32	1998	0.985513	1.3028	1998	1.419	0.985513	1.3986
23.5	96.85%	3.15%	38.128	1.20	1997	0.985513	1.1836	1997	1.296	0.985513	1.2776
24.5	97.10%	2.90%	37.392	1.08	1996	0.985513	1.0686	1996	1.178	0.985513	1.1608
25.5	97.35%	2.65%	36.669	0.97	1995	0.985513	0.9577	1995	1.063	0.985513	1.0480
26.5	97.60%	2.40%	35.961	0.86	1994	0.985513	0.8506	1994	0.953	0.985513	0.9391
27.5	97.85%	2.15%	35.266	0.76	1993	0.985513	0.7472	1993	0.846	0.985513	0.8341
28.5	98.10%	1.90%	34.584	0.66	1992	0.985513	0.6476	1992	0.744	0.985513	0.7328
29.5	98.35%	1.65%	33.916	0.56	1991	0.985513	0.5515	1991	0.644	0.985513	0.6351
30.5	98.60%	1.40%	33.261	0.47	1990	0.985513	0.4589	1990	0.549	0.985513	0.5408
31.5	98.85%	1.15%	32.618	0.38	1989	0.985513	0.3697	1989	0.457	0.985513	0.4500
32.5	99.10%	0.90%	31.988	0.29	1988	0.985513	0.2837	1988	0.368	0.985513	0.3625
33.5	99.35%	0.65%	31.369	0.20	1987	0.985513	0.2009	1987	0.282	0.985513	0.2782
34.5	100.00%	0.00%	30.763	0.00	1986	0.985513	0.0000	1986	0.200	0.985513	0.1971
Totals				135.72			116.71		130.20		111.84

Notes to Pages 3 and 3A

Page 3

2	Page 5, line (2) divided by Page 5, line (1)
3	(2) / (1 plus the 10 year average growth rate of North Carolina Workers Compensation DPW)
4	(2) - (3)
5	(4) x 20%
6	(5) x current corporate tax rate
7	Unpaid current-year losses at year-end as a percent of current year premium. Sum of Page 3A, Column (5)
8	Discounted unpaid current-year losses at year-end as a percent of current year premium. Sum of Page 3A, Column (8)
9	Unpaid prior-year losses at year-end as a percent of current year premium. Sum of Page 3A, Column (10)
10	Discounted unpaid prior-year losses at year-end as a percent of current year premium. Sum of Page 3A, Column (12)
11	Change in loss reserve discount: [(7) - (8)] - [(9) - (10)]
12	(11) x current corporate tax rate
13	(6) + (12)

Page 3A

1	Midpoint of number of years since end of accident period
2	Most recent available loss payment pattern for North Carolina Workers Compensation. Source: NCCI
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 DPW growth rate for North Carolina Workers Compensation.
5	(3) x (4)
6	Accident Year at current year end
7	IRS discount factors for Workers Compensation for most recent tax year from Rev. Proc. 2020-48
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 Workers Compensation for previous tax year from Rev. Proc. 2019-06
12	(10) x (11)

NCRB Investment Income Calculation
Workers Compensation

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	35.41%	354,058
3. Deductions for Prepaid Expenses		
Commissions & Brokerage	5.00%	
Taxes, Licenses, & Fees (5/6)	2.22%	
Direct Assignment Carriers		
Other Acquisition & General (1/2)	1.50%	
Servicing Carriers		
Servicing Carrier Allowance (100%) + Other (1/2)	16.41%	
Total	25.12%	
4. Deduction for Prepaid Expense: (2) x (3)		88,954
5. Net Unearned Premium Reserve Subject to Investment (2) - (4)		265,104
B. Delayed Remission of Premiums (Agents Balances)		
1. Direct Earned Premiums		1,000,000
2. Average Agents Balances		0.080
3. Delayed Remissions: (1) x (2)		80,327
C. Loss and Loss Expense Reserves		
1. Direct Earned Premiums		1,000,000
2. Expected Incurred Loss & LAE-to-Premium Ratio	0.5973	597,250
3. Expected Mean Loss and LAE Reserve-to-Incurred Ratio	4.421	2,640,442
D. Net Policyholder Funds Subject to Investment (A5 - B3 + C3)		2,825,219
E. Average Rate of Return		3.25%
F. Investment Earnings from Net Reserves: (D) x (E)		91,853
G. Average Rate of Return as a Percent of Direct Earned Premiums: (F) / (A1)		9.19%

NORTH CAROLINA
Workers Compensation

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. The data are for North Carolina Workers Compensation.

1	Direct Earned Premium for most recent calendar year	1,303,171,435
2	UEPR at end of most recent calendar year	457,670,700
3	UEPR at end of previous calendar year	465,125,387
4	Mean UEPR	461,398,044
5	Ratio [(4) / (1)]	35.41%

Line A-3
Deduction for prepaid expenses

Commissions are assumed to be incurred when the policy is written and before the premium is paid. In addition, 5/6 of Taxes, Licenses and Fees are assumed to be prepaid.

Servicing Carriers Market Share	72.12%
Direct Assignment Carriers Market Share	27.88%

The entire servicing carrier allowance and half of the other pool administration expense are assumed to be prepaid so the provision is calculated as: 0.72121 x [0.22 + 0.5 x 0.015]. For direct assignment carriers, one-half of OA&G is assumed to be prepaid, so the provision is calculated as: 0.5 x 0.10765 x 0.27879.

Line B-2
Delayed remission of premium

This deduction is necessary because of delay in collection and remission of premium to the companies. Therefore, funds for the unearned premium reserve required during the initial days of all policies must be taken from the company's surplus. Based on the distribution of North Carolina Workers Compensation assigned risk premiums by installment pay plan, the average percentage of premium still to be remitted is estimated, using the distribution of premium across months and assuming that the distribution by plan is the same within months.

NORTH CAROLINA
Workers Compensation

ESTIMATED INVESTMENT EARNINGS ON UNEARNED PREMIUM RESERVES AND ON LOSS RESERVES

EXPLANATORY NOTES

Line C-2
The expected loss and loss adjustment ratio reflects the expense provisions used in this filing.

Line C-3
The mean loss and LAE reserve-to-incurred ratio is based on the weighted average of the figure for servicing carriers and the figure for direct assignment carriers. For servicing carriers, the ratio is based only on losses, since LAE is included in the servicing carrier allowance. Market shares are used for the weights. Thus, the calculation is: 0.72121 x 4.492 + 0.27879 x 4.238 = 4.421

Line E
The average rate of return is the average of the pretax current yield calculated on Page 8 and the pretax embedded yield. The embedded yield (see Page 9) 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 10). The current yield is the estimated currently available rate of return (including both income and capital gains) on the industry investment portfolio (see Page 8).

Embedded Yield	3.81%
Current Yield	2.69%
Average	3.25%

North Carolina Workers Compensation
Ratios to Incurred Loss

Year	(1) Loss Reserve	(2) LAE Reserve	(3) Incurred Loss	(4) Incurred LAE	(5) ((1) + (2))/ ((3) + (4))
2011	3.664	0.462	1.000	0.160	3.558
2012	3.504	0.449	1.000	0.171	3.375
2013	3.964	0.524	1.000	0.181	3.800
2014	4.022	0.556	1.000	0.209	3.788
2015	4.294	0.610	1.000	0.194	4.107
2016	4.562	0.671	1.000	0.233	4.245
2017	5.165	0.790	1.000	0.274	4.673
2018	5.804	0.905	1.000	0.239	5.413
2019	5.449	0.851	1.000	0.230	5.122
2020	4.488	0.678	1.000	0.203	4.294
Average	**4.492**				**4.238**

Source: NCCI

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	10.75%	0.58%	21.00%	0.46%
Municipal	21.92%	0.49%	5.25%	0.47%
Industrial	30.16%	1.26%	21.00%	1.00%
Preferred Stock	0.82%	4.61%	13.13%	4.00%
Common Stock	27.59%	8.31%	19.47%	6.69%
Mortgage Loans	1.27%	2.99%	21.00%	2.36%
Real Estate	0.79%	10.05%	21.00%	7.94%
Cash & Short-term Investments	6.71%	0.03%	21.00%	0.02%
Rate of Return Before Expenses	100.00%	3.00%	19.16%	2.42%
Investment Expenses		0.31%	21.00%	0.24%
Portfolio Rate of Return		2.69%	18.96%	2.18%

Sources

Preferred Stock	Current yield on iShares Preferred Stock Index ETF, 7/6/2021
Real Estate	REIT Sector Cost of Equity, using 3 month average T-Bill for risk free rate, 0.0828 ERP, 1.21 Beta (source: Damodaran Online)
Cash	3 month Treasury rate, averaged over 3 months (source: US Treasury)
Municipal	Maturity weighted average of 3 month average 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	0.0828 ERP (source: Damodaran Online) plus 3 month average T-Bill Rate
Investment Expenses	Investment Expenses from statutory Page 12 - Exhibit of Net Investment Income divided by Cash and Invested Assets from statutory Page 2 - Assets. Data is for the Total Property-Casualty Industry, sourced from the 2020 edition of A.M. Best's Aggregates and Averages.

Portfolio Yield and Tax Rate
Embedded Yield

		Income	Tax Rate
Bonds			
	Taxable	29,370,354	21.00%
	Non-Taxable	7,800,625	5.25%
Stocks			
	Taxable	8,913,032	13.13%
	Non-Taxable	1,595,181	5.25%
Mortgage Loans		996,462	21.00%
Real Estate		2,034,695	21.00%
Contract Loans		202	21.00%
Cash & Short Term Inv		2,497,031	21.00%
All Other		9,785,602	21.00%
Total		62,993,184	17.54%
Inv. Expenses		5,845,840	21.00%
Net Inv. Income		57,147,344	17.19%
Mean Invested Assets		1,822,857,949	
Inv. Inc. Yield Rate		3.14%	17.19%
Capital Gains (10 yr. avg.) (% of Inv. Assets)		0.68%	0.00%
Invest. Yield Rate (pre=tax)		3.81%	14.14%
Invest. Yield Rate (post-tax)		3.27%	

Source: A.M. Best's Aggregates and Averages, 2020 Edition, statutory Page 12 - Exhibit of Net Investment Income (Column 2 - Earned During Year) for Total Property-Casualty Industry. For capital gains, see Exhibit RB-8, Page 10.

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
2011	1,330,998,082	8,100,143	0.61%
2012	1,366,568,026	7,563,305	0.55%
2013	1,400,656,619	9,035,405	0.65%
2014	1,473,600,834	12,163,890	0.83%
2015	1,543,882,375	12,093,078	0.78%
2016	1,567,611,077	9,887,732	0.63%
2017	1,596,937,470	8,086,268	0.51%
2018	1,676,831,258	15,725,303	0.94%
2019	1,733,729,297	10,825,733	0.62%
2020	1,822,857,949	11,238,484	0.62%
Total	15,513,672,984	104,719,341	0.68%

"Mean Invested Assets" is the average of current and prior year values for Cash and Invested Assets (from statutory Page 2). Sourced from 2010-2020 editions of A.M. Best's Aggregates and Averages. Capital gains are expressed net of taxes.

North Carolina

Workers Compensation

Premium-to-Surplus Ratios

Year	Net
2011	0.740
2012	0.763
2013	0.796
2014	0.794
2015	0.829
2016	0.814
2017	0.800
2018	0.880
2019	0.810
2020	0.764
Average	0.799

Data from NAIC Statutory Filings for all groups and unaffiliated companies writing Workers Compensation insurance in North Carolina. Weighted average of group level surplus-to-premium ratios is based on group level North Carolina Workers Compensation premiums, which is then inverted for the premium-to-surplus ratio.

North Carolina
Workers Compensation
Calculation of Ratio of GAAP Net Worth to Statutory Surplus

	2014	2015	2016	2017	2018
Policyholder Surplus	675,233,591,461	674,150,481,028	700,833,588,840	750,700,298,191	742,079,084,495
+ Deferred Acquisition Costs	31,242,614,928	32,401,590,297	33,046,102,666	34,674,341,556	43,991,738,565
+ Non-Admitted DTA Provision	11,237,499,832	12,112,807,244	11,544,280,333	5,482,491,430	6,314,927,861
+ Non-admitted Assets (non-tax part)	33,563,586,431	40,260,421,135	43,722,898,341	46,932,629,941	46,502,063,197
+ Provision for Reinsurance	2,392,301,235	2,251,585,712	2,185,395,913	2,595,884,443	2,737,598,756
+ Provision for FASB 115 (after-tax)	25,814,318,855	16,081,984,811	10,015,172,605	14,432,773,013	912,505,274
- Surplus Notes	(11,673,768,635)	(12,446,044,946)	(12,027,889,160)	(11,859,500,848)	(11,660,367,237)
GAAP-adjusted Net Worth	767,810,144,106	764,812,825,281	789,319,549,538	842,958,917,726	830,877,550,911
Ratio of Net Worth to Surplus	1.14	1.13	1.13	1.12	1.12
Five Year Average	1.13				

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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