September 1, 2022

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

Re: Workers Compensation Insurance
2022 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, 2023 and shall be applied to all residual market policies as of the first normal anniversary rating date which is on or after April 1, 2023, 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 references the September 1, 2022 Loss Cost Filing for the voluntary market to support the change in loss costs. Combined, the two filings support an average decrease in the overall rate level for residual market workers compensation insurance of 0.8%.

This rate level change includes a 4.8% decrease in loss costs detailed in the 2022 loss cost filing and a 4.2% increase in the loss cost multiplier detailed in this filing.

By industry group, the changes are: Manufacturing, 0.3% increase; Contracting, 1.7% decrease; Office and Clerical, 2.0% decrease; Goods & Services, 1.2% decrease; and Miscellaneous, 0.4% 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 12.7% to the overall residual market rate level for 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) Joanna Biliouris, 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
General Manager

JB:ko
Enclosures

NORTH CAROLINA - ASSIGNED RISK

SUMMARY

Proposed Effective Date April 1, 2023

I. Industrial Classifications

Overall Proposed Change in Rate Level

- New and Renewal Policies -0.8%

By Industry Group

Manufacturing	+0.3%
Contracting	-1.7%
Office and Clerical	-2.0%
Goods and Services	-1.2%
Miscellaneous	+0.4%
Overall	-0.8%

II. Federal Classifications

Overall Proposed Change in Rate Level

- New and Renewal Policies -12.7%

III. Summary of Miscellaneous Changes

	Current	Proposed
- USL&HW %	58%	58%
- Experience Rating Split Point	$18,500	$18,500
- Experience Rating Premium Eligibility Thresholds		
Column A	$12,000	$12,500
Column B	$6,000	$6,250

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 2020 Experience

Premium:

(1)	Standard Earned Premium Developed to Ultimate (Appendix A-II)	$828,544,876
(2)	Premium On-level Factor (Appendix A-I)	0.827
(3)	Premium Available for Benefit Costs = (1) x (2)	$685,206,612

Indemnity Benefit Cost:

(4)	Limited Indemnity Losses Developed to Ultimate (Appendix A-II)	$320,094,552
(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)	$384,113,462
(9)	Adjusted Limited Indemnity Cost Ratio excluding Trend and Benefits = (8) / (3)	0.561
(10)	Factor to Reflect Indemnity Trend (Appendix A-III)	0.889
(11)	Projected Limited Indemnity Cost Ratio = (9) x (10)	0.499
(12)	Factor to Adjust Indemnity Cost Ratio to an Unlimited Basis (Appendix A-II)	1.010
(13)	Projected Indemnity Cost Ratio = (11) x (12)	0.504
(14)	Factor to Reflect Proposed Changes in Indemnity Benefits (Appendix C)	1.000
(15)	Projected Indemnity Cost Ratio including Benefit Changes = (13) x (14)	0.504

Medical Benefit Cost:

(16)	Limited Medical Losses Developed to Ultimate (Appendix A-II)	$275,395,612
(17)	Medical Loss On-level Factor (Appendix A-I)	1.009
(18)	Factor to Include Loss Adjustment Expense (Exhibit II)	1.200
(19)	Composite Adjustment Factor = (17) x (18)	1.211
(20)	Adjusted Limited Medical Losses = (16) x (19)	$333,504,086
(21)	Adjusted Limited Medical Cost Ratio excluding Trend and Benefits = (20) / (3)	0.487
(22)	Factor to Reflect Medical Trend (Appendix A-III)	0.889
(23)	Projected Limited Medical Cost Ratio = (21) x (22)	0.433
(24)	Factor to Adjust Medical Cost Ratio to an Unlimited Basis (Appendix A-II)	1.010
(25)	Projected Medical Cost Ratio = (23) x (24)	0.437
(26)	Factor to Reflect Proposed Changes in Medical Benefits (Appendix C)	1.005
(27)	Projected Medical Cost Ratio including Benefit Changes = (25) x (26)	0.439

Total Benefit Cost:

(28)	Indicated Change Based on Experience, Trend and Benefits = (15) + (27)	0.943

NORTH CAROLINA

EXHIBIT I

Determination of Indicated Rate Level Change

Section B - Policy Year 2019 Experience

Premium:

(1)	Standard Earned Premium Developed to Ultimate (Appendix A-II)	$896,950,285
(2)	Premium On-level Factor (Appendix A-I)	0.728
(3)	Premium Available for Benefit Costs = (1) x (2)	$652,979,807

Indemnity Benefit Cost:

(4)	Limited Indemnity Losses Developed to Ultimate (Appendix A-II)	$320,792,438
(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)	$384,950,926
(9)	Adjusted Limited Indemnity Cost Ratio excluding Trend and Benefits = (8) / (3)	0.590
(10)	Factor to Reflect Indemnity Trend (Appendix A-III)	0.858
(11)	Projected Limited Indemnity Cost Ratio = (9) x (10)	0.506
(12)	Factor to Adjust Indemnity Cost Ratio to an Unlimited Basis (Appendix A-II)	1.010
(13)	Projected Indemnity Cost Ratio = (11) x (12)	0.511
(14)	Factor to Reflect Proposed Changes in Indemnity Benefits (Appendix C)	1.000
(15)	Projected Indemnity Cost Ratio including Benefit Changes = (13) x (14)	0.511

Medical Benefit Cost:

(16)	Limited Medical Losses Developed to Ultimate (Appendix A-II)	$274,951,540
(17)	Medical Loss On-level Factor (Appendix A-I)	1.021
(18)	Factor to Include Loss Adjustment Expense (Exhibit II)	1.200
(19)	Composite Adjustment Factor = (17) x (18)	1.225
(20)	Adjusted Limited Medical Losses = (16) x (19)	$336,815,637
(21)	Adjusted Limited Medical Cost Ratio excluding Trend and Benefits = (20) / (3)	0.516
(22)	Factor to Reflect Medical Trend (Appendix A-III)	0.858
(23)	Projected Limited Medical Cost Ratio = (21) x (22)	0.443
(24)	Factor to Adjust Medical Cost Ratio to an Unlimited Basis (Appendix A-II)	1.010
(25)	Projected Medical Cost Ratio = (23) x (24)	0.447
(26)	Factor to Reflect Proposed Changes in Medical Benefits (Appendix C)	1.005
(27)	Projected Medical Cost Ratio including Benefit Changes = (25) x (26)	0.449

Total Benefit Cost:

(28)	Indicated Change Based on Experience, Trend and Benefits = (15) + (27)	0.960

NORTH CAROLINA

EXHIBIT I

Determination of Indicated Rate Level Change

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

(1)	Policy Year 2020 Indicated Change Based on Experience, Trend, and Benefits	0.943 (-5.7%)
(2)	Policy Year 2019 Indicated Change Based on Experience, Trend, and Benefits	0.96 (-4.0%)
(3)	Indicated Change Based on Experience, Trend, and Benefits = [(1)+(2)] / 2	0.952 (-4.8%)

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

(1)	Indicated Loss Cost Level Change	0.952 (-4.8%)
(2)	Proposed Change in the Assigned Risk Loss Cost Multiplier = [Exhibit I-A, Sheet 1, Line (9) / Exhibit I-A, Sheet 2, Line (9)]	1.042 (+4.2%)
(3)	Indicated Assigned Risk Rate Level Change = (1) x (2)	0.992 (-0.8%)

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

Industry Group Differentials (Appendix A-V):

Manufacturing	1.011
Contracting	0.991
Office & Clerical	0.988
Goods & Services	0.996
Miscellaneous	1.012

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	0.992	1.011	1.003	(+0.3%)
Contracting	0.992	0.991	0.983	(-1.7%)
Office & Clerical	0.992	0.988	0.980	(-2.0%)
Goods & Services	0.992	0.996	0.988	(-1.2%)
Miscellaneous	0.992	1.012	1.004	(+0.4%)
Overall	0.992	1.000	0.992	(-0.8%)

North Carolina Department of Insurance

Summary of Supporting Information Form
Calculation of INDICATED Assigned Risk Loss Cost Multiplier
Effective April 1, 2023

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): 2.075 (see attached) Cite the nature and percent modification. Attach supporting data and/or rationale for the modification(s).		
	B. Loss Cost Modification Factor:	2.075	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	23.9%	
	C. General Expenses	Incl. in B	
	D. Taxes, Licenses, Fees & Loss Based Assessments	2.66%	
	E. Profit, Contingencies and Investment Income	2.0%	
	F. Uncollectible Premium Provision	8.3%	
	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)	1.166	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)	3.058	
9.	Selected Loss Cost Multiplier: (Explain any differences between 8 and 9, other than rounding)	3.058	
10.	Rate Level Changes for the Coverages to which this page applies	-0.8%	
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, 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 Cite the nature and percent modification. Attach supporting data and/or rationale for the modification(s).	
	B. Loss Cost Modification Factor:	1.992
	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	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
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 Lost Cost Multiplier	2.936

North Carolina - Assigned Risk

Calculation of Loss Cost Modification Factor

1.	Current Assigned Risk Differential	2.391
2.	Proposed Change in Assigned Risk Differential (See Exh. II-E, Sheet 1)	1.042
3.	Proposed Assigned Risk Differential (1) x (2)	2.491
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)	2.075

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)		23.9%
4. Uncollectible Premium Provision (See Exhibit II-F, Sheet 1)		11.5%
5. Underwriting Profit and Contingencies		2.0%
a. Underwriting Profit (See Exhibits RB-11 and RB-13)	2.0%	
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)		16.6%

* 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^
2017	22.9%	9.2%	2016	11.3%
2018	23.4%	9.2%	2017	11.1%
2019	21.7%	9.6%	2018	10.9%
2020	18.1%	10.0%	2019	10.4%
2021	18.4%	9.3%	2020	9.5%

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)
2016	11.4%	0.992	11.3%
2017	11.2%	0.988	11.1%
2018	11.1%	0.986	10.9%
2019	10.5%	0.987	10.4%
2020	9.2%	1.035	9.5%

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	1.049	1.035
2nd	1.001	0.987
3rd	0.998	0.986
4th	0.996	0.988
5th	0.997	0.992
6th	0.998	0.995
7th	1.000	0.997
8th	0.999	0.997
9th	0.997	0.998
10th	1.000	1.001
11th	0.999	1.001
12th	0.999	1.002
13th	0.999	1.003
14th	1.002	1.004
15th	1.000	1.002
16th	1.000	1.002
17th	1.001	1.002
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 1/1/2022 Three-Year Servicing Carrier Allowances* (Includes LAE)	22.36%
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)	23.9%

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

North Carolina - Assigned Risk

Pool Expense Provision*

Data Valued as of 12/31/2021

Calendar Year	Gross Written Premium^	Administrative & Separately Reimbursable Expense	Expenses as a % of GWP
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%
2021	75,838,904	1,236,702	1.6%
		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 *	$	2,837,965	$	2,837,965
(4) Standard Premium Including Additional Premium Generated by MPM and MMP *	$	33,076,702	$	33,076,702
(5) Impact of MPM and MMP = (3) / (4)		0.086		0.086
(6) Expense Constant		160		160
(7) Standard Premium Including Expense Constant Premium and Balance to Minimum Premium **	$	67,636,100	$	67,636,100
(8) Standard Premium Excluding Expense Constant Premium and Balance to Minimum Premium **	$	58,006,772	$	58,006,772
(9) Premium Generated from Expense Constant and Balance to Minimum Premium = (7) - (8)	$	9,629,328	$	9,629,328
(10) Effect of Expense Constant and Minimum Premiums = (9) / (8)				0.166

* Source: Unit Statistical Data for policy years 2011 through 2018.
** Source: Policy Data collected by the NCRB for policy years 2019 through 2021.

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 12/31/2021				
2011	7,152,784	26,223,727	3.666	
2012	10,046,894	31,165,154	3.102	
2013	12,983,538	42,653,607	3.285	
2014	13,600,779	39,439,257	2.900	
2015	14,389,435	46,810,321	3.253	
2016	15,181,461	38,824,938	2.557	
2017	15,611,300	38,593,677	2.472	
2018	17,953,118	51,471,754	2.867	
2019	19,149,654	52,119,226	2.722	
2020	20,248,565	24,937,009	1.232	
II. Statewide Experience Valued as of 12/31/2021				
2011	414,847,355	671,424,880	1.618	2.266
2012	421,865,082	619,917,711	1.469	2.112
2013	441,686,250	592,665,468	1.342	2.448
2014	466,723,707	581,589,327	1.246	2.327
2015	497,319,877	568,089,159	1.142	2.849
2016	532,700,307	543,299,302	1.020	2.507
2017	567,385,451	553,566,883	0.976	2.533
2018	612,929,185	606,747,045	0.990	2.896
2019	652,989,800	596,216,817	0.913	2.981
2020	685,075,424	614,479,465	0.897	1.373
			Average Differential ^	2.429

(a)	Indicated Differential in Standard Pure Premium Based on Experience	2.429
(b)	Current Impact of Standard Pure Premium Programs@	2.415
(c)	Indicated Change in Assigned Risk Pure Premium Differential Based on Paid Losses = (a) / (b)	1.006
(d)	Indicated Change in Assigned Risk Pure Premium Differential Based on Paid+Case Losses [See Exhibit II-E, Sheet 4, Item (c)]	1.077
(e)	Selected Change in Assigned Risk Pure Premium Differential (Proposed Assigned Risk Pure Premium Differential = 2.491)	1.042

* Developed to fifth report and brought to the 4/1/2022 pure premium level.

** Developed to ultimate and brought to the 1/1/2021 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 1.0% and a differential of 2.391. 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
2011	40,411,208	0.421	2.382	7,152,784
2012	55,507,700	0.432	2.384	10,046,894
2013	72,130,766	0.431	2.400	12,983,538
2014	78,617,219	0.414	2.393	13,600,779
2015	81,758,153	0.419	2.386	14,389,435
2016	84,812,632	0.425	2.368	15,181,461
2017	81,308,854	0.451	2.354	15,611,300
2018	82,733,261	0.512	2.356	17,953,118
2019	75,392,337	0.596	2.345	19,149,654
2020	70,799,177	0.670	2.345	20,248,565

Policy Year	(5) Ind. Losses Paid	(6) Development Factor	(7) On-level Factor^	(8) = ((5) x (6)) x (7) Adjusted Ind. Losses
2011	11,423,600	1.053	0.997	11,992,964
2012	13,778,590	1.062	1.000	14,632,863
2013	21,131,702	1.070	1.000	22,610,921
2014	20,525,083	1.077	1.000	22,105,514
2015	20,047,352	1.090	1.000	21,851,614
2016	17,510,467	1.113	1.000	19,489,150
2017	18,613,614	1.155	1.000	21,498,724
2018	21,066,071	1.242	1.000	26,164,060
2019	14,271,199	1.515	1.000	21,620,866
2020	5,374,843	2.824	1.000	15,178,557

Policy Year	(9) Med. Losses Paid	(10) Development Factor	(11) On-level Factor^	(12) = ((9) x (10)) x (11) Adjusted Med. Losses
2011	13,409,612	1.084	0.979	14,230,763
2012	15,401,282	1.092	0.983	16,532,291
2013	18,275,450	1.100	0.997	20,042,686
2014	15,467,607	1.103	1.016	17,333,743
2015	21,517,054	1.110	1.045	24,958,707
2016	16,461,874	1.124	1.045	19,335,788
2017	14,315,798	1.146	1.042	17,094,953
2018	20,749,573	1.183	1.031	25,307,694
2019	23,318,554	1.281	1.021	30,498,360
2020	5,736,304	1.686	1.009	9,758,452

* Developed to a fifth report. See Exhibit II-E, Sheet 7.
^ See Appendix A-I for the derivation of the factors for Policy Years 2019 and 2020. Factors for the remaining years are calculated in a similar manner.
# This is composed of an implied differential of 2.326 and year-specific ARAP impacts that 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 Premium On-level
2011	407,694,571	7,152,784	414,847,355
2012	411,818,188	10,046,894	421,865,082
2013	428,702,712	12,983,538	441,686,250
2014	453,122,928	13,600,779	466,723,707
2015	482,930,442	14,389,435	497,319,877
2016	517,518,846	15,181,461	532,700,307
2017	551,774,151	15,611,300	567,385,451
2018	594,976,067	17,953,118	612,929,185
2019	633,840,146	19,149,654	652,989,800
2020	664,826,859	20,248,565	685,075,424

Policy Year	(4) Ind. Losses Paid	(5) Development Factor	(6) On-level Factor^	(7) = ((4) x (5)) x (6) Adjusted Ind. Losses
2011	331,520,944	1.053	0.997	348,044,279
2012	297,597,765	1.062	1.000	316,048,826
2013	293,043,454	1.070	1.000	313,556,496
2014	284,570,446	1.077	1.000	306,482,370
2015	272,349,774	1.090	1.000	296,861,254
2016	262,125,125	1.113	1.000	291,745,264
2017	260,584,021	1.155	1.000	300,974,544
2018	262,155,455	1.242	1.000	325,597,075
2019	211,569,045	1.515	1.000	320,527,103
2020	115,649,652	2.824	1.000	326,594,617

Policy Year	(8) Med. Losses Paid	(9) Development Factor	(10) On-level Factor^	(11) = ((8) x (9)) x (10) Adjusted Med. Losses
2011	304,720,723	1.084	0.979	323,380,601
2012	283,080,580	1.092	0.983	303,868,885
2013	254,498,925	1.100	0.997	279,108,972
2014	245,489,179	1.103	1.016	275,106,957
2015	233,827,238	1.110	1.045	271,227,905
2016	214,165,095	1.124	1.045	251,554,038
2017	211,527,988	1.146	1.042	252,592,339
2018	230,512,580	1.183	1.031	281,149,970
2019	210,787,907	1.281	1.021	275,689,714
2020	169,227,162	1.686	1.009	287,884,848

* 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 2019 and 2020.
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 12/31/2021				
2011	7,152,784	25,035,233	3.500	
2012	10,046,894	29,685,245	2.955	
2013	12,983,538	40,611,247	3.128	
2014	13,600,779	37,743,342	2.775	
2015	14,389,435	44,100,021	3.065	
2016	15,181,461	45,041,680	2.967	
2017	15,611,300	38,930,791	2.494	
2018	17,953,118	60,931,962	3.394	
2019	19,149,654	64,659,470	3.377	
2020	20,248,565	23,824,257	1.177	
II. Statewide Experience Valued as of 12/31/2021				
2011	414,847,355	651,050,577	1.569	2.231
2012	421,865,082	603,870,464	1.431	2.065
2013	441,686,250	567,479,414	1.285	2.434
2014	466,723,707	562,711,570	1.206	2.301
2015	497,319,877	547,356,831	1.101	2.784
2016	532,700,307	525,869,393	0.987	3.006
2017	567,385,451	532,700,695	0.939	2.656
2018	612,929,185	594,498,694	0.970	3.499
2019	652,989,800	606,819,103	0.929	3.635
2020	685,075,424	581,457,982	0.849	1.386
			Average Differential ^	2.600

(a)	Indicated Differential in Standard Pure Premium Based on Experience	2.600
(b)	Current Impact of Standard Pure Premium Programs@	2.415
(c)	Indicated Change in Assigned Risk Pure Premium Differential = (a)/(b)	1.077

* Developed to fifth report and brought to the 4/1/2022 pure premium level.
** Developed to ultimate and brought to the 1/1/2021 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 1.0% and a differential of 2.391. 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
2011	40,411,208	0.421	2.382	7,152,784
2012	55,507,700	0.432	2.384	10,046,894
2013	72,130,766	0.431	2.400	12,983,538
2014	78,617,219	0.414	2.393	13,600,779
2015	81,758,153	0.419	2.386	14,389,435
2016	84,812,632	0.425	2.368	15,181,461
2017	81,308,854	0.451	2.354	15,611,300
2018	82,733,261	0.512	2.356	17,953,118
2019	75,392,337	0.596	2.345	19,149,654
2020	70,799,177	0.670	2.345	20,248,565

Policy Year	(5) Ind. Losses Paid+Case	(6) Development Factor	(7) On-level Factor^	(8) = ((5) x (6)) x (7) Adjusted Ind. Losses
2011	11,428,280	1.022	0.997	11,644,663
2012	13,855,628	1.024	1.000	14,188,163
2013	21,364,233	1.027	1.000	21,941,067
2014	20,744,882	1.031	1.000	21,387,973
2015	20,328,873	1.034	1.000	21,020,055
2016	18,599,414	1.040	1.000	19,343,391
2017	20,262,710	1.056	1.000	21,397,422
2018	23,465,763	1.082	1.000	25,389,956
2019	19,992,648	1.165	1.000	23,291,435
2020	9,865,827	1.478	1.000	14,581,692

Policy Year	(9) Med. Losses Paid+Case	(10) Development Factor	(11) On-level Factor^	(12) = ((9) x (10)) x (11) Adjusted Med. Losses
2011	13,409,612	1.020	0.979	13,390,570
2012	15,471,136	1.019	0.983	15,497,082
2013	18,377,192	1.019	0.997	18,670,180
2014	15,782,161	1.020	1.016	16,355,369
2015	21,653,031	1.020	1.045	23,079,966
2016	24,156,841	1.018	1.045	25,698,289
2017	16,709,682	1.007	1.042	17,533,369
2018	34,473,333	1.000	1.031	35,542,006
2019	41,386,286	0.979	1.021	41,368,035
2020	9,551,746	0.959	1.009	9,242,565

* Developed to a fifth report. See Exhibit II-E, Sheet 7.
^ See Appendix A-I for the derivation of the factors for Policy Years 2019 and 2020. Factors for the remaining years are calculated in a similar manner.
# This is composed of an implied differential of 2.326 and year-specific ARAP impacts that 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
2011	407,694,571	7,152,784	414,847,355
2012	411,818,188	10,046,894	421,865,082
2013	428,702,712	12,983,538	441,686,250
2014	453,122,928	13,600,779	466,723,707
2015	482,930,442	14,389,435	497,319,877
2016	517,518,846	15,181,461	532,700,307
2017	551,774,151	15,611,300	567,385,451
2018	594,976,067	17,953,118	612,929,185
2019	633,840,146	19,149,654	652,989,800
2020	664,826,859	20,248,565	685,075,424

Policy Year	(4) Ind. Losses Paid+Case	(5) Development Factor	(6) On-level Factor^	(7) = ((4) x (5)) x (6) Adjusted Ind. Losses
2011	332,945,620	1.022	0.997	339,249,613
2012	301,276,853	1.024	1.000	308,507,497
2013	295,937,462	1.027	1.000	303,927,773
2014	291,121,340	1.031	1.000	300,146,102
2015	279,923,894	1.034	1.000	289,441,306
2016	272,489,228	1.040	1.000	283,388,797
2017	277,760,491	1.056	1.000	293,315,078
2018	295,057,799	1.082	1.000	319,252,539
2019	275,586,071	1.165	1.000	321,057,773
2020	212,174,889	1.478	1.000	313,594,486

Policy Year	(8) Med. Losses Paid+Case	(9) Development Factor	(10) On-level Factor^	(11) = ((8) x (9)) x (10) Adjusted Med. Losses
2011	312,244,351	1.020	0.979	311,800,964
2012	294,868,473	1.019	0.983	295,362,967
2013	259,415,775	1.019	0.997	263,551,641
2014	253,363,313	1.020	1.016	262,565,468
2015	241,969,721	1.020	1.045	257,915,525
2016	227,936,000	1.018	1.045	242,480,596
2017	228,139,699	1.007	1.042	239,385,617
2018	266,970,082	1.000	1.031	275,246,155
2019	285,887,407	0.979	1.021	285,761,330
2020	276,824,012	0.959	1.009	267,863,496

* 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 2019 and 2020.
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	
2017	$80,145,819	$81,029,350	1.011
2018	81,927,327	82,679,244	1.009
2019	74,238,226	75,091,969	1.012
Average			1.011
	2nd Report	3rd Report	
2016	$84,140,477	$84,946,953	1.010
2017	81,029,350	81,144,984	1.001
2018	82,679,244	82,733,261	1.001
Average			1.004
	3rd Report	4th Report	
2015	$81,844,849	$81,759,768	0.999
2016	84,946,953	84,790,589	0.998
2017	81,144,984	81,308,854	1.002
Average			1.000
	4th Report	5th Report	
2014	$78,621,367	$78,601,500	1.000
2015	81,759,768	81,746,755	1.000
2016	84,790,589	84,812,632	1.000
Average			1.000

Three-year average premium development factors

1st/5th	2nd/5th	3rd/5th	4th/5th
1.015	1.004	1.000	1.000

Section B - Calculation of Developed Assigned Risk Standard Premium

Policy Year	Standard Premium	Development Factor	Developed Premium
2011	40,411,208	1.000	40,411,208
2012	55,507,700	1.000	55,507,700
2013	72,130,766	1.000	72,130,766
2014	78,617,219	1.000	78,617,219
2015	81,758,153	1.000	81,758,153
2016	84,812,632	1.000	84,812,632
2017	81,308,854	1.000	81,308,854
2018	82,733,261	1.000	82,733,261
2019	75,091,969	1.004	75,392,337
2020	69,752,884	1.015	70,799,177

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	
2017	$897,502,582	$910,098,722	1.014
2018	885,328,756	900,595,498	1.017
2019	818,316,566	821,858,316	1.004
Average			1.012
	2nd Report	3rd Report	
2016	$992,867,536	$992,355,249	0.999
2017	953,714,481	952,904,038	0.999
2018	900,595,498	900,115,079	0.999
Average			0.999
	3rd Report	4th Report	
2015	$1,015,451,907	$1,015,604,942	1.000
2016	1,025,653,046	1,025,223,062	1.000
2017	952,904,038	952,977,809	1.000
Average			1.000
	4th Report	5th Report	
2014	$973,558,209	$973,367,415	1.000
2015	1,043,618,818	1,043,252,303	1.000
2016	1,025,223,062	1,024,789,405	1.000
Average			1.000

Three-year average premium development factors

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

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

Policy Year	Standard Premium	Development Factor	Voluntary On-level Factor*	Voluntary Prem Dev't & On-level
2011	910,032,525	1.000	0.448	407,694,571
2012	921,293,485	1.000	0.447	411,818,188
2013	946,363,603	1.000	0.453	428,702,712
2014	998,068,124	1.000	0.454	453,122,928
2015	1,043,046,311	1.000	0.463	482,930,442
2016	1,024,789,795	1.000	0.505	517,518,846
2017	952,977,809	1.000	0.579	551,774,151
2018	900,115,079	1.000	0.661	594,976,067
2019	821,858,316	0.999	0.772	633,840,146
2020	748,967,349	1.011	0.878	664,826,859

* See Appendix A-I for the derivation of the figures for Policy Years 2019 and 2020.

North Carolina - Assigned Risk

Impact of the Assigned Risk Adjustment Program*

Based on Assigned Risk Data for Policies with Effective Dates in 2021

Type of Risk	(1) Experience Modified Premium	(2) ARAP Premium	(3) ARAP Impact (2) / (1)
Risks with Credit Mods	$3,097,413	$3,097,413	1.000
Risks with Debit Mods	2,779,201	3,437,687	1.237
Risks with Mods of 1.00	11,515	11,515	1.000
Risks with No Mods	59,251,529	59,251,529	1.000
Totals	$65,139,658	$65,798,144	1.010

Historical Impacts of the Assigned Risk Adjustment Program

Policy Year	ARAP Impact
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
2020	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
2010				27,460	27,486	27,487	27,494	27,494	27,494
2011			29,964	29,962	29,960	29,962	29,949	29,949	29,949
2012		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	62,118
2014	58,723	58,063	57,964	57,800	57,768	57,770	57,770		57,770
2015	62,522	62,941	62,906	62,871	62,871	62,880			62,880
2016	59,840	59,795	60,339	60,101	60,075				60,075
2017	63,712	62,053	62,198	62,336					62,274
2018	63,020	62,127	61,941						61,693
2019	57,076	55,421							55,200
2020	53,198								52,240

Policy Year	1 / 2	2 / 3	3 / 4	4 / 5	5 / 6	6 / 7	7 / 8	8 / Ult
2010						1.000	1.000	
2011					1.000	1.000	1.000	
2012				0.999	1.000	1.000	1.000	
2013			0.988	0.999	0.999	1.000	1.000	
2014		0.998	0.997	0.999	1.000	1.000		
2015	1.007	0.999	0.999	1.000	1.000			
2016	0.999	1.009	0.996	1.000				
2017	0.974	1.002	1.002					
2018	0.986	0.997						
2019	0.971							
5-Yr Avg x H/L	0.986	1.000	0.997	0.999	1.000	1.000	1.000	0.000
Selected	0.986	1.000	0.997	0.999	1.000	1.000	1.000	1.000
Ultimate	0.982	0.996	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
2010				25,124	25,242	25,230	25,339	25,351	25,351	7.8%
2011			26,525	26,706	26,727	26,752	26,738	26,756	26,756	10.7%
2012		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	56,151	56,151	9.6%
2014	56,754	55,302	55,184	55,141	54,490	52,818	53,246		53,299	7.7%
2015	59,850	58,787	59,314	58,232	57,486	57,656			57,714	8.2%
2016	57,434	54,132	53,606	52,856	52,927				52,556	12.5%
2017	58,251	54,044	54,257	54,461					53,862	13.5%
2018	57,965	53,658	54,003						53,031	14.0%
2019	53,992	49,147							48,409	12.3%
2020	49,681								45,607	12.7%

Policy Year	1 / 2	2 / 3	3 / 4	4 / 5	5 / 6	6 / 7	7 / 8	8 / Ult
2010						1.004	1.000	
2011					1.001	0.999	1.001	
2012				1.001	1.001	0.998	0.997	
2013			0.993	1.000	0.974	0.991	1.009	
2014		0.998	0.999	0.988	0.969	1.008		
2015	0.982	1.009	0.982	0.987	1.003			
2016	0.943	0.990	0.986	1.001				
2017	0.928	1.004	1.004					
2018	0.926	1.006						
2019	0.910							
5-Yr Avg x H/L	0.932	1.003	0.993	0.996	0.992	1.000	1.001	
Selected	0.932	1.003	0.993	0.996	0.992	1.000	1.001	1.000
Ultimate	0.918	0.985	0.982	0.989	0.993	1.001	1.001	1.000

3-Yr Avg	13.0%
5-Yr Avg	13.0%
10-Yr Avg	11.0%
Selected	11.5%

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

North Carolina - Assigned Risk

Uncollectible Premium Provision

1. Selected Uncollectible Premium Provision	11.5%
2. Expense Components Calculated as a Percentage of Collected Premium	
A. Commission and Brokerage	5.0%
B. Servicing Carrier Allowance	22.36%
C. Total (A + B)	27.36%
3. Uncollectible Premium Provision Adjustment Factor (1.000 - 2C)	0.726
4. Adjusted Uncollectible Premium Provision (1 x 3)	8.3%

North Carolina - Assigned Risk

Factor to Convert Loss Costs to Assigned Risk Rates

For all classification codes, the proposed loss cost multiplier of 3.058 is applied to the advisory loss costs (contained in the Rate Bureau's Loss Costs Reference Filing proposed effective April 1, 2023) 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, 2023

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	4.65	1090	1.11	0.36	2041	3.79	918	0.89	0.36	2735	6.24	1408	1.48	0.36
0008	3.33	826	0.79	0.36	2065	3.36	832	0.77	0.33	2759	8.10	1500	1.92	0.36
0016	7.46	1500	1.58	0.29	2070	7.52	1500	1.72	0.33	2790	2.75	710	0.69	0.40
0034	5.29	1218	1.22	0.33	2081	5.57	1274	1.38	0.40	2797	6.42	1444	1.61	0.40
0035	3.24	808	0.75	0.33	2089	3.55	870	0.83	0.36	2799	9.11	1500	2.08	0.33
0036	5.47	1254	1.28	0.36	2095	5.17	1194	1.18	0.33	2802	6.61	1482	1.51	0.33
0037	5.38	1236	1.13	0.29	2105	5.63	1286	1.40	0.40	2835	3.73	906	0.92	0.40
0042	7.19	1500	1.65	0.33	2110	3.61	882	0.85	0.36	2836	4.13	986	1.02	0.40
0050	10.00	1500	2.10	0.29	2111	3.12	784	0.73	0.36	2841	5.32	1224	1.27	0.36
0059D	0.52	–	0.05	0.25	2112	6.27	1414	1.48	0.36	2881	4.37	1034	1.09	0.40
0065D	0.15	–	0.02	0.29	2114	3.46	852	0.86	0.40	2883	5.44	1248	1.29	0.36
0066D	0.15	–	0.02	0.33	2121	2.11	582	0.53	0.40	2915	4.04	968	0.85	0.29
0067D	0.15	–	0.02	0.33	2130	3.58	876	0.83	0.33	2916	5.50	1260	1.16	0.29
0079	3.70	900	0.85	0.33	2131	2.48	656	0.58	0.36	2923	2.39	638	0.59	0.40
0083	6.30	1420	1.45	0.33	2143	3.64	888	0.91	0.40	2960	6.42	1444	1.47	0.33
0106	20.46	1500	4.05	0.24	2157	5.05	1170	1.18	0.36	3004	2.17	594	0.43	0.25
0113	6.42	1444	1.52	0.36	2172	2.51	662	0.52	0.29	3018	4.31	1022	0.85	0.25
0170	3.52	864	0.82	0.36	2174	4.74	1108	1.13	0.36	3022	6.05	1370	1.43	0.36
0251	6.45	1450	1.48	0.33	2211	10.12	1500	2.13	0.29	3027	2.87	734	0.61	0.29
0401	12.81	A	2.54	0.24	2220	3.88	936	0.89	0.33	3028	4.37	1034	0.92	0.29
0771N	0.67	–	–	–	2286	–	–	0.89	0.33	3030	7.16	1500	1.50	0.29
0908P	260.00	420	59.78	0.33	2288	6.09	1378	1.44	0.36	3040	6.15	1390	1.41	0.33
0913P	719.00	879	164.80	0.33	2302	2.94	748	0.68	0.33	3041	4.98	1156	1.14	0.33
0917	6.09	1378	1.52	0.40	2305	3.55	870	0.75	0.29	3042	5.02	1164	1.15	0.33
1005	11.07	1500	2.03	0.24	2361	2.69	698	0.62	0.33	3064	4.80	1120	1.10	0.33
1164	5.41	1242	1.00	0.24	2362	4.10	980	0.97	0.36	3076	4.43	1046	1.04	0.36
1165XD	4.56	1072	0.83	0.24	2380	2.91	742	0.69	0.36	3081D	5.14	1188	1.16	0.33
1320	3.06	772	0.60	0.25	2386	–	–	0.82	0.36	3082D	5.35	1230	1.11	0.29
1322	14.31	1500	2.64	0.24	2388	1.96	552	0.49	0.40	3085D	7.40	1500	1.67	0.33
1430	7.95	1500	1.68	0.29	2402	3.79	918	0.80	0.29	3110	5.63	1286	1.29	0.33
1438	6.48	1456	1.35	0.29	2413	3.82	924	0.88	0.33	3111	3.85	930	0.91	0.36
1452	3.52	864	0.73	0.29	2416	3.98	956	0.94	0.36	3113	2.75	710	0.63	0.33
1463	13.15	1500	2.44	0.23	2417	2.54	668	0.60	0.36	3114	3.82	924	0.88	0.33
1472	3.94	948	0.83	0.29	2501	3.49	858	0.82	0.36	3118	2.48	656	0.62	0.40
1624D	5.01	1162	0.97	0.25	2503	1.74	508	0.41	0.36	3119	1.10	380	0.29	0.44
1642	3.64	888	0.76	0.29	2534	–	–	0.82	0.36	3122	3.18	796	0.79	0.40
1654	13.36	1500	2.77	0.29	2570	5.32	1224	1.26	0.36	3126	2.39	638	0.54	0.33
1655	–	–	0.76	0.29	2585	4.98	1156	1.14	0.33	3131	2.26	612	0.52	0.33
1699	3.73	906	0.78	0.29	2586	4.37	1034	1.04	0.36	3132	3.73	906	0.88	0.36
1701	3.94	948	0.78	0.25	2587	3.91	942	0.92	0.36	3145	2.69	698	0.62	0.33
1710	7.43	1500	1.56	0.29	2589	3.15	790	0.73	0.33	3146	2.78	716	0.64	0.33
1741	–	–	0.78	0.25	2600	6.76	1500	1.58	0.36	3169	3.82	924	0.90	0.36
1747	3.39	838	0.70	0.29	2623	8.65	1500	1.82	0.29	3175	–	–	0.90	0.36
1748	6.70	1500	1.42	0.29	2651	2.20	600	0.52	0.36	3179	2.39	638	0.56	0.36
1803D	11.07	1500	2.13	0.29	2660	3.46	852	0.86	0.40	3180	2.81	722	0.66	0.36
1853	–	–	0.78	0.25	2670	–	–	0.80	0.36	3188	2.32	624	0.53	0.33
1860	–	–	0.79	0.29	2683	–	–	0.82	0.36	3220	3.49	858	0.80	0.33
1924	4.56	1072	1.07	0.36	2688	3.39	838	0.80	0.36	3223	–	–	0.66	0.36
1925	5.87	1334	1.35	0.33	2702	36.24	1500	6.73	0.23	3224	4.98	1156	1.23	0.40
2002	4.86	1132	1.14	0.36	2705X*	90.06	1500	17.70	0.25	3227	4.53	1066	1.06	0.36
2003	4.31	1022	0.99	0.33	2709	11.62	1500	2.28	0.25	3240	–	–	0.95	0.36
2014	7.28	1500	1.53	0.29	2710	11.96	1500	2.51	0.29	3241	4.13	986	0.97	0.36
2016	3.49	858	0.82	0.36	2714	5.44	1248	1.30	0.36	3255	3.67	894	0.92	0.40
2021	4.71	1102	1.08	0.33	2727X	15.14	1500	2.99	0.25	3257	4.01	962	0.95	0.36
2039	3.98	956	0.94	0.36	2731	6.02	1364	1.42	0.36	3270	3.27	814	0.78	0.36

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3300	6.27	1414	1.57	0.40	4101	3.42	844	0.78	0.33	4703	2.08	576	0.47	0.33
3303	3.39	838	0.80	0.36	4109	0.67	294	0.16	0.36	4717	2.91	742	0.73	0.40
3307	4.04	968	0.93	0.33	4110	1.16	392	0.28	0.36	4720	2.45	650	0.56	0.33
3315	4.71	1102	1.11	0.36	4111	2.78	716	0.65	0.36	4740	1.68	496	0.31	0.23
3334	5.08	1176	1.15	0.33	4113	–	–	0.65	0.36	4741	4.19	998	0.95	0.33
3336	3.27	814	0.75	0.33	4114	4.37	1034	1.00	0.33	4751	4.83	1126	1.02	0.29
3365	8.96	1500	1.75	0.25	4130	4.65	1090	1.10	0.36	4771N	3.76	1046	0.74	0.25
3372	4.16	992	0.95	0.33	4131	10.64	1500	2.53	0.36	4777	4.01	962	0.80	0.24
3373	5.63	1286	1.32	0.36	4133	3.24	808	0.81	0.40	4825	1.19	398	0.25	0.29
3383	2.02	564	0.47	0.36	4149	1.10	380	0.27	0.40	4828	2.75	710	0.54	0.25
3385	1.44	448	0.34	0.36	4206	3.73	906	0.87	0.36	4829	2.17	594	0.43	0.25
3400	3.85	930	0.91	0.36	4207	3.18	796	0.62	0.25	4902	2.91	742	0.69	0.36
3507	3.06	772	0.70	0.33	4239	3.49	858	0.68	0.25	4923	1.28	416	0.29	0.33
3515	2.57	674	0.59	0.33	4240	4.25	1010	1.07	0.40	5020	8.96	1500	1.76	0.25
3548	2.20	600	0.52	0.36	4243	2.78	716	0.64	0.33	5022	11.07	1500	2.06	0.23
3559	3.27	814	0.75	0.33	4244	3.21	802	0.67	0.29	5037	16.15	1500	2.98	0.24
3574	1.65	490	0.39	0.36	4250	2.60	680	0.60	0.33	5040	12.69	1500	2.35	0.23
3581	1.80	520	0.43	0.36	4251	4.46	1052	1.05	0.36	5057	7.98	1500	1.49	0.23
3612	2.51	662	0.57	0.33	4263	4.43	1046	1.01	0.33	5059	28.99	1500	5.40	0.23
3620	4.56	1072	0.96	0.29	4273	3.82	924	0.88	0.33	5069	–	–	5.40	0.23
3629	2.26	612	0.52	0.33	4279	3.79	918	0.79	0.29	5102	9.05	1500	1.78	0.25
3632	3.21	802	0.74	0.33	4282	–	–	0.79	0.29	5146	6.91	1500	1.44	0.29
3634	2.11	582	0.48	0.33	4283	2.81	722	0.66	0.36	5160	3.82	924	0.71	0.23
3635	2.20	600	0.51	0.33	4299	2.54	668	0.58	0.33	5183	5.20	1200	1.02	0.25
3638	2.69	698	0.63	0.36	4304	6.64	1488	1.52	0.33	5188	5.44	1248	1.07	0.25
3642	2.23	606	0.53	0.36	4307	2.23	606	0.56	0.40	5190	5.41	1242	1.06	0.25
3643	2.69	698	0.56	0.29	4351	2.48	656	0.58	0.36	5191	1.44	448	0.30	0.29
3647	3.52	864	0.80	0.33	4352	2.23	606	0.53	0.36	5192	3.94	948	0.90	0.33
3648	1.90	540	0.48	0.40	4360	–	–	0.17	0.29	5213	10.37	1500	1.93	0.23
3681	1.16	392	0.28	0.36	4361	1.35	430	0.32	0.36	5215	8.50	1500	1.78	0.29
3685	1.35	430	0.31	0.36	4410	4.28	1016	1.01	0.36	5221	6.33	1426	1.25	0.25
3719	1.41	442	0.26	0.24	4420	5.84	1328	1.14	0.25	5222	11.35	1500	2.10	0.23
3724	6.09	1378	1.13	0.23	4431	2.05	570	0.51	0.40	5223	7.71	1500	1.62	0.29
3726	7.00	1500	1.30	0.23	4432	1.44	448	0.36	0.40	5348	6.33	1426	1.32	0.29
3803	3.27	814	0.77	0.36	4439	–	–	0.62	0.33	5402	9.85	1500	2.32	0.36
3807	2.60	680	0.61	0.36	4452	3.49	858	0.80	0.33	5403	8.90	1500	1.75	0.25
3808	7.86	1500	1.79	0.33	4459	3.98	956	0.84	0.29	5437	8.75	1500	1.72	0.25
3821	8.04	1500	1.69	0.29	4470	3.18	796	0.73	0.33	5443	6.18	1396	1.42	0.33
3822X	5.50	1260	1.30	0.36	4484	3.55	870	0.84	0.36	5445	14.49	1500	2.70	0.23
3824X	5.87	1334	1.39	0.36	4493	3.42	844	0.78	0.33	5462	8.99	1500	1.88	0.29
3826	1.01	362	0.23	0.33	4511	0.64	288	0.15	0.33	5472	12.66	1500	2.36	0.23
3827	2.35	630	0.55	0.36	4557	3.67	894	0.77	0.29	5473	17.12	1500	3.18	0.23
3830	2.11	582	0.48	0.33	4558	2.72	704	0.62	0.33	5474	10.86	1500	2.03	0.23
3851	2.87	734	0.68	0.36	4568	3.15	790	0.66	0.29	5478	5.72	1304	1.12	0.25
3865	4.01	962	1.00	0.40	4581	1.47	454	0.29	0.24	5479	9.27	1500	1.94	0.29
3881	4.86	1132	1.11	0.33	4583	7.52	1500	1.50	0.24	5480	10.12	1500	1.98	0.25
4000	7.74	1500	1.52	0.25	4611	1.38	436	0.32	0.36	5491	3.24	808	0.64	0.25
4021	5.63	1286	1.29	0.33	4635	4.71	1102	0.93	0.25	5506	8.47	1500	1.66	0.25
4024D	5.44	1248	1.13	0.29	4653	3.21	802	0.76	0.36	5507	5.93	1346	1.17	0.25
4034	9.05	1500	1.89	0.29	4665	10.09	1500	2.11	0.29	5508	–	–	1.17	0.25
4036	3.36	832	0.70	0.29	4670	–	–	0.98	0.33	5535	11.71	1500	2.18	0.23
4038	3.85	930	0.95	0.40	4683	4.28	1016	0.98	0.33	5537	7.00	1500	1.46	0.29
4053	–	–	0.88	0.33	4686	2.45	650	0.51	0.29	5551	26.94	1500	5.03	0.23
4061	–	–	0.88	0.33	4692	1.10	380	0.26	0.36	5606	1.62	484	0.30	0.23
4062	3.85	930	0.88	0.33	4693	1.31	422	0.31	0.36	5610	8.50	1500	1.79	0.29

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5645	25.14	1500	4.69	0.23	7152M	12.45	1500	2.37	0.24	8002	3.00	760	0.71	0.36
5703	22.84	1500	4.80	0.29	7153M	8.62	1500	1.71	0.24	8006	3.61	882	0.90	0.40
5705	34.86	1500	7.35	0.29	7219	13.88	1500	2.71	0.25	8008	1.99	558	0.50	0.40
5951	0.67	294	0.16	0.36	7222X	13.64	1500	2.66	0.25	8010	2.63	686	0.62	0.36
6003	9.17	1500	1.80	0.25	7225	14.68	1500	3.05	0.29	8013	0.52	264	0.12	0.33
6005	9.94	1500	2.08	0.29	7228	–	–	2.71	0.25	8015	1.13	386	0.26	0.33
6017	–	–	1.93	0.23	7229	–	–	2.71	0.25	8017	2.17	594	0.55	0.40
6018	4.83	1126	1.00	0.29	7230X	14.13	1500	3.21	0.33	8018	4.59	1078	1.08	0.36
6045	8.35	1500	1.74	0.29	7231	15.11	1500	3.43	0.33	8021	3.55	870	0.84	0.36
6204	11.38	1500	2.23	0.25	7232X	20.21	1500	3.92	0.25	8031	3.12	784	0.74	0.36
6206	4.34	1028	0.80	0.24	7309F	16.48	1500	2.67	0.21	8032	2.75	710	0.65	0.36
6213	3.24	808	0.60	0.24	7313F	7.34	1500	1.19	0.21	8033	2.72	704	0.68	0.40
6214	2.54	668	0.50	0.25	7317F	14.74	1500	2.39	0.21	8037	2.17	594	0.56	0.44
6216	8.93	1500	1.65	0.24	7327F	31.68	1500	5.13	0.21	8039	2.54	668	0.64	0.40
6217	7.19	1500	1.34	0.23	7333M	5.08	1176	0.93	0.24	8044	4.25	1010	1.00	0.36
6229	7.80	1500	1.63	0.29	7335M	5.63	1286	1.03	0.24	8045	1.16	392	0.27	0.36
6233	3.18	796	0.58	0.24	7337M	8.10	1500	1.42	0.24	8046	3.79	918	0.90	0.36
6235	8.99	1500	1.66	0.24	7350F	19.75	1500	3.35	0.23	8047	1.28	416	0.30	0.36
6236	9.79	1500	2.04	0.29	7360	6.88	1500	1.44	0.29	8058	3.79	918	0.90	0.36
6237	2.45	650	0.48	0.25	7370	7.49	1500	1.76	0.36	8072	1.10	380	0.28	0.40
6251D	6.73	1500	1.31	0.25	7380	9.08	1500	1.89	0.29	8102	2.69	698	0.64	0.36
6252D	5.05	1170	0.92	0.24	7382	7.86	1500	1.79	0.33	8103	4.25	1010	0.98	0.33
6306	7.03	1500	1.39	0.25	7390	6.42	1444	1.51	0.36	8106	5.84	1328	1.23	0.29
6319	5.53	1266	1.03	0.23	7394M	5.05	1170	0.93	0.24	8107	4.25	1010	0.83	0.25
6325	5.53	1266	1.03	0.23	7395M	5.60	1280	1.03	0.24	8111	2.97	754	0.68	0.33
6400	7.28	1500	1.52	0.29	7398M	8.07	1500	1.42	0.24	8116	3.18	796	0.73	0.33
6503	3.58	876	0.84	0.36	7402	0.21	202	0.05	0.36	8203	10.58	1500	2.41	0.33
6504	4.53	1066	1.07	0.36	7403	7.22	1500	1.69	0.36	8204	6.88	1500	1.59	0.33
6702M*	7.28	1500	1.51	0.29	7405N	2.63	864	0.61	0.36	8209	4.95	1150	1.17	0.36
6703M*	11.65	1500	2.33	0.29	7420	11.41	1500	2.08	0.24	8215	5.32	1224	1.12	0.29
6704M*	8.10	1500	1.69	0.29	7421	1.28	416	0.27	0.29	8227	5.66	1292	1.11	0.25
6801F	9.85	1500	1.74	0.28	7422	2.20	600	0.43	0.25	8232	7.65	1500	1.60	0.29
6811	8.78	1500	1.85	0.29	7425	3.39	838	0.65	0.25	8233	4.34	1028	0.90	0.29
6824F	13.27	1500	2.34	0.28	7431N	2.14	728	0.42	0.25	8235	6.30	1420	1.44	0.33
6826F	7.31	1500	1.29	0.28	7445N	0.89	–	–	–	8236X	7.40	1500	1.46	0.25
6834	4.40	1040	1.04	0.36	7453N	0.70	–	–	–	8263	9.60	1500	2.21	0.33
6836	5.60	1280	1.29	0.33	7502	3.03	766	0.63	0.29	8264	6.36	1432	1.33	0.29
6843F	16.91	1500	2.74	0.21	7515	1.62	484	0.30	0.23	8265	8.29	1500	1.63	0.25
6845F	11.96	1500	1.94	0.21	7520	4.28	1016	0.98	0.33	8279	8.78	1500	1.74	0.24
6854	8.38	1500	1.65	0.25	7529X	17.64	1500	3.25	0.24	8288	9.85	1500	2.28	0.33
6872F	16.33	1500	2.65	0.21	7538	6.09	1378	1.13	0.23	8291X	5.41	1242	1.24	0.33
6874F	30.52	1500	4.94	0.21	7539	2.63	686	0.51	0.25	8292X	5.14	1188	1.21	0.36
6882	5.20	1200	1.03	0.25	7540	6.02	1364	1.12	0.23	8293X	11.41	1500	2.68	0.36
6884	5.66	1292	1.10	0.25	7580	4.53	1066	0.95	0.29	8304	7.95	1500	1.56	0.25
7016M	6.48	1456	1.20	0.24	7590	5.72	1304	1.20	0.29	8350	12.54	1500	2.47	0.25
7024M	7.22	1500	1.33	0.24	7600	9.14	1500	1.90	0.29	8380	3.24	808	0.74	0.33
7038M	9.39	1500	1.78	0.23	7605	4.16	992	0.82	0.25	8381	2.87	734	0.66	0.33
7046M	9.63	1500	1.79	0.23	7610	0.83	326	0.17	0.29	8385	3.94	948	0.90	0.33
7047M	10.40	1500	1.84	0.24	7705	7.65	1500	1.75	0.33	8392	3.24	808	0.82	0.40
7050M	15.01	1500	2.73	0.23	7710	5.99	1358	1.18	0.25	8393	2.60	680	0.54	0.29
7090M	10.43	1500	1.98	0.23	7711	5.99	1358	1.18	0.25	8500	9.30	1500	1.95	0.29
7098M	10.70	1500	1.99	0.23	7720X	4.80	1120	1.01	0.29	8601	0.46	252	0.09	0.25
7099M	15.41	1500	2.75	0.23	7723X	3.24	808	0.64	0.25	8602	1.93	546	0.40	0.29
7133	6.39	1438	1.27	0.24	7855	5.99	1358	1.25	0.29	8603	0.12	184	0.03	0.36
7151M	7.77	1500	1.55	0.24	8001	3.91	942	0.93	0.36	8606	2.63	686	0.52	0.25

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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
8709F	7.98	1500	1.29	0.21	9083	1.71	502	0.44	0.44					
8719	3.12	784	0.61	0.25	9084	1.87	534	0.47	0.40					
8720	1.74	508	0.34	0.25	9089	1.38	436	0.35	0.40					
8721	0.55	270	0.12	0.29	9093	1.77	514	0.44	0.40					
8723	0.21	202	0.05	0.33	9101	4.71	1102	1.18	0.40					
8725	3.24	808	0.68	0.29	9102	4.77	1114	1.10	0.33					
8726F	4.19	998	0.74	0.28	9154	2.35	630	0.56	0.36					
8734M	0.58	276	0.12	0.29	9156	3.00	760	0.74	0.40					
8737M	0.52	264	0.11	0.29	9170	13.18	1500	2.60	0.25					
8738M	0.83	326	0.17	0.29	9178	9.11	1500	2.42	0.44					
8742	0.43	246	0.09	0.29	9179	27.49	1500	7.09	0.44					
8745	5.50	1260	1.27	0.33	9180	7.34	1500	1.70	0.33					
8748	0.95	350	0.18	0.25	9182	3.18	796	0.76	0.36					
8755	0.52	264	0.11	0.29	9186	17.06	1500	3.39	0.24					
8799	0.73	306	0.17	0.36	9220	8.10	1500	1.86	0.33					
8800	2.26	612	0.53	0.36	9402	8.62	1500	1.69	0.25					
8803	0.09	178	0.02	0.29	9403	11.93	1500	2.34	0.25					
8805M	0.24	208	0.06	0.36	9410	4.25	1010	1.00	0.36					
8810	0.18	196	0.04	0.36	9501	4.22	1004	0.89	0.29					
8814M	0.21	202	0.05	0.36	9505	5.69	1298	1.30	0.33					
8815M	0.37	234	0.07	0.36	9516	3.82	924	0.87	0.33					
8820	0.18	196	0.04	0.29	9519	6.51	1462	1.36	0.29					
8824	3.36	832	0.87	0.44	9521	4.92	1144	1.03	0.29					
8825	–	–	0.71	0.40	9522	2.75	710	0.68	0.40					
8826	2.81	722	0.71	0.40	9534	8.23	1500	1.52	0.23					
8831	1.77	514	0.46	0.44	9554	14.10	1500	2.79	0.25					
8832	0.49	258	0.11	0.36	9586	0.67	294	0.17	0.40					
8833	1.53	466	0.36	0.36	9600	3.42	844	0.80	0.36					
8835	3.18	796	0.75	0.36	9620	2.17	594	0.46	0.29					
8842X	3.39	838	0.88	0.44										
8848	–	–	0.87	0.44										
8849	–	–	0.87	0.44										
8855	0.18	196	0.04	0.36										
8856	0.95	350	0.22	0.36										
8864X	1.71	502	0.43	0.40										
8868	0.73	306	0.18	0.40										
8869	1.56	472	0.39	0.40										
8871	0.12	184	0.03	0.36										
8901	0.31	222	0.07	0.29										
9012	1.35	430	0.28	0.29										
9014	4.46	1052	1.05	0.36										
9015	3.94	948	0.91	0.33										
9016	3.15	790	0.75	0.36										
9019	4.65	1090	0.98	0.29										
9033	2.94	748	0.67	0.33										
9040	4.50	1060	1.12	0.40										
9044	1.68	496	0.42	0.40										
9052	2.32	624	0.58	0.40										
9058	2.17	594	0.56	0.44										
9060	1.96	552	0.49	0.40										
9061	1.62	484	0.40	0.40										
9062	1.80	520	0.45	0.40										
9063	1.16	392	0.29	0.40										
9077F	7.40	1500	1.41	0.35										
9082	1.74	508	0.45	0.44										

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

Effective April 1, 2023
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	0.52	S	1624D	0.03	S	4024D	0.06	S
0065D	0.15	S	1803D	0.92	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	0.03	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, 2023
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	$83,900
Leased or rented vehicle	$55,900

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" $2,200

Minimum Premium Multiplier 200

Minimum Weekly Payroll applicable in accordance with ***Basic Manual*** Rule 2-E-1 -- "Executive Officers" $1,100

Premium Determination for Partners and Sole Proprietors in accordance with ***Basic Manual*** Rule 2-E-3 (Annual Payroll) $55,900

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%	0.4%	0.3%	0.2%	0.1%
$200	1.8%	1.5%	1.1%	0.9%	0.6%	0.4%	0.3%
$300	2.5%	2.0%	1.5%	1.2%	0.8%	0.6%	0.4%
$400	3.1%	2.5%	1.9%	1.5%	1.0%	0.7%	0.5%
$500	3.7%	3.0%	2.2%	1.8%	1.2%	0.9%	0.7%
$1,000	5.9%	4.7%	3.6%	3.0%	2.1%	1.5%	1.2%
$1,500	7.5%	6.0%	4.7%	3.9%	2.8%	2.0%	1.6%
$2,000	8.7%	7.1%	5.5%	4.7%	3.4%	2.5%	2.0%
$2,500	9.9%	8.0%	6.3%	5.3%	4.0%	2.9%	2.4%
$5,000	14.1%	11.7%	9.5%	8.2%	6.3%	4.9%	4.0%

Terrorism - (Assigned Risk) $0.01

Effective April 1, 2023
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 (1.051).)

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 $12,500. If more than two years, an average annual premium of at least $6,250 is required. These amounts are applicable for ratings effective April 1, 2023, and subsequent. The ***Experience Rating Plan Manual*** should be referenced for the latest approved eligibility amounts by state.

TABLE OF WEIGHTING VALUES
APPLICABLE TO ALL POLICIES
Experience Rating Program - ERA

Expected Losses			Weighting Values	Expected Losses			Weighting Values
0	--	2,554	0.04	1,440,686	--	1,520,153	0.44
2,555	--	10,328	0.05	1,520,154	--	1,604,222	0.45
10,329	--	18,267	0.06	1,604,223	--	1,693,304	0.46
18,268	--	26,378	0.07	1,693,305	--	1,787,862	0.47
26,379	--	34,666	0.08	1,787,863	--	1,888,419	0.48
34,667	--	57,982	0.09	1,888,420	--	1,995,564	0.49
57,983	--	86,309	0.10	1,995,565	--	2,109,969	0.50
86,310	--	111,506	0.11	2,109,970	--	2,232,397	0.51
111,507	--	136,039	0.12	2,232,398	--	2,363,724	0.52
136,040	--	160,575	0.13	2,363,725	--	2,504,958	0.53
160,576	--	185,414	0.14	2,504,959	--	2,657,265	0.54
185,415	--	210,723	0.15	2,657,266	--	2,822,001	0.55
210,724	--	236,616	0.16	2,822,002	--	3,000,752	0.56
236,617	--	263,180	0.17	3,000,753	--	3,195,389	0.57
263,181	--	290,487	0.18	3,195,390	--	3,408,126	0.58
290,488	--	318,601	0.19	3,408,127	--	3,641,615	0.59
318,602	--	347,582	0.20	3,641,616	--	3,899,047	0.60
347,583	--	377,490	0.21	3,899,048	--	4,184,305	0.61
377,491	--	408,386	0.22	4,184,306	--	4,502,161	0.62
408,387	--	440,331	0.23	4,502,162	--	4,858,540	0.63
440,332	--	473,388	0.24	4,858,541	--	5,260,899	0.64
473,389	--	507,625	0.25	5,260,900	--	5,718,752	0.65
507,626	--	543,114	0.26	5,718,753	--	6,244,430	0.66
543,115	--	579,929	0.27	6,244,431	--	6,854,213	0.67
579,930	--	618,151	0.28	6,854,214	--	7,570,040	0.68
618,152	--	657,866	0.29	7,570,041	--	8,422,210	0.69
657,867	--	699,168	0.30	8,422,211	--	9,453,780	0.70
699,169	--	742,157	0.31	9,453,781	--	10,728,066	0.71
742,158	--	786,941	0.32	10,728,067	--	12,342,156	0.72
786,942	--	833,638	0.33	12,342,157	--	14,452,883	0.73
833,639	--	882,375	0.34	14,452,884	--	17,331,140	0.74
882,376	--	933,291	0.35	17,331,141	--	21,488,613	0.75
933,292	--	986,537	0.36	21,488,614	--	28,021,774	0.76
986,538	--	1,042,280	0.37	28,021,775	--	39,781,450	0.77
1,042,281	--	1,100,699	0.38	39,781,451	--	67,220,671	0.78
1,100,700	--	1,161,995	0.39	67,220,672	--	204,416,711	0.79
1,161,996	--	1,226,386	0.40	204,416,712		AND OVER	0.80
1,226,387	--	1,294,115	0.41				
1,294,116	--	1,365,449	0.42				
1,365,450	--	1,440,685	0.43				

(a) G	12.20
(b) State Per Claim Accident Limitation	$305,500
(c) State Multiple Claim Accident Limitation	$611,000
(d) USL&HW Per Claim Accident Limitation	$574,500
(e) USL&HW Multiple Claim Accident Limitation	$1,149,000
(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, 2023

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	--	65,621	30,500	2,105,732	--	2,166,697	244,000	4,240,114	--	4,301,104	457,500
65,622	--	112,941	36,600	2,166,698	--	2,227,664	250,100	4,301,105	--	4,362,095	463,600
112,942	--	167,311	42,700	2,227,665	--	2,288,633	256,200	4,362,096	--	4,423,087	469,700
167,312	--	224,668	48,800	2,288,634	--	2,349,604	262,300	4,423,088	--	4,484,079	475,800
224,669	--	283,421	54,900	2,349,605	--	2,410,576	268,400	4,484,080	--	4,545,072	481,900
283,422	--	342,911	61,000	2,410,577	--	2,471,550	274,500	4,545,073	--	4,606,064	488,000
342,912	--	402,831	67,100	2,471,551	--	2,532,525	280,600	4,606,065	--	4,667,057	494,100
402,832	--	463,023	73,200	2,532,526	--	2,593,501	286,700	4,667,058	--	4,728,049	500,200
463,024	--	523,396	79,300	2,593,502	--	2,654,478	292,800	4,728,050	--	4,789,042	506,300
523,397	--	583,896	85,400	2,654,479	--	2,715,456	298,900	4,789,043	--	4,850,036	512,400
583,897	--	644,488	91,500	2,715,457	--	2,776,435	305,000	4,850,037	--	4,911,029	518,500
644,489	--	705,149	97,600	2,776,436	--	2,837,415	311,100	4,911,030	--	4,972,022	524,600
705,150	--	765,863	103,700	2,837,416	--	2,898,396	317,200	4,972,023	--	5,033,016	530,700
765,864	--	826,618	109,800	2,898,397	--	2,959,377	323,300	5,033,017	--	5,094,010	536,800
826,619	--	887,407	115,900	2,959,378	--	3,020,359	329,400	5,094,011	--	5,155,004	542,900
887,408	--	948,222	122,000	3,020,360	--	3,081,342	335,500	5,155,005	--	5,215,998	549,000
948,223	--	1,009,059	128,100	3,081,343	--	3,142,326	341,600	5,215,999	--	5,276,992	555,100
1,009,060	--	1,069,915	134,200	3,142,327	--	3,203,310	347,700	5,276,993	--	5,337,987	561,200
1,069,916	--	1,130,786	140,300	3,203,311	--	3,264,295	353,800	5,337,988	--	5,398,981	567,300
1,130,787	--	1,191,670	146,400	3,264,296	--	3,325,281	359,900	5,398,982	--	5,459,976	573,400
1,191,671	--	1,252,565	152,500	3,325,282	--	3,386,267	366,000	5,459,977	--	5,520,971	579,500
1,252,566	--	1,313,470	158,600	3,386,268	--	3,447,253	372,100	5,520,972	--	5,581,965	585,600
1,313,471	--	1,374,383	164,700	3,447,254	--	3,508,240	378,200	5,581,966	--	5,642,960	591,700
1,374,384	--	1,435,304	170,800	3,508,241	--	3,569,228	384,300	5,642,961	--	5,703,955	597,800
1,435,305	--	1,496,230	176,900	3,569,229	--	3,630,215	390,400	5,703,956	--	5,764,951	603,900
1,496,231	--	1,557,163	183,000	3,630,216	--	3,691,204	396,500	5,764,952	--	5,825,500	610,000
1,557,164	--	1,618,101	189,100	3,691,205	--	3,752,192	402,600				
1,618,102	--	1,679,043	195,200	3,752,193	--	3,813,181	408,700				
1,679,044	--	1,739,989	201,300	3,813,182	--	3,874,170	414,800				
1,739,990	--	1,800,939	207,400	3,874,171	--	3,935,160	420,900				
1,800,940	--	1,861,892	213,500	3,935,161	--	3,996,150	427,000				
1,861,893	--	1,922,848	219,600	3,996,151	--	4,057,140	433,100				
1,922,849	--	1,983,807	225,700	4,057,141	--	4,118,131	439,200				
1,983,808	--	2,044,768	231,800	4,118,132	--	4,179,121	445,300				
2,044,769	--	2,105,731	237,900	4,179,122	--	4,240,113	451,400				

For Expected Losses greater than $5,825,500, the Ballast Value can be calculated using the following formula (rounded to the nearest 1):

Ballast = (0.10)(Expected Losses) + 2500(Expected Losses)(12.20) / (Expected Losses + (700)(12.20))

G = 12.20

NORTH CAROLINA

APPENDIX E

Assigned Risk Rates Comparison

Class Code	Current 04/01/22	Proposed 04/01/23	Percent Change
0005	4.75	4.65	-2.1%
0008	3.23	3.33	3.1%
0016	9.01	7.46	-17.2%
0034	5.19	5.29	1.9%
0035	3.34	3.24	-3.0%
0036	5.40	5.47	1.3%
0037	5.49	5.38	-2.0%
0042	7.28	7.19	-1.2%
0050	9.62	10.00	4.0%
0059	0.53	0.52	-1.9%
0065	0.15	0.15	0.0%
0066	0.15	0.15	0.0%
0067	0.15	0.15	0.0%
0079	3.81	3.70	-2.9%
0083	6.31	6.30	-0.2%
0106	22.65	20.46	-9.7%
0113	6.66	6.42	-3.6%
0170	3.52	3.52	0.0%
0251	6.31	6.45	2.2%
0401	13.44	12.81	-4.7%
0771	0.62	0.67	8.1%
0908	267.00	260.00	-2.6%
0913	763.00	719.00	-5.8%
0917	5.96	6.09	2.2%
1005	12.41	11.07	-10.8%
1164	5.75	5.41	-5.9%
1165	4.58	4.56	-0.4%
1320	3.02	3.06	1.3%
1322	13.94	14.31	2.7%
1430	7.36	7.95	8.0%
1438	7.16	6.48	-9.5%
1452	3.55	3.52	-0.8%
1463	13.67	13.15	-3.8%
1472	3.84	3.94	2.6%
1624	5.28	5.01	-5.1%
1642	3.49	3.64	4.3%
1654	14.61	13.36	-8.6%
1699	3.55	3.73	5.1%
1701	4.17	3.94	-5.5%
1710	8.45	7.43	-12.1%
1747	2.90	3.39	16.9%
1748	6.69	6.70	0.1%
1803	11.18	11.07	-1.0%
1924	4.22	4.56	8.1%

NORTH CAROLINA

APPENDIX E

Assigned Risk Rates Comparison

Class Code	Current 04/01/22	Proposed 04/01/23	Percent Change
1925	6.04	5.87	-2.8%
2002	4.55	4.86	6.8%
2003	4.05	4.31	6.4%
2014	7.66	7.28	-5.0%
2016	3.58	3.49	-2.5%
2021	4.52	4.71	4.2%
2039	3.55	3.98	12.1%
2041	3.73	3.79	1.6%
2065	3.34	3.36	0.6%
2070	7.98	7.52	-5.8%
2081	5.13	5.57	8.6%
2089	3.55	3.55	0.0%
2095	5.34	5.17	-3.2%
2105	5.66	5.63	-0.5%
2110	3.08	3.61	17.2%
2111	3.23	3.12	-3.4%
2112	5.90	6.27	6.3%
2114	3.58	3.46	-3.4%
2121	2.14	2.11	-1.4%
2130	3.23	3.58	10.8%
2131	2.55	2.48	-2.7%
2143	3.90	3.64	-6.7%
2157	5.19	5.05	-2.7%
2172	2.44	2.51	2.9%
2174	4.52	4.74	4.9%
2211	10.42	10.12	-2.9%
2220	3.73	3.88	4.0%
2288	5.69	6.09	7.0%
2302	2.76	2.94	6.5%
2305	3.58	3.55	-0.8%
2361	2.49	2.69	8.0%
2362	3.78	4.10	8.5%
2380	2.82	2.91	3.2%
2388	2.14	1.96	-8.4%
2402	4.17	3.79	-9.1%
2413	3.90	3.82	-2.1%
2416	3.49	3.98	14.0%
2417	2.44	2.54	4.1%
2501	3.26	3.49	7.1%
2503	1.73	1.74	0.6%
2570	5.78	5.32	-8.0%
2585	4.93	4.98	1.0%
2586	4.25	4.37	2.8%
2587	3.49	3.91	12.0%

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Assigned Risk Rates Comparison

Class Code	Current 04/01/22	Proposed 04/01/23	Percent Change
2589	3.34	3.15	-5.7%
2600	6.60	6.76	2.4%
2623	8.71	8.65	-0.7%
2651	2.44	2.20	-9.8%
2660	3.49	3.46	-0.9%
2688	3.55	3.39	-4.5%
2702	34.89	36.24	3.9%
2705	92.30	90.06	-2.4%
2709	12.21	11.62	-4.8%
2710	12.26	11.96	-2.4%
2714	5.22	5.44	4.2%
2727	15.17	15.14	-0.2%
2731	5.87	6.02	2.6%
2735	6.07	6.24	2.8%
2759	7.78	8.10	4.1%
2790	2.73	2.75	0.7%
2797	7.07	6.42	-9.2%
2799	8.98	9.11	1.4%
2802	7.19	6.61	-8.1%
2835	3.46	3.73	7.8%
2836	4.17	4.13	-1.0%
2841	5.96	5.32	-10.7%
2881	4.31	4.37	1.4%
2883	5.43	5.44	0.2%
2915	4.40	4.04	-8.2%
2916	5.84	5.50	-5.8%
2923	2.46	2.39	-2.8%
2960	6.40	6.42	0.3%
3004	2.08	2.17	4.3%
3018	4.37	4.31	-1.4%
3022	5.87	6.05	3.1%
3027	2.90	2.87	-1.0%
3028	4.11	4.37	6.3%
3030	7.54	7.16	-5.0%
3040	6.66	6.15	-7.7%
3041	4.96	4.98	0.4%
3042	5.43	5.02	-7.6%
3064	5.08	4.80	-5.5%
3076	4.75	4.43	-6.7%
3081	5.43	5.14	-5.3%
3082	5.61	5.35	-4.6%
3085	7.49	7.40	-1.2%
3110	5.78	5.63	-2.6%
3111	3.90	3.85	-1.3%

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Assigned Risk Rates Comparison

Class Code	Current 04/01/22	Proposed 04/01/23	Percent Change
3113	2.76	2.75	-0.4%
3114	4.02	3.82	-5.0%
3118	2.58	2.48	-3.9%
3119	1.17	1.10	-6.0%
3122	3.17	3.18	0.3%
3126	2.29	2.39	4.4%
3131	2.44	2.26	-7.4%
3132	3.90	3.73	-4.4%
3145	2.76	2.69	-2.5%
3146	2.76	2.78	0.7%
3169	4.14	3.82	-7.7%
3179	2.41	2.39	-0.8%
3180	2.67	2.81	5.2%
3188	2.41	2.32	-3.7%
3220	3.49	3.49	0.0%
3224	4.87	4.98	2.3%
3227	4.14	4.53	9.4%
3241	4.46	4.13	-7.4%
3255	3.52	3.67	4.3%
3257	4.05	4.01	-1.0%
3270	3.46	3.27	-5.5%
3300	6.01	6.27	4.3%
3303	3.11	3.39	9.0%
3307	4.28	4.04	-5.6%
3315	4.64	4.71	1.5%
3334	4.90	5.08	3.7%
3336	3.26	3.27	0.3%
3365	8.13	8.96	10.2%
3372	4.40	4.16	-5.5%
3373	5.19	5.63	8.5%
3383	2.05	2.02	-1.5%
3385	1.35	1.44	6.7%
3400	4.37	3.85	-11.9%
3507	3.05	3.06	0.3%
3515	2.82	2.57	-8.9%
3548	1.94	2.20	13.4%
3559	3.37	3.27	-3.0%
3574	1.61	1.65	2.5%
3581	1.85	1.80	-2.7%
3612	2.49	2.51	0.8%
3620	5.02	4.56	-9.2%
3629	2.17	2.26	4.1%
3632	3.23	3.21	-0.6%
3634	2.02	2.11	4.5%

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Assigned Risk Rates Comparison

Class Code	Current 04/01/22	Proposed 04/01/23	Percent Change
3635	2.44	2.20	-9.8%
3638	2.58	2.69	4.3%
3642	2.08	2.23	7.2%
3643	2.46	2.69	9.3%
3647	3.52	3.52	0.0%
3648	2.05	1.90	-7.3%
3681	1.17	1.16	-0.9%
3685	1.47	1.35	-8.2%
3719	1.47	1.41	-4.1%
3724	6.01	6.09	1.3%
3726	7.42	7.00	-5.7%
3803	3.40	3.27	-3.8%
3807	3.02	2.60	-13.9%
3808	6.87	7.86	14.4%
3821	8.63	8.04	-6.8%
3822	5.19	5.50	6.0%
3824	5.84	5.87	0.5%
3826	1.09	1.01	-7.3%
3827	2.46	2.35	-4.5%
3830	2.00	2.11	5.5%
3851	2.93	2.87	-2.0%
3865	3.76	4.01	6.6%
3881	4.81	4.86	1.0%
4000	7.31	7.74	5.9%
4021	5.87	5.63	-4.1%
4024	5.63	5.44	-3.4%
4034	8.63	9.05	4.9%
4036	3.43	3.36	-2.0%
4038	3.73	3.85	3.2%
4062	3.96	3.85	-2.8%
4101	3.52	3.42	-2.8%
4109	0.67	0.67	0.0%
4110	1.26	1.16	-7.9%
4111	2.44	2.78	13.9%
4114	4.58	4.37	-4.6%
4130	4.52	4.65	2.9%
4131	10.30	10.64	3.3%
4133	2.93	3.24	10.6%
4149	1.06	1.10	3.8%
4206	3.73	3.73	0.0%
4207	3.26	3.18	-2.5%
4239	3.49	3.49	0.0%
4240	4.58	4.25	-7.2%
4243	2.55	2.78	9.0%

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Class Code	Current 04/01/22	Proposed 04/01/23	Percent Change
4244	3.17	3.21	1.3%
4250	2.52	2.60	3.2%
4251	4.11	4.46	8.5%
4263	4.11	4.43	7.8%
4273	3.84	3.82	-0.5%
4279	3.55	3.79	6.8%
4283	2.46	2.81	14.2%
4299	2.52	2.54	0.8%
4304	6.25	6.64	6.2%
4307	2.38	2.23	-6.3%
4351	2.52	2.48	-1.6%
4352	2.23	2.23	0.0%
4361	1.35	1.35	0.0%
4410	4.49	4.28	-4.7%
4420	6.34	5.84	-7.9%
4431	2.11	2.05	-2.8%
4432	1.35	1.44	6.7%
4452	3.34	3.49	4.5%
4459	3.84	3.98	3.6%
4470	3.20	3.18	-0.6%
4484	3.70	3.55	-4.1%
4493	3.52	3.42	-2.8%
4511	0.70	0.64	-8.6%
4557	3.37	3.67	8.9%
4558	2.70	2.72	0.7%
4568	2.73	3.15	15.4%
4581	1.50	1.47	-2.0%
4583	7.19	7.52	4.6%
4611	1.32	1.38	4.5%
4635	5.08	4.71	-7.3%
4653	2.99	3.21	7.4%
4665	9.07	10.09	11.2%
4683	4.46	4.28	-4.0%
4686	2.58	2.45	-5.0%
4692	1.06	1.10	3.8%
4693	1.32	1.31	-0.8%
4703	2.05	2.08	1.5%
4717	2.85	2.91	2.1%
4720	2.44	2.45	0.4%
4740	1.70	1.68	-1.2%
4741	3.96	4.19	5.8%
4751	3.84	4.83	25.8%
4771	3.43	3.76	9.6%
4777	4.22	4.01	-5.0%

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Class Code	Current 04/01/22	Proposed 04/01/23	Percent Change
4825	1.17	1.19	1.7%
4828	2.79	2.75	-1.4%
4829	2.08	2.17	4.3%
4902	3.17	2.91	-8.2%
4923	1.29	1.28	-0.8%
5020	8.89	8.96	0.8%
5022	10.80	11.07	2.5%
5037	17.72	16.15	-8.9%
5040	13.94	12.69	-9.0%
5057	9.10	7.98	-12.3%
5059	34.09	28.99	-15.0%
5102	9.30	9.05	-2.7%
5146	7.19	6.91	-3.9%
5160	3.70	3.82	3.2%
5183	5.52	5.20	-5.8%
5188	5.02	5.44	8.4%
5190	5.16	5.41	4.8%
5191	1.41	1.44	2.1%
5192	4.02	3.94	-2.0%
5213	10.18	10.37	1.9%
5215	8.48	8.50	0.2%
5221	6.43	6.33	-1.6%
5222	11.85	11.35	-4.2%
5223	8.42	7.71	-8.4%
5348	6.60	6.33	-4.1%
5402	10.27	9.85	-4.1%
5403	9.10	8.90	-2.2%
5437	9.39	8.75	-6.8%
5443	6.60	6.18	-6.4%
5445	14.35	14.49	1.0%
5462	9.68	8.99	-7.1%
5472	11.91	12.66	6.3%
5473	16.93	17.12	1.1%
5474	11.06	10.86	-1.8%
5478	5.60	5.72	2.1%
5479	9.77	9.27	-5.1%
5480	10.33	10.12	-2.0%
5491	3.37	3.24	-3.9%
5506	9.45	8.47	-10.4%
5507	5.99	5.93	-1.0%
5535	11.74	11.71	-0.3%
5537	7.13	7.00	-1.8%
5551	24.79	26.94	8.7%
5606	1.56	1.62	3.8%

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Class Code	Current 04/01/22	Proposed 04/01/23	Percent Change
5610	8.68	8.50	-2.1%
5645	26.96	25.14	-6.8%
5703	24.79	22.84	-7.9%
5705	37.73	34.86	-7.6%
5951	0.62	0.67	8.1%
6003	9.71	9.17	-5.6%
6005	10.27	9.94	-3.2%
6018	4.46	4.83	8.3%
6045	7.95	8.35	5.0%
6204	11.94	11.38	-4.7%
6206	4.55	4.34	-4.6%
6213	2.85	3.24	13.7%
6214	2.73	2.54	-7.0%
6216	9.04	8.93	-1.2%
6217	7.13	7.19	0.8%
6229	8.30	7.80	-6.0%
6233	3.58	3.18	-11.2%
6235	8.77	8.99	2.5%
6236	10.39	9.79	-5.8%
6237	2.41	2.45	1.7%
6251	6.81	6.73	-1.2%
6252	5.14	5.05	-1.8%
6306	7.39	7.03	-4.9%
6319	5.99	5.53	-7.7%
6325	5.11	5.53	8.2%
6400	7.42	7.28	-1.9%
6503	3.61	3.58	-0.8%
6504	4.61	4.53	-1.7%
6702	7.34	7.28	-0.8%
6703	11.77	11.65	-1.0%
6704	8.16	8.10	-0.7%
6801	8.45	9.85	16.6%
6811	9.04	8.78	-2.9%
6824	15.39	13.27	-13.8%
6826	7.85	7.31	-6.9%
6834	4.69	4.40	-6.2%
6836	6.16	5.60	-9.1%
6843	19.62	16.91	-13.8%
6845	13.88	11.96	-13.8%
6854	8.10	8.38	3.5%
6872	18.95	16.33	-13.8%
6874	35.40	30.52	-13.8%
6882	5.28	5.20	-1.5%
6884	5.75	5.66	-1.6%

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Class Code	Current 04/01/22	Proposed 04/01/23	Percent Change
7016	7.10	6.48	-8.7%
7024	7.89	7.22	-8.5%
7038	7.45	9.39	26.0%
7046	9.92	9.63	-2.9%
7047	11.38	10.40	-8.6%
7050	11.91	15.01	26.0%
7090	8.27	10.43	26.1%
7098	11.03	10.70	-3.0%
7099	15.90	15.41	-3.1%
7133	6.89	6.39	-7.3%
7151	8.39	7.77	-7.4%
7152	13.41	12.45	-7.2%
7153	9.30	8.62	-7.3%
7219	13.64	13.88	1.8%
7222	13.67	13.64	-0.2%
7225	13.53	14.68	8.5%
7230	14.44	14.13	-2.1%
7231	14.44	15.11	4.6%
7232	19.83	20.21	1.9%
7309	19.13	16.48	-13.9%
7313	8.51	7.34	-13.7%
7317	17.08	14.74	-13.7%
7327	36.76	31.68	-13.8%
7333	5.28	5.08	-3.8%
7335	5.87	5.63	-4.1%
7337	8.45	8.10	-4.1%
7350	22.91	19.75	-13.8%
7360	6.40	6.88	7.5%
7370	7.25	7.49	3.3%
7380	9.07	9.08	0.1%
7382	7.10	7.86	10.7%
7390	6.31	6.42	1.7%
7394	5.40	5.05	-6.5%
7395	5.99	5.60	-6.5%
7398	8.63	8.07	-6.5%
7402	0.18	0.21	16.7%
7403	7.28	7.22	-0.8%
7405	2.90	2.63	-9.3%
7420	11.97	11.41	-4.7%
7421	1.32	1.28	-3.0%
7422	2.23	2.20	-1.3%
7425	3.37	3.39	0.6%
7431	2.00	2.14	7.0%
7445	0.97	0.89	-8.2%

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Class Code	Current 04/01/22	Proposed 04/01/23	Percent Change
7453	0.67	0.70	4.5%
7502	3.08	3.03	-1.6%
7515	1.56	1.62	3.8%
7520	4.37	4.28	-2.1%
7529	18.89	17.64	-6.6%
7538	7.31	6.09	-16.7%
7539	2.73	2.63	-3.7%
7540	6.07	6.02	-0.8%
7580	4.84	4.53	-6.4%
7590	5.25	5.72	9.0%
7600	9.07	9.14	0.8%
7605	4.17	4.16	-0.2%
7610	0.91	0.83	-8.8%
7705	7.72	7.65	-0.9%
7710	5.96	5.99	0.5%
7711	5.96	5.99	0.5%
7720	4.72	4.80	1.7%
7723	3.32	3.24	-2.4%
7855	6.04	5.99	-0.8%
8001	4.05	3.91	-3.5%
8002	3.17	3.00	-5.4%
8006	3.67	3.61	-1.6%
8008	2.05	1.99	-2.9%
8010	2.70	2.63	-2.6%
8013	0.56	0.52	-7.1%
8015	1.11	1.13	1.8%
8017	2.17	2.17	0.0%
8018	4.43	4.59	3.6%
8021	3.52	3.55	0.9%
8031	3.49	3.12	-10.6%
8032	2.96	2.75	-7.1%
8033	2.64	2.72	3.0%
8037	2.26	2.17	-4.0%
8039	2.41	2.54	5.4%
8044	4.22	4.25	0.7%
8045	1.14	1.16	1.8%
8046	3.90	3.79	-2.8%
8047	1.23	1.28	4.1%
8058	3.96	3.79	-4.3%
8072	1.03	1.10	6.8%
8102	2.55	2.69	5.5%
8103	4.02	4.25	5.7%
8106	6.25	5.84	-6.6%
8107	4.49	4.25	-5.3%

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Class Code	Current 04/01/22	Proposed 04/01/23	Percent Change
8111	2.93	2.97	1.4%
8116	3.23	3.18	-1.5%
8203	9.98	10.58	6.0%
8204	7.16	6.88	-3.9%
8209	5.16	4.95	-4.1%
8215	5.19	5.32	2.5%
8227	5.81	5.66	-2.6%
8232	7.04	7.65	8.7%
8233	4.22	4.34	2.8%
8235	6.57	6.30	-4.1%
8236	8.10	7.40	-8.6%
8263	10.00	9.60	-4.0%
8264	6.69	6.36	-4.9%
8265	8.24	8.29	0.6%
8279	8.48	8.78	3.5%
8288	9.56	9.85	3.0%
8291	5.19	5.41	4.2%
8292	5.25	5.14	-2.1%
8293	11.91	11.41	-4.2%
8304	7.45	7.95	6.7%
8350	12.62	12.54	-0.6%
8380	3.40	3.24	-4.7%
8381	2.88	2.87	-0.3%
8385	3.58	3.94	10.1%
8392	3.29	3.24	-1.5%
8393	2.41	2.60	7.9%
8500	9.04	9.30	2.9%
8601	0.47	0.46	-2.1%
8602	1.94	1.93	-0.5%
8603	0.12	0.12	0.0%
8606	2.73	2.63	-3.7%
8709	9.24	7.98	-13.6%
8719	3.17	3.12	-1.6%
8720	1.67	1.74	4.2%
8721	0.59	0.55	-6.8%
8723	0.23	0.21	-8.7%
8725	3.55	3.24	-8.7%
8726	4.86	4.19	-13.8%
8734	0.65	0.58	-10.8%
8737	0.56	0.52	-7.1%
8738	0.91	0.83	-8.8%
8742	0.47	0.43	-8.5%
8745	5.25	5.50	4.8%
8748	0.97	0.95	-2.1%

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Class Code	Current 04/01/22	Proposed 04/01/23	Percent Change
8755	0.50	0.52	4.0%
8799	0.67	0.73	9.0%
8800	2.17	2.26	4.1%
8803	0.09	0.09	0.0%
8805	0.23	0.24	4.3%
8810	0.18	0.18	0.0%
8814	0.21	0.21	0.0%
8815	0.35	0.37	5.7%
8820	0.21	0.18	-14.3%
8824	3.37	3.36	-0.3%
8826	2.96	2.81	-5.1%
8831	1.79	1.77	-1.1%
8832	0.47	0.49	4.3%
8833	1.56	1.53	-1.9%
8835	3.32	3.18	-4.2%
8842	3.43	3.39	-1.2%
8855	0.21	0.18	-14.3%
8856	0.94	0.95	1.1%
8864	1.76	1.71	-2.8%
8868	0.73	0.73	0.0%
8869	1.70	1.56	-8.2%
8871	0.12	0.12	0.0%
8901	0.32	0.31	-3.1%
9012	1.44	1.35	-6.2%
9014	4.43	4.46	0.7%
9015	3.99	3.94	-1.3%
9016	3.20	3.15	-1.6%
9019	4.11	4.65	13.1%
9033	2.96	2.94	-0.7%
9040	4.64	4.50	-3.0%
9044	1.67	1.68	0.6%
9052	2.38	2.32	-2.5%
9058	2.29	2.17	-5.2%
9060	2.00	1.96	-2.0%
9061	1.61	1.62	0.6%
9062	1.82	1.80	-1.1%
9063	1.20	1.16	-3.3%
9077	6.37	7.40	16.2%
9082	1.76	1.74	-1.1%
9083	1.79	1.71	-4.5%
9084	1.97	1.87	-5.1%
9089	1.44	1.38	-4.2%
9093	1.85	1.77	-4.3%
9101	4.87	4.71	-3.3%

NORTH CAROLINA

APPENDIX E

Assigned Risk Rates Comparison

Class Code	Current 04/01/22	Proposed 04/01/23	Percent Change
9102	4.87	4.77	-2.1%
9154	2.55	2.35	-7.8%
9156	3.29	3.00	-8.8%
9170	12.53	13.18	5.2%
9178	9.27	9.11	-1.7%
9179	25.91	27.49	6.1%
9180	7.13	7.34	2.9%
9182	3.11	3.18	2.3%
9186	20.74	17.06	-17.7%
9220	8.13	8.10	-0.4%
9402	8.60	8.62	0.2%
9403	11.94	11.93	-0.1%
9410	3.99	4.25	6.5%
9501	4.49	4.22	-6.0%
9505	6.37	5.69	-10.7%
9516	4.05	3.82	-5.7%
9519	6.19	6.51	5.2%
9521	5.19	4.92	-5.2%
9522	2.70	2.75	1.9%
9534	8.22	8.23	0.1%
9554	15.64	14.10	-9.8%
9586	0.67	0.67	0.0%
9600	3.43	3.42	-0.3%
9620	2.29	2.17	-5.2%

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 4.37% of premium. Given the 2.0% 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 10.39% to 11.01%, depending on the assumptions made about future investment returns. Also shown therein is the ratio of net worth to surplus of 1.137. Accordingly, the corresponding return on statutory surplus would range from 11.81% to 12.51%. Based on data from SNL Global, the 5-year average of each year's premium-weighted ratio of surplus to assets (based on 2021 North Carolina Workers Compensation direct premiums written) is .315. Accordingly, the corresponding return on assets would range from 3.72% to 3.94%. If 2.0% 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
JOANNA BILIOURIS

NORTH CAROLINA WORKERS COMPENSATION INSURANCE
2022 ASSIGNED RISK RATE FILING
BY THE NORTH CAROLINA RATE BUREAU

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

A. My name is Joanna Biliouris. My business address is 2910 Sumner Blvd, Raleigh, North Carolina 27616.

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

A. Yes. I am the General Manager. Prior to becoming the General Manager in early 2022, I had been employed by the Bureau as Chief Operating Officer since 2015.

Q. What is the Bureau's function with respect to assigned risk rates for Workers Compensation insurance?

A. The Bureau promulgates assigned risk rates for Workers Compensation insurance for North Carolina.

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, 2022 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 briefly describe 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 nine 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 2021 premium writings, the direct assignment carriers will receive approximately 32% of the assigned risk premium starting July 2022and the servicing carriers will be assigned approximately 68% of the premium. These quota shares are updated each year based on premium writings, and as needed for other changes.

Q. How many insurance companies were licensed to write workers compensation insurance in North Carolina during 2021?

A. Five hundred seventy (570) insurance companies.

Q. How many insurance companies were actually writing workers compensation insurance in North Carolina during 2021?

A. Three hundred and thirty-one (331) insurance companies had positive premium.

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

2022 NORTH CAROLINA WORKERS COMPENSATION
LOSS COST AND ASSIGNED RISK RATE FILINGS
PROPOSED TO BE EFFECTIVE ON APRIL 1, 2023

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, 2023 through March 31, 2024 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 2020 and then $10 million in 2021 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 2019 and 2020 evaluated as of December 31, 2021.

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.

On the contrary, the timing of Policy Year 2020 is such that most of its exposure falls after the start of the pandemic—meaning that Policy Year 2020 is potentially subject to more pandemic related effects than Policy Year 2019.

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 2020. This timing is such that it significantly limits the potential direct or indirect effects of the COVID-19 pandemic on the individual classification code experience.

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

A. Similar to the prior year's filing, reported COVID-19-related claims have been excluded from the data on which this filing is based. This is 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 and 2021 average weekly wage values were impacted by COVID-19-related shifts in employment across industry sectors. In this year's analysis the 2020 and 2021 AWW values were 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 +7.6%. The adjusted wage increase is +5.7%. From 2020 to 2021, the unadjusted increase in average weekly wage is +5.6%, while the adjusted value is +5.8%. The impact of the adjustment to the 2021 average weekly wage is much lower than for 2020.

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.

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 4.8% 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 decrease of 0.8% 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, 2023. 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, 2023 through March 31, 2024. 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 2020 and is commonly referred to as "Policy Year 2020" data. The second block of data reflects the experience from all policies with effective dates during 2019 and is referred to as "Policy Year 2019" 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 2019 and 2020 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 2020 (Exhibit I, Section A) and 2019 (Exhibit I, Section B). An average of the separate Policy Year 2019 and 2020 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 -3.5% 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 2019 and 2020 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 4.8% 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 2020 and 2021 average weekly wage (AWW) values 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. Similarly, as the economy recovered in 2021, additional industry sector mix changes were observed. Therefore, in this

year's ratemaking analysis the 2020 and 2021 AWW values were adjusted to exclude the estimated impact of the pandemic-related, industry sector mix changes. 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. *Have there been any changes to the methodology for distributing the overall change to the individual classifications?*

A. NCCI's class ratemaking methodology groups claims into *likely* and *not-likely* groups based on characteristics such as injury type, body part and claim status. As part of the standard development methodology, 80% of the development beyond a 10th report is allocated to the *likely* group, with the remaining 20% allocated to *not-likely* development. Recent research by NCCI supports modifying the 80%/20% split to a 60%/40% split, allocating more of the development beyond a 10th report to the *not-likely* group. This change is incorporated in the Filings. All other methodology for

distributing the overall change to the individual classifications has not changed from prior Filings.

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 decrease of 0.8% 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 16.6% 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. *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 -13.8% from the current loss cost level. The Assigned Risk filing proposes an overall average rate level change of -12.7% 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
2022 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
2017	9.3%	9.1%	9.2%
2018	9.3%	9.1%	9.2%
2019	9.7%	9.5%	9.6%
2020	10.6%	9.4%	10.0%
2021	9.3%	9.3%	9.3%

NATIONAL COUNCIL ON COMPENSATION INSURANCE
2022 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
2017	1,986,485,845	1.093	2,171,229,029	16,054,250,403	1.120	17,980,760,451	0.93
2018	1,992,855,628	1.142	2,275,841,127	15,856,810,303	1.194	18,933,031,502	0.93
2019	1,970,766,937	1.228	2,420,101,799	14,024,739,977	1.343	18,835,225,789	0.93
2020	1,594,810,376	1.416	2,258,251,492	9,545,564,666	1.727	16,485,190,178	0.93
2021	1,028,944,013	2.106	2,166,956,091	4,757,786,718	3.782	17,993,949,367	0.93

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
2017	11.3%	0.013	1.055	0.70	-	9.3%
2018	11.2%	0.014	1.057	0.70	-	9.3%
2019	11.9%	0.012	1.063	0.70	-	9.7%
2020	12.7%	0.012	1.065	0.70	2.1%	10.6%
2021	11.2%	0.012	1.058	0.70	0.8%	9.3%

NATIONAL COUNCIL ON COMPENSATION INSURANCE
2022 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
2017	2,314,345,746	1.013	2,344,432,241	22,874,791,410	0.953	21,799,676,214	1.02
2018	2,373,997,567	1.011	2,400,111,540	24,344,930,179	0.925	22,519,060,416	1.02
2019	2,524,213,486	1.003	2,531,786,126	24,879,648,922	0.894	22,242,406,136	1.02
2020	2,262,992,410	0.987	2,233,573,509	23,413,206,749	0.865	20,252,423,838	1.02
2021	2,279,553,301	0.987	2,249,919,108	23,887,064,333	0.851	20,327,891,747	1.02

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
2017	11.0%	0.013	1.055	0.70	-	9.1%
2018	10.9%	0.014	1.057	0.70	-	9.1%
2019	11.6%	0.012	1.063	0.70	-	9.5%
2020	11.2%	0.012	1.065	0.70	2.1%	9.4%
2021	11.3%	0.012	1.058	0.70	0.8%	9.3%

PRE-FILED TESTIMONY

OF

MARK MULVANEY

2022 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 34 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 4,600 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 2022 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, a servicing carrier 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 0.8% decrease in rate level for the industrial classifications, and a 12.7% 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 0.8% decrease for the industrial classifications and a 12.7% 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 0.3% increase
Contracting 1.7% decrease
Office and Clerical 2.0% decrease
Goods and Services 1.2% decrease
Miscellaneous 0.4% increase

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

A. April 1, 2023.

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

A. The current Assigned Risk rates became effective April 1, 2022.

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 4/1/2022 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 4/1/2022 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 4/1/2022 level.

When taking the ratio of the ratios, the measurement unit in the denominator of each is common, both representing pure premiums at the 4/1/2022 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, 2011 through 2020. 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 2.391 and the impact of ARAP of 1.010) 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 (1.042) multiplied by the current assigned risk differential results in an indicated assigned risk differential of 2.491.

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 2.491 multiplied by the adjustment factor of .833 results in the proposed Loss Cost Modification factor of 2.075 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 2.075 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, 2022 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 2019 through 2021. The impact of minimum premiums is based on Unit Statistical Data for policy years 2011 to 2018. The combined impact of the expense constant and minimum premiums is 16.6% of assigned risk premium excluding these items. This impact is expressed as a factor (1.166) 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 3.058 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

2022 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 2022), and Virginia (2016). In addition, I have supplied testimony for various rate filings in North Carolina starting in 2019, including Workers Compensation, Private Passenger Auto, Homeowners, Mobile Homeowners, Flood, and Dwelling.

Q: What was the nature of your testimony in those previous cases?

A: In the Florida, Massachusetts, and Virginia cases, I offered testimony on the underwriting profit factors used in the rates. Specifically, I evaluated the suitability of the methods and assumptions used to develop those factors, as well as whether the rate of return on capital implied by those factors was reasonable. For the North Carolina filings, I estimated the rate of return on capital implied by the selected underwriting profit factors and assessed whether that rate of return was reasonable.

Q: What is the purpose of your testimony?

A: I was asked by the North Carolina Rate Bureau, as a financial economist with expertise in insurance, 1) to assist the Bureau committee with the underwriting profit factor selection, 2) to determine the expected return on insurance net worth implicit in the filing, and 3) to assess whether the expected return on net worth constitutes a reasonable rate of return and thus whether the selected underwriting profit factor satisfies North Carolina's statutory requirements.

Q: Please summarize the main findings of your testimony.

A: The first task was to determine the range for a reasonable rate of return on capital. I started by creating a set of estimates of the cost of insurance equity relevant for the North Carolina 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 7.3% to 13.5%.

Next, I calculated a weighted average cost of capital (WACC) by estimating the fraction of debt in the typical insurance holding company capital structure and weighting together the cost of equity with cost of debt based on this fraction. The resulting range for the WACC was about 6.6% to 11.6%.

The next task was to determine the projected rate of return on capital associated with the selected underwriting profit provision. Using a pro forma return model similar to that used in previous filings, I analyzed how the selected underwriting profit provisions used in the filing translate into expected returns on net worth. Consistent with previous filings, and with North Carolina law stipulating that the investment income earned on capital and surplus is not to be considered in determining the appropriate rate of return for the insurance industry, I refer to the expected return on net worth without including investment income on capital and surplus as the *statutory return*. When calculating the expected return on net worth including investment income earned on capital and surplus, I refer to the figure as the *total return.* My calculations, as detailed in Exhibit RB-8, show a statutory return of 7.93% and a total return of 11.01%.

I next considered two adjustments to the model that I believe produce a more accurate representation of the rate of return produced by the selected underwriting profit factor. First, I adjusted the asset portfolio allocations (across bonds, stocks, and various other investments) to reflect the allocations actually supporting North Carolina 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 7.50% and the total return to 10.39%.

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 North Carolina 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 North Carolina industry portfolio.

These components of after-tax return, all denominated as a percent of premium, are then summed and related to net worth. This is accomplished by multiplying the returns as 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 weighted average invested asset portfolio for the North Carolina insurance market (using total North Carolina DPW for weights) and use various sources to estimate the current market yields for those assets. Sources for current market rates, and a summary of the overall calculation, are provided on Page 8 of Exhibit RB-8. For each of the bond subcategories, I obtain a maturity distribution for the North Carolina industry portfolio in that subcategory from the Schedule D summary exhibits and match each maturity level from the exhibits to a corresponding bond yield of similar maturity, so that the average yield shown on Page 8 is a weighted average across maturities according to the North Carolina industry portfolio. The overall pre-tax current yield on the industry portfolio as thus determined is 4.41%. 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 3.42%. For the pro forma calculations, I average these two figures to obtain 3.91% (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 1998-2021 period.

Q: What is the expected return on net worth?

A: To calculate the implied return on insurance company equity, components of after-tax return are summed and related to net worth, which, as a percentage of premium, is calculated based on the product of the premium-to-surplus ratio from Page 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 2.0%, if achieved, would yield an expected statutory return on net worth of 7.93% (without including investment income on surplus) and a total return on net worth of 11.01% (when including investment income on surplus).

Q: Have you considered the impact of any other alternative assumptions on your estimates?

A: Yes, I have considered the impact of an alternative investment yield calculation.

Specifically, I considered the combined impact of two changes.

First, I based the asset distribution on a premium-weighted average of the portfolio allocations used by the companies writing Workers Compensation in North Carolina. The pro forma model relied on the weighted average invested asset distribution for the North Carolina insurance industry. While I have followed this convention in Exhibit RB-8, the assumption may not be suitable for the case of Workers Compensation because the North Carolina 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 Workers Compensation business in North Carolina, in my opinion, offers a much closer approximation to the average investment portfolio supporting North Carolina Workers Compensation underwriting.

Second, I based the investment yield solely on the current yield. The practice of averaging embedded yields with current yields makes little difference when the yields are relatively close together. But there is a significant divergence between the current yields on investments and embedded yields, with the pre-tax current yield being nearly 100 basis points higher than the embedded yield. The current yield, in my opinion, is the better indicator of investment yields for a prospective ratemaking exercise, where the relevant questions concern the terms on which money will be invested today and in the future.

The combined effect of these two changes is to drop the statutory return to 7.50% and the total return to 10.39% (including investment income on surplus).

Q: How was the underwriting profit factor determined?

A: The Bureau selected the 2.0% 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: Kroll (formerly Duff & Phelps) and Damodaran Online (an open-access website maintained by Aswath Damodaran, a valuation expert affiliated with New York University) both publish estimates for the property-casualty industry. Kroll updates the estimates quarterly (the estimates reported below are from 3/31/2022), while Damodaran Online updates the estimates annually (1/1/2022).

Kroll reports estimates from a variety of methodologies. Some estimates are produced using factor models, where the industry's sensitivity to a pricing factor (or sensitivities to a set of factors) are measured and used to generate a cost of capital. For example, single factor models (such as the CAPM) typically mark the overall stock market return in excess of a "base" fixed income return as the pricing factor. The cost of capital is generated in this case by estimating a risk premium for each factor, adjusting that risk premium to account for the sensitivity of the industry in question to that factor, and then adding the adjusted risk premium to the current yield of the "base" fixed income instrument to produce a cost of capital. In addition to CAPM estimates, Kroll also reports a "CAPM + size premium" estimate to recognize the higher cost of capital endured by smaller firms and thus correct for the average size of firms within an industry. The "Buildup Method" employs a related approach, adding a size premium and an industry premium to the standard market risk premium. The Fama-French-5-factor model extends the single risk factor framework of the CAPM to a five factor risk framework, thus pricing an industry's equity on the basis of its sensitivity to four additional factors in addition to overall market returns. Kroll also utilizes discounted cash flow (DCF) models, where free cash flow or dividends are forecasted into the future, with the cost of capital estimate being the implied discount rate on the future cash flows that explains the current equity valuation. In general, the two classes of methods---factor models and DCF models---are perhaps the two most widely accepted and widely deployed methods for estimating the cost of equity.

Damodaran reports estimates from a single-factor CAPM model. However, rather than estimating the risk premium associated with the stock market on the basis of simple averages of historical excess returns (as is typically done), he attempts to modify the premium to account for the current level of stock market valuation. This distinction is one example of the substantial variation in implementation of factor models, which can have significant effects on the estimates. There is also substantial methodological variation in implementation of the DCF model, which is estimated with different time period stages, with time-varying growth rates. All of this underscores the importance of consulting multiple sources of estimates and testing sensitivities where possible.

The approaches described above all produce estimates of the cost of equity. This cost of equity is then weighted together with an estimated cost of debt for the industry to produce a WACC for publicly traded firms. The weights are based on the composition of the capital structure (equity versus debt) for the industry.

Q: Please describe how you derived your independent estimates of the cost of equity capital for publicly traded firms.

A: I used a single factor model, also referred to as a "risk premium" approach in previous filings in North Carolina. This approach estimates the cost of equity as

$$r + \beta * (ERP)$$

where r is the current yield on a reference fixed income instrument, ERP is the estimated expected excess return of the stock market over that fixed income yield, and β is the estimated covariation between the equity of the property-casualty industry and the overall stock market (more precisely, the covariance of property-casualty equities with the S&P 500, divided by the variance of the S&P 500).

For the reference interest rate, I tried four different fixed income assets---the 3-month Treasury Bill, the 10-year Treasury Note, the Moody's Seasoned Aaa Corporate Bond Index, and the Moody's Seasoned Baa Corporate Bond Index. In each case, I estimated the equity risk premium as the average excess return of the S&P 500 over the return on the reference fixed income asset over the 1928-2021 period. To calculate the average returns, I used the formula from Blume (1974)[1] by weighting together the arithmetic average and the geometric average, as in:

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

where N is the sample size, T is the return horizon (corresponding to the maturity of the fixed income asset), π_A is the arithmetic average return in the sample, and π_G is the geometric average return in the sample.

For β (beta), I estimated a weighted average beta for the North Carolina Workers Compensation market. For each publicly traded holding company associated with an operating subsidiary underwriting Workers Compensation insurance in North Carolina in 2021, I pulled the beta provided by S&P Global (based on 1-year and 3-year daily returns). I then calculated a weighted average based on 2021 North Carolina 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 used the figure from Damodaran Online, based on a 3.09% 10-year Treasury rate.

Q: What were the results?

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

A: The following table lists the cost of equity and the WACC for publicly traded companies, including the estimates I produced and those reported by Kroll and Damodaran Online for the property-casualty industry.

Cost of Capital for Publicly Traded Companies

Source	Method	Current Yield (7/11/2022)	Equity Risk Premium	Cost of Equity		WACC	
Kroll	CAPM			6.8%		6.1%	
Kroll	CAPM + Size Premium			7.1%		6.3%	
Kroll	Build-Up			7.8%		6.9%	
Kroll	Fama-French 5-factor			6.4%		5.8%	
Kroll	DCF (1-stage)			7.5%		6.7%	
Kroll	DCF (3-stage)			11.8%		10.2%	
Damodaran Online	Implied Premium			6.74%		6.12%	
				Low	High	Low	High
Zanjani	Risk Premium over T-Bill	2.18%	8.49%	7.89%	10.46%	7.08%	9.19%
Zanjani	Risk Premium over T-Note	3.09%	6.57%	7.50%	9.49%	6.77%	8.40%
Zanjani	Risk Premium over Aaa Bond	4.11%	5.74%	7.96%	9.70%	7.15%	8.57%
Zanjani	Risk Premium over Baa Bond	5.31%	4.49%	8.33%	9.69%	7.44%	8.56%

I have also shown the current yield and equity risk premium elements for each of my own estimates to facilitate reconstruction. Other parameters I used were calculated as described above: 1) the weighted average beta for the North Carolina industry (0.6720 to 0.9752), 2) the cost of debt (3.46%), and 3) the percentage of debt in the capital structure (18.20%).

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

$$2.186\% + 0.6720 \times 8.49\% = 7.89\%,$$

and the WACC is:

$$(1 - .1820) \times 7.89\% + .1820 \times 3.46\% = 7.08\%.$$

Note that the estimates for capital structure and the cost of debt differ across sources, so the relationship between the cost of equity and the WACC for Kroll and Damodaran Online will not follow the exact formula listed above.

Q: Do you believe any adjustments are necessary to the estimated cost of equity in the context of this filing?

A: Yes. All of the foregoing estimates are based on the data of publicly traded companies, which have the easiest access to financing and thus the lowest costs of capital. However, I found that operating companies affiliated with publicly traded holding companies wrote about 56% of the 2021 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.

All the approaches have their flaws. IPO studies, for example, are thought to have a bias toward overstating the discount because of the differences in timing of transactions. Restricted stock and private placement studies tend to understate the discount: Since they confine their attention to public companies, they do not account for factors other than the discount for lack of marketability (DLOM), and, moreover, the actual restrictions on marketability for private placements have been loosened significantly over the years by the Securities and Exchange Commission.

On balance, however, the studies point to a substantial discount. For purposes of this testimony, I use a discount of 25%, which is 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	7.8%		6.9%	
Duff & Phelps	CAPM + Size Premium	8.1%		7.1%	
Duff & Phelps	Build-Up	8.9%		7.8%	
Duff & Phelps	Fama-French 5-factor	7.3%		6.6%	
Duff & Phelps	DCF (1-stage)	8.6%		7.6%	
Duff & Phelps	DCF (3-stage)	13.5%		11.6%	
Damodaran Online	Implied Premium	7.73%		6.92%	
		Low	**High**	**Low**	**High**
Zanjani	Risk Premium over T-Bill	9.04%	12.00%	8.03%	10.45%
Zanjani	Risk Premium over T-Note	8.60%	10.89%	7.67%	9.54%
Zanjani	Risk Premium over Aaa Bond	9.55%	11.11%	8.10%	9.74%
Zanjani	Risk Premium over Baa Bond	9.13%	11.13%	8.44%	9.72%

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 11.01% is within the span of estimates, which range from 7.3% to 13.5%. 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 testing robustness by 1) adjusting the investment portfolio to the allocations matched to the North Carolina Workers Compensation market and 2) substituting current yields for embedded yields, the total return drops to 10.39% (which is in the middle of the estimate range), and the statutory return drops to 7.50% (which is toward the lower end of the range).

A second school of thought is that, although the capital of the operating subsidiaries may be fully financed by equity, the holding companies are the source of that equity. Thus, one should "look through" the operating subsidiaries to the level of the holding companies to determine a cost of capital, which is important because the holding companies---unlike the insurance subsidiaries---typically hold significant debt in the capital structure. Holding companies that are typically classified as property-casualty companies have, in recent history and on average, had in

the neighborhood of 20% debt. Thus, the cost of capital for the holding company is, under this school of thought, calculated as a weighted average of the cost of equity and the cost of debt, with the weights based on each component's share of the capital structure. The result is the WACC discussed above, which, as can be seen above, is typically lower than the cost of equity due to the lower cost of debt.

On the other hand, the market value of the capital of the holding company will be different from the book value of the capital invested in the insurance subsidiaries. Thus, a particular return on net worth at the level of the operating subsidiary will translate into a lower (higher) return on holding company capital if the market value of the holding company capital exceeds (is less than) the net worth of the insurance subsidiaries.

Stock market valuations at current levels put the market-to-net worth ratio of the public companies that own the major underwriters of Workers Compensation insurance in North Carolina, on average, well above one. However, even if one assumes that the market value of holding company capital is equal to the net worth of the operating subsidiaries, the table demonstrates that a total return on capital of 11.01% is reasonable and not excessive; it falls toward the upper end of the span of estimates (6.6% to 11.6%). The same characterization---of reasonable and not excessive---applies to a statutory return on capital of 7.93%, which falls toward the lower end of the span of estimates. Similar conclusions apply after adjusting projected returns to account for the investment portfolio of companies serving the North Carolina Workers Compensation market and the current level of investment yields.

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 2.0% underwriting profit factor was 7.93% (not including investment income on surplus). The expected total return on net worth was 11.01% (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 7.50% and 10.39%, respectively. After reviewing the cost of capital estimates for the industry produced by third parties and producing my own estimates tailored to the North Carolina market, I found the expected returns on net worth resulting from the selected underwriting profit factors to be consistent with a reasonable and not excessive return on invested capital. Thus, I believe that the selected underwriting profit factor is reasonable and not excessive.

An important caveat to this analysis, however, is that all conclusions are predicated on the assumption that the indicated rate level is achieved. In the event that a lower rate level is implemented, the expected rate of return could be inadequate.

Q: Does that conclude your testimony?

A: Yes.

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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***, 125: Article 106071, (2021) [Winner of Casualty Actuarial Society Hachemeister Prize, 2015]

"Capital Allocation Techniques: Review and Comparison," (with Daniel Bauer and Qiheng Guo), ***Variance***, 14(2), (2021)

"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, 2022

"Dynamic Capital Allocation in General Insurance," (with Daniel Bauer and Qiheng Guo), working paper, 2022

"The Ignorance of Crowds: Understanding Reserving Errors in the Liability Crisis of 1997-2001," (with Eren Cifci, Qianlong Liu, Steve Mildenhall, Lars Powell, and Kenny Wunder), working paper, 2022

"Market Discipline and Guaranty Funds in Life Insurance," (with Martin Grace, Shinichi Kamiya, and Robert W. Klein), working paper, 2019

"The Effect of Government Guarantees on Market Discipline in the Property-Casualty Insurance Industry," (with Yiling Deng, Ty Leverty, and Kenny Wunder), working paper, 2019

"An Integrated Approach to Measuring Asset and Liability Risks in Financial Institutions," (with Daniel Bauer), working paper, 2019

"Optimal Insurance Contracts with Insurer Background Risk," (with Xiaohu Ping), working paper, 2015

"The Effect of Banking Crises: Evidence from Non-Life Insurance Consumption," (with Shinichi Kamiya and Jackie Li), working paper, 2015

"Bankruptcy in the Core and Periphery of Financial Groups: The Case of the Property-Casualty Insurance Industry" working paper, 2010

"The Rise and Fall of the Fraternal Life Insurer: Law and Organizational Form in U.S. Life Insurance, 1870-1920," working paper, (*revise and resubmit, Journal of Law & Economics),* 2007

"Organizational Form and the Underwriting Cycle: Theory with Evidence from the Pennsylvania Fire Insurance Market, 1873-1909," working paper, 2004

"Consumption versus Production of Insurance," (with Tomas Philipson), *NBER Working Paper #6225,* 1997

External Research Projects and Consulting

2021	Expert Witness, Workers' Compensation Rate Filings, Massachusetts
2021	Expert Witness, Insurance Rate Filings, North Carolina
2020	Expert Witness, Insurance Rate Filings, North Carolina
2019	NCCI Review of Cost of Capital Methodology
2019	Expert Witness, Workers' Compensation Rate Filings, Massachusetts
2019	Expert Witness, Insurance Rate Filings, North Carolina
2018	NCCI Review of TCJA
2017	Expert Witness, Workers' Compensation Rate Hearing, Florida
2016	Expert Witness, Assigned Risk Workers' Compensation Rate Hearing, Virginia
2015	Expert Witness, Workers' Compensation Rate Hearing, Florida
2015	NCCI Revision of Underwriting Profit and Contingency Internal Rate of Return Model
2015	An Extension of the Project on the Costs of Holding Capital, sponsored by the CAS
2013	Microinsurance Centre Lessons from History Project
2012	Allocation of the Costs of Holding Capital, sponsored by the CAS,
2011	CRO Risk Index Project, co-sponsored by SOA and Bloomberg, co-founder
2009	"The Financial Crisis and Lessons for Insurers," $50,000 SOA grant, role: report co-author

Papers Presented at Professional Meetings

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 Mathematical Economics, Journal of Money, Credit, and Banking, Journal of Political Economy, Journal of Risk and Insurance, Management Science, Mathematical Social Sciences, North American Actuarial Journal, Proceedings of the National Academy of Sciences, Review of Financial Studies, Risk Management and Insurance Review, Scandinavian Actuarial Journal,* and *Science.*

Working Group Participation

Committee on the Global Financial System, Working Group on Institutional Investors, Global Savings, and Asset Allocation (2006); *Presidential Working Group on Financial Markets, Working Group on Terrorism Insurance* (2006)

Continuing Education Activities

2004-2007	Central Banking Seminar, Federal Reserve Bank of New York, Topics: Introduction to U.S. Financial Markets; Introduction to Non-bank Financial Institutions
2009	Texas Farm Bureau Program, Georgia State University, Topic: Securitization, the Insurance Industry, and the Panic of 2007
2009-2012	Horst K. Jannott Visiting Fellows Program, Georgia State University, Topics: Securitization, the Insurance Industry, and the Panic of 2007; Introduction to Statistics

NCRB - Pro Forma Statutory Rate of Return
Workers Compensation

		Pre-Tax	Tax Liability	Post-Tax
1	**Premiums**	100.00%		
	Loss & LAE	62.34%		
	Commissions	5.00%		
	Other Acquisition & General	3.49%		
	Taxes, Licenses & Fees	2.66%		
	Servicing Carrier Allowance & Other	16.16%		
	Uncollectible Premium	8.35%		
2	**Pro Forma Underwriting Profit**	2.00%		
3	**Regular Tax**		0.42%	
4	**Additional Tax Due to IRS Treatment of Reserves**		0.08%	
5	**Return from Underwriting Post-Tax**			1.50%
6	**Investment Gain on Insurance Transaction**	11.67%	1.91%	9.76%
7	**Statutory Return as a Percent of Premium (post-tax)**			11.26%
8	**Premium-to-Net Worth Ratio**			0.70
9	**Statutory Return as a Percent of Net Worth (post-tax)**			7.93%

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	16.35%
(c)	Pre-tax Investment Yield	3.91%
(d)	Premium-to-Surplus Ratio	0.801
(e)	Net Worth-to-Surplus Ratio	1.14
(f)	Uncollectible Premium (adjusted for expense offsets)	8.35%
(g)	Additional Tax Due to IRS Treatment of Loss Reserves and UEPR	0.08%
(h)	Prepaid Expense Ratio	24.61%
(i)	Unearned Premium Reserve to Premium Ratio	35.25%

Notes to Exhibit RB-8 Page 1

1 Selected expense provisions from the filing. Servicing carrier allowance times servicing carrier market share 0.239 x 0.67605 = 0.1616. 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: 0.107818 x 0.32395 = 0.0349, where 0.107818 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	62.34%		
	Commissions	5.00%		
	Other Acquisition & General	3.49%		
	Taxes, Licenses & Fees	2.66%		
	Servicing Carrier Allowance & Other	16.16%		
	Uncollectible Premium	8.35%		
2	**Pro Forma Underwriting Profit**	2.00%		
3	**Regular Tax**		0.42%	
4	**Additional Tax Due to IRS Treatment of Reserves**		0.08%	
5	**Return from Underwriting Post-Tax**			1.50%
6	**Investment Gain on Insurance Transaction**	11.67%	1.91%	9.76%
7	**Investment Gain on Surplus**	5.22%	0.85%	4.37%
8	**Total Return as a Percent of Premium (post-tax)**			15.63%
9	**Premium-to-Net Worth Ratio**			0.70
10	**Total Return as a Percent of Net Worth (post-tax)**			11.01%

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	16.35%
(c)	Pre-tax Investment Yield	3.91%
(d)	Premium-to-Surplus Ratio	0.80
(e)	Net Worth-to-Surplus Ratio	1.14
(f)	Uncollectible Premium (adjusted for expense offsets)	8.35%
(g)	Additional Tax Due to IRS Treatment of Loss Reserves and UEPR	0.08%
(h)	Prepaid Expense Ratio	24.61%
(i)	Unearned Premium Reserve to Premium Ratio	35.25%

Notes to Exhibit RB-8 Page 1

1 Selected expense provisions from the filing. Servicing carrier allowance times servicing carrier market share 0.239 x 0.67605 = 0.1616. 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: 0.107818 x 0.32395 = 0.0349, where 0.107818 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	35.61%
3. Unearned Premium Reserve 12/31/Prior	35.15%
4. Increase: (2) - (3)	0.46%
5. 20% of Increase = Taxable Income	0.09%
6. Additional Tax Liability due to Unearned Premium Reserve	0.02%
7. Unpaid Loss Current Year	136.00%
8. Discounted Unpaid Loss Prior Year	117.31%
9. Unpaid Loss Prior Year	131.04%
10. Discounted Unpaid Loss Prior Year	112.62%
11. Additional Income	0.26%
12. Additional Tax Liability due to Loss Reserve Discounting	0.06%
13. Total Additional Tax Liabilities (6) + (12)	0.08%

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	28.85%	71.15%	62.341	44.36	2021	0.883902	39.2060				
1.5	59.45%	40.55%	61.529	24.95	2020	0.859962	21.4560	2020	43.778	0.875556	38.3299
2.5	76.70%	23.30%	60.727	14.15	2019	0.848235	12.0020	2019	24.625	0.859577	21.1670
3.5	84.05%	15.95%	59.936	9.56	2018	0.839662	8.0270	2018	13.965	0.854517	11.9334
4.5	87.50%	12.50%	59.155	7.39	2017	0.834129	6.1679	2017	9.435	0.839662	7.9224
5.5	89.55%	10.45%	58.384	6.10	2016	0.828905	5.0573	2016	7.298	0.834129	6.0875
6.5	90.70%	9.30%	57.624	5.36	2015	0.832567	4.4617	2015	6.022	0.828905	4.9914
7.5	91.30%	8.70%	56.873	4.95	2014	0.841036	4.1614	2014	5.289	0.832567	4.4036
8.5	91.85%	8.15%	56.132	4.57	2013	0.84715	3.8755	2013	4.883	0.841036	4.1072
9.5	92.55%	7.45%	55.401	4.13	2012	0.865946	3.5741	2012	4.515	0.84715	3.8250
10.5	93.10%	6.90%	54.679	3.77	2011	0.878065	3.3128	2011	4.074	0.865946	3.5275
11.5	93.55%	6.45%	53.967	3.48	2010	0.890414	3.0994	2010	3.724	0.878065	3.2697
12.5	93.95%	6.05%	53.264	3.22	2009	0.902995	2.9099	2009	3.436	0.890414	3.0590
13.5	94.20%	5.80%	52.570	3.05	2008	0.915813	2.7923	2008	3.180	0.902995	2.8719
14.5	94.40%	5.60%	51.885	2.91	2007	0.928867	2.6989	2007	3.009	0.915813	2.7560
15.5	94.70%	5.30%	51.209	2.71	2006	0.942154	2.5571	2006	2.868	0.928867	2.6637
16.5	95.10%	4.90%	50.542	2.48	2005	0.955661	2.3667	2005	2.679	0.942154	2.5238
17.5	95.45%	4.55%	49.883	2.27	2004	0.969334	2.2001	2004	2.444	0.955661	2.3359
18.5	95.75%	4.25%	49.233	2.09	2003	0.982913	2.0567	2003	2.240	0.969334	2.1714
19.5	96.00%	4.00%	48.592	1.94	2002	0.985513	1.9155	2002	2.065	0.982913	2.0299
20.5	96.25%	3.75%	47.959	1.80	2001	0.985513	1.7724	2001	1.918	0.985513	1.8906
21.5	96.50%	3.50%	47.334	1.66	2000	0.985513	1.6327	2000	1.775	0.985513	1.7493
22.5	96.75%	3.25%	46.717	1.52	1999	0.985513	1.4963	1999	1.635	0.985513	1.6114
23.5	97.00%	3.00%	46.109	1.38	1998	0.985513	1.3632	1998	1.499	0.985513	1.4768
24.5	97.25%	2.75%	45.508	1.25	1997	0.985513	1.2333	1997	1.365	0.985513	1.3455
25.5	97.50%	2.50%	44.915	1.12	1996	0.985513	1.1066	1996	1.235	0.985513	1.2173
26.5	97.75%	2.25%	44.330	1.00	1995	0.985513	0.9830	1995	1.108	0.985513	1.0922
27.5	98.00%	2.00%	43.752	0.88	1994	0.985513	0.8624	1994	0.984	0.985513	0.9702
28.5	98.25%	1.75%	43.182	0.76	1993	0.985513	0.7447	1993	0.864	0.985513	0.8511
29.5	98.50%	1.50%	42.620	0.64	1992	0.985513	0.6300	1992	0.746	0.985513	0.7350
30.5	98.75%	1.25%	42.064	0.53	1991	0.985513	0.5182	1991	0.631	0.985513	0.6218
31.5	99.00%	1.00%	41.516	0.42	1990	0.985513	0.4091	1990	0.519	0.985513	0.5114
32.5	99.25%	0.75%	40.976	0.31	1989	0.985513	0.3029	1989	0.410	0.985513	0.4038
33.5	99.50%	0.50%	40.442	0.20	1988	0.985513	0.1993	1988	0.303	0.985513	0.2989
34.5	100.00%	0.00%	39.915	0.00	1987	0.985513	0.0000	1987	0.200	0.985513	0.1967
Totals				136.00			117.31		131.04		112.62

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 IRS Bulletin 2021-52
8	(5) x (7)
9	Accident Year at prior year end
10	Column (3), previous period x Column (4), current period
11	IRS discount factors for Workers Compensation for previous tax year from Rev. Proc. 2020-48
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	35.25%	352,475
3. Deductions for Prepaid Expenses		
Commissions & Brokerage	5.00%	
Taxes, Licenses, & Fees (5/6)	2.22%	
Direct Assignment Carriers		
Other Acquisition & General (1/2)	1.75%	
Servicing Carriers		
Servicing Carrier Allowance (100%) + Other (1/2)	15.65%	
Total	24.61%	
4. Deduction for Prepaid Expense: (2) x (3)		86,752
5. Net Unearned Premium Reserve Subject to Investment (2) - (4)		265,723
B. Delayed Remission of Premiums (Agents Balances)		
1. Direct Earned Premiums		1,000,000
2. Average Agents Balances		0.085
3. Delayed Remissions: (1) x (2)		84,537
C. Loss and Loss Expense Reserves		
1. Direct Earned Premiums		1,000,000
2. Expected Incurred Loss & LAE-to-Premium Ratio	0.6234	623,410
3. Expected Mean Loss and LAE Reserve-to-Incurred Ratio	4.492	2,800,358
D. Net Policyholder Funds Subject to Investment (A5 - B3 + C3)		2,981,544
E. Average Rate of Return		3.91%
F. Investment Earnings from Net Reserves: (D) x (E)		116,651
G. Average Rate of Return as a Percent of Direct Earned Premiums: (F) / (A1)		11.67%

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	1,312,039,596
2	UEPR at end of most recent calendar year	467,252,014
3	UEPR at end of previous calendar year	457,670,700
4	Mean UEPR	462,461,357
5	Ratio [(4) / (1)]	35.25%

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	67.61%
Direct Assignment Carriers Market Share	32.40%

The entire servicing carrier allowance and half of the other pool administration expense are assumed to be prepaid so the provision is calculated as: 0.67605 x [0.224 + 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 0.107818 x 0.32395.

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: 0.67605 x 4.577 + 0.32395 x 4.315 = 4.492

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	3.42%
Current Yield	4.41%
Average	3.91%

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))
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	0.848	1.000	0.224	5.145
2020	4.488	0.676	1.000	0.198	4.311
2021	4.521	0.683	1.000	0.213	4.292
Average	**4.577**				**4.315**

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	8.47%	2.91%	21.00%	2.30%
Municipal	21.43%	2.14%	5.25%	2.03%
Industrial	33.42%	3.63%	21.00%	2.87%
Preferred Stock	0.51%	4.74%	13.13%	4.12%
Common Stock	20.82%	9.98%	19.60%	8.03%
Mortgage Loans	1.30%	5.27%	21.00%	4.16%
Real Estate	0.80%	6.94%	21.00%	5.48%
Cash & Short-term Investments	5.48%	1.49%	21.00%	1.18%
Other Long-Term Investments	7.78%	5.99%	18.91%	4.86%
Rate of Return Before Expenses	100.00%	4.69%	18.59%	3.82%
Investment Expenses		0.29%	21.00%	0.23%
Portfolio Rate of Return		4.41%	18.43%	3.59%

Sources

Preferred Stock	Current yield on iShares Preferred Stock Index ETF, 7/6/2022
Real Estate	REIT Sector Cost of Capital, using 10-year Treasury of 3.09%. (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	Damodaran Online ERP (source: Damodaran Online) plus 3 month average T-Bill Rate
Other LTI	Average of yields on bond portfolio, preferred stock, common stock, mortgages, and real estate.
Investment Expenses	Investment Expenses from statutory Page 12 - 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 2021 edition of A.M. Best's Aggregates and Averages.

Portfolio Yield and Tax Rate
Embedded Yield

		Income	Tax Rate
Bonds			
	Taxable	28,332,003	21.00%
	Non-Taxable	7,245,882	5.25%
Stocks			
	Taxable	8,486,504	13.13%
	Non-Taxable	2,429,550	5.25%
Mortgage Loans		1,029,624	21.00%
Real Estate		1,999,576	21.00%
Contract Loans		17,597	21.00%
Cash & Short Term Inv		819,448	21.00%
All Other		9,860,358	21.00%
Total		60,220,542	17.36%
Inv. Expenses		5,835,453	21.00%
Net Inv. Income		54,385,089	16.97%
Mean Invested Assets		1,975,605,647	
Inv. Inc. Yield Rate		2.75%	16.97%
Capital Gains (10 yr. avg.) (% of Inv. Assets)		0.67%	0.00%
Invest. Yield Rate (pre=tax)		3.42%	13.67%
Invest. Yield Rate (post-tax)		2.95%	

Source: A.M. Best's Aggregates and Averages, 2021 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	1,366,568,026	7,563,305	0.55%
2012	1,400,656,619	9,035,405	0.65%
2013	1,473,600,834	12,163,890	0.83%
2014	1,543,882,375	12,093,078	0.78%
2015	1,567,611,077	9,887,732	0.63%
2016	1,596,937,470	8,086,268	0.51%
2017	1,676,831,258	15,725,303	0.94%
2018	1,733,729,297	10,825,733	0.62%
2019	1,822,857,949	11,238,484	0.62%
2020	1,975,605,647	10,933,304	0.55%
Total	16,158,280,550	107,552,502	0.67%

"Mean Invested Assets" is the average of current and prior year values for Cash and Invested Assets (from statutory Page 2). Sourced from 2011-2021 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
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
2021	0.762
Average	0.801

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

	2016	2017	2018	2019	2020
Policyholder Surplus	700,833,588,840	750,700,298,191	742,079,084,495	847,278,658,173	910,066,482,410
+ Deferred Acquisition Costs	33,046,102,666	34,674,341,556	43,991,738,565	46,002,606,289	48,118,482,109
+ Non-Admitted DTA Provision	11,544,280,333	5,482,491,430	6,314,927,861	6,045,409,090	6,001,020,602
+ Non-admitted Assets (non-tax part)	43,722,898,341	46,932,629,941	46,502,063,197	50,520,441,190	51,971,123,366
+ Provision for Reinsurance	2,185,395,913	2,595,884,443	2,737,598,756	2,944,031,835	3,290,710,172
+ Provision for FASB 115(after-tax)	10,015,172,605	14,432,773,013	912,505,274	32,483,869,271	57,249,505,836
- Surplus Notes	(12,027,889,160)	(11,859,500,848)	(11,660,367,237)	(11,606,263,627)	(13,225,869,920)
GAAP-adjusted Net Worth	789,319,549,538	842,958,917,726	830,877,550,911	973,668,752,221	1,063,471,454,574
Ratio of Net Worth to Surplus	1.126	1.123	1.120	1.149	1.169
Five Year Average	1.137				

Source: ISO

Sample of Findings on the Private Company Discount

Study	Years	Discount	Type
Emory (1994)	1992-1993	45%	IPO
Willamette Management Associates (various)	1975-1997	29% to 60%	IPO
Garland and Reilly (2004)	1998-2002	35%	IPO
Larcker et al. (2018)	2017	39% to 47%	IPO
Koeplin et al. (2000)	1984-1998	20% to 30%	Acquisitions
Block (2007)	1999-2006	20% to 25%	Acquisitions
Officer (2007)	1979-2003	15% to 30%	Acquisitions
Paglia and Harjoto (2010)	1993-2008	65% to 70%	Acquisitions
Jaffe et al. (2018)	1985-2014	0%	Acquisitions
Lohrey (2020)	2005-2015	48% to 62%	Acquisitions
Silber (1991)	1981-1988	34%	Restricted Stock
Johnson (1999)	1991-1995	20%	Restricted Stock
Bajaj et al. (2001)	1990-1995	7%	Private placements
Comment (2012)	2004-2010	5% to 6%	Private placements
Finnerty (2013)	1991-1997	21%	Private placements
Finnerty (2013)	1997-2007	15%	Private placements
Chen et al. (2015)	1999-2012	10%	Private placements

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