

August 28, 2015

The Honorable Wayne Goodwin  
Commissioner  
North Carolina Dept. of Insurance  
P. O. Box 26387  
Raleigh, NC 27611

Re: Workers Compensation Insurance  
2015 Residual Market Rate Filing

Dear Commissioner Goodwin:

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, 2016 and shall be applied to all residual market policies as of the first normal anniversary rating date which is on or after April 1, 2016, but shall not otherwise be available to outstanding policies. No policy may be canceled and rewritten to take advantage of or to avoid application of this rule.

The enclosed memoranda, exhibits, testimony and other supporting data explain the calculations supporting the loss cost multiplier; this filing makes reference to the August 28, 2015 Loss Cost Filing for the voluntary market to support the change in loss costs. Combined, the two filings support an average increase in the overall premium for residual market workers compensation insurance of 2.2%.

This premium level change includes a 10.2% decrease in loss costs detailed in the 2015 loss cost filing and a 13.8% increase in the loss cost multiplier detailed in this filing.

By industry group, the changes are: Manufacturing, 3.1% increase; Contracting, 0.2% increase; Office and Clerical, 1.5% increase; Goods & Services, 2.1% increase; and Miscellaneous, 4.1% 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 an increase of 12.7% to the overall residual market premium level of the "F" classifications.

The filing proposes no change in the maximum minimum premium of \$1,500 or the minimum premium multiplier of 200. The filing includes a proposed decrease to the expense constant from \$250 to \$160.

Information and statistical data required pursuant to NCGS §58-36-15 and 11 NCAC 10.1111 are submitted. Additionally, the pre-filed testimony of (a) Raymond F. Evans, Jr., CPCU, General Manager - North Carolina Rate Bureau, (b) Jay A. Rosen, FCAS, MAAA - National Council on Compensation Insurance, Inc. (c) Mark Mulvaney, FCAS, MAAA - Milliman, Inc., (d) Dr. James H. Vander Weide - Financial Strategy Associates and (e) Dr. David Appel - Milliman, Inc. and exhibits referenced therein are enclosed.

Sincerely,

Raymond F. Evans, Jr., CPCU  
General Manager

## NORTH CAROLINA - ASSIGNED RISK

### SUMMARY

Proposed Effective Date

April 1, 2016

#### I. Industrial Classifications

Overall Proposed Change in Rate Level

- New and Renewal Policies +2.2%

By Industry Group

Manufacturing	+3.1%
Contracting	+0.2%
Office and Clerical	+1.5%
Goods and Services	+2.1%
<u>Miscellaneous</u>	<u>+4.1%</u>
Overall	+2.2%

#### II. Federal Classifications

Overall Proposed Change in Rate Level

- New and Renewal Policies +12.7%

#### II. Summary of Miscellaneous Changes

	<u>Current</u>	<u>Proposed</u>
A. USL&HW %	91%	92%
B. Expense Constant	\$250	\$160
C. Experience Rating Premium Eligibility Thresholds (Column A / Column B)	\$8,000 / \$4,000	\$10,000 / \$5,000

## NORTH CAROLINA – ASSIGNED RISK

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\*Sections incorporated by reference to the Loss Cost Filing submitted 8/28/2015

## NORTH CAROLINA

### EXHIBIT I

#### Determination of Indicated Loss Cost Level Change

##### Section A - Policy Year 2013 Experience

##### Premium:

(1) Standard Earned Premium Developed to Ultimate (Appendix A-II)	\$1,029,388,115
(2) Premium On-level Factor (Appendix A-I)	0.925
(3) Premium Available for Benefit Costs = (1) x (2)	\$952,184,006

##### Indemnity Benefit Cost:

(4) Limited Indemnity Losses Developed to Ultimate (Appendix A-II)	\$384,231,422
(5) Indemnity Loss On-level Factor (Appendix A-I)	1.003
(6) Factor to Include Loss Adjustment Expense (Exhibit II)	1.170
(7) Composite Adjustment Factor = (5) x (6)	1.174
(8) Adjusted Limited Indemnity Losses = (4) x (7)	\$451,087,689
(9) Adjusted Limited Indemnity Cost Ratio excluding Trend and Benefits = (8) / (3)	0.474
(10) Factor to Reflect Indemnity Trend (Appendix A-III)	0.967
(11) Projected Limited Indemnity Cost Ratio = (9) x (10)	0.458
(12) Factor to Adjust Indemnity Cost Ratio to an Unlimited Basis (Appendix A-II)	1.009
(13) Projected Indemnity Cost Ratio = (11) x (12)	0.462
(14) Factor to Reflect Proposed Changes in Indemnity Benefits (Appendix C)	1.003
(15) Projected Indemnity Cost Ratio including Benefit Changes = (13) x (14)	0.463

##### Medical Benefit Cost:

(16) Limited Medical Losses Developed to Ultimate (Appendix A-II)	\$345,147,729
(17) Medical Loss On-level Factor (Appendix A-I)	0.990
(18) Factor to Include Loss Adjustment Expense (Exhibit II)	1.170
(19) Composite Adjustment Factor = (17) x (18)	1.158
(20) Adjusted Limited Medical Losses = (16) x (19)	\$399,681,070
(21) Adjusted Limited Medical Cost Ratio excluding Trend and Benefits = (20) / (3)	0.420
(22) Factor to Reflect Medical Trend (Appendix A-III)	1.000
(23) Projected Limited Medical Cost Ratio = (21) x (22)	0.420
(24) Factor to Adjust Medical Cost Ratio to an Unlimited Basis (Appendix A-II)	1.009
(25) Projected Medical Cost Ratio = (23) x (24)	0.424
(26) Factor to Reflect Proposed Changes in Medical Benefits (Appendix C)	0.969
(27) Projected Medical Cost Ratio including Benefit Changes = (25) x (26)	0.411

##### Total Benefit Cost:

(28) Indicated Change Based on Experience, Trend and Benefits = (15) + (27)	0.874
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## NORTH CAROLINA

### EXHIBIT I

#### Determination of Indicated Loss Cost Level Change

##### Section B - Policy Year 2012 Experience

##### Premium:

(1) Standard Earned Premium Developed to Ultimate (Appendix A-II)	\$995,256,615
(2) Premium On-level Factor (Appendix A-I)	0.923
(3) Premium Available for Benefit Costs = (1) x (2)	\$918,621,856

##### Indemnity Benefit Cost:

(4) Limited Indemnity Losses Developed to Ultimate (Appendix A-II)	\$369,392,821
(5) Indemnity Loss On-level Factor (Appendix A-I)	1.007
(6) Factor to Include Loss Adjustment Expense (Exhibit II)	1.170
(7) Composite Adjustment Factor = (5) x (6)	1.178
(8) Adjusted Limited Indemnity Losses = (4) x (7)	\$435,144,743
(9) Adjusted Limited Indemnity Cost Ratio excluding Trend and Benefits = (8) / (3)	0.474
(10) Factor to Reflect Indemnity Trend (Appendix A-III)	0.957
(11) Projected Limited Indemnity Cost Ratio = (9) x (10)	0.454
(12) Factor to Adjust Indemnity Cost Ratio to an Unlimited Basis (Appendix A-II)	1.009
(13) Projected Indemnity Cost Ratio = (11) x (12)	0.458
(14) Factor to Reflect Proposed Changes in Indemnity Benefits (Appendix C)	1.003
(15) Projected Indemnity Cost Ratio including Benefit Changes = (13) x (14)	0.459

##### Medical Benefit Cost:

(16) Limited Medical Losses Developed to Ultimate (Appendix A-II)	\$380,868,846
(17) Medical Loss On-level Factor (Appendix A-I)	0.975
(18) Factor to Include Loss Adjustment Expense (Exhibit II)	1.170
(19) Composite Adjustment Factor = (17) x (18)	1.141
(20) Adjusted Limited Medical Losses = (16) x (19)	\$434,571,353
(21) Adjusted Limited Medical Cost Ratio excluding Trend and Benefits = (20) / (3)	0.473
(22) Factor to Reflect Medical Trend (Appendix A-III)	1.000
(23) Projected Limited Medical Cost Ratio = (21) x (22)	0.473
(24) Factor to Adjust Medical Cost Ratio to an Unlimited Basis (Appendix A-II)	1.009
(25) Projected Medical Cost Ratio = (23) x (24)	0.477
(26) Factor to Reflect Proposed Changes in Medical Benefits (Appendix C)	0.969
(27) Projected Medical Cost Ratio including Benefit Changes = (25) x (26)	0.462

##### Total Benefit Cost:

(28) Indicated Change Based on Experience, Trend and Benefits = (15) + (27)	0.921
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## NORTH CAROLINA

### EXHIBIT I

#### Determination of Indicated Rate Level Change

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

(1) Policy Year 2013 Indicated Change Based on Experience, Trend, and Benefits	0.874	(-12.6%)
(2) Policy Year 2012 Indicated Change Based on Experience, Trend, and Benefits	0.921	(-7.9%)
(3) Indicated Change Based on Experience, Trend and Benefits = $[(1)+(2)] / 2$	0.898	(-10.2%)

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

(1) Indicated Loss Cost Level Change	0.898	(-10.2%)
(2) Proposed Change in the Assigned Risk Loss Cost Multiplier = [Exhibit I-A, Sheet 1, Line (9) / Exhibit I-A, Sheet 2, Line (9)]	1.138	(13.8%)
(3) Indicated Assigned Risk Rate Level Change = (1) x (2)	1.022	(2.2%)

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

Industry Group Differentials (Appendix A-V):

Manufacturing	1.009
Contracting	0.980
Office & Clerical	0.993
Goods & Services	0.999
Miscellaneous	1.019

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

Industry Group	(1) Final Overall Rate Level Change	(2) Industry Group Differential	(3) = (1) x (2) Final Rate Level Change by Industry Group	
Manufacturing	1.022	1.009	1.031	(+3.1%)
Contracting	1.022	0.980	1.002	(+0.2%)
Office & Clerical	1.022	0.993	1.015	(+1.5%)
Goods & Services	1.022	0.999	1.021	(+2.1%)
Miscellaneous	1.022	1.019	1.041	(+4.1%)
Overall	1.022	1.000	1.022	(+2.2%)

**North Carolina Department of Insurance**

Summary of Supporting Information Form  
Calculation of INDICATED Assigned Risk Loss Cost Multiplier  
Effective April 1, 2016

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):		
	<input type="checkbox"/> Without modification (factor = 1.000)		
	<input checked="" type="checkbox"/> With the following modification(s): 1.516 (see attached) Cite the nature and percent modification. Attach supporting data and/or rationale for the modification(s).		
	B. Loss Cost Modification Factor:	<u>1.516</u>	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	<u>5.0%</u>	
	B. Other Acquisition	<u>20.6%</u>	
	C. General Expenses	<u>Incl. in B</u>	
	D. Taxes, Licenses, Fees & Loss Based Assessments	<u>2.96%</u>	
	E. Profit, Contingencies and Investment Income	<u>10.0%</u>	
	F. Uncollectible Premium Provision	<u>10.0%</u>	
	G. Total (A + B + C + D + E + F)	<u>48.6%</u>	
4.	Development of Expected Loss & Loss Adjustment Expense (Target Cost) Ratio: (Expressed in decimal form: 1.000 - 3G)	<u>0.514</u>	
5.	Overall impact of expense constant & minimum premiums: (Expressed in decimal form: i.e., 1.2% overall impact would be 1.012)	<u>1.153</u>	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)	<u>1.000</u>	
7.	Provision for loss based assessments	<u>0.000</u>	
8.	Formula Loss Cost Multiplier : $2B \times (1.0 - 7) / ((6 - 3G) \times 5)$	<u>2.557</u>	
9.	Selected Loss Cost Multiplier: (Explain any differences between 8 and 9, other than rounding)	<u>2.557</u>	
10.	Rate Level Changes for the Coverages to which this page applies	<u>2.2%</u>	
11.	Are you amending:		
	the minimum premium formula?	No	
	the expense constant(s) ?	Yes	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.		

**North Carolina Department of Insurance**

Summary of Supporting Information Form  
Calculation of CURRENT Assigned Risk Loss Cost Multiplier  
Effective April 1, 2015

1. Does this filing apply uniformly to all workers compensation classes?  
(If no, identify exception and provide justification for variations.)
  
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): 1.432  
Cite the nature and percent modification. Attach supporting data and/or rationale for the modification(s).
  - B. Loss Cost Modification Factor: 1.432  
  
 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	20.4%
C. General Expenses	Incl. in B
D. Taxes, Licenses, Fees & Loss Based Assessments	2.96%
E. Profit, Contingencies and Investment Income	9.0%
F. Uncollectible Premium Provision	9.5%
G. Total (A + B + C + D + E + F)	46.9%
  
4. Development of Expected Loss & Loss Adjustment Expense (Target Cost) Ratio:  
(Expressed in decimal form: 1.000 - 3G) 0.531
  
5. Overall impact of expense constant & minimum premiums:  
(Expressed in decimal form: i.e., 1.2% overall impact would be 1.012) 1.200
  
6. Overall impact of size-of-risk discounts plus expense gradation recognition in retrospective rating:  
(Expressed in decimal form: i.e., 8.6% average discount would be 0.914) 1.000
  
7. Provision for premium taxes, licenses, fees and loss based assessments 0.000
  
8. Formula Loss Cost Multiplier :  $2B \times (1.0 - 7) / ((6 - 3G) \times 5)$  2.247
  
9. Selected Lost Cost Multiplier 2.247

## North Carolina - Assigned Risk

### Calculation of Loss Cost Modification Factor

1. Current Assigned Risk Differential	1.604
2. Proposed Change in Assigned Risk Differential (See Exh. II-E, Sheet 1)	1.064
3. Proposed Assigned Risk Differential (1) x (2)	1.707
4. Factor to Adjust Loss Costs to Avoid Double Counting Servicing Carrier LAE (See Exhibit II-A, Sheet 3)	0.888
5. Loss Cost Modification Factor (3) x (4)	1.516

## 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)	17.0%
Factor to adjust loss costs to avoid double counting Servicing Carrier LAE (See Exhibit II-A, Sheet 3)	0.888
3. Other Acquisition, General Expense * (and LAE for Servicing Carriers) (See Exhibit II-B, Sheet 1)	20.6%
4. Uncollectible Premium Provision (See Exhibit II-F)	10.0%
5. Underwriting Profit and Contingencies	10.0%
a. Underwriting Profit (See Exhibits RB-11 and RB-13)	10.0%
b. Contingencies	--
6. Taxes, Licenses, and Fees	
TLF Including Regulatory Surcharge (2.5% x 1.065)	2.66%
Miscellaneous Tax (judgmentally selected)	0.3%
Total Including Miscellaneous Tax	2.96%
7. Effect of Expense Constant and Minimum Premiums (See Exhibit II-D) (Expense Constant of \$160)	15.3%

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

## North Carolina

### Derivation of Loss Adjustment Expense Provision

	<u>COUNTRYWIDE</u>			<u>NORTH CAROLINA</u>		
(1) <u>Year</u>	(2) Accident Year Developed LAE Ratio+	(3) Accident Year Developed DCCE Ratio+	(4) Accident Year Developed AOE Ratio+	(5) Accident Year DCCE Ratio Adjusted to NC Relativity (3) x 0.744 <sup>^</sup>	(6) Accident Year LAE Ratio Adjusted to NC Relativity (4) + (5)	(7) <u>Calendar Year</u>
2010	18.5%	11.5%	7.0%	8.6%	15.6%	18.1%
2011	18.8%	12.1%	6.7%	9.0%	15.7%	16.0%
2012	19.8%	12.8%	7.0%	9.5%	16.5%	16.3%
2013	20.3%	12.9%	7.4%	9.6%	17.0%	17.5%
2014	20.4%	13.4%	7.0%	10.0%	17.0%	19.7%
Current North Carolina Loss Adjustment Expense Provision						17.0%
Selected North Carolina Loss Adjustment Expense Provision						17.0%

+ Source: NCCI Call for Loss Adjustment Expense (See Exhibit RB-4).

<sup>^</sup> Exhibit II-A, Sheet 2.

## North Carolina

### Derivation of North Carolina DCCE relativity

	(1)	(2)	(3)
	Calendar Years 2013 and 2014 <u>Paid Losses* ('000s)</u>	Calendar Years 2013 and 2014 <u>Paid DCCE* ('000s)</u>	DCCE Ratio <u>(2)/(1)</u>
(a) North Carolina	\$1,570,158	\$142,007	9.0%
(b) Countrywide	47,699,535	5,789,801	12.1%
 North Carolina DCCE relativity (3a) / (3b)			 0.744
 Selected DCCE relativity			 0.744

\* Source: Annual Statement Statutory Page 14 data, excluding state funds, collected and aggregated by NCCI, Inc.

## North Carolina - Assigned Risk

### Derivation of Loss Adjustment Expense Removal Factor

1. Selected loss adjustment expense provision (See Exhibit II-A, Sheet 1)	1.170
2. Servicing carrier 2016 quota (See Exhibit II-B, Sheet 1)	0.7725
3. Factor to adjust loss costs to avoid double counting servicing carrier LAE $[(2) / (1)] + [1.0 - (2)]$	0.888

## North Carolina - Assigned Risk

Average Expense Provision  
Other Acquisition, General Expense and Servicing Carrier LAE

1. Servicing Carriers (See Exhibit II-B, Sheet 2)	
a. Allowance and separate reimbursement (incl. LAE)	23.32%
b. Quota (100% - 2b)	77.25%
2. Direct Assignment Carriers (See Exhibit II-B, Sheet 2)	
a. Other acquisition and general expense ratio	11.21%
b. Quota	22.75%
3. Average expense provision, excluding taxes, licenses and fees and loss-based assessments and including servicing carrier LAE (1a)x(1b) + (2a)x(2b)	20.6%

## North Carolina - Assigned Risk

### Expense Ratios for Servicing Carriers

1. Weighted-Average of 1/1/2015 Three-Year Servicing Carrier Allowances* (Includes LAE)	21.12%
2. Pool Administration Expenses (See Exhibit II-C)	2.2%
 Total Servicing Carrier Allowance and Separate Reimbursement	 23.32%

### Expense Ratios for Direct Assignment Carriers^

Calendar Year	Net Earned Premium <u>Std. Basis</u>	Commission & Brokerage	Other Acq. Field Super. <u>Collection</u>	General <u>Expenses</u>	Other Acq. Field Super. & Gen. Exp <u>&amp; Gen. Exp</u>
2012	\$357,997,760	\$20,429,622	\$14,348,140	\$20,679,138	\$35,027,278
2013	364,409,587	20,095,154	18,927,463	17,244,538	36,172,001
2014	<u>352,821,288</u>	<u>19,982,976</u>	<u>17,940,686</u>	<u>17,385,251</u>	<u>35,325,937</u>
 Total	 \$1,075,228,635	 \$60,507,752	 \$51,216,289	 \$55,308,927	 \$106,525,216

Direct Assignment Carriers' Other Acquisition and General Expense Ratio#	11.21%
Direct Assignment Carriers' 2016 Quota (See Exhibit II-B, Sheet 1)	22.75%

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

^ Source: Data collected by NCCI, Inc. Based on data from current direct assignment carriers.

# Weighted by individual carrier direct assignment market shares.

## North Carolina - Assigned Risk

Pool Expense Provision\*

Data Valued as of 12/31/2014

Calendar Year	Gross Written Premium	Administrative & Separately Reimbursable Expense	Expenses as a % of GWP
2005	\$94,687,415	\$1,524,794	1.6%
2006	85,136,259	1,340,448	1.6%
2007	79,009,903	1,578,985	2.0%
2008	67,829,797	1,487,546	2.2%
2009	35,409,667	1,526,566	4.3%
2010	28,209,061	1,391,888	4.9%
2011	26,656,338	1,101,386	4.1%
2012	44,339,357	1,033,100	2.3%
2013	59,499,848	1,041,196	1.7%
2014	62,118,817	998,280	<u>1.6%</u>
		Weighted Average	2.2%

\* Source: Data collected by NCCI, Inc.

## 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 *	\$ 3,155,199	\$ 3,481,677
(4) Standard Premium Including Additional Premium Generated by MPM and MMP *	\$ 43,795,215	\$ 44,121,693
(5) Impact of MPM and MMP = (3) / (4)	0.072	0.079
(6) Expense Constant	250	160
(7) Standard Premium Including Expense Constant Premium and Balance to Minimum Premium **	\$ 61,403,785	\$ 61,403,785
(8) Standard Premium Excluding Expense Constant Premium and Balance to Minimum Premium **	\$ 51,802,462	\$ 53,237,526
(9) Premium Generated from Expense Constant and Balance to Minimum Premium = (7) - (8)	\$ 9,601,323	\$ 8,166,259
(10) Effect of Expense Constant and Minimum Premiums = (9) / (8)		0.153

\* Source: Unit Statistical Data for policy years 2003 through 2010.

\*\* Source: Policy Data collected by the NCRB for policy years 2012 through 2014.

**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)
<b>I. Residual Market Experience Valued as of 12/31/2014</b>				
2004	\$64,154,145	\$92,610,094	1.444	
2005	65,059,513	81,375,022	1.251	
2006	52,627,752	81,292,078	1.545	
2007	44,353,315	70,097,472	1.580	
2008	28,389,396	38,585,641	1.359	
2009	19,764,093	22,577,284	1.142	
2010	15,854,662	20,488,644	1.292	
2011	15,079,552	27,370,553	1.815	
2012	20,940,554	32,320,976	1.543	
2013	26,650,497	40,999,660	1.538	
<b>II. Statewide Experience Valued as of 12/31/2014</b>				
2004	\$772,264,975	\$734,038,216	0.951	1.518
2005	835,427,406	758,478,170	0.908	1.378
2006	894,262,060	785,034,353	0.878	1.760
2007	968,524,623	882,329,514	0.911	1.734
2008	900,341,419	789,007,562	0.876	1.551
2009	837,441,784	733,758,549	0.876	1.304
2010	864,965,692	768,102,392	0.888	1.455
2011	902,995,944	796,226,007	0.882	2.058
2012	918,311,822	753,639,111	0.821	1.879
2013	952,446,492	741,752,883	0.779	1.974
			Average Differential ^	1.661
(a)	Indicated Differential in Standard Pure Premium Based on Experience			1.661
(b)	Current Impact of Standard Pure Premium Programs@			1.651
(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)]			1.121
(e)	Selected Change in Assigned Risk Pure Premium Differential (Proposed Assigned Risk Pure Premium Differential = 1.707)			1.064

\* Developed to fifth report and brought to the 4/1/2015 pure premium level.

\*\* Developed to ultimate and brought to the 8/7/2014 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 2.9% and a differential of 1.604. ARAP impact from Exhibit II-E, Sheet 9.

## North Carolina - Assigned Risk (Residual Market)

Policy Year	(1) Standard Premium*	(2) On-level Factor <sup>^</sup>	(3) Effect of Current Standard Premium Programs#	(4) = (1) x ((2) / (3)) Stand. Pure Prem. at Current Level
2004	\$125,546,272	0.867	1.697	\$64,154,145
2005	131,433,360	0.832	1.681	65,059,513
2006	120,983,338	0.727	1.670	52,627,752
2007	110,606,770	0.662	1.651	44,353,315
2008	74,512,851	0.621	1.631	28,389,396
2009	51,874,260	0.622	1.633	19,764,093
2010	41,395,985	0.625	1.630	15,854,662
2011	40,427,754	0.612	1.642	15,079,552
2012	55,545,236	0.619	1.644	20,940,554
2013	71,641,121	0.615	1.655	26,650,497

Policy Year	(5) Ind. Losses Paid	(6) Development Factor	(7) On-level Factor <sup>^</sup>	(8) = ((5) x (6)) x (7) Adjusted Ind. Losses
2004	\$46,209,328	1.079	1.019	\$50,807,202
2005	38,476,577	1.090	1.017	42,652,440
2006	34,395,906	1.112	1.012	38,707,226
2007	30,121,741	1.135	1.006	34,393,305
2008	16,158,997	1.166	1.002	18,879,074
2009	9,481,178	1.224	0.996	11,558,542
2010	9,227,430	1.318	0.994	12,088,782
2011	8,283,446	1.504	1.007	12,545,511
2012	7,512,624	1.970	1.007	14,903,468
2013	5,319,173	3.966	1.003	21,159,128

Policy Year	(9) Med. Losses Paid	(10) Development Factor	(11) On-level Factor <sup>^</sup>	(12) = ((9) x (10)) x (11) Adjusted Med. Losses
2004	\$36,580,063	1.183	0.966	\$41,802,892
2005	33,460,341	1.198	0.966	38,722,582
2006	36,075,039	1.222	0.966	42,584,852
2007	29,687,418	1.245	0.966	35,704,167
2008	16,113,881	1.266	0.966	19,706,567
2009	8,674,194	1.315	0.966	11,018,742
2010	6,363,749	1.365	0.967	8,399,862
2011	10,504,202	1.452	0.972	14,825,042
2012	11,123,357	1.606	0.975	17,417,508
2013	9,556,958	2.097	0.990	19,840,532

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

<sup>^</sup> See Appendix A-I for the derivation of the factors for policy years 2012 and 2013.

Factors for the remaining years are calculated in a similar manner.

# This is composed of a differential of 1.604 and year-specific ARAP impacts which are displayed on Exhibit II-E, Sheet 9.

## North Carolina - Assigned Risk (Statewide Market)

Policy Year	(1) Voluntary Standard Premium*	(2) Assigned Risk Standard Premium**	(3) = (1) + (2) Standard Pure Premium On-level	
2004	\$708,110,830	\$64,154,145	\$772,264,975	
2005	770,367,893	65,059,513	835,427,406	
2006	841,634,308	52,627,752	894,262,060	
2007	924,171,308	44,353,315	968,524,623	
2008	871,952,023	28,389,396	900,341,419	
2009	817,677,691	19,764,093	837,441,784	
2010	849,111,030	15,854,662	864,965,692	
2011	887,916,392	15,079,552	902,995,944	
2012	897,371,268	20,940,554	918,311,822	
2013	925,795,995	26,650,497	952,446,492	

Policy Year	(4) Ind. Losses Paid	(5) Development Factor	(6) On-level Factor^	(7) = ((4) x (5)) x (6) Adjusted Ind. Losses
2004	\$356,840,365	1.079	1.019	\$392,346,338
2005	364,466,248	1.090	1.017	404,021,770
2006	375,672,095	1.112	1.012	422,760,338
2007	413,294,826	1.135	1.006	471,904,166
2008	363,724,544	1.166	1.002	424,951,024
2009	322,553,353	1.224	0.996	393,226,083
2010	307,615,784	1.318	0.994	403,004,977
2011	272,188,119	1.504	1.007	412,236,528
2012	194,157,885	1.970	1.007	385,168,470
2013	101,700,174	3.966	1.003	404,552,919

Policy Year	(8) Med. Losses Paid	(9) Development Factor	(10) On-level Factor^	(11) = ((8) x (9)) x (10) Adjusted Med. Losses
2004	\$299,001,099	1.183	0.966	\$341,691,878
2005	306,287,221	1.198	0.966	354,456,400
2006	306,894,321	1.222	0.966	362,274,015
2007	341,261,816	1.245	0.966	410,425,348
2008	297,685,720	1.266	0.966	364,056,538
2009	268,074,586	1.315	0.966	340,532,466
2010	276,598,380	1.365	0.967	365,097,415
2011	272,073,625	1.452	0.972	383,989,479
2012	235,316,691	1.606	0.975	368,470,641
2013	162,425,381	2.097	0.990	337,199,964

\* 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 2012 and 2013.

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)
<b>I. Residual Market Experience Valued as of 12/31/2014</b>				
2004	\$64,154,145	\$98,429,040	1.534	
2005	65,059,513	83,499,559	1.283	
2006	52,627,752	80,405,888	1.528	
2007	44,353,315	74,827,793	1.687	
2008	28,389,396	38,813,440	1.367	
2009	19,764,093	25,704,707	1.301	
2010	15,854,662	18,213,378	1.149	
2011	15,079,552	29,809,847	1.977	
2012	20,940,554	42,782,708	2.043	
2013	26,650,497	48,459,482	1.818	
<b>II. Statewide Experience Valued as of 12/31/2014</b>				
2004	\$772,264,975	\$734,057,197	0.951	1.613
2005	835,427,406	756,530,619	0.906	1.416
2006	894,262,060	763,429,538	0.854	1.789
2007	968,524,623	867,996,052	0.896	1.883
2008	900,341,419	763,791,753	0.848	1.612
2009	837,441,784	714,311,598	0.853	1.525
2010	864,965,692	740,301,263	0.856	1.342
2011	902,995,944	762,069,953	0.844	2.342
2012	918,311,822	733,012,278	0.798	2.560
2013	952,446,492	712,407,853	0.748	2.430
			Average Differential ^	1.851
(a)	Indicated Differential in Standard Pure Premium Based on Experience			1.851
(b)	Current Impact of Standard Pure Premium Programs@			1.651
(c)	Indicated Change in Assigned Risk Pure Premium Differential = (a)/(b)			1.121

\* Developed to fifth report and brought to the 4/1/2015 pure premium level.

\*\* Developed to ultimate and brought to the 8/7/2014 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 2.9% and a differential of 1.604. ARAP impact from Exhibit II-E, Sheet 9.

## North Carolina - Assigned Risk (Residual Market)

Policy Year	(1) Standard Premium*	(2) On-level Factor <sup>^</sup>	(3) Effect of Current Standard Premium Programs#	(4) = (1) x ((2) / (3)) Stand. Pure Prem. at Current Level
2004	\$125,546,272	0.867	1.697	\$64,154,145
2005	131,433,360	0.832	1.681	65,059,513
2006	120,983,338	0.727	1.670	52,627,752
2007	110,606,770	0.662	1.651	44,353,315
2008	74,512,851	0.621	1.631	28,389,396
2009	51,874,260	0.622	1.633	19,764,093
2010	41,395,985	0.625	1.630	15,854,662
2011	40,427,754	0.612	1.642	15,079,552
2012	55,545,236	0.619	1.644	20,940,554
2013	71,641,121	0.615	1.655	26,650,497

Policy Year	(5) Ind. Losses Paid+Case	(6) Development Factor	(7) On-level Factor <sup>^</sup>	(8) = ((5) x (6)) x (7) Adjusted Ind. Losses
2004	\$47,294,705	1.033	1.019	\$49,783,683
2005	40,745,519	1.036	1.017	42,929,968
2006	36,115,674	1.041	1.012	38,047,574
2007	30,911,710	1.050	1.006	32,652,040
2008	17,969,987	1.062	1.002	19,122,294
2009	10,853,512	1.085	0.996	11,728,957
2010	9,782,062	1.115	0.994	10,841,557
2011	10,734,048	1.184	1.007	12,798,077
2012	13,050,697	1.344	1.007	17,662,918
2013	13,461,937	1.824	1.003	24,628,237

Policy Year	(9) Med. Losses Paid+Case	(10) Development Factor	(11) On-level Factor <sup>^</sup>	(12) = ((9) x (10)) x (11) Adjusted Med. Losses
2004	\$46,072,747	1.093	0.966	\$48,645,357
2005	38,144,874	1.101	0.966	40,569,591
2006	39,468,214	1.111	0.966	42,358,314
2007	38,843,594	1.124	0.966	42,175,753
2008	17,880,885	1.140	0.966	19,691,146
2009	12,515,268	1.156	0.966	13,975,750
2010	6,471,471	1.178	0.967	7,371,821
2011	14,476,279	1.209	0.972	17,011,770
2012	20,627,612	1.249	0.975	25,119,790
2013	18,250,163	1.319	0.990	23,831,245

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

<sup>^</sup> See Appendix A-I for the derivation of the factors for policy years 2012 and 2013.

Factors for the remaining years are calculated in a similar manner.

# This is composed of a differential of 1.604 and year-specific ARAP impacts which are displayed on Exhibit II-E, Sheet 9.

## North Carolina - Assigned Risk (Statewide Market)

Policy Year	(1) Voluntary Standard Premium*	(2) Assigned Risk Standard Premium**	(3) = (1) + (2) Standard Pure Premium On-level	
2004	\$708,110,830	\$64,154,145	\$772,264,975	
2005	770,367,893	65,059,513	835,427,406	
2006	841,634,308	52,627,752	894,262,060	
2007	924,171,308	44,353,315	968,524,623	
2008	871,952,023	28,389,396	900,341,419	
2009	817,677,691	19,764,093	837,441,784	
2010	849,111,030	15,854,662	864,965,692	
2011	887,916,392	15,079,552	902,995,944	
2012	897,371,268	20,940,554	918,311,822	
2013	925,795,995	26,650,497	952,446,492	

Policy Year	(4) Ind. Losses Paid+Case	(5) Development Factor	(6) On-level Factor^	(7) = ((4) x (5)) x (6) Adjusted Ind. Losses
2004	\$369,201,099	1.033	1.019	\$388,631,045
2005	379,200,770	1.036	1.017	399,530,482
2006	391,766,658	1.041	1.012	412,723,040
2007	432,524,569	1.050	1.006	456,875,702
2008	384,483,914	1.062	1.002	409,138,561
2009	347,872,421	1.085	0.996	375,931,811
2010	342,775,148	1.115	0.994	379,901,124
2011	316,454,133	1.184	1.007	377,304,465
2012	265,100,155	1.344	1.007	358,788,670
2013	200,175,413	1.824	1.003	366,215,313

Policy Year	(8) Med. Losses Paid+Case	(9) Development Factor	(10) On-level Factor^	(11) = ((8) x (9)) x (10) Adjusted Med. Losses
2004	\$327,158,287	1.093	0.966	\$345,426,152
2005	335,663,360	1.101	0.966	357,000,137
2006	326,777,862	1.111	0.966	350,706,498
2007	378,639,167	1.124	0.966	411,120,350
2008	322,048,956	1.140	0.966	354,653,192
2009	303,018,715	1.156	0.966	338,379,787
2010	316,383,033	1.178	0.967	360,400,139
2011	327,418,749	1.209	0.972	384,765,488
2012	307,301,109	1.249	0.975	374,223,608
2013	265,117,084	1.319	0.990	346,192,540

\* 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 2012 and 2013.

Factors for the remaining years are calculated in a similar manner.

**North Carolina - Assigned Risk  
(Residual Market)**

**Section A - Assigned Risk Premium Development Factors**

<u>Policy Year</u>	<u>Standard Premium for Matching Companies</u>		<u>Development Factor</u>
	<u>1st Report</u>	<u>2nd Report</u>	
2010	41,400,028	41,331,341	0.998
2011	40,864,924	40,297,146	0.986
2012	54,141,728	55,600,837	1.027
Average			1.004
	<u>2nd Report</u>	<u>3rd Report</u>	
2009	52,269,741	51,838,082	0.992
2010	41,331,341	41,293,589	0.999
2011	40,297,146	40,387,367	1.002
Average			0.998
	<u>3rd Report</u>	<u>4th Report</u>	
2008	74,534,116	74,526,289	1.000
2009	51,838,082	51,846,292	1.000
2010	41,293,589	41,395,985	1.002
Average			1.001
	<u>4th Report</u>	<u>5th Report</u>	
2007	110,528,170	110,556,632	1.000
2008	74,526,289	74,484,013	0.999
2009	51,846,292	51,874,260	1.001
Average			1.000

Three-year average premium development factors

<u>1st/5th</u>	<u>2nd/5th</u>	<u>3rd/5th</u>	<u>4th/5th</u>
1.003	0.999	1.001	1.000

**Section B - Calculation of Developed Assigned Risk Standard Premium**

<u>Policy Year</u>	<u>Standard Premium</u>	<u>Development Factor</u>	<u>Developed Premium</u>
2004	125,546,272	1.000	125,546,272
2005	131,433,360	1.000	131,433,360
2006	120,983,338	1.000	120,983,338
2007	110,606,770	1.000	110,606,770
2008	74,512,851	1.000	74,512,851
2009	51,874,260	1.000	51,874,260
2010	41,395,985	1.000	41,395,985
2011	40,387,367	1.001	40,427,754
2012	55,600,837	0.999	55,545,236
2013	71,426,840	1.003	71,641,121

**North Carolina - Assigned Risk  
(Statewide Market)**

**Section A - Voluntary Premium Development Factors**

<u>Policy Year</u>	<u>Standard Premium for Matching Companies</u>		<u>Development Factor</u>
	<u>1st Report</u>	<u>2nd Report</u>	
2010	912,038,775	917,565,380	1.006
2011	922,944,873	930,663,743	1.008
2012	926,002,072	934,769,119	1.009
Average			1.008
	<u>2nd Report</u>	<u>3rd Report</u>	
2009	955,318,907	955,426,108	1.000
2010	917,565,380	917,047,703	0.999
2011	922,953,631	922,614,619	1.000
Average			1.000
	<u>3rd Report</u>	<u>4th Report</u>	
2008	1,044,970,275	1,044,742,320	1.000
2009	955,426,108	955,444,689	1.000
2010	907,166,879	906,980,260	1.000
Average			1.000
	<u>4th Report</u>	<u>5th Report</u>	
2007	1,073,923,919	1,073,694,536	1.000
2008	1,044,742,320	1,044,897,243	1.000
2009	946,312,698	946,112,376	1.000
Average			1.000

Three-year average premium development factors

<u>1st/5th</u>	<u>2nd/5th</u>	<u>3rd/5th</u>	<u>4th/5th</u>
1.008	1.000	1.000	1.000

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

<u>Policy Year</u>	<u>Standard Premium</u>	<u>Development Factor</u>	<u>Voluntary On-level Factor*</u>	<u>Voluntary Prem Dev't &amp; On-level</u>
2004	702,490,903	1.000	1.008	708,110,830
2005	774,239,088	1.000	0.995	770,367,893
2006	904,011,072	1.000	0.931	841,634,308
2007	1,070,882,164	1.000	0.863	924,171,308
2008	1,044,253,920	1.000	0.835	871,952,023
2009	954,116,326	1.000	0.857	817,677,691
2010	914,990,334	1.000	0.928	849,111,030
2011	927,812,322	1.000	0.957	887,916,392
2012	939,655,778	1.000	0.955	897,371,268
2013	949,791,528	1.008	0.967	925,795,995

\* See Appendix A-I for the derivation of the figures for policy years 2012 and 2013.

## North Carolina - Assigned Risk

### Impact of the Assigned Risk Adjustment Program\*

Based on Assigned Risk Data for Policies with Effective Dates in 2014

<u>Type of Risk</u>	(1) Experience Modified <u>Premium</u>	(2) ARAP <u>Premium</u>	(3) ARAP Impact <u>(2) / (1)</u>
Risks with Credit Mods	\$7,949,777	\$7,949,777	1.000
Risks with Debit Mods	8,190,795	10,230,450	1.249
Risks with Mods of 1.00	95,556	95,556	1.000
Risks with No Mods	<u>54,519,875</u>	<u>54,519,875</u>	<u>1.000</u>
Totals	\$70,756,003	\$72,795,658	1.029

### Historical Impacts of the Assigned Risk Adjustment Program

<u>Policy Year</u>	<u>ARAP Impact</u>
2004	1.058
2005	1.048
2006	1.041
2007	1.029
2008	1.017
2009	1.018
2010	1.016
2011	1.024
2012	1.025
2013	1.032

\* Source: North Carolina Rate Bureau

## North Carolina - Assigned Risk

### Uncollectible Premium Provision

#### Section 1 - Gross Premium as of 12/31/2014 - Traumatic Only (000s)

Policy Year	1st	2nd	3rd	4th	5th	6th	7th	8th	Ultimate Gross
2003						85,172	85,119	85,281	85,281
2004					86,921	86,953	87,065	87,042	87,042
2005				99,443	98,829	98,901	98,892	98,883	98,883
2006			86,140	86,053	86,384	86,384	86,379	86,381	86,381
2007		81,207	81,286	81,916	81,963	81,968	81,979		81,979
2008	56,702	55,298	55,473	55,456	55,431	55,456			55,456
2009	37,953	37,700	37,324	37,363	37,388				37,388
2010	27,467	27,292	27,350	27,460					27,488
2011	30,406	29,958	29,964						30,054
2012	44,773	45,425							45,606
2013	61,228								60,921

Policy Year	1 / 2	2 / 3	3 / 4	4 / 5	5 / 6	6 / 7	7 / 8	8 / Ult
2003						0.999	1.002	
2004					1.000	1.001	1.000	
2005				0.994	1.001	1.000	1.000	
2006			0.999	1.004	1.000	1.000	1.000	
2007		1.001	1.008	1.001	1.000	1.000		
2008	0.975	1.003	1.000	1.000	1.000			
2009	0.993	0.990	1.001	1.001				
2010	0.994	1.002	1.004					
2011	0.985	1.000						
2012	1.015							

5-Yr Avg x H/L	0.991	1.001	1.002	1.001	1.000	1.000	1.000	
Selected	0.991	1.001	1.002	1.001	1.000	1.000	1.000	1.000
Ultimate	0.995	1.004	1.003	1.001	1.000	1.000	1.000	1.000

#### Section 2 - Collected Premium as of 12/31/2014 - Traumatic Only (000s)

Policy Year	1st	2nd	3rd	4th	5th	6th	7th	8th	Ultimate Collected	Uncollected/ Gross
2003						80,426	80,381	80,531	80,531	5.6%
2004					80,452	80,508	80,628	80,518	80,518	7.5%
2005				91,867	91,178	91,310	91,232	91,288	91,288	7.7%
2006			77,160	76,940	77,192	77,078	77,165	77,197	77,197	10.6%
2007		67,740	66,953	67,337	67,522	67,589	67,634		67,701	17.4%
2008	52,893	48,261	48,126	48,373	48,444	48,492			48,540	12.5%
2009	35,278	33,352	33,304	33,482	33,537				33,604	10.1%
2010	25,817	24,884	25,078	25,124					25,225	8.2%
2011	28,976	27,566	26,525						26,737	11.0%
2012	42,451	40,444							40,565	11.1%
2013	58,222								55,485	8.9%

Policy Year	1 / 2	2 / 3	3 / 4	4 / 5	5 / 6	6 / 7	7 / 8	8 / Ult		
2003						0.999	1.002		3-Yr Avg	10.3%
2004					1.001	1.001	0.999		5-Yr Avg	9.9%
2005				0.992	1.001	0.999	1.001		10-Yr Avg	10.5%
2006			0.997	1.003	0.999	1.001	1.000			
2007		0.988	1.006	1.003	1.001	1.001			Selected	10.0%
2008	0.912	0.997	1.005	1.001	1.001					
2009	0.945	0.999	1.005	1.002						
2010	0.964	1.008	1.002							
2011	0.951	0.962								
2012	0.953									

5-Yr Avg x H/L	0.950	0.995	1.004	1.002	1.001	1.000	1.001	
Selected	0.950	0.995	1.004	1.002	1.001	1.000	1.001	1.000
Ultimate	0.953	1.003	1.008	1.004	1.002	1.001	1.001	1.000

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

**WORKERS COMPENSATION AND EMPLOYERS LIABILITY**

**NORTH CAROLINA**

Exhibit III

Page S1

Effective April 1, 2016

**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	7.13	1500	1.58	0.30	2002	4.88	1136	1.13	0.33	2702	47.25	1500	7.79	0.21
0008	5.75	1310	1.21	0.27	2003	8.26	1500	1.82	0.30	2705X*	175.87	1500	34.19	0.24
0016	15.11	1500	2.96	0.24	2014	9.21	1500	1.80	0.24	2709	20.87	1500	4.06	0.24
0034	8.98	1500	1.98	0.30	2016	4.22	1004	0.96	0.33	2710	20.87	1500	3.84	0.21
0035	5.09	1178	1.17	0.33	2021	4.22	1004	0.89	0.27	2714	9.38	1500	2.15	0.33
0036	9.64	1500	2.14	0.30	2039	5.37	1234	1.23	0.33	2727X	21.81	1500	4.23	0.24
0037	8.54	1500	1.80	0.27	2041	5.96	1352	1.37	0.33	2731	8.21	1500	1.60	0.24
0042	10.48	1500	2.20	0.27	2065	7.06	1500	1.56	0.30	2735	10.00	1500	2.30	0.33
0050	13.73	1500	3.02	0.30	2070	10.97	1500	2.41	0.30	2759	12.20	1500	2.80	0.33
0059D	0.87	-	0.07	0.21	2081	5.83	1326	1.29	0.30	2790	3.71	902	0.85	0.33
0065D	0.20	-	0.02	0.24	2089	6.03	1366	1.33	0.30	2791	-	-	1.82	0.33
0066D	0.20	-	0.02	0.24	2095	9.41	1500	2.07	0.30	2797	12.94	1500	2.86	0.30
0067D	0.20	-	0.02	0.24	2105	7.21	1500	1.66	0.33	2799	9.46	1500	1.96	0.27
0079	8.39	1500	1.64	0.24	2110	4.88	1136	1.12	0.33	2802	10.23	1500	2.15	0.27
0083	8.08	1500	1.78	0.30	2111	9.84	1500	2.27	0.33	2812	-	-	1.85	0.30
0106	48.71	1500	8.97	0.21	2112	6.90	1500	1.59	0.33	2835	5.57	1274	1.36	0.36
0113	11.10	1500	2.45	0.30	2114	4.76	1112	1.09	0.33	2836	4.14	988	1.02	0.36
0170	6.98	1500	1.54	0.30	2121	3.35	830	0.74	0.30	2841	7.90	1500	1.82	0.33
0251	9.44	1500	2.08	0.30	2130	4.50	1060	1.00	0.30	2881	8.23	1500	2.02	0.36
0400	14.75	1500	3.08	0.27	2131	6.34	1428	1.40	0.30	2883	8.36	1500	1.85	0.30
0401	23.83	A	4.39	0.21	2143	5.29	1218	1.22	0.33	2913	4.94	1148	1.21	0.36
0771N	1.02	-	-	-	2157	9.08	1500	1.99	0.30	2915	4.99	1158	1.04	0.27
0908P	312.00	472	68.42	0.30	2172	3.94	948	0.82	0.27	2916	7.67	1500	1.41	0.21
0913P	1429.00	1500	314.42	0.30	2174	7.13	1500	1.64	0.33	2923	4.73	1106	1.08	0.33
0917	11.40	1500	2.62	0.33	2211	17.49	1500	3.41	0.24	2942	4.53	1066	1.11	0.36
1005	14.91	1500	2.43	0.21	2220	6.21	1402	1.37	0.30	2960	10.66	1500	2.35	0.30
1164	14.42	1500	2.36	0.21	2286	3.02	764	0.69	0.33	3004	3.58	876	0.70	0.24
1165XD	7.75	1500	1.40	0.21	2288	11.10	1500	2.54	0.33	3018	7.52	1500	1.46	0.24
1320	5.04	1168	0.92	0.21	2300	5.27	1214	1.28	0.36	3022	16.70	1500	3.81	0.33
1322	20.92	1500	3.82	0.21	2302	4.24	1008	0.94	0.30	3027	5.37	1234	1.04	0.24
1430	17.21	1500	3.36	0.24	2305	6.09	1378	1.28	0.27	3028	6.01	1362	1.33	0.30
1438	8.00	1500	1.46	0.21	2361	4.47	1054	0.99	0.30	3030	12.43	1500	2.43	0.24
1452	6.11	1382	1.19	0.24	2362	3.43	846	0.75	0.30	3040	13.25	1500	2.58	0.24
1463	18.90	1500	3.48	0.21	2380	5.50	1260	1.22	0.30	3041	12.12	1500	2.66	0.30
1470	-	-	1.04	0.22	2386	3.45	850	0.79	0.33	3042	7.85	1500	1.64	0.27
1472	5.73	1306	1.04	0.22	2388	4.65	1090	1.07	0.33	3064	11.56	1500	2.56	0.30
1473	-	-	1.04	0.22	2402	6.14	1388	1.20	0.24	3069	-	-	1.42	0.30
1474	-	-	1.04	0.22	2413	5.91	1342	1.30	0.30	3076	6.42	1444	1.42	0.30
1624D	7.18	1500	1.30	0.21	2416	5.32	1224	1.18	0.30	3081D	9.64	1500	1.85	0.24
1642	5.63	1286	1.09	0.24	2417	3.17	794	0.70	0.30	3082D	7.70	1500	1.48	0.24
1654	63.90	1500	12.32	0.24	2501	5.37	1234	1.19	0.30	3085D	9.97	1500	1.91	0.24
1655	7.03	1500	1.36	0.24	2503	2.53	666	0.58	0.33	3110	11.10	1500	2.45	0.30
1699	8.46	1500	1.65	0.24	2534	3.73	906	0.86	0.33	3111	5.57	1274	1.23	0.30
1701	11.20	1500	2.18	0.24	2570	9.36	1500	2.14	0.33	3113	4.19	998	0.92	0.30
1710	14.04	1500	2.73	0.24	2585	8.11	1500	1.85	0.33	3114	5.24	1208	1.15	0.30
1741D	6.37	1434	0.91	0.21	2586	5.29	1218	1.16	0.30	3118	4.14	988	0.95	0.33
1747	4.45	1050	0.86	0.24	2587	6.98	1500	1.59	0.33	3119	1.94	548	0.48	0.36
1748	8.80	1500	1.72	0.24	2589	4.70	1100	1.04	0.30	3122	3.89	938	0.90	0.33
1803D	19.59	1500	3.30	0.21	2600	6.01	1362	1.37	0.33	3126	5.42	1244	1.20	0.30
1852D	5.09	1178	0.82	0.20	2623	13.99	1500	2.94	0.27	3131	3.43	846	0.76	0.30
1853	3.02	764	0.63	0.27	2651	3.84	928	0.88	0.33	3132	6.11	1382	1.35	0.30
1860	4.09	978	0.93	0.33	2660	5.11	1182	1.18	0.33	3145	4.12	984	0.91	0.30
1924	5.04	1168	1.16	0.33	2670	3.27	814	0.80	0.36	3146	5.04	1168	1.11	0.30
1925	6.98	1500	1.47	0.27	2683	2.63	686	0.61	0.33	3169	7.36	1500	1.62	0.30
2001	-	-	1.82	0.30	2688	7.29	1500	1.67	0.33	3175	8.67	1500	1.92	0.30

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

**WORKERS COMPENSATION AND EMPLOYERS LIABILITY**

*Effective April 1, 2016*

**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
3179	3.53	866	0.81	0.33	3830	2.56	672	0.54	0.27	4470	4.53	1066	1.00	0.30
3180	4.35	1030	1.00	0.33	3851	8.28	1500	1.90	0.33	4484	5.17	1194	1.14	0.30
3188	2.81	722	0.64	0.33	3865	4.40	1040	1.09	0.36	4493	5.01	1162	1.10	0.30
3220	3.86	932	0.85	0.30	3881	9.36	1500	2.06	0.30	4511	1.00	360	0.21	0.27
3223	6.88	1500	1.68	0.36	4000	10.53	1500	1.93	0.21	4557	5.88	1336	1.35	0.33
3224	7.47	1500	1.69	0.33	4021	9.87	1500	1.93	0.24	4558	2.86	732	0.63	0.30
3227	7.06	1500	1.61	0.33	4024D	6.44	1448	1.24	0.24	4561	-	-	0.83	0.27
3240	5.80	1320	1.34	0.33	4034	12.32	1500	2.41	0.24	4568	4.70	1100	0.92	0.24
3241	6.37	1434	1.40	0.30	4036	4.96	1152	0.96	0.24	4581	1.64	488	0.30	0.21
3255	5.34	1228	1.30	0.36	4038	6.70	1500	1.63	0.36	4583	12.99	1500	2.40	0.21
3257	7.21	1500	1.59	0.30	4053	3.94	948	0.87	0.30	4611	1.36	432	0.31	0.33
3270	6.01	1362	1.33	0.30	4061	5.63	1286	1.28	0.33	4635	6.42	1444	1.06	0.21
3300	6.98	1500	1.55	0.30	4062	5.24	1208	1.15	0.30	4653	4.53	1066	1.04	0.33
3303	8.08	1500	1.85	0.33	4101	6.52	1464	1.37	0.27	4665	14.37	1500	2.80	0.24
3307	7.36	1500	1.62	0.30	4109	1.02	364	0.24	0.33	4670	15.93	1500	3.13	0.24
3315	10.43	1500	2.39	0.33	4110	2.28	616	0.50	0.30	4683	9.23	1500	2.03	0.30
3334	8.95	1500	1.96	0.30	4111	3.20	800	0.73	0.33	4686	4.78	1116	0.93	0.24
3336	6.09	1378	1.18	0.24	4112	-	-	0.50	0.30	4692	1.25	410	0.29	0.33
3365	14.34	1500	2.79	0.24	4113	4.32	1024	0.94	0.29	4693	2.15	590	0.47	0.30
3372	7.65	1500	1.60	0.27	4114	7.57	1500	1.66	0.30	4703	4.35	1030	0.95	0.30
3373	9.59	1500	2.11	0.30	4130	8.11	1500	1.79	0.30	4717	4.78	1116	1.17	0.36
3383	2.51	662	0.57	0.33	4131	9.87	1500	2.27	0.33	4720	3.58	876	0.79	0.30
3385	1.89	538	0.43	0.33	4133	4.09	978	0.94	0.33	4740	6.24	1408	1.21	0.24
3400	6.52	1464	1.37	0.27	4149	1.33	426	0.33	0.36	4741	5.01	1162	1.10	0.30
3507	4.99	1158	1.10	0.30	4150	-	-	0.33	0.36	4751	6.67	1494	1.31	0.24
3515	4.30	1020	0.95	0.30	4206	5.57	1274	1.22	0.30	4771N	5.78	1500	0.96	0.21
3516	-	-	0.95	0.30	4207	3.73	906	0.72	0.24	4777	9.69	1500	1.59	0.21
3548	2.94	748	0.65	0.30	4239	6.78	1500	1.32	0.24	4825	2.45	650	0.48	0.24
3559	4.94	1148	1.09	0.30	4240	4.37	1034	1.00	0.33	4828	3.66	892	0.76	0.27
3574	1.53	466	0.35	0.33	4243	4.37	1034	0.96	0.30	4829	3.20	800	0.59	0.21
3581	2.25	610	0.52	0.33	4244	4.37	1034	0.96	0.30	4902	7.47	1500	1.70	0.33
3612	4.96	1152	1.04	0.27	4250	4.17	994	0.92	0.30	4923	2.07	574	0.45	0.30
3620	11.84	1500	2.32	0.24	4251	4.73	1106	1.04	0.30	5020	16.36	1500	3.19	0.24
3629	3.76	912	0.86	0.33	4263	8.62	1500	1.92	0.30	5022	16.36	1500	3.00	0.21
3632	6.49	1458	1.36	0.27	4273	6.03	1366	1.33	0.30	5037	39.89	1500	6.54	0.21
3634	3.58	876	0.82	0.33	4279	4.73	1106	1.04	0.30	5040	17.77	1500	2.92	0.21
3635	5.65	1290	1.24	0.30	4282	5.14	1188	1.17	0.33	5057	13.83	1500	2.28	0.21
3638	3.09	778	0.71	0.33	4283	3.91	942	0.86	0.30	5059	47.51	1500	7.87	0.20
3642	2.56	672	0.56	0.30	4299	3.78	916	0.87	0.33	5069	39.91	1500	6.51	0.21
3643	3.61	882	0.80	0.30	4301	-	-	1.04	0.30	5102	12.73	1500	2.34	0.21
3647	3.76	912	0.79	0.27	4304	9.74	1500	2.05	0.27	5146	12.55	1500	2.44	0.24
3648	2.84	728	0.65	0.33	4307	3.81	922	0.93	0.36	5160	6.78	1500	1.24	0.21
3681	1.84	528	0.42	0.33	4351	3.02	764	0.66	0.29	5183	9.92	1500	1.93	0.24
3685	2.48	656	0.57	0.33	4352	3.30	820	0.76	0.33	5188	13.22	1500	2.57	0.24
3719	3.04	768	0.50	0.21	4360	3.17	794	0.72	0.33	5190	10.66	1500	2.07	0.24
3724	7.29	1500	1.34	0.21	4361	2.53	666	0.58	0.33	5191	1.69	498	0.37	0.30
3726	11.99	1500	1.97	0.21	4362	-	-	0.72	0.33	5192	7.85	1500	1.73	0.30
3803	5.01	1162	1.10	0.30	4410	7.39	1500	1.63	0.30	5213	16.34	1500	3.00	0.21
3807	4.17	994	0.96	0.33	4417	-	-	1.63	0.30	5215	10.23	1500	2.14	0.27
3808	8.74	1500	1.82	0.27	4420	17.52	1500	3.20	0.21	5221	11.28	1500	2.19	0.24
3821	14.73	1500	3.10	0.27	4431	2.94	748	0.72	0.36	5222	21.79	1500	3.99	0.21
3822X	9.67	1500	2.02	0.27	4432	2.53	666	0.62	0.36	5223	11.69	1500	2.28	0.24
3824X	7.95	1500	1.67	0.27	4439	3.99	958	0.83	0.27	5348	10.56	1500	2.05	0.24
3826	1.53	466	0.33	0.29	4452	6.24	1408	1.38	0.30	5402	11.40	1500	2.62	0.33
3827	3.86	932	0.81	0.27	4459	5.68	1296	1.25	0.30	5403	14.86	1500	2.73	0.21

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

**WORKERS COMPENSATION AND EMPLOYERS LIABILITY**

Exhibit III

Effective April 1, 2016

**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
5437	13.02	1500	2.53	0.24	6826F	10.20	1500	1.60	0.23	7453N	1.05	-	-	-
5443	9.44	1500	2.08	0.30	6834	6.55	1470	1.37	0.27	7502	6.16	1392	1.20	0.24
5445	22.78	1500	4.19	0.21	6836	10.20	1500	1.99	0.24	7515	2.76	712	0.46	0.21
5462	15.57	1500	3.03	0.24	6843F	23.29	1500	3.20	0.19	7520	7.36	1500	1.63	0.30
5472	10.15	1500	1.66	0.21	6845F	21.04	1500	2.89	0.19	7529X	44.26	1500	7.29	0.21
5473	27.28	1500	4.51	0.21	6854	9.97	1500	1.64	0.21	7538	21.04	1500	3.48	0.21
5474	16.36	1500	3.01	0.21	6872F	22.63	1500	3.09	0.19	7539	5.42	1244	0.99	0.21
5478	8.26	1500	1.60	0.24	6874F	36.64	1500	5.01	0.19	7540	12.68	1500	2.10	0.21
5479	15.70	1500	3.29	0.27	6882	10.79	1500	1.77	0.21	7580	7.26	1500	1.41	0.24
5480	13.07	1500	2.39	0.21	6884	14.01	1500	2.28	0.21	7590	9.44	1500	1.98	0.27
5491	6.98	1500	1.28	0.21	7016M	9.10	1500	1.49	0.21	7600	12.61	1500	2.45	0.24
5506	15.16	1500	2.51	0.21	7024M	10.10	1500	1.65	0.21	7601	-	-	2.45	0.24
5507	10.82	1500	1.98	0.21	7038M	11.02	1500	1.83	0.20	7605	5.32	1224	1.04	0.24
5508	29.07	1500	5.62	0.24	7046M	15.01	1500	2.46	0.21	7610	1.38	436	0.29	0.27
5535	17.31	1500	3.38	0.24	7047M	17.92	1500	2.76	0.21	7611	-	-	2.45	0.24
5537	12.66	1500	2.46	0.24	7050M	21.73	1500	3.40	0.20	7612	-	-	2.45	0.24
5551	38.87	1500	6.43	0.20	7090M	12.25	1500	2.03	0.20	7613	-	-	2.45	0.24
5606	3.38	836	0.62	0.21	7098M	16.67	1500	2.74	0.21	7705	19.00	1500	3.98	0.27
5610	15.62	1500	3.45	0.30	7099M	29.58	1500	4.59	0.21	7710	12.32	1500	2.27	0.21
5645	33.01	1500	6.08	0.21	7133	10.69	1500	1.97	0.21	7711	12.32	1500	2.27	0.21
5651	-	-	6.08	0.21	7151M	12.99	1500	2.39	0.21	7720X	4.99	1158	0.97	0.24
5703	34.75	1500	6.74	0.24	7152M	25.62	1500	4.45	0.21	7723X	7.77	1500	1.29	0.20
5705	50.19	1500	9.82	0.24	7153M	14.42	1500	2.65	0.21	7855	8.18	1500	1.59	0.24
5951	0.72	304	0.17	0.33	7222X	17.57	1500	3.40	0.24	8001	5.52	1264	1.27	0.33
6003	23.19	1500	4.50	0.24	7228X	17.49	1500	3.39	0.24	8002	4.12	984	0.92	0.30
6005	13.17	1500	2.53	0.24	7229X	26.90	1500	4.91	0.21	8006	7.59	1500	1.68	0.30
6017	11.25	1500	2.17	0.24	7230X	20.30	1500	4.25	0.27	8008	3.04	768	0.70	0.33
6018	7.88	1500	1.51	0.24	7231	18.05	1500	3.77	0.27	8010	3.20	800	0.73	0.33
6045	10.53	1500	2.04	0.24	7232X	22.71	1500	4.14	0.21	8013	0.89	338	0.20	0.30
6204	24.01	1500	4.42	0.21	7309F	32.12	1500	4.41	0.19	8015	1.94	548	0.43	0.30
6206	9.08	1500	1.49	0.21	7313F	6.57	1474	0.90	0.19	8017	3.76	912	0.87	0.33
6213	5.63	1286	1.03	0.21	7317F	24.93	1500	3.35	0.19	8018	4.96	1152	1.13	0.33
6214	6.88	1500	1.13	0.21	7323	-	-	1.38	0.20	8021	5.98	1356	1.32	0.30
6216	16.03	1500	2.63	0.21	7327F	32.73	1500	4.53	0.19	8031	7.65	1500	1.70	0.30
6217	13.96	1500	2.56	0.21	7333M	9.74	1500	1.59	0.21	8032	4.58	1076	1.05	0.33
6229	9.72	1500	1.78	0.21	7335M	10.82	1500	1.76	0.21	8033	3.94	948	0.87	0.30
6233	6.70	1500	1.22	0.21	7337M	19.20	1500	2.95	0.21	8037	4.58	1076	1.05	0.33
6235	15.19	1500	2.49	0.21	7350F	24.73	1500	3.72	0.20	8039	4.96	1152	1.14	0.33
6236	27.08	1500	5.26	0.24	7360	10.97	1500	2.13	0.24	8044	8.13	1500	1.70	0.27
6237	4.42	1044	0.86	0.24	7370	15.70	1500	3.45	0.30	8045	1.23	406	0.28	0.33
6251D	16.26	1500	2.94	0.21	7380	11.74	1500	2.45	0.27	8046	6.21	1402	1.38	0.30
6252D	10.59	1500	1.73	0.21	7382	11.63	1500	2.56	0.30	8047	2.22	604	0.51	0.33
6260	15.16	1500	2.48	0.21	7390	11.74	1500	2.58	0.30	8058	6.52	1464	1.44	0.30
6306	12.35	1500	2.26	0.21	7394M	9.77	1500	1.59	0.21	8072	1.71	502	0.39	0.33
6319	13.78	1500	2.53	0.21	7395M	10.84	1500	1.77	0.21	8102	3.25	810	0.74	0.33
6325	12.66	1500	2.32	0.21	7398M	19.25	1500	2.96	0.21	8103	4.99	1158	1.05	0.27
6400	14.98	1500	3.14	0.27	7402	0.33	226	0.08	0.30	8105	5.06	1172	1.16	0.33
6503	3.94	948	0.90	0.33	7403	11.74	1500	2.29	0.24	8106	8.80	1500	1.71	0.24
6504	5.27	1214	1.21	0.33	7405N	4.99	1490	0.97	0.24	8107	9.10	1500	1.77	0.24
6702M*	9.95	1500	1.93	0.24	7420	30.45	1500	4.93	0.21	8111	4.91	1142	1.08	0.30
6703M*	19.61	1500	3.59	0.24	7421	2.25	610	0.41	0.21	8116	6.26	1412	1.39	0.30
6704M*	11.05	1500	2.14	0.24	7422	5.14	1188	0.85	0.21	8203	16.06	1500	3.55	0.30
6801F	6.65	1490	1.05	0.23	7425	6.78	1500	1.10	0.21	8204	7.75	1500	1.51	0.24
6811	16.75	1500	3.25	0.24	7431N	3.17	1004	0.52	0.21	8209	7.52	1500	1.66	0.30
6824F	20.15	1500	3.05	0.20	7445N	1.66	-	-	-	8215	8.11	1500	1.58	0.24

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

**WORKERS COMPENSATION AND EMPLOYERS LIABILITY**

**NORTH CAROLINA**

**Exhibit III**

**Page S4**

*Effective April 1, 2016*

**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
8227	11.05	1500	1.82	0.21	8842X	5.14	1188	1.14	0.30	9620	2.43	646	0.51	0.27
8232	10.61	1500	2.07	0.24	8848X	6.37	1434	1.41	0.30					
8233	6.72	1500	1.30	0.24	8849X	6.90	1500	1.52	0.30					
8235	10.61	1500	2.35	0.30	8855	0.31	222	0.07	0.30					
8236X	12.50	1500	2.42	0.24	8856	0.46	252	0.10	0.30					
8263	13.76	1500	2.91	0.27	8864X	3.22	804	0.71	0.30					
8264	10.71	1500	2.09	0.24	8868	1.18	396	0.27	0.33					
8265	14.73	1500	2.71	0.21	8869	2.81	722	0.65	0.33					
8279	18.28	1500	3.40	0.20	8871	0.26	212	0.06	0.33					
8288	17.52	1500	3.43	0.24	8901	0.49	258	0.10	0.27					
8291X	10.69	1500	2.25	0.27	9012	2.58	676	0.54	0.27					
8292X	8.03	1500	1.77	0.30	9014	6.65	1490	1.47	0.30					
8293X	27.54	1500	5.36	0.24	9015	7.57	1500	1.67	0.30					
8304	10.33	1500	2.01	0.24	9016	6.75	1500	1.50	0.30					
8350	18.28	1500	3.36	0.21	9019	5.34	1228	1.04	0.24					
8380	6.03	1366	1.27	0.27	9033	4.42	1044	0.98	0.30					
8381	4.40	1040	0.93	0.27	9040	7.49	1500	1.72	0.33					
8385	5.96	1352	1.16	0.24	9044	3.66	892	0.84	0.33					
8392	5.78	1316	1.29	0.30	9052	4.86	1132	1.12	0.33					
8393	3.91	942	0.86	0.30	9058	3.35	830	0.82	0.36					
8500	12.27	1500	2.39	0.24	9059	-	-	0.65	0.33					
8601	1.23	406	0.26	0.27	9060	2.84	728	0.65	0.33					
8602	2.38	636	0.50	0.27	9061	2.51	662	0.62	0.36					
8603	0.20	200	0.04	0.30	9062	3.17	794	0.77	0.36					
8606	7.21	1500	1.32	0.21	9063	2.35	630	0.55	0.34					
8709F	10.23	1500	1.41	0.19	9077F	4.58	1076	0.79	0.29					
8710	-	-	0.98	0.24	9082	2.94	748	0.72	0.36					
8719	7.29	1500	1.20	0.21	9083	3.04	768	0.74	0.36					
8720	4.30	1020	0.84	0.24	9084	3.25	810	0.72	0.30					
8721	0.69	298	0.13	0.24	9089	3.73	906	0.87	0.34					
8723	0.41	242	0.09	0.30	9093	3.15	790	0.72	0.34					
8725	5.47	1254	1.07	0.24	9101	7.21	1500	1.66	0.33					
8726F	6.42	1444	1.01	0.23	9102	6.90	1500	1.53	0.30					
8734M	1.30	420	0.26	0.24	9154	4.35	1030	0.96	0.30					
8737M	1.18	396	0.23	0.24	9156	5.42	1244	1.14	0.27					
8738M	2.33	626	0.43	0.24	9170	14.75	1500	2.44	0.20					
8742	0.97	354	0.19	0.24	9178	15.88	1500	3.92	0.36					
8745	11.58	1500	2.45	0.27	9179	25.83	1500	5.93	0.33					
8748	1.59	478	0.33	0.27	9180	10.30	1500	2.03	0.24					
8755	1.05	370	0.21	0.24	9182	4.70	1100	1.05	0.30					
8799	1.23	406	0.27	0.30	9186	30.74	1500	5.69	0.21					
8800	3.07	774	0.75	0.36	9220	11.17	1500	2.34	0.27					
8803	0.20	200	0.04	0.24	9402	11.97	1500	2.32	0.24					
8805M	0.46	252	0.10	0.30	9403	18.97	1500	3.48	0.21					
8810	0.33	226	0.08	0.30	9410	6.24	1408	1.38	0.30					
8814M	0.41	242	0.09	0.30	9501	7.93	1500	1.66	0.27					
8815M	0.79	318	0.18	0.30	9505	8.28	1500	1.74	0.27					
8820	0.33	226	0.07	0.27	9516	12.99	1500	2.53	0.24					
8824	7.26	1500	1.67	0.33	9519	9.03	1500	1.76	0.24					
8825	3.63	886	0.89	0.36	9521	11.02	1500	2.15	0.24					
8826	6.98	1500	1.54	0.30	9522	4.09	978	0.90	0.30					
8831	3.09	778	0.69	0.30	9534	16.83	1500	3.07	0.21					
8832	0.87	334	0.19	0.30	9554	33.09	1500	6.10	0.21					
8833	3.40	840	0.75	0.30	9586	1.30	420	0.32	0.36					
8835	5.96	1352	1.32	0.30	9600	4.96	1152	1.13	0.33					

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

Effective April 1, 2016

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	0.87	S	1624D	0.05	S	3082D	0.13	S
0065D	0.20	S	1741D	0.87	S	3085D	0.18	S
0066D	0.20	S	1803D	1.64	S	4024D	0.05	S
0067D	0.20	S	1852D	0.15	Asb	6251D	0.10	S
1165XD	0.08	S	3081D	0.18	S	6252D	0.08	S

Asb=Asbestos, 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 2.396 and elr x 2.26.
- 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, 2016

**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.....	\$65,200
Leased or rented vehicle.....	\$43,500

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

**Expense Constant** applicable in accordance with **Basic Manual** Rule 3-A-11..... \$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	<b>Loss Development Factors</b>	
Minimum Premium Factor	0.75	1st Adjustment	0.20
Maximum Premium Factor	1.75	2nd Adjustment	0.12
Loss Conversion Factor	1.17	3rd Adjustment	0.09
Tax Multiplier	1.031	4th Adjustment	0.06

**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"..... \$1,700

**Minimum Weekly Payroll** applicable in accordance with **Basic Manual** Rule 2-E-1 -- "Executive Officers" ..... \$850

**Premium Determination for Partners and Sole Proprietors** in accordance with **Basic Manual** Rule 2-E-3 (Annual Payroll)..... \$43,500

**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 Amount	HAZARD GROUP						
	A	B	C	D	E	F	G
\$100	0.6%	0.4%	0.4%	0.3%	0.2%	0.1%	0.1%
\$200	1.1%	0.8%	0.7%	0.5%	0.3%	0.2%	0.2%
\$300	1.5%	1.2%	1.0%	0.7%	0.5%	0.3%	0.3%
\$400	1.9%	1.4%	1.2%	0.9%	0.6%	0.4%	0.4%
\$500	2.2%	1.7%	1.4%	1.0%	0.7%	0.5%	0.4%
\$1,000	3.4%	2.7%	2.3%	1.7%	1.3%	0.9%	0.8%
\$1,500	4.4%	3.4%	2.9%	2.2%	1.7%	1.2%	1.0%
\$2,000	5.1%	4.0%	3.5%	2.6%	2.0%	1.5%	1.3%
\$2,500	5.8%	4.5%	3.9%	3.0%	2.4%	1.7%	1.5%
\$5,000	8.2%	6.5%	5.8%	4.6%	3.7%	2.9%	2.4%

**Terrorism - (Assigned Risk).....** \$0.02

Effective April 1, 2016

APPLICABLE TO ASSIGNED RISK POLICIES ONLY

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MISCELLANEOUS VALUES (cont.)

<b>United States Longshore and Harbor Workers' Compensation Coverage Percentage</b> applicable only in connection with <i>Basic Manual</i> Rule 3-A-4.....	92%
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(Multiply a Non-F classification rate by a factor of 1.92 to adjust for differences in benefits and loss-based expenses. This factor is the product of the adjustment for differences in benefits (1.82) and the adjustment for differences in loss-based expenses (1.053).)

**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 \$10,000. If more than two years, an average annual premium of at least \$5,000 is required. These amounts are applicable for ratings effective date April 1, 2016 and subsequent. The *Experience Rating Plan Manual* should be referenced for the latest approved eligibility amounts by state.

Effective April 1, 2016

**TABLE OF WEIGHTING VALUES  
APPLICABLE TO ALL POLICIES**

*Experience Rating Program - ERA*

Expected Losses			Weighting Values	Expected Losses			Weighting Values
0	--	2,523	0.04	1,422,973	--	1,501,463	0.44
2,524	--	10,201	0.05	1,501,464	--	1,584,498	0.45
10,202	--	18,042	0.06	1,584,499	--	1,672,484	0.46
18,043	--	26,054	0.07	1,672,485	--	1,765,880	0.47
26,055	--	34,240	0.08	1,765,881	--	1,865,201	0.48
34,241	--	57,270	0.09	1,865,202	--	1,971,029	0.49
57,271	--	85,248	0.10	1,971,030	--	2,084,026	0.50
85,249	--	110,135	0.11	2,084,027	--	2,204,949	0.51
110,136	--	134,366	0.12	2,204,950	--	2,334,662	0.52
134,367	--	158,601	0.13	2,334,663	--	2,474,160	0.53
158,602	--	183,134	0.14	2,474,161	--	2,624,594	0.54
183,135	--	208,132	0.15	2,624,595	--	2,787,304	0.55
208,133	--	233,707	0.16	2,787,305	--	2,963,858	0.56
233,708	--	259,945	0.17	2,963,859	--	3,156,101	0.57
259,946	--	286,915	0.18	3,156,102	--	3,366,223	0.58
286,916	--	314,683	0.19	3,366,224	--	3,596,841	0.59
314,684	--	343,308	0.20	3,596,842	--	3,851,108	0.60
343,309	--	372,849	0.21	3,851,109	--	4,132,859	0.61
372,850	--	403,365	0.22	4,132,860	--	4,446,806	0.62
403,366	--	434,917	0.23	4,446,807	--	4,798,804	0.63
434,918	--	467,568	0.24	4,798,805	--	5,196,216	0.64
467,569	--	501,384	0.25	5,196,217	--	5,648,439	0.65
501,385	--	536,436	0.26	5,648,440	--	6,167,655	0.66
536,437	--	572,798	0.27	6,167,656	--	6,769,940	0.67
572,799	--	610,550	0.28	6,769,941	--	7,476,966	0.68
610,551	--	649,778	0.29	7,476,967	--	8,318,659	0.69
649,779	--	690,572	0.30	8,318,660	--	9,337,545	0.70
690,573	--	733,032	0.31	9,337,546	--	10,596,164	0.71
733,033	--	777,266	0.32	10,596,165	--	12,190,409	0.72
777,267	--	823,388	0.33	12,190,410	--	14,275,184	0.73
823,389	--	871,526	0.34	14,275,185	--	17,118,052	0.74
871,527	--	921,816	0.35	17,118,053	--	21,224,408	0.75
921,817	--	974,408	0.36	21,224,409	--	27,677,244	0.76
974,409	--	1,029,465	0.37	27,677,245	--	39,292,334	0.77
1,029,466	--	1,087,166	0.38	39,292,335	--	66,394,187	0.78
1,087,167	--	1,147,708	0.39	66,394,188	--	201,903,391	0.79
1,147,709	--	1,211,308	0.40	201,903,392	AND OVER	0.80	
1,211,309	--	1,278,204	0.41				
1,278,205	--	1,348,661	0.42				
1,348,662	--	1,422,972	0.43				

(a) G . . . . .	12.05
(b) State Per Claim Accident Limitation . . . . .	\$301,500
(c) State Multiple Claim Accident Limitation . . . . .	\$603,000
(d) USL&HW Per Claim Accident Limitation . . . . .	\$469,500
(e) USL&HW Multiple Claim Accident Limitation . . . . .	\$939,000
(f) Employers Liability Accident Limitation . . . . .	\$55,000
(g) Primary/Excess Loss Split Point . . . . .	\$16,000
(h) USL&HW Act -- Expected Loss Factor -- Non-F Classes . . . . .	1.80
<i>(Multiply a Non-F classification ELR by the USL&amp;HW Act - Expected Loss Factor of 1.80.)</i>	

Effective April 1, 2016  
**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 -- 64,815	30,125	2,079,842 -- 2,140,057	241,000	4,187,981 -- 4,248,221	451,875
64,816 -- 111,552	36,150	2,140,058 -- 2,200,275	247,025	4,248,222 -- 4,308,463	457,900
111,553 -- 165,254	42,175	2,200,276 -- 2,260,494	253,050	4,308,464 -- 4,368,705	463,925
165,255 -- 221,906	48,200	2,260,495 -- 2,320,715	259,075	4,368,706 -- 4,428,947	469,950
221,907 -- 279,936	54,225	2,320,716 -- 2,380,938	265,100	4,428,948 -- 4,489,189	475,975
279,937 -- 338,695	60,250	2,380,939 -- 2,441,162	271,125	4,489,190 -- 4,549,432	482,000
338,696 -- 397,878	66,275	2,441,163 -- 2,501,387	277,150	4,549,433 -- 4,609,675	488,025
397,879 -- 457,330	72,300	2,501,388 -- 2,561,613	283,175	4,609,676 -- 4,669,918	494,050
457,331 -- 516,961	78,325	2,561,614 -- 2,621,841	289,200	4,669,919 -- 4,730,161	500,075
516,962 -- 576,717	84,350	2,621,842 -- 2,682,069	295,225	4,730,162 -- 4,790,404	506,100
576,718 -- 636,564	90,375	2,682,070 -- 2,742,298	301,250	4,790,405 -- 4,850,647	512,125
636,565 -- 696,479	96,400	2,742,299 -- 2,802,528	307,275	4,850,648 -- 4,910,891	518,150
696,480 -- 756,447	102,425	2,802,529 -- 2,862,760	313,300	4,910,892 -- 4,971,135	524,175
756,448 -- 816,455	108,450	2,862,761 -- 2,922,991	319,325	4,971,136 -- 5,031,379	530,200
816,456 -- 876,496	114,475	2,922,992 -- 2,983,224	325,350	5,031,380 -- 5,091,623	536,225
876,497 -- 936,563	120,500	2,983,225 -- 3,043,457	331,375	5,091,624 -- 5,151,867	542,250
936,564 -- 996,653	126,525	3,043,458 -- 3,103,691	337,400	5,151,868 -- 5,212,111	548,275
996,654 -- 1,056,760	132,550	3,103,692 -- 3,163,925	343,425	5,212,112 -- 5,272,356	554,300
1,056,761 -- 1,116,883	138,575	3,163,926 -- 3,224,161	349,450	5,272,357 -- 5,332,600	560,325
1,116,884 -- 1,177,018	144,600	3,224,162 -- 3,284,396	355,475	5,332,601 -- 5,392,845	566,350
1,177,019 -- 1,237,165	150,625	3,284,397 -- 3,344,632	361,500	5,392,846 -- 5,453,090	572,375
1,237,166 -- 1,297,321	156,650	3,344,633 -- 3,404,869	367,525	5,453,091 -- 5,513,335	578,400
1,297,322 -- 1,357,485	162,675	3,404,870 -- 3,465,106	373,550	5,513,336 -- 5,573,580	584,425
1,357,486 -- 1,417,656	168,700	3,465,107 -- 3,525,344	379,575	5,573,581 -- 5,633,825	590,450
1,417,657 -- 1,477,834	174,725	3,525,345 -- 3,585,582	385,600	5,633,826 -- 5,694,070	596,475
1,477,835 -- 1,538,018	180,750	3,585,583 -- 3,645,820	391,625	5,694,071 -- 5,753,875	602,500
1,538,019 -- 1,598,206	186,775	3,645,821 -- 3,706,059	397,650		
1,598,207 -- 1,658,399	192,800	3,706,060 -- 3,766,298	403,675		
1,658,400 -- 1,718,596	198,825	3,766,299 -- 3,826,537	409,700		
1,718,597 -- 1,778,796	204,850	3,826,538 -- 3,886,777	415,725		
1,778,797 -- 1,839,000	210,875	3,886,778 -- 3,947,017	421,750		
1,839,001 -- 1,899,207	216,900	3,947,018 -- 4,007,257	427,775		
1,899,208 -- 1,959,416	222,925	4,007,258 -- 4,067,498	433,800		
1,959,417 -- 2,019,627	228,950	4,067,499 -- 4,127,739	439,825		
2,019,628 -- 2,079,841	234,975	4,127,740 -- 4,187,980	445,850		

For Expected Losses greater than \$5,753,875, the Ballast Value can be calculated using the following formula (rounded to the nearest 1):

$$\text{Ballast} = (0.10)(\text{Expected Losses}) + 2500(\text{Expected Losses})(12.05) / (\text{Expected Losses} + (700)(12.05))$$

G = 12.05

## **NORTH CAROLINA - ASSIGNED RISK**

### **APPENDIX B**

#### **Factor to Convert Loss Costs to Assigned Risk Rates**

For all classification codes, the proposed loss cost multiplier of 2.557 is applied to the advisory loss costs (contained in the Rate Bureau's Loss Costs Reference Filing proposed effective April 1, 2016) 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.

NORTH CAROLINA

APPENDIX E

Assigned Risk Rates Comparison

<u>Class Code</u>	<u>Current 04/01/15</u>	<u>Proposed 04/01/16</u>	<u>Percent Change</u>
0005	5.46	7.13	30.6%
0008	4.74	5.75	21.3%
0016	15.68	15.11	-3.6%
0034	8.43	8.98	6.5%
0035	5.28	5.09	-3.6%
0036	8.92	9.64	8.1%
0037	8.83	8.54	-3.3%
0042	10.27	10.48	2.0%
0050	14.36	13.73	-4.4%
0059	0.85	0.87	2.4%
0065	0.20	0.20	0.0%
0066	0.20	0.20	0.0%
0067	0.20	0.20	0.0%
0079	8.11	8.39	3.5%
0083	8.38	8.08	-3.6%
0106	47.52	48.71	2.5%
0113	11.30	11.10	-1.8%
0170	7.10	6.98	-1.7%
0251	9.66	9.44	-2.3%
0400	14.92	14.75	-1.1%
0401	19.98	23.83	19.3%
0771	0.97	1.02	5.2%
0908	290.00	312.00	7.6%
0913	1126.00	1429.00	26.9%
0917	11.19	11.40	1.9%
1005	15.01	14.91	-0.7%
1164	15.46	14.42	-6.7%
1165	9.33	7.75	-16.9%
1320	5.39	5.04	-6.5%
1322	22.07	20.92	-5.2%
1430	16.72	17.21	2.9%
1438	9.26	8.00	-13.6%
1452	6.40	6.11	-4.5%
1463	19.08	18.90	-0.9%
1472*	na	5.73	na
1624	7.05	7.18	1.8%
1642	5.93	5.63	-5.1%
1654	49.43	63.90	29.3%
1655	7.93	7.03	-11.3%
1699	8.81	8.46	-4.0%
1701	13.30	11.20	-15.8%
1710	12.16	14.04	15.5%
1741	6.00	6.37	6.2%
1747	4.43	4.45	0.5%

\*Proposed effective 04/01/16

**NORTH CAROLINA**

**APPENDIX E**

**Assigned Risk Rates Comparison**

<b><u>Class Code</u></b>	<b><u>Current 04/01/15</u></b>	<b><u>Proposed 04/01/16</u></b>	<b><u>Percent Change</u></b>
1748	7.48	8.80	17.6%
1803	17.39	19.59	12.7%
1852	5.13	5.09	-0.8%
1853	2.70	3.02	11.9%
1860	4.20	4.09	-2.6%
1924	5.12	5.04	-1.6%
1925	7.10	6.98	-1.7%
2002	4.81	4.88	1.5%
2003	7.21	8.26	14.6%
2014	10.07	9.21	-8.5%
2016	3.84	4.22	9.9%
2021	4.34	4.22	-2.8%
2039	5.24	5.37	2.5%
2041	6.90	5.96	-13.6%
2065	8.04	7.06	-12.2%
2070	11.35	10.97	-3.3%
2081	5.42	5.83	7.6%
2089	6.00	6.03	0.5%
2095	9.50	9.41	-0.9%
2105	6.27	7.21	15.0%
2110	4.47	4.88	9.2%
2111	10.63	9.84	-7.4%
2112	6.22	6.90	10.9%
2114	3.62	4.76	31.5%
2121	2.90	3.35	15.5%
2130	4.67	4.50	-3.6%
2131	5.03	6.34	26.0%
2143	5.10	5.29	3.7%
2157	9.66	9.08	-6.0%
2172	4.34	3.94	-9.2%
2174	7.19	7.13	-0.8%
2211	19.82	17.49	-11.8%
2220	5.98	6.21	3.8%
2286	3.03	3.02	-0.3%
2288	9.12	11.10	21.7%
2300	5.46	5.27	-3.5%
2302	3.95	4.24	7.3%
2305	5.89	6.09	3.4%
2361	4.63	4.47	-3.5%
2362	3.39	3.43	1.2%
2380	4.97	5.50	10.7%
2386	2.63	3.45	31.2%
2388	4.34	4.65	7.1%
2402	5.21	6.14	17.9%

# NORTH CAROLINA

## APPENDIX E

### Assigned Risk Rates Comparison

<u>Class Code</u>	<u>Current 04/01/15</u>	<u>Proposed 04/01/16</u>	<u>Percent Change</u>
2413	5.24	5.91	12.8%
2416	5.15	5.32	3.3%
2417	3.35	3.17	-5.4%
2501	4.88	5.37	10.0%
2503	2.88	2.53	-12.2%
2534	4.09	3.73	-8.8%
2570	10.63	9.36	-11.9%
2585	8.13	8.11	-0.2%
2586	6.11	5.29	-13.4%
2587	7.57	6.98	-7.8%
2589	4.20	4.70	11.9%
2600	4.94	6.01	21.7%
2623	11.98	13.99	16.8%
2651	4.13	3.84	-7.0%
2660	5.37	5.11	-4.8%
2670	2.99	3.27	9.4%
2683	2.72	2.63	-3.3%
2688	6.58	7.29	10.8%
2702	42.49	47.25	11.2%
2705	133.22	175.87	32.0%
2709	23.46	20.87	-11.0%
2710	18.94	20.87	10.2%
2714	8.74	9.38	7.3%
2727	16.74	21.81	30.3%
2731	7.84	8.21	4.7%
2735	9.24	10.00	8.2%
2759	11.62	12.20	5.0%
2790	3.75	3.71	-1.1%
2797	12.99	12.94	-0.4%
2799	7.37	9.46	28.4%
2802	10.25	10.23	-0.2%
2835	5.66	5.57	-1.6%
2836	4.22	4.14	-1.9%
2841	7.75	7.90	1.9%
2881	6.83	8.23	20.5%
2883	7.84	8.36	6.6%
2913	5.19	4.94	-4.8%
2915	4.97	4.99	0.4%
2916	5.89	7.67	30.2%
2923	4.27	4.73	10.8%
2942	4.34	4.53	4.4%
2960	8.52	10.66	25.1%
3004	3.44	3.58	4.1%
3018	6.67	7.52	12.7%

NORTH CAROLINA

APPENDIX E

Assigned Risk Rates Comparison

<u>Class Code</u>	<u>Current 04/01/15</u>	<u>Proposed 04/01/16</u>	<u>Percent Change</u>
3022	15.08	16.70	10.7%
3027	4.74	5.37	13.3%
3028	6.09	6.01	-1.3%
3030	12.04	12.43	3.2%
3040	11.98	13.25	10.6%
3041	10.74	12.12	12.8%
3042	8.36	7.85	-6.1%
3064	10.67	11.56	8.3%
3076	7.19	6.42	-10.7%
3081	8.83	9.64	9.2%
3082	8.06	7.70	-4.5%
3085	10.40	9.97	-4.1%
3110	10.74	11.10	3.4%
3111	5.44	5.57	2.4%
3113	4.27	4.19	-1.9%
3114	6.02	5.24	-13.0%
3118	4.11	4.14	0.7%
3119	1.78	1.94	9.0%
3122	3.95	3.89	-1.5%
3126	5.98	5.42	-9.4%
3131	2.67	3.43	28.5%
3132	6.40	6.11	-4.5%
3145	4.34	4.12	-5.1%
3146	4.49	5.04	12.2%
3169	8.04	7.36	-8.5%
3175	8.45	8.67	2.6%
3179	3.55	3.53	-0.6%
3180	3.86	4.35	12.7%
3188	2.81	2.81	0.0%
3220	4.40	3.86	-12.3%
3223	5.89	6.88	16.8%
3224	6.79	7.47	10.0%
3227	6.54	7.06	8.0%
3240	5.48	5.80	5.8%
3241	6.31	6.37	1.0%
3255	4.58	5.34	16.6%
3257	6.74	7.21	7.0%
3270	6.02	6.01	-0.2%
3300	6.83	6.98	2.2%
3303	6.56	8.08	23.2%
3307	8.52	7.36	-13.6%
3315	8.83	10.43	18.1%
3334	8.92	8.95	0.3%
3336	6.16	6.09	-1.1%

# NORTH CAROLINA

## APPENDIX E

### Assigned Risk Rates Comparison

<u>Class Code</u>	<u>Current 04/01/15</u>	<u>Proposed 04/01/16</u>	<u>Percent Change</u>
3365	15.44	14.34	-7.1%
3372	8.04	7.65	-4.9%
3373	9.71	9.59	-1.2%
3383	2.22	2.51	13.1%
3385	1.91	1.89	-1.0%
3400	6.36	6.52	2.5%
3507	4.88	4.99	2.3%
3515	3.51	4.30	22.5%
3548	3.17	2.94	-7.3%
3559	4.63	4.94	6.7%
3574	1.55	1.53	-1.3%
3581	2.94	2.25	-23.5%
3612	4.76	4.96	4.2%
3620	12.97	11.84	-8.7%
3629	3.69	3.76	1.9%
3632	6.16	6.49	5.4%
3634	3.46	3.58	3.5%
3635	4.67	5.65	21.0%
3638	2.79	3.09	10.8%
3642	2.52	2.56	1.6%
3643	3.77	3.61	-4.2%
3647	4.36	3.76	-13.8%
3648	2.90	2.84	-2.1%
3681	1.89	1.84	-2.6%
3685	2.40	2.48	3.3%
3719	3.24	3.04	-6.2%
3724	8.67	7.29	-15.9%
3726	13.44	11.99	-10.8%
3803	5.35	5.01	-6.4%
3807	3.71	4.17	12.4%
3808	6.92	8.74	26.3%
3821	12.00	14.73	22.8%
3822	10.04	9.67	-3.7%
3824	8.29	7.95	-4.1%
3826	1.66	1.53	-7.8%
3827	3.73	3.86	3.5%
3830	2.58	2.56	-0.8%
3851	8.13	8.28	1.8%
3865	4.13	4.40	6.5%
3881	8.47	9.36	10.5%
4000	10.00	10.53	5.3%
4021	9.98	9.87	-1.1%
4024	6.90	6.44	-6.7%
4034	11.57	12.32	6.5%

NORTH CAROLINA

APPENDIX E

Assigned Risk Rates Comparison

<u>Class Code</u>	<u>Current 04/01/15</u>	<u>Proposed 04/01/16</u>	<u>Percent Change</u>
4036	4.79	4.96	3.5%
4038	5.21	6.70	28.6%
4053	4.40	3.94	-10.5%
4061	6.63	5.63	-15.1%
4062	4.49	5.24	16.7%
4101	6.04	6.52	7.9%
4109	1.15	1.02	-11.3%
4110	2.61	2.28	-12.6%
4111	3.33	3.20	-3.9%
4113	4.25	4.32	1.6%
4114	9.53	7.57	-20.6%
4130	7.86	8.11	3.2%
4131	9.41	9.87	4.9%
4133	4.65	4.09	-12.0%
4149	1.01	1.33	31.7%
4206	5.95	5.57	-6.4%
4207	2.88	3.73	29.5%
4239	6.25	6.78	8.5%
4240	4.76	4.37	-8.2%
4243	3.86	4.37	13.2%
4244	4.09	4.37	6.8%
4250	3.93	4.17	6.1%
4251	4.49	4.73	5.3%
4263	7.59	8.62	13.6%
4273	5.46	6.03	10.4%
4279	4.85	4.73	-2.5%
4282	5.68	5.14	-9.5%
4283	4.94	3.91	-20.9%
4299	4.29	3.78	-11.9%
4304	8.79	9.74	10.8%
4307	3.44	3.81	10.8%
4351	2.70	3.02	11.9%
4352	2.81	3.30	17.4%
4360	3.08	3.17	2.9%
4361	2.36	2.53	7.2%
4410	7.48	7.39	-1.2%
4420	17.30	17.52	1.3%
4431	2.76	2.94	6.5%
4432	2.54	2.53	-0.4%
4439	3.89	3.99	2.6%
4452	6.43	6.24	-3.0%
4459	5.86	5.68	-3.1%
4470	4.38	4.53	3.4%
4484	5.08	5.17	1.8%

# NORTH CAROLINA

## APPENDIX E

### Assigned Risk Rates Comparison

<u>Class Code</u>	<u>Current 04/01/15</u>	<u>Proposed 04/01/16</u>	<u>Percent Change</u>
4493	4.76	5.01	5.3%
4511	0.90	1.00	11.1%
4557	5.42	5.88	8.5%
4558	2.88	2.86	-0.7%
4568	4.90	4.70	-4.1%
4581	1.73	1.64	-5.2%
4583	12.34	12.99	5.3%
4611	1.39	1.36	-2.2%
4635	6.29	6.42	2.1%
4653	4.83	4.53	-6.2%
4665	16.20	14.37	-11.3%
4670	12.83	15.93	24.2%
4683	7.28	9.23	26.8%
4686	4.29	4.78	11.4%
4692	1.12	1.25	11.6%
4693	1.82	2.15	18.1%
4703	4.47	4.35	-2.7%
4717	4.56	4.78	4.8%
4720	3.66	3.58	-2.2%
4740	4.74	6.24	31.6%
4741	4.36	5.01	14.9%
4751	7.57	6.67	-11.9%
4771	5.51	5.78	4.9%
4777	12.40	9.69	-21.9%
4825	2.11	2.45	16.1%
4828	3.77	3.66	-2.9%
4829	3.69	3.20	-13.3%
4902	7.12	7.47	4.9%
4923	2.34	2.07	-11.5%
5020	15.59	16.36	4.9%
5022	14.99	16.36	9.1%
5037	46.94	39.89	-15.0%
5040	24.36	17.77	-27.1%
5057	18.67	13.83	-25.9%
5059	43.64	47.51	8.9%
5069	48.74	39.91	-18.1%
5102	13.32	12.73	-4.4%
5146	13.57	12.55	-7.5%
5160	7.50	6.78	-9.6%
5183	10.47	9.92	-5.3%
5188	12.90	13.22	2.5%
5190	10.27	10.66	3.8%
5191	1.53	1.69	10.5%
5192	8.07	7.85	-2.7%

# NORTH CAROLINA

## APPENDIX E

### Assigned Risk Rates Comparison

<u>Class Code</u>	<u>Current 04/01/15</u>	<u>Proposed 04/01/16</u>	<u>Percent Change</u>
5213	15.91	16.34	2.7%
5215	9.17	10.23	11.6%
5221	9.73	11.28	15.9%
5222	24.29	21.79	-10.3%
5223	9.73	11.69	20.1%
5348	11.12	10.56	-5.0%
5402	10.58	11.40	7.8%
5403	14.94	14.86	-0.5%
5437	13.41	13.02	-2.9%
5443	9.62	9.44	-1.9%
5445	19.46	22.78	17.1%
5462	13.80	15.57	12.8%
5472	10.02	10.15	1.3%
5473	23.80	27.28	14.6%
5474	14.61	16.36	12.0%
5478	8.18	8.26	1.0%
5479	15.95	15.70	-1.6%
5480	13.03	13.07	0.3%
5491	6.27	6.98	11.3%
5506	13.66	15.16	11.0%
5507	10.34	10.82	4.6%
5508	29.41	29.07	-1.2%
5535	17.28	17.31	0.2%
5537	12.83	12.66	-1.3%
5551	38.29	38.87	1.5%
5606	3.57	3.38	-5.3%
5610	15.03	15.62	3.9%
5645	32.04	33.01	3.0%
5703	40.09	34.75	-13.3%
5705	39.05	50.19	28.5%
5951	0.79	0.72	-8.9%
6003	19.01	23.19	22.0%
6005	13.44	13.17	-2.0%
6017	11.44	11.25	-1.7%
6018	8.13	7.88	-3.1%
6045	8.61	10.53	22.3%
6204	24.94	24.01	-3.7%
6206	9.21	9.08	-1.4%
6213	5.89	5.63	-4.4%
6214	6.92	6.88	-0.6%
6216	16.63	16.03	-3.6%
6217	14.27	13.96	-2.2%
6229	9.26	9.72	5.0%
6233	8.36	6.70	-19.9%

# NORTH CAROLINA

## APPENDIX E

### Assigned Risk Rates Comparison

<u>Class Code</u>	<u>Current 04/01/15</u>	<u>Proposed 04/01/16</u>	<u>Percent Change</u>
6235	16.92	15.19	-10.2%
6236	27.55	27.08	-1.7%
6237	4.40	4.42	0.5%
6251	19.41	16.26	-16.2%
6252	11.98	10.59	-11.6%
6260	12.02	15.16	26.1%
6306	12.47	12.35	-1.0%
6319	13.39	13.78	2.9%
6325	12.99	12.66	-2.5%
6400	13.53	14.98	10.7%
6503	4.61	3.94	-14.5%
6504	5.24	5.27	0.6%
6702	12.47	9.95	-20.2%
6703	24.78	19.61	-20.9%
6704	13.86	11.05	-20.3%
6801	6.29	6.65	5.7%
6811	17.86	16.75	-6.2%
6824	17.19	20.15	17.2%
6826	9.93	10.20	2.7%
6834	6.67	6.55	-1.8%
6836	10.22	10.20	-0.2%
6843	24.07	23.29	-3.2%
6845	21.75	21.04	-3.3%
6854	10.67	9.97	-6.6%
6872	23.39	22.63	-3.2%
6874	37.84	36.64	-3.2%
6882	10.54	10.79	2.4%
6884	14.74	14.01	-5.0%
7016	6.83	9.10	33.2%
7024	7.59	10.10	33.1%
7038	11.26	11.02	-2.1%
7046	14.61	15.01	2.7%
7047	13.57	17.92	32.1%
7050	22.38	21.73	-2.9%
7090	12.52	12.25	-2.2%
7098	16.22	16.67	2.8%
7099	29.01	29.58	2.0%
7133	11.55	10.69	-7.4%
7151	14.04	12.99	-7.5%
7152	27.89	25.62	-8.1%
7153	15.59	14.42	-7.5%
7222	18.20	17.57	-3.5%
7228	16.99	17.49	2.9%
7229	24.92	26.90	7.9%

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APPENDIX E

Assigned Risk Rates Comparison

<u>Class Code</u>	<u>Current 04/01/15</u>	<u>Proposed 04/01/16</u>	<u>Percent Change</u>
7230	20.87	20.30	-2.7%
7231	18.72	18.05	-3.6%
7232	23.77	22.71	-4.5%
7309	31.73	32.12	1.2%
7313	6.79	6.57	-3.2%
7317	21.21	24.93	17.5%
7327	29.71	32.73	10.2%
7333	10.22	9.74	-4.7%
7335	11.37	10.82	-4.8%
7337	20.34	19.20	-5.6%
7350	21.37	24.73	15.7%
7360	10.49	10.97	4.6%
7370	14.27	15.70	10.0%
7380	11.08	11.74	6.0%
7382	12.58	11.63	-7.6%
7390	11.59	11.74	1.3%
7394	11.53	9.77	-15.3%
7395	12.81	10.84	-15.4%
7398	22.90	19.25	-15.9%
7402	0.36	0.33	-8.3%
7403	10.79	11.74	8.8%
7405	4.54	4.99	9.9%
7420	34.29	30.45	-11.2%
7421	2.92	2.25	-22.9%
7422	4.74	5.14	8.4%
7425	7.39	6.78	-8.3%
7431	3.73	3.17	-15.0%
7445	1.51	1.66	9.9%
7453	1.24	1.05	-15.3%
7502	6.22	6.16	-1.0%
7515	3.01	2.76	-8.3%
7520	7.46	7.36	-1.3%
7529	34.42	44.26	28.6%
7538	24.18	21.04	-13.0%
7539	5.01	5.42	8.2%
7540	12.79	12.68	-0.9%
7580	7.64	7.26	-5.0%
7590	11.06	9.44	-14.6%
7600	12.61	12.61	0.0%
7605	5.51	5.32	-3.4%
7610	1.26	1.38	9.5%
7705	20.00	19.00	-5.0%
7710	11.71	12.32	5.2%
7711	11.71	12.32	5.2%

NORTH CAROLINA

APPENDIX E

Assigned Risk Rates Comparison

<u>Class Code</u>	<u>Current 04/01/15</u>	<u>Proposed 04/01/16</u>	<u>Percent Change</u>
7720	5.35	4.99	-6.7%
7723	7.06	7.77	10.1%
7855	10.27	8.18	-20.4%
8001	6.02	5.52	-8.3%
8002	4.34	4.12	-5.1%
8006	6.94	7.59	9.4%
8008	3.08	3.04	-1.3%
8010	3.01	3.20	6.3%
8013	1.03	0.89	-13.6%
8015	1.80	1.94	7.8%
8017	3.69	3.76	1.9%
8018	5.01	4.96	-1.0%
8021	5.24	5.98	14.1%
8031	7.46	7.65	2.5%
8032	4.18	4.58	9.6%
8033	4.16	3.94	-5.3%
8037	3.51	4.58	30.5%
8039	5.28	4.96	-6.1%
8044	7.73	8.13	5.2%
8045	1.15	1.23	7.0%
8046	6.00	6.21	3.5%
8047	2.18	2.22	1.8%
8058	7.01	6.52	-7.0%
8072	1.55	1.71	10.3%
8102	3.03	3.25	7.3%
8103	5.86	4.99	-14.8%
8105	5.10	5.06	-0.8%
8106	9.64	8.80	-8.7%
8107	8.63	9.10	5.4%
8111	4.65	4.91	5.6%
8116	6.54	6.26	-4.3%
8203	14.54	16.06	10.5%
8204	6.31	7.75	22.8%
8209	7.08	7.52	6.2%
8215	7.77	8.11	4.4%
8227	10.36	11.05	6.7%
8232	9.77	10.61	8.6%
8233	6.70	6.72	0.3%
8235	11.01	10.61	-3.6%
8236	12.61	12.50	-0.9%
8263	14.04	13.76	-2.0%
8264	10.70	10.71	0.1%
8265	13.91	14.73	5.9%
8279	17.03	18.28	7.3%

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Assigned Risk Rates Comparison

<u>Class Code</u>	<u>Current 04/01/15</u>	<u>Proposed 04/01/16</u>	<u>Percent Change</u>
8288	18.90	17.52	-7.3%
8291	10.02	10.69	6.7%
8292	8.29	8.03	-3.1%
8293	26.60	27.54	3.5%
8304	9.89	10.33	4.4%
8350	18.67	18.28	-2.1%
8380	5.77	6.03	4.5%
8381	4.79	4.40	-8.1%
8385	5.89	5.96	1.2%
8392	5.75	5.78	0.5%
8393	3.80	3.91	2.9%
8500	13.46	12.27	-8.8%
8601	1.26	1.23	-2.4%
8602	1.98	2.38	20.2%
8603	0.25	0.20	-20.0%
8606	7.12	7.21	1.3%
8709	8.90	10.23	14.9%
8719	7.30	7.29	-0.1%
8720	4.47	4.30	-3.8%
8721	0.65	0.69	6.2%
8723	0.36	0.41	13.9%
8725	4.74	5.47	15.4%
8726	6.38	6.42	0.6%
8734	1.19	1.30	9.2%
8737	1.06	1.18	11.3%
8738	2.11	2.33	10.4%
8742	0.88	0.97	10.2%
8745	10.79	11.58	7.3%
8748	1.51	1.59	5.3%
8755	1.01	1.05	4.0%
8799	1.10	1.23	11.8%
8800	2.45	3.07	25.3%
8803	0.20	0.20	0.0%
8805	0.49	0.46	-6.1%
8810	0.36	0.33	-8.3%
8814	0.43	0.41	-4.7%
8815	0.88	0.79	-10.2%
8820	0.34	0.33	-2.9%
8824	7.08	7.26	2.5%
8825	3.69	3.63	-1.6%
8826	6.79	6.98	2.8%
8831	2.81	3.09	10.0%
8832	0.85	0.87	2.4%
8833	3.24	3.40	4.9%

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Assigned Risk Rates Comparison

<u>Class Code</u>	<u>Current 04/01/15</u>	<u>Proposed 04/01/16</u>	<u>Percent Change</u>
8835	5.84	5.96	2.1%
8842	4.85	5.14	6.0%
8848	5.57	6.37	14.4%
8849	7.10	6.90	-2.8%
8855	0.36	0.31	-13.9%
8856	0.36	0.46	27.8%
8864	3.44	3.22	-6.4%
8868	1.06	1.18	11.3%
8869	2.52	2.81	11.5%
8871	0.27	0.26	-3.7%
8901	0.45	0.49	8.9%
9012	2.81	2.58	-8.2%
9014	6.11	6.65	8.8%
9015	7.77	7.57	-2.6%
9016	6.56	6.75	2.9%
9019	5.86	5.34	-8.9%
9033	4.16	4.42	6.3%
9040	6.94	7.49	7.9%
9044	3.57	3.66	2.5%
9052	4.90	4.86	-0.8%
9058	3.01	3.35	11.3%
9060	2.94	2.84	-3.4%
9061	2.47	2.51	1.6%
9062	3.08	3.17	2.9%
9063	2.22	2.35	5.9%
9077	4.07	4.58	12.5%
9082	2.97	2.94	-1.0%
9083	2.99	3.04	1.7%
9084	2.81	3.25	15.7%
9089	2.90	3.73	28.6%
9093	2.88	3.15	9.4%
9101	7.21	7.21	0.0%
9102	6.16	6.90	12.0%
9154	4.54	4.35	-4.2%
9156	6.07	5.42	-10.7%
9170	11.28	14.75	30.8%
9178	15.17	15.88	4.7%
9179	28.27	25.83	-8.6%
9180	9.33	10.30	10.4%
9182	4.36	4.70	7.8%
9186	37.95	30.74	-19.0%
9220	10.13	11.17	10.3%
9402	13.73	11.97	-12.8%
9403	18.45	18.97	2.8%

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**Assigned Risk Rates Comparison**

<b><u>Class Code</u></b>	<b><u>Current 04/01/15</u></b>	<b><u>Proposed 04/01/16</u></b>	<b><u>Percent Change</u></b>
9410	6.20	6.24	0.6%
9501	7.24	7.93	9.5%
9505	6.29	8.28	31.6%
9516	11.57	12.99	12.3%
9519	8.85	9.03	2.0%
9521	10.09	11.02	9.2%
9522	4.00	4.09	2.3%
9534	18.90	16.83	-11.0%
9554	32.06	33.09	3.2%
9586	1.33	1.30	-2.3%
9600	4.74	4.96	4.6%
9620	2.43	2.43	0.0%

## 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.

#### Item

- \*1 North Carolina losses and loss adjustment expenses
- \*2 Credibility factor development and application
- \*3 Loss development factor development and application
- \*4 Trending factor development and application
- \*5 Changes in premium base and exposures
- \*6 Limiting factor development and application
- \*7 Percent rate or loss cost change
- 8 Underwriting profit and contingencies and investment income
- 9 Investment earnings on capital and surplus
- \*10 Additional supplemental information per 11 NCAC 10.1111

\* Sections incorporated by reference to the Loss Cost Filing submitted 8/28/2015

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 J. Vander Weide and D. Appel (Exhibits RB-6 through RB-13).

## 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) are expected to be 2.90% of premium. Given the 10.0% 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 D. Appel (Exhibits RB-11 through RB-13). Also shown therein is the ratio of net worth to surplus of 1.16. Accordingly, the corresponding return on statutory surplus would be 12.14%. Based on data from A.M. Best's Aggregates & Averages, the 5-year average ratio of net worth to assets is .403. Accordingly, the corresponding return on assets would be 4.20%. If 10.0% is not in fact earned as underwriting profit, the resulting returns would be correspondingly lower.

See also the pre-filed testimony of D. Appel (Exhibit RB-11) and J. Vander Weide (Exhibit RB-6).

PRE-FILED TESTIMONY  
OF  
RAYMOND F. EVANS

NORTH CAROLINA WORKERS COMPENSATION INSURANCE  
2015 RESIDUAL MARKET RATE FILING  
BY THE NORTH CAROLINA RATE BUREAU

- Q. Would you state your full name and business address?
- A. Raymond F. Evans, Jr. CPCU, 2910 Sumner Boulevard, Raleigh, North Carolina.
- Q. Are you employed by the North Carolina Rate Bureau ("Bureau")?
- A. Yes.
- Q. In what capacity?
- A. I am the General Manager.
- Q. How long have you been employed by the Bureau?
- A. Since September 2000.
- Q. Would you summarize your educational background?
- A. I graduated from Ohio State University with a Bachelor of Science Degree in Accounting. I also have the designation of Chartered Property Casualty Underwriter.
- Q. What was your work experience after graduation and prior to your employment by the Bureau?
- A. From March 1966 to July 2000, I was employed by the State Auto Insurance Companies, Columbus, Ohio in various capacities, including the position of Executive Vice President of a subsidiary.
- Q. Can you identify Exhibits RB-1 through RB-13?
- 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-13 contain the required accompanying prefiled testimony and exhibits. Together, these materials constitute a filing (the "Filing") that is dated August 28, 2015 submitted by the Bureau to the Honorable Wayne Goodwin, Commissioner of Insurance, with respect to workers compensation insurance assigned risk rates in North Carolina.

- Q. Does the Bureau have actuaries on its staff?
- A. Yes, the Bureau has an actuary on its staff. However, the Bureau continues to obtain actuarial expertise for preparation of the Filing from the Workers Compensation Committee, the National Council on Compensation Insurance, Inc. and from Milliman, Inc.
- Q. Would you describe briefly the workers compensation insurance residual market mechanism for North Carolina?
- A. Yes. North Carolina General Statute 58-36-1(5) requires every insurer that writes workers compensation insurance in North Carolina to insure and accept any eligible workers compensation insurance risk that has been certified to be “difficult to place” by a licensed fire and casualty insurance agent. The Commissioner of Insurance has approved the North Carolina Workers Compensation Insurance Plan which describes the rules and procedures for assigning applicant employers to an insurance company. The designated insurer must issue the standard Workers Compensation and Employers Liability Insurance Policy for each assigned employer and provide the usual and customary service to its insureds.
- Q. Do all insurance companies receive assignments?
- A. No. Many insurance companies have opted to meet their residual market participation requirements by becoming a member of the National Workers Compensation Reinsurance Association (“National Pool”). Under the pool arrangement all assignments for those members of the National Pool are made to insurers designated as “servicing carriers” of the pool. Insurers who do not elect to participate in the National Pool are designated as direct assignment carriers for North Carolina and applicant employers are assigned to the direct assignment carriers on the basis of their voluntary workers compensation insurance premium writings in North Carolina.
- Q. How many servicing carriers are there and how are they selected?
- A. There are currently three servicing carriers who were selected through a competitive bid process.
- Q. How many direct assignment carriers are there?
- A. At this time there are eight companies or company groups that have been approved as direct assignment carriers.
- Q. What will be the residual market quota shares of the direct assignment carriers compared to the servicing carriers?
- A. On the basis of 2014 premium writings, the direct assignment carriers will receive approximately 23% of the assigned risk premium during 2015 and the servicing carriers will be assigned approximately 77% of the premium.
- Q. How many insurance companies were licensed to write workers compensation insurance in North Carolina during 2014?

- A. Five hundred twenty-eight (528) insurance companies.
- Q. How many insurance companies were actually writing workers compensation insurance in North Carolina during 2014?
- A. Three hundred twenty-nine (329) insurance companies.
- Q. Does the Filing submitted to the Commissioner include, to the extent available, the information to be furnished in connection with filings under Article 36 of Chapter 58 of the General Statutes?
- A. Yes. Those data that were available have been submitted to the Commissioner as part of the Filing. As shown and explained in that submission, some data were not collected or, if collected, were not retrievable from the statistical data in the form requested. The individual circumstances with respect to such data are explained in the submission.
- Q. Does that conclude your pre-filed testimony?
- A. Yes.

PREFILED TESTIMONY  
OF  
JAY A. ROSEN

2015 NORTH CAROLINA WORKERS COMPENSATION  
LOSS COST AND ASSIGNED RISK RATE FILINGS

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

A. My name is Jay Rosen, and I am a Director and Senior 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 six jurisdictions in NCCI's Eastern Region (including North Carolina).

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

A. I have a Bachelor of Science degree and a Master of Science degree, both in Mathematics, from the University of Florida, in Gainesville, Florida. 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 been employed by NCCI since June of 1992.

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 same 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. These loss cost and rate filings are based on the data submitted to NCCI and the North Carolina Rate Bureau (NCRB) by insurance companies writing workers compensation business in North Carolina.

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. Sure. 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. Those insurers electing to provide employers workers compensation coverage in North Carolina’s competitive marketplace—incorporating their own underwriting guidelines and expense needs—constitute the “voluntary market.”

An employer unable to secure workers compensation insurance in the voluntary market obtains coverage through the Workers Compensation Insurance Plan—also referred to as the assigned risk 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 may vary between individual classification codes—both above and below this average.

The proposed overall average change is equitably distributed to the various industry groups and then to the more than 600 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, 2016 through March 31, 2017 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. No. 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 clearly 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 2014 and then \$10 million in 2015 would be questioned about the large change in premium amounts.

The third test is a 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.

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 10.2% from the current loss cost level for the industrial classifications.

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

A. The Assigned Risk rate filing seeks an overall average rate level increase of 2.2% 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, 2016. 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 financial data experience and adjusting it to reflect conditions that are expected to exist during the period April 1, 2016 through March 31, 2017. 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 simply 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 2013 and is commonly referred to as "policy year 2013" data. The second block of data reflects the experience from all policies with effective dates during 2012 and is referred to as "policy year 2012" data. This data consists of earned premiums and losses during these periods reported to NCCI by those companies writing workers compensation insurance in North Carolina. "Losses" is simply another name 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 three years of data were reviewed in connection with this year's actuarial analysis, data for policy years 2013 and 2012 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 2013 (Exhibit I, Section A) and 2012 (Exhibit I, Section B). An average of the separate policy year 2013 and 2012 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 what it would be if it had been earned under the latest approved loss costs, 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 premiums.

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, many 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 17.0% so that the final loss costs will include a provision for loss adjustment expense (lines 6 and 18).

The resulting loss figures are compared to the total estimated premium that would be available to fund these losses (lines 9 and 21). 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 -1.0% per year for indemnity losses and 0.0% per year for medical losses.

The final step is to adjust the developed 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 2013 and 2012 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 10.2% 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, the next step in the process is to compute the actual loss development factors. In calculating these factors, 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 loss 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 loss 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 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. *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 17.0% loss adjustment expense provision for use in the Filings.

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

A. Yes.

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

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

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

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

The results of these two analyses are incorporated in the formula Loss Cost Multiplier (Exhibit I-A, Sheet 1 of the Assigned Risk filing). After

combining the indicated change in the loss cost level and the proposed change in the Loss Cost Multiplier, the final Assigned Risk rate level increase of 2.2% 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 charged by the carriers on their book of business is able to ultimately be collected (Exhibit II-F).
- (v) Underwriting profit – The underwriting profit analysis was conducted by Dr. Vander Weide and Dr. Appel.
- (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), and 0.3% for miscellaneous 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 15.3% of premium in the assigned risk market (Exhibit II-D).

Q. *Please describe the rationale in support of decreasing the expense constant in the assigned risk market.*

A. Insurer expenses as a proportion of premium vary by size of risk. As risk size increases, marginal expenses tend to diminish. An expense constant helps address these expense differences by size of risk. The expense constant together with the expense provisions included in the manual rate provide the necessary funding for insurer expenses.

A recent expense constant study examined the general and production costs by policy size to determine the indicated expense constant. For each individual company and year, a comparison of estimated and actual

expenses was made by utilizing distributions of premium writings derived from unit statistical plan data and expense information obtained from Insurance Expense Exhibit (IEE) data. A determination was made as to which expense constant value minimized the difference between the estimated and actual expenses. The indicated expense constant was the value that provided the best fit to the actual data.

The change to the assigned risk market expense constant is being proposed in a premium-neutral fashion across the assigned risk market. More specifically, an offset of +2.8% has been included in the proposed assigned risk rate level change in order to offset the \$90 reduction in the assigned risk market expense constant.

Q. *Please explain the NCRB's rationale for proposing to increase the current experience rating premium eligibility thresholds.*

A. The current North Carolina premium eligibility thresholds were last changed in 2007. The proposed update contained in this year's Filings is intended to establish experience rating premium eligibility thresholds that are more comparable to those in effect in other jurisdictions around the country.

Q. *Please explain the NCRB's rationale for proposing to eliminate the classification codes identified at the end of Exhibit III in the filing.*

A. The NCRB proposed their elimination due to the fact that the above-referenced classification codes only exist in North Carolina, have limited payroll exposure, and there are comparable national classification codes already in effect in the state.

Q. *Are there any additional changes in miscellaneous rating values contained in the Filings?*

A. Yes. The pages summarizing the Filings by component identify additional changes, as do the miscellaneous values and retrospective rating plan sections of Exhibit III. The Table of Weighting Values and the Table of Ballast Values in Exhibit III were also updated.

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 -1.0% 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. 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**

**2015 COUNTRYWIDE ANNUAL LOSS ADJUSTMENT EXPENSE REVIEW—EVALUATED AS OF 12/31/2014**

**LOSS ADJUSTMENT EXPENSE SUMMARY**

**Analysis Based on Private Carrier Data**

	(1)	(2)	(3)=(1)+(2)	(4)	(5)	(6)=(4)+(5)	(7)=(3)-(6)
	Call #19 DCCE Ratio (Avg. of Paid and Incurred Indications)	Call #19 AOE Ratio (Avg. of Paid and Incurred Indications) <sup>1</sup>	Call #19 LAE Ratio	Calendar Year Incurred DCCE Ratio From IEE <sup>2</sup>	Calendar Year Incurred AOE Ratio From IEE <sup>1,2</sup>	Incurred LAE Ratio From IEE <sup>2</sup>	Difference
<u>Year</u>	<u>Incurred Indications)</u>	<u>Incurred Indications) <sup>1</sup></u>	<u>Ratio</u>	<u>From IEE <sup>2</sup></u>	<u>From IEE <sup>1,2</sup></u>	<u>From IEE <sup>2</sup></u>	<u>Difference</u>
2005	10.1%	7.4%	17.5%	10.4%	7.2%	17.6%	-0.1%
2006	10.5%	7.7%	18.2%	12.6%	7.2%	19.8%	-1.6%
2007	10.6%	7.7%	18.3%	10.1%	7.3%	17.4%	0.9%
2008	11.1%	6.9%	18.0%	11.9%	7.1%	19.0%	-1.0%
2009	11.3%	7.3%	18.6%	11.3%	7.3%	18.6%	0.0%
2010	11.5%	7.0%	18.5%	11.9%	7.2%	19.1%	-0.6%
2011	12.1%	6.7%	18.8%	11.4%	6.7%	18.1%	0.7%
2012	12.8%	7.0%	19.8%	12.2%	6.2%	18.4%	1.4%
2013	12.9%	7.4%	20.3%	12.1%	7.0%	19.1%	1.2%
2014	13.4%	7.0%	20.4%	13.0%	6.7%	19.7%	0.7%

**Notes:**

Loss adjustment expense indications are displayed as a percentage of loss.

<sup>1</sup> Adjusted for the impact of large deductible policies.

<sup>2</sup> The IEE data is direct of reinsurance, excludes state funds and is from the NCCI Compiled IEE Validated Summary.

**NATIONAL COUNCIL ON COMPENSATION INSURANCE**

**2015 COUNTRYWIDE ANNUAL LOSS ADJUSTMENT EXPENSE REVIEW—EVALUATED AS OF 12/31/2014**

**Analysis Based on Private Carrier Data**

**DCCE—PAID ANALYSIS—Excluding Large Deductible Policies**

<u>AY</u>	(1) <u>Paid DCCE</u>	(2) Cumulative Paid DCCE Development <u>Factors</u>	(3)=(1)x(2) Estimated Paid DCCE Developed to a <u>10th Report</u>	(4) <u>Paid Losses</u>	(5) Cumulative Paid Loss Development <u>Factors</u>	(6)=(4)x(5) Estimated Paid Losses Developed to a <u>10th Report</u>	(7)=(3)/(6)x10th/Ult. Estimated Ultimate DCCE <u>Ratio</u>
2005	1,545,654,482	NA	1,545,654,482	15,094,798,678	NA	15,094,798,678	10.0%
2006	1,735,638,486	1.017	1,765,144,340	16,177,098,146	1.017	16,452,108,814	10.5%
2007	1,866,913,756	1.038	1,937,856,479	17,486,316,104	1.039	18,168,282,432	10.5%
2008	2,030,451,397	1.068	2,168,522,092	17,934,292,924	1.068	19,153,824,843	11.1%
2009	1,850,968,770	1.112	2,058,277,272	16,092,265,202	1.109	17,846,322,109	11.3%
2010	1,874,612,028	1.178	2,208,292,969	16,006,086,181	1.170	18,727,120,832	11.6%
2011	1,866,247,564	1.295	2,416,790,595	15,117,663,370	1.274	19,259,903,133	12.3%
2012	1,605,786,982	1.526	2,450,430,935	12,738,198,121	1.466	18,674,198,445	12.9%
2013	1,182,789,417	2.110	2,495,685,670	9,793,247,320	1.922	18,822,621,349	13.1%
2014	458,596,559	5.600	2,568,140,730	4,454,876,877	4.232	18,853,038,943	13.4%

**NATIONAL COUNCIL ON COMPENSATION INSURANCE**

**2015 COUNTRYWIDE ANNUAL LOSS ADJUSTMENT EXPENSE REVIEW—EVALUATED AS OF 12/31/2014**

**Analysis Based on Private Carrier Data**

**DCCE—INCURRED ANALYSIS—Excluding Large Deductible Policies**

	(1)	(2)	(3)=(1)x(2)	(4)	(5)	(6)=(4)x(5)	(7)=(3)/(6)x10th/Ult.
		Cumulative Incurred DCCE Development	Estimated Incurred DCCE Developed to a		Cumulative Incurred Loss Development	Estimated Incurred Losses Developed to a	Estimated Ultimate DCCE
<u>AY</u>	<u>Incurred DCCE</u>	<u>Factors</u>	<u>10th Report</u>	<u>Incurred Losses</u>	<u>Factors</u>	<u>10th Report</u>	<u>Ratio</u>
2005	1,787,443,475	NA	1,787,443,475	17,468,195,331	NA	17,468,195,331	10.2%
2006	2,011,547,389	0.999	2,009,535,842	19,160,075,975	1.001	19,179,236,051	10.5%
2007	2,211,659,837	0.998	2,207,236,517	20,778,715,066	1.001	20,799,493,781	10.6%
2008	2,380,448,627	0.999	2,378,068,178	21,675,146,819	1.000	21,675,146,819	11.0%
2009	2,262,289,990	1.001	2,264,552,280	20,239,596,392	0.997	20,178,877,603	11.2%
2010	2,404,682,178	0.997	2,397,468,131	21,161,478,898	0.995	21,055,671,504	11.4%
2011	2,614,521,595	0.983	2,570,074,728	21,961,600,211	0.985	21,632,176,208	11.9%
2012	2,759,284,231	0.983	2,712,376,399	21,801,625,908	0.987	21,518,204,771	12.6%
2013	2,807,011,885	0.993	2,787,362,802	22,380,975,969	0.986	22,067,642,305	12.6%
2014	2,957,709,355	1.019	3,013,905,833	22,958,748,838	0.984	22,591,408,857	13.3%

## NATIONAL COUNCIL ON COMPENSATION INSURANCE

### 2015 COUNTRYWIDE ANNUAL LOSS ADJUSTMENT EXPENSE REVIEW—EVALUATED AS OF 12/31/2014

#### Analysis Based on Private Carrier Data

#### AOE—PAID ANALYSIS—Including Large Deductible Policies

AY	(1) Paid AOE	(2) Cumulative Paid AOE Development Factors	(3)=(1)x(2) Estimated Paid AOE Developed to a 10th Report	(4) Paid Losses	(5) Cumulative Paid Loss Development Factors	(6) Estimated Paid Losses Developed to a 10th Report	(7)=(3)/(6)x10th/Ult. Estimated Ultimate AOE Ratio
2005	1,894,501,827	NA	1,894,501,827	15,806,588,286	NA	15,806,588,286	7.6% (a)
2006	2,100,380,997	1.012	2,125,585,569	16,875,508,015	1.017	17,162,391,651	7.9% (b)
2007	2,149,867,471	1.028	2,210,063,760	18,103,519,251	1.039	18,809,556,502	7.8% (c)
2008	1,984,933,086	1.050	2,084,179,740	18,608,441,104	1.070	19,911,031,981	7.0% (d)
2009	1,870,880,025	1.078	2,016,808,667	16,549,426,914	1.115	18,452,611,009	7.3% (e)
2010	1,765,590,212	1.121	1,979,226,628	16,363,632,884	1.180	19,309,086,803	7.0% (f)
2011	1,653,717,022	1.179	1,949,732,369	15,419,898,180	1.289	19,876,248,754	6.6% (g)
2012	1,555,396,545	1.282	1,994,018,371	12,949,371,798	1.489	19,281,614,607	6.9% (h)
2013	1,445,033,753	1.482	2,141,540,022	9,929,534,338	1.955	19,412,239,631	7.4% (i)
2014	920,916,586	2.227	2,050,881,237	4,501,901,912	4.324	19,466,223,867	6.9% (j)

Adjusted for Impact of Large Deductibles

- (a)  $(\text{Col.3/Col.6} \times (10\text{th/Ult.}) + 0.007) \times 0.65$
- (b)  $(\text{Col.3/Col.6} \times (10\text{th/Ult.}) + 0.008) \times 0.65$
- (c)  $(\text{Col.3/Col.6} \times (10\text{th/Ult.}) + 0.009) \times 0.67$
- (d)  $(\text{Col.3/Col.6} \times (10\text{th/Ult.}) + 0.008) \times 0.67$
- (e)  $(\text{Col.3/Col.6} \times (10\text{th/Ult.}) + 0.008) \times 0.68$
- (f)  $(\text{Col.3/Col.6} \times (10\text{th/Ult.}) + 0.007) \times 0.69$
- (g)  $(\text{Col.3/Col.6} \times (10\text{th/Ult.}) + 0.005) \times 0.69$
- (h)  $(\text{Col.3/Col.6} \times (10\text{th/Ult.}) + 0.005) \times 0.70$
- (i)  $(\text{Col.3/Col.6} \times (10\text{th/Ult.}) + 0.004) \times 0.70$
- (j)  $(\text{Col.3/Col.6} \times (10\text{th/Ult.}) + 0.003) \times 0.70$

**NATIONAL COUNCIL ON COMPENSATION INSURANCE**

**2015 COUNTRYWIDE ANNUAL LOSS ADJUSTMENT EXPENSE REVIEW—EVALUATED AS OF 12/31/2014**

**Analysis Based on Private Carrier Only Data**

**AOE—INCURRED ANALYSIS—Including Large Deductible Policies**

	(1)	(2)	(3)=(1)x(2)	(4)	(5)	(6)	(7)=(3)/(6)x10th/Ult.
		Cumulative Incurred AOE Development	Estimated Incurred AOE Developed to a		Cumulative Incurred Loss Development	Estimated Incurred Losses Developed to a	Estimated Ultimate AOE
<u>AY</u>	<u>Incurred AOE</u>	<u>Factors</u>	<u>10th Report</u>	<u>Incurred Losses</u>	<u>Factors</u>	<u>10th Report</u>	<u>Ratio</u>
2005	2,004,072,312	NA	2,004,072,312	19,224,435,047	NA	19,224,435,047	7.2% (a)
2006	2,221,734,735	1.006	2,235,065,143	20,867,071,408	1.002	20,908,805,551	7.5% (b)
2007	2,292,158,105	1.013	2,321,956,160	22,536,388,795	1.002	22,581,461,573	7.5% (c)
2008	2,144,288,910	1.020	2,187,174,688	23,442,899,712	1.002	23,489,785,511	6.8% (d)
2009	2,074,639,750	1.028	2,132,729,663	21,842,545,477	1.000	21,842,545,477	7.2% (e)
2010	2,037,878,351	1.038	2,115,317,728	22,732,040,472	0.997	22,663,844,351	6.9% (f)
2011	2,063,388,992	1.041	2,147,987,941	23,768,271,263	0.985	23,411,747,194	6.7% (g)
2012	2,111,468,177	1.049	2,214,930,118	23,672,665,837	0.987	23,364,921,181	7.0% (h)
2013	2,353,739,986	1.045	2,459,658,285	24,513,475,715	0.983	24,096,746,628	7.4% (i)
2014	2,415,355,544	1.001	2,417,770,900	25,374,440,687	0.976	24,765,454,111	7.1% (j)

Adjusted for Impact of Large Deductibles

- (a)  $(\text{Col.3/Col.6} \times (10\text{th/Ult.}) + 0.007) \times 0.65$
- (b)  $(\text{Col.3/Col.6} \times (10\text{th/Ult.}) + 0.008) \times 0.65$
- (c)  $(\text{Col.3/Col.6} \times (10\text{th/Ult.}) + 0.009) \times 0.67$
- (d)  $(\text{Col.3/Col.6} \times (10\text{th/Ult.}) + 0.008) \times 0.67$
- (e)  $(\text{Col.3/Col.6} \times (10\text{th/Ult.}) + 0.008) \times 0.68$
- (f)  $(\text{Col.3/Col.6} \times (10\text{th/Ult.}) + 0.007) \times 0.69$
- (g)  $(\text{Col.3/Col.6} \times (10\text{th/Ult.}) + 0.005) \times 0.69$
- (h)  $(\text{Col.3/Col.6} \times (10\text{th/Ult.}) + 0.005) \times 0.70$
- (i)  $(\text{Col.3/Col.6} \times (10\text{th/Ult.}) + 0.004) \times 0.70$
- (j)  $(\text{Col.3/Col.6} \times (10\text{th/Ult.}) + 0.003) \times 0.70$

**PRE-FILED TESTIMONY**  
**OF**  
**MARK MULVANEY**  
**2015 NORTH CAROLINA WORKERS COMPENSATION**  
**ASSIGNED RISK RATE FILING**

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Q. Please state your name and business address.

A. My name is Mark Mulvaney, my business address is Milliman, Inc., 1400 Wewatta Street, Suite 300, 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 27 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.

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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, and the Middle East. Milliman employs more than 3,000 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 2015 workers compensation insurance Assigned Risk Rate Filing (the "Filing")?

A. Yes I was.

Q. What was the scope of that engagement?

A. Milliman was engaged for two aspects of this filing. Dr. David Appel of Milliman's New York Office was engaged to review the Underwriting Profit factor to include in the Assigned Risk Rate Filing. For this year's filing, the Rate Bureau also 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. David Appel and Dr. James Vander Weide 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.

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

A. No it is not.

Q. Have you completed your review of the Filing?

A. Yes I have.

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

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

Q. What are assigned risks?

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

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

A. By definition, insurance rates (along with the associated rating plans) are to include provisions for all costs associated with the transfer of risk. These costs include losses, expenses, taxes, licenses and fees, and profit and contingencies. Since 1995 in North Carolina, the voluntary market workers compensation filings by the Rate Bureau have included provisions for losses, loss adjustment expenses, and loss based assessments only. These are called loss costs. They exclude provision for production expenses, general expenses, dividends, taxes, licenses and fees (since 1999), and profit and contingencies.

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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 loss costs by classification as contained in that filing 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 seeking a 2.2% increase in rate level for the industrial classifications, and a 12.7% increase in rate level for the Federal ("F") classifications.

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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 2.2% increase for the industrial classifications and 12.7% increase 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 3.1% increase  
Contracting 0.2% increase  
Office and Clerical 1.5% increase  
Goods and Services 2.1% increase  
Miscellaneous 4.1% increase

Q. Are there other changes proposed with this filing?

A. Yes, the Rate Bureau is also proposing to decrease the expense constant from \$250 per policy to \$160 per policy.

Q. How does the change in expense constant affect the filing?

A. Since it is for a reduction in expense constant, it lowers the premium that would apply absent the change. Therefore, it requires an offsetting increase in the loss cost multiplier so that the total premium level stays the same before and after the change in expense constant.

Q. Where in the filing can I see the impact of the change in expense constant?

A. It is calculated in Exhibit II-D, and is shown in Exhibit I-A, Sheet 1, Item 5. Including the change in expense constant, this value is a factor of 1.153. Absent the change in expense constant, it would have been a factor of 1.185. Since this factor appears in the denominator of the loss cost multiplier formula, the rate level was increased by the ratio  $1.185/1.153$  or approximately 2.8% to counter the reduction in premium arising from the expense constant change. Therefore, the overall rate level change for the industrial classifications would have been for a slight reduction absent the change in expense constant.

Q. Is the Rate Bureau filing for a change in the experience rating eligibility thresholds?

A. Yes, the experience rating plan is mandatory for eligible insureds. Eligibility is determined by a pair of tests regarding premium and an insured is eligible if it passes either one. The first is related to the total premium volume in the most recent 24 months of the experience period, and the second test is the average premium volume over the entire experience period. Currently North Carolina's eligibility is \$8,000 for total premium in the most recent 24 months of the experience period or an average premium size of \$4,000 over the entire experience period. The Rate Bureau is proposing to increase these thresholds to \$10,000 over the most recent 24 month period and to \$5,000 for the average over the entire experience period.

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Q. Why is the Rate Bureau filing for a change in the experience rating eligibility thresholds?

A. It is important that the experience rating thresholds be updated from time to time. Workers compensation premiums inexorably rise as inflationary pressures increase the cost of losses. Thus, as premiums rise employers who were previously ineligible will become eligible simply through the impact of time and inflation. However, the experience rating plan has eligibility criteria because the experience of the smallest insureds lacks predictive credibility in estimating future losses. Therefore, the experience rating eligibility thresholds must be modified from time to time to prevent application of the plan to insureds whose experience lacks credibility.

Q. In your opinion are the changes to the experience rating eligibility thresholds reasonable?

A. Yes

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

A. April 1, 2016.

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

A. The current Assigned Risk rates became effective April 1, 2015.

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.

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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, Field Supervision 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?

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- 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 4/1/15 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 4/1/15 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 4/1/15 level.

When taking the ratio of the ratios, the measurement unit in the denominator of each is common, both representing pure premiums at the 4/1/15 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, 2004 through 2013. 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 1.604 and the impact of ARAP of 1.029) to determine an indicated change for each method. The Rate Bureau gives equal weight to the indicated changes for each method. The average indicated change (1.064) multiplied by the current assigned risk differential results in an indicated assigned risk differential of 1.707.

An adjustment is made to prevent a double counting of Servicing Carrier loss adjustment expenses.

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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, Field Supervision and General Expenses). 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 .888 and is calculated in Exhibit II-A, Sheet 3 of the filing. The indicated differential of 1.707 multiplied by the adjustment factor of .888 results in the proposed loss cost modification factor of 1.516 and is shown on Exhibit I-A, Sheet 3 of the filing.

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

A. Yes it is.

Q. In your opinion is the loss cost modification factor of 1.516 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, Field Supervision, and General Expenses determined?

A. Separate provisions are calculated for Servicing Carriers and Direct Assignment Carriers, and the resulting provision is the weighted average of the two, using their respective Assigned Risk market shares (called "Quotas") as weights.

For the Servicing Carriers, the provision is the weighted average of the January 1, 2015 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 plus separately reimbursable expenses to gross written premium.

For direct assignment carriers, the provision is based on the assigned risk market share weighted average for Other Acquisition, Field Supervision, and General Expense ratios for calendar years 2012 through 2014.

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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, Field Supervision, 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) plus a provision of 0.3% for miscellaneous taxes, producing a total of 2.96%. 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 provided by Dr. James Vander Weide and a rate of return model provided by Dr. David Appel of Milliman. I have not reviewed nor have I been asked to provide an opinion concerning the Underwriting Profit provision. I am relying on these other experts 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 ten year uncollectible premium ratios after development.

Q. Has the methodology used to calculate the Uncollectible Premium changed in this filing?

A. There was a small change in that previously it was the uncollectible premium ratios that were developed to ultimate based on a development to a 23<sup>rd</sup> report. In this filing, the numerator

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collected premium and the denominator gross premium are developed separately to an 8<sup>th</sup> report, and then the developed numerator is divided by the developed denominator. I do not consider this difference material.

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 2012 through 2014, along with the number of policies which had an expense constant charged. The impact of minimum premiums is based on Unit Statistical Data for policy years 2003 to 2010. The combined impact of the expense constant and minimum premiums is 15.3% of assigned risk premium excluding these items. This impact is expressed as a factor (1.153) and used as a divisor in the loss cost multiplier formula to reduce the rates on account of 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. There is no change to the general formula, but there is a proposed change to the expense constant. The Rate Bureau has proposed to decrease the expense constant from \$250 to \$160.

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?

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A. It is 2.557 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 each and 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 reflect 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  
JAMES H. VANDER WEIDE

2015 WORKERS COMPENSATION INSURANCE  
ASSIGNED RISK RATE FILING  
BY THE NORTH CAROLINA RATE BUREAU

Q. WHAT IS YOUR NAME, OCCUPATION, AND BUSINESS ADDRESS?

A. My name is James H. Vander Weide. I am President of Financial Strategy Associates, a firm that provides strategic and financial consulting services to corporate clients. My business address is 3606 Stoneybrook Drive, Durham, North Carolina 27705.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND PRIOR ACADEMIC EXPERIENCE.

A. I graduated from Cornell University with a Bachelor's Degree in Economics and then attended Northwestern University where I earned a Ph.D. in Finance. I joined the faculty of the School of Business at Duke University where I was subsequently named Assistant Professor, Associate Professor, Professor, and Research Professor. I have published research in the areas of finance and economics and taught courses in these fields at Duke for more than thirty-five years. I am now retired from my teaching duties at Duke.

I have taught courses in corporate finance, investment management, and management of financial institutions. I also taught a graduate seminar on the theory of public utility pricing and lectured in executive development seminars on the cost of capital, financial analysis, capital budgeting, mergers and acquisitions, cash management, short-run financial planning, and competitive strategy.

I have served as Program Director and taught in numerous executive education programs at Duke, including the Duke Advanced Management Program, the Duke Management Challenge, the Duke Executive Program in Telecommunications, Competitive Strategies in Telecommunications, and the Duke Program for Manager Development for managers from the former Soviet Union. I have also taught in tailored programs developed for corporations such as ABB, Accenture, Allstate, AT&T, Progress Energy, GlaxoSmithKline, Lafarge, MidAmerican Energy, Norfolk Southern, The Rank Group, Siemens, TRW, and Wolseley PLC.

In addition to my teaching and executive education activities, I have written research papers on such topics as portfolio management, the cost of capital, capital budgeting, the effect of regulation on the performance of

public utilities, and cash management. My articles have been published in *American Economic Review*, *Financial Management*, *International Journal of Industrial Organization*, *Journal of Finance*, *Journal of Financial and Quantitative Analysis*, *Journal of Bank Research*, *Journal of Accounting Research*, *Journal of Cash Management*, *Management Science*, *The Journal of Portfolio Management*, *Atlantic Economic Journal*, *Journal of Economics and Business*, and *Computers and Operations Research*. I have written a book titled *Managing Corporate Liquidity: an Introduction to Working Capital Management*, a chapter for *The Handbook of Modern Finance*, "Financial Management in the Short Run," and a chapter for the book, *The Handbook of Portfolio Construction: Contemporary Applications of Markowitz Techniques*, "Principles for Lifetime Portfolio Selection: Lessons from Portfolio Theory."

- Q. HAVE YOU PREVIOUSLY PRESENTED EVIDENCE ON THE COST OF CAPITAL AND OTHER REGULATORY ISSUES?
- A. Yes. As an expert on financial and economic theory and practice, I have participated in more than four hundred regulatory and legal proceedings before the U.S. Congress, the Canadian Radio-Television and Telecommunications Commission, the Federal Communications Commission, the National Telecommunications and Information Administration,

the Federal Energy Regulatory Commission, the National Energy Board (Canada), the public utility commissions of forty-five states and four Canadian provinces, the insurance commissions of five states, the Iowa State Board of Tax Review, the National Association of Securities Dealers, and the North Carolina Property Tax Commission. In addition, I have prepared expert testimony in proceedings before the U.S. Tax Court, the U.S. District Court for the District of Nebraska; the U.S. District Court for the District of New Hampshire; the U.S. District Court for the District of Northern Illinois; the U.S. District Court for the Eastern District of North Carolina; the Montana Second Judicial District Court, Silver Bow County; the U.S. District Court for the Northern District of California; the Superior Court, North Carolina; the U.S. Bankruptcy Court for the Southern District of West Virginia; the U. S. District Court for the Eastern District of Michigan; and the Supreme Court of the State of New York.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. I have been asked by the North Carolina Rate Bureau to make an independent appraisal of the aggregate cost of equity capital for the companies writing workers compensation insurance in North Carolina and to recommend a rate of return on equity that is fair, that allows those companies

in the aggregate to attract and retain capital on reasonable terms, that is commensurate with returns on investments of comparable risk, and that maintains the financial integrity of those companies in the aggregate.

Q. WHAT DO YOU MEAN BY THE PHRASE "COST OF EQUITY CAPITAL?"

A. A firm's cost of equity capital is the rate of return expectation that is required in the marketplace on equity investments of comparable risk. If an investor does not expect to earn a return on an equity investment in a firm that is at least as large as the return the investor could expect to earn on other investments of comparable risk, then the investor will not invest in that firm's shares. Thus, a firm's cost of equity capital is also the rate of return expectation that is required in the marketplace in order to induce equity investors to purchase shares in that firm.

Q. IS THE COST OF EQUITY CAPITAL THE SAME AS THE RETURN ON EQUITY?

A. No. The cost of equity capital is a market-based concept that reflects investors' future expectations, while the return on equity is an accounting concept that measures results of past performance. The return on equity is equal

to income available for common equity divided by the book value of common equity.

Q. HAVE YOU FORMED AN OPINION REGARDING THE COST OF EQUITY CAPITAL FOR THE AVERAGE COMPANY WRITING WORKERS COMPENSATION INSURANCE IN NORTH CAROLINA?

A. Yes.

Q. WHAT IS YOUR OPINION IN THAT REGARD?

A. The cost of equity capital for such a company is in the range 8.6 percent to 12.1 percent.

Q. WHAT ECONOMIC PRINCIPLES DID YOU CONSIDER IN ARRIVING AT THAT OPINION?

A. There are two primary economic principles relevant to my appraisal of the cost of equity capital. The first, relating to the demand for capital, states that a firm should continue to invest in its business only so long as the return on its investment is greater than or equal to its cost of capital. In the context of a regulated firm, this principle suggests that the regulatory agency should establish revenue levels which will offer the firm an opportunity to earn a return on its investment that is at least equal to its cost of capital.

The second principle, relating to the supply of capital, states that rational investors are maximizing their total return on capital only if the returns they expect to receive on investments of comparable risk are equal. If these returns are not equal, rational investors will reduce or completely eliminate investments in those activities yielding lower expected returns for a given level of risk and will increase investments in those activities yielding higher expected returns. The second principle implies that regulated firms will be unable to obtain the capital required to expand service on reasonable terms unless they are able to provide investors returns equal to those expected on investments of comparable risk.

Q. DO THESE ECONOMIC PRINCIPLES APPLY TO THE SETTING OF INSURANCE RATES?

A. Yes. These are general economic principles that apply to investing in any business activity, including insurance.

Q. HOW DID YOU GO ABOUT DETERMINING THE COST OF EQUITY CAPITAL FOR THE AVERAGE COMPANY WRITING WORKERS COMPENSATION INSURANCE IN NORTH CAROLINA?

A. I used two generally accepted methods to estimate the cost of equity: (i) the Discounted Cash Flow (DCF) Model, and (ii) the Risk Premium Approach.

Q. PLEASE DESCRIBE THE DCF MODEL.

A. The DCF Model suggests that investors value an asset on the basis of the future cash flows they expect to receive from owning the asset. Thus, investors value an investment in a bond because they expect to receive a sequence of semi-annual coupon payments over the life of the bond and a terminal payment equal to the bond's face value at the time the bond matures. Likewise, investors value an investment in a firm's stock because they expect to receive a sequence of dividend payments and, perhaps, expect to sell the stock at a higher price sometime in the future.

A second fundamental principle of the DCF approach is that investors value a dollar received in the future less than a dollar received today. This is because, if they had the dollar today, they could invest it in an interest earning account and increase their wealth. This principle is called the time value of money.

Applying the two fundamental DCF principles noted above to an investment in a bond suggests that investors should value their investment in the bond on the basis of the present value of the bond's future cash flows. Thus, the price of the bond should be equal to:

**Equation 1**

$$P_B = \frac{C}{(1+i)} + \frac{C}{(1+i)^2} + \dots + \frac{C+F}{(1+i)^n}$$

where:

$P_B$	=	Bond price;
$C$	=	Cash value of the coupon payment (assumed for notational convenience to occur annually rather than semi-annually);
$F$	=	Face value of the bond;
$i$	=	The rate of interest the investor could earn by investing his money in an alternative bond of equal risk; and
$n$	=	The number of periods before the bond matures.

Applying these same principles to an investment in a firm's stock suggests that the price of the stock should be equal to:

**Equation 2**

$$P_S = \frac{D_1}{(1+k)} + \frac{D_2}{(1+k)^2} + \dots + \frac{D_n + P_n}{(1+k)^n}$$

where:

$P_S$	=	Current price of the firm's stock;
$D_1, D_2 \dots D_n$	=	Expected annual dividend per share on the firm's stock;
$P_n$	=	Price per share of stock at the time the investor expects to sell the stock; and
$k$	=	Return the investor expects to earn on alternative investments of the same risk, i.e., the investor's required rate of return.

Equation (2) is frequently called the Annual Discounted Cash Flow (DCF) Model of stock valuation.

Q. HOW DO YOU USE THE DCF MODEL TO DETERMINE THE COST OF EQUITY CAPITAL?

A. The "k" in the equation is the cost of equity capital. We make certain simplifying assumptions regarding the other factors in the equation and then mathematically solve for "k."

Q. WHAT ARE THE ASSUMPTIONS YOU MAKE?

A. Most analysts make three simplifying assumptions. First, they assume that dividends are expected to grow at the constant rate ("g") into the indefinite future. Second, they assume that the stock price at time "n" is simply the present value of all dividends expected in periods subsequent to "n." Third, they assume that the investors' required rate of return, "k," exceeds the expected dividend growth rate, "g."

Q. DOES THE ANNUAL DCF MODEL OF STOCK VALUATION PRODUCE APPROPRIATE ESTIMATES OF A FIRM'S COST OF EQUITY CAPITAL?

A. No. The Annual DCF Model of stock valuation produces appropriate estimates of a firm's cost of equity capital only if the firm pays dividends just once a year. Since

most firms pay dividends quarterly, the Annual DCF Model produces downwardly biased estimates of the cost of equity. Investors can expect to earn a higher annual effective return on an investment in a firm that pays quarterly dividends than in one which pays the same amount of dollar dividends once at the end of each year. A complete analysis of the implications of the quarterly payment of dividends on the DCF Model is provided in Exhibit RB-9. For the reasons cited there, I employed the Quarterly DCF Model throughout my calculations.

Q. PLEASE DESCRIBE THE QUARTERLY DCF MODEL YOU USED.

A. The Quarterly DCF Model I used is described by Equation 10 on page 11 in Exhibit RB-9. This equation shows that the cost of equity is: the sum of the dividend yield and the growth rate, where the dividend in the dividend yield is the equivalent dividend at the end of the year, and the growth rate is the expected growth in dividends or earnings per share.

Q. HOW DO YOU APPLY THE DCF APPROACH TO OBTAIN THE COST OF EQUITY CAPITAL FOR THE COMPANIES WRITING WORKERS COMPENSATION INSURANCE IN NORTH CAROLINA?

A. I apply the DCF approach to two groups of companies: Value Line's group of property/casualty insurance companies and the S&P 500.

Q. WHY DO YOU APPLY THE DCF APPROACH TO THE S&P 500 AS WELL AS TO VALUE LINE'S PROPERTY/CASUALTY INSURANCE COMPANIES?

A. As I noted previously, the cost of equity is defined as the rate of return investors expect to earn on investments in other companies of comparable risk. I apply the DCF approach to the S&P 500 because they are a large group of companies that, on average, are typically viewed as being comparable in risk to the property/casualty insurance industry. The use of a larger set of comparable risk companies should provide an accurate estimate of the cost of equity for the companies writing workers compensation insurance in North Carolina.

Q. DO YOU INCLUDE ALL THE VALUE LINE PROPERTY/CASUALTY INSURANCE COMPANIES?

A. No. Among the Value Line property/casualty insurance companies, I delete any firm which has recently lowered its dividend and which has no five-year earnings growth forecasts available from I/B/E/S (formerly known as the Institutional Brokers Estimate System, now part of Thomson

Reuters).<sup>1</sup> The Value Line property/casualty companies I use are shown in Exhibit RB-7.

Q. WHAT CRITERIA DO YOU USE TO SELECT COMPANIES IN THE S&P 500?

A. I include those firms which pay dividends and which have at least three five-year earnings forecasts available from I/B/E/S. I exclude the insurance companies in the S&P 500, as identified by I/B/E/S Thomson Reuters, because I have already calculated DCF results for the Value Line property/casualty insurance companies. The S&P 500 companies I use are shown in Exhibit RB-8.

Q. WHY DO YOU ELIMINATE ANY COMPANY WHICH HAD RECENTLY LOWERED ITS DIVIDEND OR WHICH FAILS TO PAY DIVIDENDS?

A. I eliminate those companies because it is difficult to make a reliable estimate of the future dividend growth rate for companies that have recently lowered their dividends or do not pay dividends. If a company has recently lowered its dividend, investors do not know whether the company will again lower its dividend in the future, or whether the

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<sup>1</sup> I have previously included companies that had three or more long-term earnings growth forecasts. However, at this time, this criterion produces a group of only five Value Line property/casualty insurance companies. In addition, on July 1, 2015, two of these companies, ACE Limited and Chubb, announced an agreement to merge. Therefore, at this time I report DCF results for all property casualty insurance companies that have a long-term earnings growth forecast from I/B/E/S.

company will attempt to increase its dividend back toward its previous level. If a company does not pay a dividend, one cannot mathematically apply the DCF approach.

Q. HOW DO YOU ESTIMATE THE GROWTH COMPONENT OF THE QUARTERLY DCF MODEL?

A. I use the average of analysts' estimates of future earnings per share (EPS) growth reported by I/B/E/S. As part of their research, financial analysts working at Wall Street firms periodically estimate EPS growth for each firm they follow. The EPS forecasts for each firm are then published. The forecasts are used by investors who are contemplating purchasing or selling shares in individual companies.

Q. WHAT IS I/B/E/S?

A. I/B/E/S is a collection of analysts' forecasts for a broad group of companies expressed in terms of a mean forecast and a standard deviation of forecast for each firm. The mean forecast is used by investors as an estimate of future firm performance.

Q. WHY DO YOU USE THE I/B/E/S GROWTH ESTIMATES?

A. The I/B/E/S growth rates (1) are widely circulated in the financial community, (2) include the projections of reputable financial analysts who develop estimates of

future growth, (3) are reported on a timely basis to investors, and (4) are widely used by institutional and other investors. For these reasons, I believe these estimates represent unbiased estimates of investors' expectations of each firm's long-term growth prospects and, accordingly, are incorporated by investors into their return requirements. Consequently, in my opinion, they provide the best available estimate of investors' long-term growth expectations.

Q. WHY DO YOU RELY EXCLUSIVELY ON ANALYSTS' PROJECTIONS OF FUTURE EPS GROWTH IN ESTIMATING THE INVESTORS' EXPECTED GROWTH RATE RATHER THAN LOOKING AT PAST HISTORICAL GROWTH RATES?

A. There is considerable empirical evidence that analysts' forecasts are more highly correlated with stock prices than are firms' historical growth rates, and, thus, that investors actually use these forecasts.

Q. HAVE YOU PERFORMED ANY STUDIES CONCERNING THE USE OF ANALYSTS' FORECASTS AS THE BEST ESTIMATE OF INVESTORS' EXPECTED GROWTH RATE, G?

A. Yes, I prepared a study with Willard T. Carleton, Professor of Finance Emeritus at the University of Arizona, on why analysts' forecasts provide the best estimate of investors'

expectations of future long-term growth. This study is described in a paper entitled "Investor Growth Expectations: Analysts vs. History," published in *The Journal of Portfolio Management*.

Q. PLEASE SUMMARIZE THE RESULTS OF YOUR STUDY.

A. First, we performed a correlation analysis to identify the historically-oriented growth rates which best described a firm's stock price. Then we did a regression study comparing the historical growth rates with the consensus analysts' forecasts. In every case, the regression equations containing the average of analysts' forecasts statistically outperformed the regression equations containing the historical growth estimates. These results are consistent with those found by Cragg and Malkiel, the early major research in this area. These results are also consistent with the hypothesis that investors use analysts' forecasts, rather than historically-oriented growth calculations, in making buy and sell decisions. They provide overwhelming evidence that the analysts' forecasts of future growth are superior to historically-oriented growth measures in predicting a firm's stock price.

Q. WHAT PRICE DO YOU USE IN YOUR DCF MODEL?

A. I use a simple average of the monthly high and low stock prices for each firm for the three-month period, April, May, and June 2015. These high and low stock prices are obtained from Thomson Reuters.

Q. WHY DO YOU USE THE THREE-MONTH AVERAGE STOCK PRICE,  $P_0$ , IN APPLYING THE DCF METHOD?

A. I use a three-month average stock price in applying the DCF method because stock prices fluctuate daily, while financial analysts' forecasts for a given company are generally changed less frequently, often on a quarterly basis. Thus, to match the stock price with an earnings forecast, it is appropriate to average stock prices over a three-month period.

Q. PLEASE EXPLAIN YOUR INCLUSION OF FLOTATION COSTS.

A. All firms that have sold securities in the capital markets have incurred some level of flotation costs, including underwriters' commissions, legal fees, printing expense, etc. These costs are paid from the proceeds of the stock sale and must be recovered over the life of the equity issue. Costs vary depending upon the size of the issue, the type of registration method used and other factors, but in general these costs range between four percent and five percent of the proceeds from the issue. In addition to

these costs, the underwriter's offer price is set below the most recent closing price before the public offering in order to reduce the risk that the underwriters will be unable to sell the entire offering at the offer price. The difference between the offer price and the recent closing price is generally in the range two percent to three percent. Thus, the total flotation cost, including both issuance expense and underwriter discount, could range anywhere from five percent to eight percent of the proceeds of an equity issue. These cost ranges have been developed and confirmed in a number of generally accepted studies. I believe a combined five percent allowance for flotation costs is a conservative estimate that should be used in applying the DCF model in this proceeding.

- Q. PLEASE SUMMARIZE THE RESULTS OF YOUR APPLICATION OF THE DCF METHOD TO THE PROPERTY/CASUALTY INSURANCE COMPANIES AND THE S&P 500.
- A. As shown in Exhibits RB-7 and RB-8, the average DCF cost of equity capital for my group of Value Line property/casualty companies is 10.6 percent; and for the S&P 500 companies, 12.1 percent.

Q. WHAT CONCLUSION DO YOU REACH FROM YOUR DCF ANALYSIS ABOUT THE COST OF EQUITY CAPITAL FOR COMPANIES WRITING WORKERS COMPENSATION INSURANCE IN NORTH CAROLINA?

A. On the basis of my DCF analysis, I would conclude that for companies writing workers compensation insurance in North Carolina the cost of equity is in the range 10.6 percent to 12.1 percent.

Q. YOU NOTE THAT THE SECOND METHOD YOU USE TO ESTIMATE THE COST OF EQUITY CAPITAL FOR COMPANIES WRITING WORKERS COMPENSATION INSURANCE IN NORTH CAROLINA IS A RISK PREMIUM APPROACH. PLEASE DESCRIBE THAT APPROACH.

A. I perform a study of the comparable returns received by bond and stock investors over the last eighty-nine years. I estimate the returns on stock and bond portfolios, using stock price and dividend yield data on the S&P 500 stock portfolio and bond yield data on Moody's A-rated utility bonds.

My study consists of analyzing the historically achieved returns on broadly based stock and bond portfolios going back to 1926. For stocks, I use the S&P 500 stock portfolio; and for bonds, I use Moody's A-rated utility bonds. The resulting annual returns on the stock and bond portfolios purchased in each year from 1926 through 2014 are shown on Exhibit RB-10. The difference between the

stock return and the bond return over that period of time on an arithmetic average basis is 4.5 percentage points.

Q. WHAT CONCLUSIONS DO YOU DRAW FROM YOUR RISK PREMIUM ANALYSES?

A. My own studies, combined with my analysis of other studies, provide strong evidence for the belief that investors today require an equity return of at least 4.5 percentage points above the expected yield on A-rated long-term debt issues.

Interest rates on Moody's seasoned A-rated utility bonds during the three months April through June 2015 range from 3.8 percent to 4.4 percent. On the basis of this information and my knowledge of bond market conditions, I conclude that the long-term yield on A-rated utility bonds is approximately 4.1 percent. Adding a 4.5 percentage point risk premium to the 4.1 percent expected yield on A-rated utility bonds, I obtain an expected return on equity of 8.6 percent.

Q. ARE THERE REASONS TO BELIEVE THAT THE RESULT OF YOUR EX POST RISK PREMIUM ANALYSIS MAY UNDERESTIMATE THE COST OF EQUITY AT THIS TIME?

A. Yes. The ex post risk premium model may produce an unrealistically low result because the model result is

highly sensitive to the estimate of the bond yield. At this time, bond yields are unusually low, reflecting policy decisions of the U.S. government and the U.S. Federal Reserve Bank to keep interest rates low in order to stimulate the economy. Since the ex post risk premium cost of equity result is the sum of the risk premium and the bond yield, the use of an unusually low bond yield in the model may cause the ex post risk premium model result to underestimate the cost of equity. Because the cost of equity is a forward-looking concept, it would be reasonable to apply the ex post risk premium model using a forecast of the expected bond yield, rather than a recent bond yield. Because bond yields are expected to increase over the next several years, the use of a forecasted bond yield would produce a significantly higher ex post risk premium estimate of the cost of equity. Thus, I consider my ex post risk premium model result to be conservative.

- Q. BASED ON YOUR ANALYSES, WHAT IS YOUR OPINION AS TO THE COST OF CAPITAL FOR THE AVERAGE INSURANCE COMPANY WRITING WORKERS COMPENSATION INSURANCE IN NORTH CAROLINA?
- A. Based on my review and studies, I believe that a conservative estimate of the cost of common equity capital for the average insurance company writing workers

compensation insurance in North Carolina is in the range  
8.6 percent to 12.1 percent.

SUMMARY OF DISCOUNTED CASH FLOW ANALYSIS FOR  
PROPERTY/CASUALTY INSURANCE COMPANIES

	COMPANY	MOST RECENT QUARTERLY DIVIDEND (D <sub>0</sub> )	STOCK PRICE (P <sub>0</sub> )	FORECAST OF FUTURE EARNINGS GROWTH	DCF MODEL RESULT
1	ACE Limited	0.650	107.063	8.15%	11.0%
2	Allstate Corp.	0.300	68.640	8.00%	10.0%
3	Amer. Financial Group	0.250	64.422	8.00%	9.8%
4	Berkley (W.R.)	0.120	50.148	7.30%	8.3%
5	Chubb Corp.	0.570	98.667	9.00%	11.5%
6	CNA Fin'l	0.250	39.790	5.00%	7.9%
7	Erie Indemnity	0.681	82.926	10.00%	13.9%
8	HCC Insurance Hldgs.	0.295	60.653	7.00%	9.1%
9	Mercury General	0.618	56.011	7.60%	12.8%
10	Old Republic	0.185	15.362	10.00%	14.5%
11	RLI Corp.	0.190	50.127	8.90%	10.6%
12	Selective Ins. Group	0.140	27.650	6.70%	9.0%
13	Travelers Cos.	0.610	102.097	6.75%	9.3%
14	Average				10.6%

## Notes:

d <sub>0</sub>	=	Latest quarterly dividend.
d <sub>1</sub> , d <sub>2</sub> , d <sub>3</sub> , d <sub>4</sub> ,	=	Expected next four quarterly dividends, calculated by multiplying the last four quarterly dividends per Value Line, by the factor (1 + g).
P <sub>0</sub>	=	Average of the monthly high and low stock prices during the three months ending June 2015 per Thomson Reuters.
FC	=	Flotation costs.
g	=	I/B/E/S forecast of future earnings growth June 2015.
k	=	Cost of equity using the quarterly version of the DCF Model and a five percent allowance for flotation costs as shown by the formula below:

$$k = \frac{d_1(1+k)^{.75} + d_2(1+k)^{.50} + d_3(1+k)^{.25} + d_4}{P_0(1-FC)} + g$$

SUMMARY OF DISCOUNTED CASH FLOW ANALYSIS FOR  
S&P 500 COMPANIES

	COMPANY	STOCK PRICE (P <sub>0</sub> )	D <sub>0</sub>	FORECAST OF FUTURE EARNINGS GROWTH	MODEL RESULT
1	3M	159.80	4.10	9.49%	12.5%
2	ABBOTT LABORATORIES	48.00	0.96	9.70%	12.0%
3	ACCENTURE CLASS A	95.70	2.04	9.63%	12.1%
4	AIR PRDS. & CHEMS.	145.81	3.24	12.35%	15.0%
5	AIRGAS	103.88	2.40	9.22%	11.9%
6	ALTERA	46.76	0.72	10.68%	12.5%
7	ALTRIA GROUP	50.72	2.08	8.27%	13.0%
8	AMER. ELEC. PWR.	55.71	2.12	5.08%	9.4%
9	AMERICAN EXPRESS	79.36	1.16	8.56%	10.2%
10	AMETEK	53.45	0.36	12.20%	13.0%
11	AMGEN	160.62	3.16	11.17%	13.5%
12	APPLE	128.31	2.08	13.42%	15.4%
13	AT&T	34.42	1.88	4.48%	10.6%
14	AUTOMATIC DATA PROC.	84.80	1.96	10.40%	13.1%
15	BECTON DICKINSON	141.72	2.40	11.34%	13.3%
16	BEST BUY	35.39	0.92	12.22%	15.3%
17	BLACKROCK	364.24	8.72	12.08%	14.9%
18	BOEING	145.31	4.19	12.38%	15.8%
19	BORGWARNER	59.94	0.52	13.39%	14.4%
20	C R BARD	171.28	0.96	10.79%	11.4%
21	CARDINAL HEALTH	87.30	1.55	10.73%	12.8%
22	CH ROBINSON WWD.	65.40	1.52	11.00%	13.7%
23	CINTAS	83.53	0.85	12.34%	13.5%
24	CISCO SYSTEMS	28.62	0.84	9.40%	12.8%
25	CLOROX	107.84	3.08	6.43%	9.7%
26	CME GROUP	93.50	2.00	12.33%	14.9%
27	CMS ENERGY	33.70	1.16	6.73%	10.7%
28	COCA COLA	40.72	1.32	4.83%	8.5%
29	COLGATE-PALM.	67.61	1.52	8.03%	10.6%
30	COMERICA	48.50	0.84	10.16%	12.2%
31	CONAGRA FOODS	38.51	1.00	7.15%	10.1%
32	COSTCO WHOLESALE	143.76	1.60	9.72%	11.0%
33	CSX	34.86	0.72	8.83%	11.2%
34	CUMMINS	136.74	3.12	11.23%	13.9%
35	CVS HEALTH	102.05	1.40	14.85%	16.5%
36	DELPHI AUTOMOTIVE	84.94	1.00	13.49%	14.9%
37	DISCOVER FINANCIAL SVS.	58.53	1.12	9.25%	11.5%
38	DOLLAR GENERAL	74.67	0.88	12.68%	14.1%
39	DOMINION RESOURCES	70.76	2.59	5.89%	10.0%
40	DOVER	74.22	1.60	8.65%	11.1%
41	DOW CHEMICAL	51.04	1.68	9.09%	12.9%
42	DR PEPPER SNAPPLE GROUP	76.18	1.92	7.70%	10.6%

	COMPANY	STOCK PRICE (P <sub>0</sub> )	D <sub>0</sub>	FORECAST OF FUTURE EARNINGS GROWTH	MODEL RESULT
43	DTE ENERGY	79.08	2.92	4.51%	8.6%
44	DUKE ENERGY	75.95	3.18	4.49%	9.2%
45	EASTMAN CHEMICAL	77.01	1.60	7.17%	9.5%
46	EATON	70.04	2.20	9.17%	12.8%
47	ECOLAB	114.43	1.32	13.40%	14.8%
48	EMC	26.64	0.46	12.00%	14.0%
49	EMERSON ELECTRIC	58.49	1.88	7.55%	11.2%
50	EQUIFAX	97.86	1.16	10.18%	11.6%
51	ESTEE LAUDER COS. 'A'	85.59	0.96	9.33%	10.6%
52	EVERSOURCE ENERGY	48.63	1.67	6.60%	10.5%
53	FEDEX	173.66	1.00	15.90%	16.6%
54	FIDELITY NAT.INFO.SVS.	63.95	1.04	12.03%	14.0%
55	FLOWSERVE	55.99	0.72	7.18%	8.6%
56	FLUOR	57.61	0.84	10.50%	12.2%
57	GAP	39.68	0.92	9.40%	12.1%
58	GARMIN	45.87	2.04	6.57%	11.6%
59	GENERAL DYNAMICS	139.12	2.76	9.82%	12.1%
60	GENERAL ELECTRIC	26.98	0.92	7.59%	11.5%
61	GENERAL MILLS	56.04	1.76	6.18%	9.7%
62	GILEAD SCIENCES	108.35	1.72	13.30%	15.2%
63	GOLDMAN SACHS GP.	202.99	2.60	8.06%	9.5%
64	HALLIBURTON	46.21	0.72	8.36%	10.1%
65	HARLEY-DAVIDSON	57.02	1.24	12.27%	14.9%
66	HERSHEY	93.90	2.14	9.13%	11.8%
67	HOME DEPOT	111.49	2.36	13.50%	16.1%
68	HONEYWELL INTL.	103.46	2.07	10.04%	12.4%
69	HUMANA	188.96	1.16	11.71%	12.4%
70	HUNT JB TRANSPORT SVS.	86.58	0.84	14.82%	16.0%
71	ILLINOIS TOOL WORKS	95.30	1.94	10.32%	12.7%
72	INGERSOLL-RAND	68.21	1.16	10.50%	12.5%
73	INTEL	32.49	0.96	8.25%	11.7%
74	INTL.FLAVORS & FRAG.	115.64	1.88	8.47%	10.3%
75	INTUIT	102.41	1.00	12.26%	13.4%
76	INVESCO	40.11	1.08	12.72%	15.9%
77	J M SMUCKER	115.94	2.56	6.48%	9.0%
78	JOHNSON & JOHNSON	100.20	3.00	5.13%	8.5%
79	JP MORGAN CHASE & CO.	64.99	1.60	7.64%	10.5%
80	JUNIPER NETWORKS	26.33	0.40	11.74%	13.5%
81	KANSAS CITY SOUTHERN	98.57	1.32	12.53%	14.1%
82	KEURIG GREEN MOUNTAIN	99.48	1.15	15.00%	16.4%
83	KEYCORP	14.66	0.30	9.74%	12.1%
84	KOHL'S	69.63	1.80	9.04%	12.0%
85	KROGER	72.28	0.84	10.03%	11.4%
86	L BRANDS	89.00	2.00	10.55%	13.2%
87	LENNAR 'A'	48.73	0.16	11.60%	12.0%

	COMPANY	STOCK PRICE (P <sub>0</sub> )	D <sub>0</sub>	FORECAST OF FUTURE EARNINGS GROWTH	MODEL RESULT
88	LINEAR TECHNOLOGY	46.56	1.20	9.00%	12.0%
89	LOCKHEED MARTIN	191.37	6.00	8.90%	12.5%
90	LYONDELLBASELL INDS.CL.A	100.72	3.12	5.24%	8.7%
91	MACY'S	67.32	1.44	9.18%	11.7%
92	MARATHON PETROLEUM	50.93	1.00	8.60%	10.9%
93	MCCORMICK & COMPANY NV.	77.89	1.60	7.78%	10.1%
94	MCDONALDS	97.07	3.40	6.78%	10.8%
95	MCGRAW HILL FINANCIAL	104.63	1.32	14.58%	16.1%
96	MEAD JOHNSON NUTRITION	96.55	1.65	9.23%	11.2%
97	MEDTRONIC	76.13	1.52	6.63%	8.9%
98	MICROSOFT	46.05	1.24	5.56%	8.6%
99	MONDELEZ INTERNATIONAL CL.A	39.38	0.60	9.10%	10.9%
100	MONSANTO	115.68	1.96	11.28%	13.3%
101	MOODY'S	106.99	1.36	13.10%	14.6%
102	NASDAQ OMX GROUP	50.25	1.00	8.46%	10.7%
103	NETAPP	34.33	0.72	10.87%	13.3%
104	NEWELL RUBBERMAID	39.80	0.76	9.55%	11.8%
105	NEXTERA ENERGY	101.88	3.08	6.27%	9.7%
106	NIELSEN	45.38	1.12	12.33%	15.3%
107	NIKE 'B'	102.70	1.12	12.52%	13.8%
108	NORDSTROM	75.88	1.48	7.30%	9.5%
109	NORFOLK SOUTHERN	97.02	2.36	9.13%	12.0%
110	NORTHROP GRUMMAN	159.28	3.20	6.84%	9.1%
111	ORACLE	43.39	0.60	7.50%	9.1%
112	PARKER-HANNIFIN	120.74	2.52	10.29%	12.7%
113	PATTERSON COMPANIES	47.89	0.88	9.93%	12.1%
114	PAYCHEX	48.87	1.52	9.50%	13.1%
115	PENTAIR	63.96	1.28	9.07%	11.4%
116	PEPSICO	95.54	2.81	6.00%	9.3%
117	PERKINELMER	52.01	0.28	9.26%	9.9%
118	PERRIGO	190.11	0.50	13.72%	14.0%
119	PG&E	52.31	1.82	4.71%	8.6%
120	PHILLIPS 66	79.45	2.24	8.73%	12.0%
121	PNC FINL.SVS.GP.	94.26	2.04	6.49%	8.9%
122	PPG INDUSTRIES	114.01	1.44	11.43%	12.9%
123	PRAXAIR	121.46	2.86	8.17%	10.9%
124	PREC.CASTPARTS	210.59	0.12	11.34%	11.4%
125	PROCTER & GAMBLE	80.17	2.65	6.73%	10.5%
126	QUALCOMM	68.23	1.92	6.50%	9.7%
127	QUEST DIAGNOSTICS	75.65	1.52	10.72%	13.1%
128	RALPH LAUREN CL.A	134.43	2.00	9.23%	11.0%
129	RAYTHEON 'B'	104.20	2.68	8.23%	11.2%
130	REGIONS FINL.NEW	10.02	0.24	5.98%	8.7%
131	ROCKWELL AUTOMATION	121.23	2.60	8.48%	11.0%
132	ROCKWELL COLLINS	96.03	1.32	11.30%	12.9%

	COMPANY	STOCK PRICE (P <sub>0</sub> )	D <sub>0</sub>	FORECAST OF FUTURE EARNINGS GROWTH	MODEL RESULT
133	ROPER TECHNOLOGIES	173.03	1.00	13.30%	14.0%
134	ROSS STORES	50.09	0.47	12.13%	13.2%
135	SCHLUMBERGER	90.14	2.00	10.12%	12.7%
136	SEAGATE TECH.	54.77	2.16	7.33%	11.9%
137	SEMPRA EN.	105.75	2.80	7.93%	11.0%
138	SOUTHERN	43.77	2.17	3.32%	8.8%
139	ST. JUDE MEDICAL	72.56	1.16	10.04%	11.9%
140	STARWOOD H&R. WORLDWIDE	83.90	1.50	9.63%	11.7%
141	STRYKER	94.86	1.38	8.81%	10.5%
142	SYMANTEC	24.60	0.60	7.93%	10.7%
143	SYSCO	37.41	1.20	5.97%	9.6%
144	T ROWE PRICE GROUP	80.62	2.08	12.01%	15.1%
145	TARGET	80.71	2.24	12.75%	16.1%
146	TEXAS INSTRUMENTS	55.03	1.36	10.00%	12.9%
147	THERMO FISHER SCIENTIFIC	130.26	0.60	9.50%	10.0%
148	TIFFANY & CO	90.14	1.60	10.98%	13.1%
149	TJX	66.87	0.84	11.25%	12.7%
150	TOTAL SYSTEM SERVICES	40.63	0.40	11.08%	12.2%
151	TRACTOR SUPPLY	88.52	0.80	15.49%	16.6%
152	TWENTY-FIRST CENTURY FOX CL.A	33.59	0.30	15.31%	16.4%
153	UNION PACIFIC	103.94	2.20	13.49%	16.0%
154	UNITED PARCEL SER. 'B'	99.46	2.92	9.36%	12.8%
155	UNITED TECHNOLOGIES	115.99	2.56	9.01%	11.6%
156	UNITEDHEALTH GROUP	117.75	2.00	9.82%	11.8%
157	UNIVERSAL HEALTH SVS. 'B'	125.03	0.40	11.60%	12.0%
158	US BANCORP	43.63	1.02	5.89%	8.5%
159	V F	71.61	1.28	11.51%	13.6%
160	VERIZON COMMUNICATIONS	49.18	2.20	5.93%	11.0%
161	VIACOM 'B'	67.89	1.32	10.42%	12.7%
162	WALGREENS BOOTS ALLIANCE	86.35	1.35	13.83%	15.7%
163	WALT DISNEY	109.97	1.32	15.15%	16.6%
164	WEC ENERGY GROUP	48.45	1.83	6.28%	10.6%
165	WELLS FARGO & CO	55.75	1.50	9.78%	12.9%
166	WESTERN UNION	21.23	0.62	8.10%	11.5%
167	WHOLE FOODS MARKET	45.14	0.52	12.47%	13.8%
168	WW GRAINGER	242.13	4.68	11.23%	13.5%
169	XCEL ENERGY	33.75	1.28	4.58%	8.8%
170	XILINX	45.12	1.24	8.82%	12.0%
171	XYLEM	36.60	0.56	9.13%	10.9%
172	YUM! BRANDS	88.38	1.64	11.32%	13.5%
173	ZIMMER BIOMET HDG.	110.79	0.88	10.00%	10.9%
174	ZIONS BANCORP.	28.98	0.24	10.11%	11.1%
175	ZOETIS	48.18	0.33	11.90%	12.7%
176	Average				12.1%

Notes: In applying the DCF Model to the S&P 500, I include in the DCF analysis only

those companies in the S&P 500 group which pay a dividend, have a positive growth rate, and have at least three analysts' long-term growth estimates. In addition, I exclude all companies in the I/B/E/S group of insurance companies. I also eliminate those companies with DCF results that varied from the mean by one standard deviation or more.

Notes:

$D_0$  = Latest dividend per Thomson Reuters.  
 $d_0$  = Latest quarterly dividend.  
 $P_0$  = Average of monthly high and low stock prices March, April, and June 2015 per Thomson Reuters.  
FC = Selling and flotation costs.  
g = I/B/E/S forecast of future earnings growth June 2015.  
k = Cost of equity using the quarterly version of the DCF Model and a five percent allowance for flotation costs as shown by the formula below:

$$k = \left[ \frac{d_0(I+g)^{\frac{1}{4}}}{P_0(I-FC)} + (I+g)^{\frac{1}{4}} \right]^4 - I$$

THE QUARTERLY DCF MODEL

The simple DCF Model assumes that a firm pays dividends only at the end of each year. Since firms in fact pay dividends quarterly and investors appreciate the time value of money, the annual version of the DCF Model generally underestimates the value investors are willing to place on the firm's expected future dividend stream. In this appendix, we review two alternative formulations of the DCF Model that allow for the quarterly payment of dividends.

When dividends are assumed to be paid annually, the DCF Model suggests that the current price of the firm's stock is given by the expression:

$$P_0 = \frac{D_1}{(1+k)} + \frac{D_2}{(1+k)^2} + \dots + \frac{D_n + P_n}{(1+k)^n} \quad (1)$$

where

- $P_0$  = current price per share of the firm's stock,
- $D_1, D_2, \dots, D_n$  = expected annual dividends per share on the firm's stock,
- $P_n$  = price per share of stock at the time investors expect to sell the stock, and
- $k$  = return investors expect to earn on alternative investments of the same risk, i.e., the investors' required rate of return.

Unfortunately, expression (1) is rather difficult to analyze, especially for the purpose of estimating  $k$ . Thus, most analysts make a number of simplifying assumptions. First, they assume that dividends are expected to grow at the constant rate  $g$  into the indefinite future. Second, they assume that the stock price at time  $n$  is simply the present value of all dividends expected in periods subsequent to  $n$ . Third, they assume that the investors' required rate of return,  $k$ , exceeds the expected dividend growth rate  $g$ . Under the above simplifying assumptions, a firm's stock price may be written as the following sum:

$$P_0 = \frac{D_0(1+g)}{(1+k)} + \frac{D_0(1+g)^2}{(1+k)^2} + \frac{D_0(1+g)^3}{(1+k)^3} + \dots, \quad (2)$$

where the three dots indicate that the sum continues indefinitely.

As we shall demonstrate shortly, this sum may be simplified to:

$$P_0 = \frac{D_0(1+g)}{(k-g)}$$

First, however, we need to review the very useful concept of a geometric progression.

Geometric Progression

Consider the sequence of numbers 3, 6, 12, 24,..., where each number after the first is obtained by multiplying the preceding number by the factor 2. Obviously, this sequence of numbers may also be expressed as the sequence  $3, 3 \times 2, 3 \times 2^2, 3 \times 2^3, \dots$ . This sequence is an example of a geometric progression.

Definition: A geometric progression is a sequence in which each term after the first is obtained by multiplying some fixed number, called the common ratio, by the preceding term.

A general notation for geometric progressions is:  $a$ , the first term,  $r$ , the common ratio, and  $n$ , the number of terms. Using this notation, any geometric progression may be represented by the sequence:

$$a, ar, ar^2, ar^3, \dots, ar^{n-1}.$$

In studying the DCF Model, we will find it useful to have an expression for the sum of  $n$  terms of a geometric progression. Call this sum  $S_n$ . Then

$$S_n = a + ar + \dots + ar^{n-1}. \quad (3)$$

However, this expression can be simplified by multiplying both sides of equation (3) by  $r$  and then subtracting the new equation from the old. Thus,

$$rS_n = ar + ar^2 + ar^3 + \dots + ar^n$$

and

$$S_n - rS_n = a - ar^n \quad ,$$

or

$$(1 - r) S_n = a (1 - r^n) \quad .$$

Solving for  $S_n$ , we obtain:

$$S_n = \frac{a(1-r^n)}{(1-r)} \quad (4)$$

as a simple expression for the sum of  $n$  terms of a geometric progression. Furthermore, if  $|r| < 1$ , then  $S_n$  is finite, and as  $n$  approaches infinity,  $S_n$  approaches  $a \div (1 - r)$ . Thus, for a geometric progression with an infinite number of terms and  $|r| < 1$ , equation (4) becomes:

$$S = \frac{a}{1-r} \quad (5)$$

#### Application to DCF Model

Comparing equation (2) with equation (3), we see that the firm's stock price (under the DCF assumption) is the sum of an infinite geometric progression with the first term

$$a = \frac{D_0(1+g)}{(1+k)}$$

and common factor

$$r = \frac{(1+g)}{(1+k)}$$

Applying equation (5) for the sum of such a geometric progression,  
we obtain

$$S = a \cdot \frac{1}{(1-r)} = \frac{D_0(1+g)}{(1+k)} \cdot \frac{1}{1-\frac{1+g}{1+k}} = \frac{D_0(1+g)}{(1+k)} \cdot \frac{1+k}{k-g} = \frac{D_0(1+g)}{k-g}$$

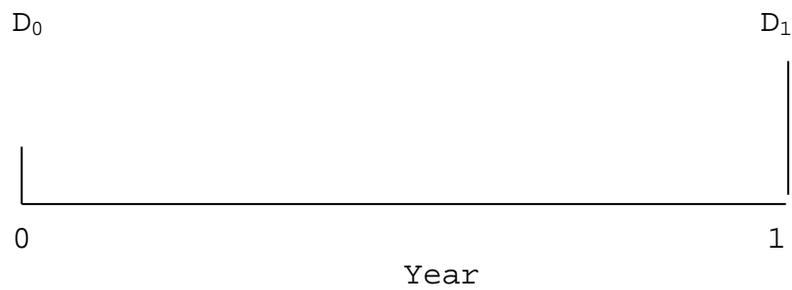
as we suggested earlier.

Quarterly DCF Model

The Annual DCF Model assumes that dividends grow at an annual rate of  $g\%$  per year (see Figure 1).

Figure 1

Annual DCF Model

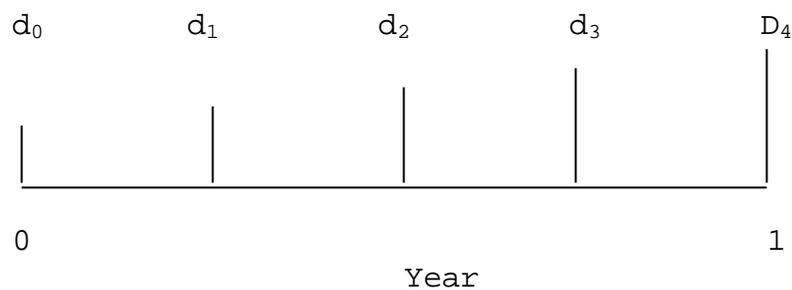


$$D_0 = 4d_0$$

$$D_1 = D_0(1 + g)$$

Figure 2

Quarterly DCF Model (Constant Growth Version)



$$d_1 = d_0(1+g)^{.25}$$

$$d_2 = d_0(1+g)^{.50}$$

$$d_3 = d_0(1+g)^{.75}$$

$$d_4 = d_0(1+g)$$

In the Quarterly DCF Model, it is natural to assume that quarterly dividend payments differ from the preceding quarterly dividend by the factor  $(1 + g)^{.25}$ , where  $g$  is expressed in terms of percent per year and the decimal .25 indicates that the growth has only occurred for one quarter of the year. (See Figure 2.) Using this assumption, along with the assumption of constant growth and  $k > g$ , we obtain a new expression for the firm's stock price, which takes account of the quarterly payment of dividends. This expression is:

$$P_0 = \frac{d_0(1+g)^{\frac{1}{4}}}{(1+k)^{\frac{1}{4}}} + \frac{d_0(1+g)^{\frac{2}{4}}}{(1+k)^{\frac{2}{4}}} + \frac{d_0(1+g)^{\frac{3}{4}}}{(1+k)^{\frac{3}{4}}} + \dots \quad (6)$$

where  $d_0$  is the last quarterly dividend payment, rather than the last annual dividend payment. (We use a lower case  $d$  to remind the reader that this is not the annual dividend.)

Although equation (6) looks formidable at first glance, it too can be greatly simplified using the formula [equation (4)] for the sum of an infinite geometric progression. As the reader can easily verify, equation (6) can be simplified to:

$$P_0 = \frac{d_0(1+g)^{\frac{1}{4}}}{(1+k)^{\frac{1}{4}} - (1+g)^{\frac{1}{4}}} \quad (7)$$

Solving equation (7) for  $k$ , we obtain a DCF formula for estimating the cost of equity under the quarterly dividend assumption:

$$k = \left[ \frac{d_0(1+g)^{\frac{1}{4}}}{P_0} + (1+g)^{\frac{1}{4}} \right]^4 - 1 \quad (8)$$

#### An Alternative Quarterly DCF Model

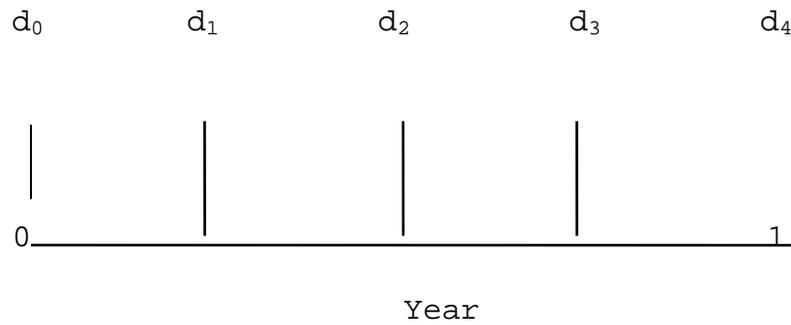
Although the constant growth Quarterly DCF Model [equation (8)] allows for the quarterly timing of dividend payments, it does require the assumption that the firm increases its dividend payments each quarter. Since this assumption is difficult for some analysts to accept, we now discuss a second Quarterly DCF Model that allows for constant quarterly dividend payments within each dividend year.

Assume then that the firm pays dividends quarterly and that each dividend payment is constant for four consecutive quarters. There are four cases to consider, with each case distinguished by varying assumptions about where we are evaluating the firm in relation to the time of its next dividend increase. (See Figure 3.)

Figure 3

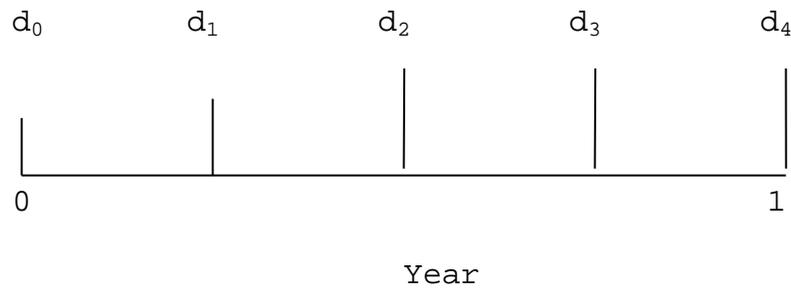
Quarterly DCF Model (Constant Dividend Version)

Case 1



$$d_1 = d_2 = d_3 = d_4 = d_0(1+g)$$

Case 2

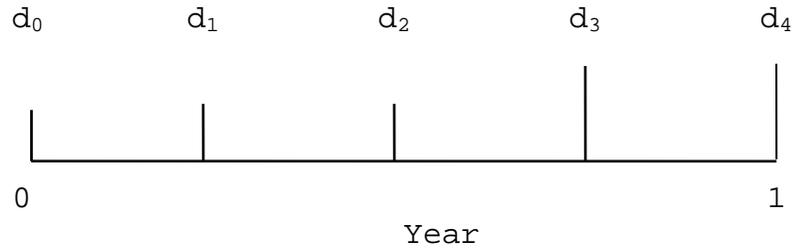


$$d_1 = d_0$$

$$d_2 = d_3 = d_4 = d_0(1+g)$$

Figure 3 (continued)

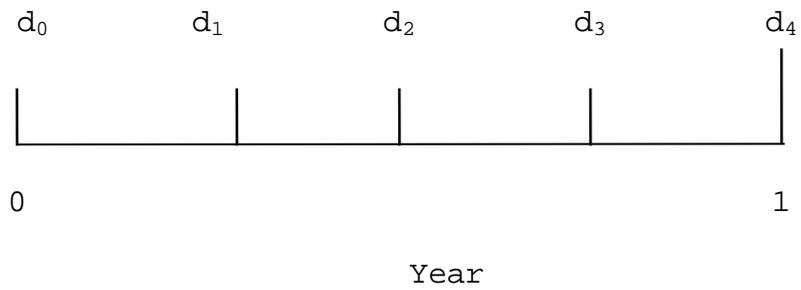
Case 3



$$d_1 = d_2 = d_0$$

$$d_3 = d_4 = d_0(1+g)$$

Case 4



$$d_1 = d_2 = d_3 = d_0$$

$$d_4 = d_0(1+g)$$

If we assume that the investor invests the quarterly dividend in an alternative investment of the same risk, then the amount accumulated by the end of the year will in all cases be given by

$$D_1^* = d_1 (1+k)^{3/4} + d_2 (1+k)^{1/2} + d_3 (1+k)^{1/4} + d_4$$

where  $d_1$ ,  $d_2$ ,  $d_3$  and  $d_4$  are the four quarterly dividends. Under these new assumptions, the firm's stock price may be expressed by an Annual DCF Model of the form (2), with the exception that

$$D_1^* = d_1 (1 + k)^{3/4} + d_2 (1 + k)^{1/2} + d_3 (1 + k)^{1/4} + d_4 \quad (9)$$

is used in place of  $D_0(1+g)$ . But, we already know that the Annual DCF Model may be reduced to

$$P_0 = \frac{D_0(1+g)}{k-g}$$

Thus, under the assumptions of the second Quarterly DCF Model, the firm's cost of equity is given by

$$k = \frac{D_1^*}{P_0} + g \quad (10)$$

with  $D_1^*$  given by (9).

Although equation (10) looks like the Annual DCF Model, there

are at least two very important practical differences. First, since  $D_1^*$  is always greater than  $D_0(1+g)$ , the estimates of the cost of equity are always larger (and more accurate) in the Quarterly Model (10) than in the Annual Model. Second, since  $D_1^*$  depends on  $k$  through equation (9), the unknown "k" appears on both sides of (10), and an iterative procedure is required to solve for  $k$ .

COMPARATIVE RETURNS ON S&P 500 STOCKS  
AND MOODY'S A-RATED UTILITY BONDS 1926-2014

LINE NO.	YEAR	S&P 500 STOCK PRICE	STOCK DIVIDEND YIELD	STOCK RETURN	A-RATED BOND PRICE	BOND RATE OF RETURN	RISK PREMIUM
1	2015	2,028.18	0.0208		\$107.65		
2	2014	1,822.36	0.0210	13.39%	\$89.89	24.20%	-10.81%
3	2013	1,481.11	0.0220	25.24%	\$97.45	-3.65%	28.89%
4	2012	1,300.58	0.0214	16.02%	\$94.36	7.52%	8.50%
5	2011	1,282.62	0.0185	3.25%	\$77.36	27.14%	-23.89%
6	2010	1,123.58	0.0203	16.18%	\$75.02	8.44%	7.74%
7	2009	865.58	0.0310	32.91%	\$68.43	15.48%	17.43%
8	2008	1,378.76	0.0206	-35.16%	\$72.25	0.24%	-35.40%
9	2007	1,424.16	0.0181	-1.38%	\$72.91	4.59%	-5.97%
10	2006	1,278.72	0.0183	13.20%	\$75.25	2.20%	11.01%
11	2005	1,181.41	0.0177	10.01%	\$74.91	5.80%	4.21%
12	2004	1,132.52	0.0162	5.94%	\$70.87	11.34%	-5.40%
13	2003	895.84	0.0180	28.22%	\$62.26	20.27%	7.95%
14	2002	1,140.21	0.0138	-20.05%	\$57.44	15.35%	-35.40%
15	2001	1,335.63	0.0116	-13.47%	\$56.40	8.93%	-22.40%
16	2000	1,425.59	0.0118	-5.13%	\$52.60	14.82%	-19.95%
17	1999	1,248.77	0.0130	15.46%	\$63.03	-10.20%	25.66%
18	1998	963.36	0.0162	31.25%	\$62.43	7.38%	23.87%
19	1997	766.22	0.0195	27.68%	\$56.62	17.32%	10.36%
20	1996	614.42	0.0231	27.02%	\$60.91	-0.48%	27.49%
21	1995	465.25	0.0287	34.93%	\$50.22	29.26%	5.68%
22	1994	472.99	0.0269	1.05%	\$60.01	-9.65%	10.71%
23	1993	435.23	0.0288	11.56%	\$53.13	20.48%	-8.93%
24	1992	416.08	0.0290	7.50%	\$49.56	15.27%	-7.77%
25	1991	325.49	0.0382	31.65%	\$44.84	19.44%	12.21%
26	1990	339.97	0.0341	-0.85%	\$45.60	7.11%	-7.96%
27	1989	285.41	0.0364	22.76%	\$43.06	15.18%	7.58%
28	1988	250.48	0.0366	17.61%	\$40.10	17.36%	0.25%
29	1987	264.51	0.0317	-2.13%	\$48.92	-9.84%	7.71%
30	1986	208.19	0.0390	30.95%	\$39.98	32.36%	-1.41%
31	1985	171.61	0.0451	25.83%	\$32.57	35.05%	-9.22%
32	1984	166.39	0.0427	7.41%	\$31.49	16.12%	-8.72%
33	1983	144.27	0.0479	20.12%	\$29.41	20.65%	-0.53%
34	1982	117.28	0.0595	28.96%	\$24.48	36.48%	-7.51%
35	1981	132.97	0.0480	-7.00%	\$29.37	-3.01%	-3.99%
36	1980	110.87	0.0541	25.34%	\$34.69	-3.81%	29.16%
37	1979	99.71	0.0533	16.52%	\$43.91	-11.89%	28.41%
38	1978	90.25	0.0532	15.80%	\$49.09	-2.40%	18.20%
39	1977	103.80	0.0399	-9.06%	\$50.95	4.20%	-13.27%
40	1976	96.86	0.0380	10.96%	\$43.91	25.13%	-14.17%
41	1975	72.56	0.0507	38.56%	\$41.76	14.75%	23.81%
42	1974	96.11	0.0364	-20.86%	\$52.54	-12.91%	-7.96%
43	1973	118.40	0.0269	-16.14%	\$58.51	-3.37%	-12.77%

COMPARATIVE RETURNS ON S&P 500 STOCKS  
AND MOODY'S A-RATED UTILITY BONDS 1926-2014

LINE NO.	YEAR	S&P 500 STOCK PRICE	STOCK DIVIDEND YIELD	STOCK RETURN	A-RATED BOND PRICE	BOND RATE OF RETURN	RISK PREMIUM
44	1972	103.30	0.0296	17.58%	\$56.47	10.69%	6.89%
45	1971	93.49	0.0332	13.81%	\$53.93	12.13%	1.69%
46	1970	90.31	0.0356	7.08%	\$50.46	14.81%	-7.73%
47	1969	102.00	0.0306	-8.40%	\$62.43	-12.76%	4.36%
48	1968	95.04	0.0313	10.45%	\$66.97	-0.81%	11.26%
49	1967	84.45	0.0351	16.05%	\$78.69	-9.81%	25.86%
50	1966	93.32	0.0302	-6.48%	\$86.57	-4.48%	-2.00%
51	1965	86.12	0.0299	11.35%	\$91.40	-0.91%	12.26%
52	1964	76.45	0.0305	15.70%	\$92.01	3.68%	12.02%
53	1963	65.06	0.0331	20.82%	\$93.56	2.61%	18.20%
54	1962	69.07	0.0297	-2.84%	\$89.60	8.89%	-11.73%
55	1961	59.72	0.0328	18.94%	\$89.74	4.29%	14.64%
56	1960	58.03	0.0327	6.18%	\$84.36	11.13%	-4.95%
57	1959	55.62	0.0324	7.57%	\$91.55	-3.49%	11.06%
58	1958	41.12	0.0448	39.74%	\$101.22	-5.60%	45.35%
59	1957	45.43	0.0431	-5.18%	\$100.70	4.49%	-9.67%
60	1956	44.15	0.0424	7.14%	\$113.00	-7.35%	14.49%
61	1955	35.60	0.0438	28.40%	\$116.77	0.20%	28.20%
62	1954	25.46	0.0569	45.52%	\$112.79	7.07%	38.45%
63	1953	26.18	0.0545	2.70%	\$114.24	2.24%	0.46%
64	1952	24.19	0.0582	14.05%	\$113.41	4.26%	9.79%
65	1951	21.21	0.0634	20.39%	\$123.44	-4.89%	25.28%
66	1950	16.88	0.0665	32.30%	\$125.08	1.89%	30.41%
67	1949	15.36	0.0620	16.10%	\$119.82	7.72%	8.37%
68	1948	14.83	0.0571	9.28%	\$118.50	4.49%	4.79%
69	1947	15.21	0.0449	1.99%	\$126.02	-2.79%	4.79%
70	1946	18.02	0.0356	-12.03%	\$126.74	2.59%	-14.63%
71	1945	13.49	0.0460	38.18%	\$119.82	9.11%	29.07%
72	1944	11.85	0.0495	18.79%	\$119.82	3.34%	15.45%
73	1943	10.09	0.0554	22.98%	\$118.50	4.49%	18.49%
74	1942	8.93	0.0788	20.87%	\$117.63	4.14%	16.73%
75	1941	10.55	0.0638	-8.98%	\$116.34	4.55%	-13.52%
76	1940	12.30	0.0458	-9.65%	\$112.39	7.08%	-16.73%
77	1939	12.50	0.0349	1.89%	\$105.75	10.05%	-8.16%
78	1938	11.31	0.0784	18.36%	\$99.83	9.94%	8.42%
79	1937	17.59	0.0434	-31.36%	\$103.18	0.63%	-31.99%
80	1936	13.76	0.0327	31.10%	\$96.46	11.12%	19.99%
81	1935	9.26	0.0424	52.84%	\$82.23	22.17%	30.66%
82	1934	10.54	0.0336	-8.78%	\$66.78	29.13%	-37.91%
83	1933	7.09	0.0542	54.08%	\$79.55	-11.03%	65.11%
84	1932	8.30	0.0822	-6.36%	\$70.67	18.23%	-24.59%
85	1931	15.98	0.0550	-42.56%	\$84.49	-11.63%	-30.93%
86	1930	21.71	0.0438	-22.01%	\$81.19	8.99%	-31.00%

COMPARATIVE RETURNS ON S&P 500 STOCKS  
AND MOODY'S A-RATED UTILITY BONDS 1926-2014

LINE NO.	YEAR	S&P 500 STOCK PRICE	STOCK DIVIDEND YIELD	STOCK RETURN	A-RATED BOND PRICE	BOND RATE OF RETURN	RISK PREMIUM
87	1929	24.86	0.0336	-9.31%	\$83.95	1.48%	-10.79%
88	1928	17.53	0.0431	46.12%	\$86.71	1.43%	44.69%
89	1927	13.40	0.0502	35.84%	\$83.28	8.92%	26.92%
90	1926	12.65	0.0446	10.39%	\$80.81	8.01%	2.38%
92	Average 1926-2014			11.5%		7.0%	4.5%

Note: See Page 4 for an explanation of how stock and bond returns are derived and the source of the data presented.

COMPARATIVE RETURNS ON S&P 500 STOCKS  
AND MOODY'S A-RATED UTILITY BONDS 1926-2014

RISK PREMIUM APPROACH

SOURCE OF DATA

Stock price and yield information is obtained from Standard & Poor's Security Price publication. Standard & Poor's derives the stock dividend yield by dividing the aggregate cash dividends (based on the latest known annual rate) by the aggregate market value of the stocks in the group. The bond price information is obtained by calculating the present value of a bond due in thirty years with a \$4.00 coupon and a yield to maturity of a particular year's indicated Moody's A-rated Utility bond yield. The values shown on the ex post risk premium schedule are the January values of the respective indices.

CALCULATION OF STOCK AND BOND RETURNS

Sample calculation of "Stock Return" column:

$$\text{Stock Return (2012)} = \left[ \frac{\text{Stock Price (2013)} - \text{Stock Price (2012)} + \text{Dividend (2012)}}{\text{Stock Price (2012)}} \right]$$

where Dividend (2012) = Stock Price (2012) x Stock Div. Yield (2012)

Sample calculation of "Bond Return" column:

$$\text{Bond Return (2012)} = \left[ \frac{\text{Bond Price (2013)} - \text{Bond Price (2012)} + \text{Interest (2012)}}{\text{Bond Price (2012)}} \right]$$

where Interest = \$4.00.

**PREFILED TESTIMONY  
OF  
DAVID APPEL**

**2015 WORKERS COMPENSATION  
ASSIGNED RISK INSURANCE RATE FILING  
BY THE NORTH CAROLINA RATE BUREAU**

**AUGUST, 2015**

**I. QUALIFICATIONS AND SUMMARY**

Q. Please state your name and present business address.

A. My name is David Appel, and my business address is 1 Pennsylvania Plaza, New York, NY.

Q. What is your occupation?

A. I am a Principal with the firm of Milliman, Inc.

Q. What is Milliman, Inc.?

A. Milliman, Inc. (formerly Milliman & Robertson) is one of the nation's largest independently owned firms of actuaries and consultants. The company has more than 3000 employees, and operates offices in approximately 60 cities in the U.S., Europe, Asia and Latin America. Our clients number in the thousands: they include insurers, self-insured entities, Federal and State Governments, private corporations, non-profit organizations, unions, and many others. I am a Principal with the firm, and I am in charge of its Economics Consulting practice.

Q. Please describe your educational and employment history.

A. A complete statement of my educational, employment and academic credentials is included as Exhibit RB-12 filed with this testimony.

To summarize, I have a B.A. in economics from Brooklyn College, City University of New York, and M.A. and Ph.D. degrees in economics from Rutgers University. Prior to joining Milliman, I was employed for nine years by the National Council on Compensation Insurance (NCCI), the nation's largest workers compensation insurance statistical, research and ratemaking organization. I joined NCCI as Research Economist in 1980, and held

progressively responsible positions as Senior Research Economist, Director of Research, Assistant Vice President and finally Vice President, beginning in July 1985. Prior to 1980, I was an instructor in economics at Rutgers University.

Q. Would you please describe some of your other professional activities?

A. Yes. Throughout my professional career, I have participated in a variety of academic and business activities related to insurance. I have twice been an elected member of the Board of Directors of the American Risk and Insurance Association, the leading learned society of insurance academics. I am also a member of the editorial board of the *Journal of Insurance Regulation* (the official research publication of the National Association of Insurance Commissioners). I act as a peer referee for a number of scholarly journals in economics and insurance, and I maintain an active program of research and publication on issues of current interest in insurance economics. In addition, I was, for twelve years, an Adjunct Professor of Economics at Rutgers University.

Q. Have you ever published any papers or books?

A. Yes. During my career, I have authored many papers on various aspects of insurance that have been published in refereed books or scholarly journals. In addition, I have published a large number of papers in non-refereed journals as well. I have also co-edited three volumes of research papers dealing with various aspects of workers compensation and property-casualty insurance. My refereed publications are listed in Exhibit RB-12 filed with this testimony.

Q. Are you a member of any professional associations?

A. Yes, I am a member of the American Risk and Insurance Association, and an elected fellow of the National Academy of Social Insurance. I am also a certified arbitrator and umpire with ARIAS, the world's largest insurance and reinsurance arbitration society, and a member of the panel of neutrals of the American Arbitration Association.

Q. Have you ever testified in insurance rate regulatory proceedings?

A. Yes. I have testified on many occasions in such proceedings, including several occasions in North Carolina in the past several years. A complete list is contained in Exhibit RB-12 filed with this testimony.

Q. What was the general nature of your testimony in these cases?

A. I have addressed a wide variety of insurance issues during public testimony, including such diverse topics as the impact of economic and demographic factors on insurance costs; the effects of regulation on insurance availability; the use of econometric and statistical models in

insurance forecasting; and the use of modern financial theory in developing insurance prices. In North Carolina workers compensation cases, my testimony in recent years has focused primarily on the last of these issues, specifically on matters relating to the cost of capital and the expected returns attributable to insurance operations.

Q. Have you been retained by the North Carolina Rate Bureau as a consultant with respect to the subject of profitability in this rate case?

A. Yes. I have reviewed or considered the following specific matters in connection with this case:

1. Dr. Vander Weide's estimation of the cost of capital;
2. Whether other insurer characteristics suggest additional risk factors that should be considered in estimating the cost of capital in this case;
3. Whether there are any characteristics of workers compensation assigned risk insurance which render it more or less risky than the average line of business; and
4. The return insurers would expect to earn from underwriting workers compensation assigned risk insurance in North Carolina, assuming that the projected loss and expense provisions contained in the rate filing are realized.

I have performed various studies and analyses on these matters.

Q. Have you reached any conclusions in regard to these matters?

A. Yes. I will summarize them in bullet form here, and then discuss them each more fully later in the testimony.

1. I have reviewed Dr. Vander Weide's cost of capital estimates and find them to be reasonable. Dr. Vander Weide's estimates are based on the implicit assumption that insurers present investors with roughly average risk, relative to all possible investment activities. However, based on my analyses, I believe that investors in the property-casualty insurance industry are subject to an above average degree of risk. Thus, I think it would be prudent to view Dr. Vander Weide's estimates as a conservative estimate of the return to which insurers are entitled.
2. I have considered two additional characteristics that affect the degree of risk to which investors in property/casualty insurance stocks are exposed: One is the fact that insurers are subject to an unusual degree of interest rate risk, and the other is that insurers writing workers compensation in North Carolina tend to be smaller than those used in Dr. Vander Weide's cost of capital analysis. Since there is strong evidence that interest rate risk requires compensation in the form of higher returns, and that small firms are also expected to yield higher returns, I believe Dr. Vander Weide's estimates

are conservative, in that investors must be compensated for these risks in the form of an additional risk premium above that required for the average security.

3. I have also considered the specific characteristics of the workers compensation assigned risk business and have concluded that it is above average risk when compared with the average activity in which property casualty insurers are engaged. Thus, the cost of capital for this specific business activity will be higher than the average cost of capital for the industry as a whole.
4. I have tested the underwriting profit provision selected and filed by the NCRB to determine if it produces a fair and reasonable return for insurers. To do so, I estimated the returns insurers would expect to earn from North Carolina workers' compensation assigned risk insurance assuming that the projected loss and expense provisions contained in the rate filing are realized. I am aware that North Carolina law provides that insurers are entitled to expect to earn a return equal to the returns of industries of comparable risk, and that in calculating that expected return, investment income from capital and surplus funds is not to be considered. I refer to that operating return as the statutory return. However, as is evident from the attached exhibits, I have estimated insurer pro forma returns both including and excluding expected investment income from capital and surplus. I have done this to demonstrate that if the filed underwriting profit is actually realized, and even if investment income on surplus is considered, insurer returns will not be excessive. Obviously, if returns are not excessive including investment income from capital and surplus, they will be non-excessive excluding such income.

Based on my calculations, the selected underwriting profit provision generates a statutory return on net worth of 8.1%. (In my testimony, I will use "net worth" to mean net worth according to Generally Accepted Accounting Principles.) In addition, the total return on net worth (i.e., including investment income on surplus) is approximately 10.4%. Since this return is approximately the midpoint of Dr. Vander Weide's range for the fair rate of return, I conclude that the selected underwriting profit provision complies with North Carolina law and is clearly not excessive.

## **II. COST OF CAPITAL REVIEW**

- Q. You indicated you had reviewed Dr. Vander Weide's estimate of the cost of capital. Are you familiar with Dr. Vander Weide's approach to estimating the cost of capital in insurance rate cases?
- A. Yes. I am aware of the methodology which Dr. Vander Weide relies upon to estimate the cost of capital and have reviewed it on a number of occasions in the course of previous rate cases in North Carolina. Dr. Vander Weide has used what have traditionally been the most widely recognized and accepted models for this purpose, namely the Discounted Cash Flow (DCF) model and the risk premium method. These models, when taken together and properly applied to a reasonably selected data set, provide acceptable estimates of the cost of capital for regulated insurers.

Q. What has Dr. Vander Weide concluded with respect to the cost of capital in this case?

A. Dr. Vander Weide has concluded that the fair rate of return for insurers is now in the range of 8.6% to 12.1% on net worth as determined under generally accepted accounting principles (GAAP).

Q. In your opinion, is this an appropriate estimate of the required rate of return?

A. Yes, however as I indicated a moment ago, I believe that Dr. Vander Weide may have been conservative in his calculation of the required rate of return. Dr. Vander Weide has assumed that the property-casualty industry presents investors with average risk. However, based on my studies, I conclude the following:

1. There is evidence that additional factors affecting the risk and required return for property casualty insurance stocks are not accounted for in Dr. Vander Weide's analysis. These factors – interest rate risk and the small size of the typical workers compensation insurer – suggest that the insurance industry is above average risk, and hence requires above average returns. I would note that these additional risks may be captured in alternative cost of capital models, in particular the variant of the risk premium model known as the Fama French Three Factor model (FF3F). My studies suggest that the FF3F model produces insurance cost of capital estimates that are up to several percentage points greater than those produced by the standard risk premium model used by Dr. Vander Weide.
2. To the extent that workers compensation assigned risk insurance is viewed as above average in risk when compared with other activities in which property casualty insurers are engaged, the cost of capital will be higher than average as well.

### **III. ADDITIONAL FACTORS AFFECTING RISK**

Q. Your comments about additional risk factors suggest that Dr. Vander Weide's cost of capital may be conservative, or understated, for insurers writing workers compensation in North Carolina. Can you please elaborate on this?

A. Certainly. As mentioned earlier, I have considered whether other factors not addressed in the standard cost of capital analysis conducted by Dr. Vander Weide might indeed affect the risk and therefore the required return in this case. In fact, there were two such factors – interest rate risk and the small size of firms writing workers compensation in the state - that I have been studying for a number of years and which clearly increase the cost of capital, or required return, in this case. Based on analyses I have conducted for previous rate hearings in North Carolina, I have concluded that both of these factors create additional risks that require additional compensation above that demanded for the average security.

Q. You have made reference to the term interest rate risk. Can you please define this term?

A. Yes. Interest rate risk refers to the risk that the value of fixed income investments (such as bonds) will fluctuate with changes in interest rates. This means that there is a risk associated with holding bonds, particularly those with a relatively long term to maturity. While investments in equities are still considerably riskier than investments in long term bonds, as evidenced by the fact that returns to large company stocks have had a much higher mean and standard deviation than returns on long term government bonds over the past 85 years, bond investments impose risk as well.

Q. Does interest rate risk affect investments in property-casualty insurance stocks?

A. Yes. Property-casualty insurance companies invest large amounts of funds in bonds issued by both corporations and governmental bodies. The risk that investors face is that when interest rates change, the values of the bonds also change, and hence their investments in property-casualty stocks are subject to interest rate risk. This fact is widely recognized by the financial community. Since investors cannot diversify away interest rate risk, only the prospect of higher returns will induce them to purchase interest-sensitive stocks. That is, investors must be compensated for purchasing interest-sensitive stocks because they are increasing their exposure to interest rate risk.

Q. Why is interest rate risk different from market risk?

A. Interest rate risk is a separate source of volatility for insurance stocks. Interest rates often change as a result of changes in expectations of future inflation. These changes primarily affect firms that hold what are called nominal assets and liabilities. Nominal assets and liabilities have cash flows that are fixed in nominal terms (for example, accounts receivable, most contracts, and bonds) and are thus subject to erosion in value due to inflation. On the other hand, the cash flows associated with manufacturing and service operations tend to fluctuate with the price level. Since most non-financial firms hold relatively few nominal assets and liabilities, their stocks are not particularly sensitive to changes in interest rates that are due to changes in expected inflation. Therefore interest rate risk adds additional risk to insurance stocks, above and beyond market risk, that is not diversifiable.

Changes in interest rates that are not associated with changes in expected inflation will affect all stocks. This accounts for the moderate degree of correlation between changes in long term interest rates and returns to common stocks. However, the fact that most stocks are not very sensitive to changes in interest rates that are due to changes in expected inflation means that interest rate risk is not fully captured in measures of market risk.

Q. Is it possible to measure interest rate risk?

- A. Yes, and in the past I have conducted a number of studies designed specifically to address this issue. The principal conclusions of those studies is that since insurer assets on average have a substantially longer financial duration than insurance liabilities, when interest rates change, the value of insurer equity is subject to potentially wide fluctuation. While the market risk for insurers as measured by beta is roughly average, the degree of interest rate risk to which the industry is exposed is considerably higher than average. Since this risk cannot be entirely diversified away, the overall risk associated with an investment in property/casualty insurance is greater than average. As a consequence, insurers are entitled to a rate of return above that allowed for the average risk investment in the U.S. economy. I believe that there are three main reasons for this conclusion.

First, as noted, the high degree of financial leverage and mismatched durations of assets and liabilities contributes to the volatility of returns to investors in insurance stocks.

Second, the insurance industry is in the business of bearing risk. Individuals and corporations transfer to property-casualty insurers the potential liability for a wide range of possible adverse events, ranging from property damage to professional liability. In light of the unforeseen events that can occur, and, in the recent past, actually have occurred, investors in property-casualty insurance stocks are subject to considerable risk.

Finally, insurance is in the unique position of being a highly competitive industry that is also subject to a high degree of regulation. This combination of regulation and competition creates an environment in which insurers are subject not only to the demands of the market but also to the pressures of the political process. There is substantial evidence that regulation can increase risk for a regulated enterprise, and when that is combined with an aggressively competitive industrial structure, risk is increased.

- Q. You said that the combination of regulation and competition increased risk for insurers. Can you describe what you mean?

- A. Yes. Traditionally, direct price and rate of return regulation has been imposed on industries known as "public utilities," such as generation and transmission of electric power, distribution of natural gas, provision of local water and sewer service and the like. Because of the nature of the production process, these industries are characterized as "natural monopolies," meaning that it is most efficient for a single producer to provide the service in question. In such circumstances, the state normally grants a monopoly to a single provider and then regulates that firm directly to prevent abuse of monopoly power.

Property-casualty insurance differs dramatically from this model. Rather than a single firm providing service, there are in most states literally hundreds of firms competing in the market, none of which typically have significant market power. These firms compete aggressively to increase market share and attract the best insureds by offering a variety of price and quality combinations that are best tailored to their business objectives. This vigorous competition provides discipline in the marketplace, and, when combined with direct rate of return regulation, the risk for insurers is increased.

I should note that, historically, a number of competitively structured industries (such as airlines, trucking, and telecommunications) were subject to regulation, but in the past several decades there has been a movement to deregulate these activities. This is due in part to the widespread agreement that competition itself is an adequate regulator.

Q. You also said that you considered whether the size distribution of North Carolina insurers should impact the cost of capital in this case. Can you please describe this issue briefly and discuss its implications for this case?

A. Yes. It is a well established fact of empirical finance that small stocks tend to outperform large stocks. Ibbotson Associates, for instance, reports that firms in the ninth and tenth deciles of stocks listed on the principal U.S. stock exchanges have outperformed the market as a whole by approximately 4.8 percentage points over the period 1926 to 2013, even after accounting for the fact that these firms have above average betas. Therefore an adjustment should be made to the cost of capital to the extent that the property-casualty insurance industry is composed of small stocks.

Q. Have you conducted any studies with respect to the significance of the small stock effect?

A. Yes. As with interest rate risk, I have conducted a number of studies of this issue in previous years, and in each instance I found that (1) investors have earned higher returns from small stocks than from large stocks, and (2) the insurers in Dr. Vander Weide's cost of capital analysis are among the largest companies in the U.S. economy. The insurers in Dr. Vander Weide's analysis are larger, on average, than the companies in the property-casualty insurance industry, and they are larger, on average, than the companies writing workers compensation insurance in North Carolina.

These facts suggest that the cost of capital for insurers writing workers compensation insurance in North Carolina should be higher than for those firms contained in Dr. Vander Weide's cost of capital analysis. This reaffirms my conclusion that the cost of capital Dr. Vander Weide has presented is conservative.

Q. Can you please summarize your testimony on the cost of capital of the property-casualty insurance industry?

A. Yes. Dr. Vander Weide has assumed that the property-casualty insurance industry presents investors with risks comparable to the average investment in equities. My analysis has shown that property-casualty insurance stocks are subject to additional volatility due to interest rate sensitivity, and are relatively small when compared with the broad cross section of publicly traded firms in the U.S. economy. Since these additional risks require compensation in the form of a higher return, I conclude that Dr. Vander Weide has been conservative in his calculation of the required rate of return on property-casualty insurance investments.

#### IV. RELATIVE RISK OF WORKERS COMPENSATION ASSIGNED RISK BUSINESS

Q. Will you please now turn to the issue of the relative risk of North Carolina workers compensation assigned risk insurance?

A. Yes. As I mentioned before, the cost of capital Dr. Vander Weide estimated is the return investors require for placing their capital at risk in a large, publicly traded property-casualty insurance company that writes at least some workers compensation insurance. This is best interpreted as the return required for the average risk activity of this set of companies. If the specific activity in question in this filing, North Carolina workers compensation assigned risk insurance, is perceived as riskier than the average activity of the firms in this sample, then the fair rate of return, or cost of capital, will be higher than the value Dr. Vander Weide has estimated.

Q. Do you have any reason to believe that North Carolina workers compensation assigned risk insurance is riskier than the average investment undertaken by these companies?

A. Yes. There are a number of characteristics peculiar to the workers compensation line of insurance which render it of higher than average risk among all lines of property-casualty insurance. In addition, there are aspects of workers compensation assigned risk insurance which render it more risky than the average workers compensation coverage.

Among the many relevant considerations relating to workers compensation in general are the following:

1. Workers compensation is subject to unlimited liability; there are neither per claim, per occurrence or aggregate loss limits under the policy terms. This is in contrast to the typical property-casualty insurance contract, in which all these limits may apply.
2. Workers compensation is a "long-tailed" line of business, meaning that the payment of losses may extend for many years beyond the sale date of the policy. It is a well known principle of statistics that the longer the time horizon of a forecast, the greater the expected error in the estimate. Thus the forecast of ultimate losses in this line is subject to greater risk than in many other lines of business.
3. Workers compensation has a substantial exposure to medical inflation, which has been more rapid and less predictable than general inflation.
4. Workers compensation is subject to the risk of occupational disease, which can lead to substantial and inherently unpredictable losses in the future.
5. Workers compensation is subject to the phenomenon of "benefit utilization." This term refers to the observation that as benefits become more generous, workers increase their utilization of the system.

While the term has traditionally been applied to indemnity benefits (as benefits increase both claim frequency and duration increase), it is equally applicable to medical benefits as well. Since medical costs are covered with no deductibles or co-payments, workers compensation has become an increasingly attractive alternative to health insurance for coverage of any illness or injury.

All these characteristics suggest that workers compensation is of above average risk when compared with the other activities in which property-casualty insurers are engaged.

Q. In addition to these factors, which relate to the workers compensation line in general, are there any other considerations specific to North Carolina assigned risk business which render it riskier than average?

A. Yes. In the workers compensation line, assigned risk business is universally regarded as less favorable than voluntary market business. Participation in the assigned risk market, otherwise known as the involuntary or residual market, is not elective. Insurers have no opportunity to select insureds or underwrite the risks; as a consequence, they cannot apply business judgment to their underwriting activities.

In addition, compared with the voluntary market, assigned risk loss experience has been consistently worse than the average (i.e. combined voluntary and assigned risk) loss experience.

Q. How do these considerations affect your evaluation of the cost of capital applicable in this proceeding?

A. Based on the characteristics discussed earlier, I have concluded that: (1) workers compensation in general is riskier than the average line of property-casualty insurance business, and (2) assigned risk business is riskier than average workers compensation business. Because the risk of this activity is greater than average, the cost of capital is higher than average as well. Although it is difficult to quantify the incremental change in the fair rate of return, all the considerations noted earlier suggest that an upward adjustment would be necessary. Therefore, in my opinion Dr. Vander Weide's cost of capital must be considered to be the lower bound for the fair and reasonable rate of return in this case.

## **V. PROJECTED RETURN ATTRIBUTABLE TO INSURANCE OPERATIONS**

Q. Earlier you said that you had calculated the statutory return insurers would expect from underwriting workers compensation assigned risk insurance in North Carolina. Would you describe your analysis?

A. Yes. I relied on the traditional insurance profitability analysis utilized by the NCRB for all lines of business, and have calculated the pro forma statutory returns on equity that would be expected to arise assuming that actual underwriting and investment results materialize exactly

as projected in this filing. The results are contained in Exhibit RB-13 filed with this testimony. (I note that for long tailed lines of insurance such as workers compensation, insurers frequently rely on models that explicitly consider the time pattern of future cash flows, such as the internal rate of return model.)

Q. What do you mean when you use the term pro forma in connection with rate of return?

A. I use this term to indicate that the rate of return presented in this exhibit is based on a series of assumptions regarding such inputs as underwriting profit, investment gain, leverage, and the like. If these assumptions actually materialize, then the “pro forma” rates of return calculated in the exhibit will prevail. However, to the extent that these assumptions are not realized, the rate of return will differ from that calculated in the exhibit.

Q. Are you aware of the provisions of G.S. 58-36-10, providing that in making rates the NCRB is to consider investment income earned and realized on unearned premium and loss reserves?

A. Yes, and I understand that investment income on capital and surplus is not to be considered when making rates. As I have already indicated, I have estimated and presented the returns that can be expected, both excluding and including investment income on capital and surplus, and the highest of those returns is only at the midpoint of Dr. Vander Weide’s range for the industry’s fair rate of return. Since the NCRB’s filed underwriting profit provision generates expected returns that are not excessive even if the investment income on capital and surplus is included, the expected returns which exclude that investment income cannot be excessive.

Q. Can you please now describe the components of the model you developed?

A. Yes. The model really consists of a single page which calculates the rate of return on equity attributable to undertaking the insurance activity. It includes estimates of revenues derived from underwriting and investment activities, and estimates of costs, comprised of losses, expenses, and taxes. This exhibit is supported by several other exhibits which provide calculations of investment yield rates, tax rates, premium to surplus ratios and net worth to surplus ratios. I will describe the principal elements of these exhibits below.

1. Underwriting profit is the difference between earned premiums (net of uncollectible premium) and incurred losses and expenses, expressed as a percent of premium, and the selection is made by the Rate Bureau.
2. Uncollectible premium is projected by NCCI, based on historical data from the North Carolina assigned risk pool, and the selection is made by the Rate Bureau.
3. Taxes are calculated assuming that the regular corporate tax rate applies to underwriting income and that an additional tax liability applies due to the reserve discounting and revenue offset provisions of the Internal Revenue Code as it applies to property casualty insurers. Taxes on investment income are calculated assuming that the current statutory tax rates apply to the various classes of investment income earned.

4. Investment gain on the insurance transaction is estimated as the product of an investment yield rate and the investible funds available from loss, loss adjustment expense and unearned premium reserves (i.e., policyholder supplied funds). Investible funds are estimated using the well known ISO State-X calculation, modified as described below. The investment yield rate itself is derived as the average of the "embedded yield" and the "current yield," based on the actual portfolios of securities held by insurers. This estimated yield rate includes income from interest, dividends, real estate, and other assets, as well as realized capital gains.
5. In my estimates of the expected total return, investment gain on surplus is estimated as the product of the aforementioned investment yield rate and the amount of surplus attributable to the insurance transaction. The amount of surplus attributable to the transaction includes an adjustment to reflect the additional surplus required to support the prepayment of expenses. (In statutory accounting, the prepayment of expenses acts to reduce statutory surplus. Since prepaid expenses are already deducted from investible reserves in the investment income calculation, they are added back here to avoid deducting them from the investible balance twice.)

These components are each expressed as a percent of premium. To calculate the rate of return on equity, the components must be summed (before or after tax), and then multiplied by the ratio of premium to net worth.

- Q. Can you describe how you have reflected agents' balances in the rate of return calculations?
- A. Agents' balances, that is, delays in the collection and remission of premium to the companies, result in funds that are not available for investment. To estimate the level of agents' balances, I calculated the average date of premium collection using the distribution of North Carolina workers compensation assigned risk premium by size and the provisions of the assigned risk pool installment pay plan. The estimated average premium collection date is approximately 7.1 months. Given that the average policy sale date is 6 months, the average delay in remission is 1.1 months, which is 0.09 years.
- Q. Could you please clarify how the underwriting profit provision contained in the rate filing was determined?
- A. Yes. The issue of how that Rate Bureau determines the underwriting profit and contingency factor has routinely arisen in rate hearings in North Carolina in past years. Although it is evident from my exhibits that the Rate Bureau selects an underwriting profit provision to be included in the rates, there has been lengthy cross examination on this issue in a number of rate hearings. Therefore, to clarify this matter, I will briefly discuss the procedure used by the Rate Bureau to determine the underwriting profit factor that is included in the proposed rates.

Each year, prior to making its rate filing, the Workers Compensation Committee of the Rate Bureau meets to review data and determine values for a number of the important components of the proposed rates. One of these components is the underwriting profit factor. To determine this value, a procedure is followed in which I provide the committee with the estimated returns

on equity (both statutory returns as well as returns adjusted to include investment income on surplus) associated with alternative underwriting profit provisions, and the committee then selects a provision that is consistent with the cost of capital that has been developed by Dr. Vander Weide. Thus, the process is best described as one in which I test alternative underwriting profit provisions, and the committee selects a value based on these tests.

Q. How do you know what values of the underwriting profit provision to test?

A. I have been performing this type of analysis on behalf of the NCRB for many years, and I am quite familiar with the dynamics of these models. Therefore, it is relatively easy to know the general range of values around which the underwriting profit is likely to fall. Normally, for any particular line of business, I will select approximately five or six values of the underwriting profit provision to test, that comprise a range of perhaps two to four percentage points, and the committee typically selects a value within that range. Of course, if the committee is not satisfied with the range of values I propose, it is relatively straightforward to calculate returns associated with alternative values proposed by the committee.

As an example of this process, for this filing, I believe I tested underwriting profit provisions ranging from 8.0% to 12.0%, and the committee selected a value of 10.0%.

Q. From what you've said, it appears that the NCRB *selects* an underwriting profit provision, rather than *deriving* such a provision from the cost of capital. Is that correct, and if so, isn't it true that actuarial standards of practice require that the underwriting profit provision be *derived* from an underlying cost of capital?

A. It is correct that the Rate Bureau committee selects an underwriting profit provision and then tests whether that provision results in an expected rate of return on net worth that is consistent with the cost of capital. However, it is *not true* that actuarial standards of practice require that an underwriting profit be derived from the cost of capital. In fact, that issue is addressed explicitly in ASOP #30, entitled "Treatment of Underwriting Profit and Contingency Factors and the Cost of Capital in Property/Casualty Insurance Ratemaking." Section 3.1 of that ASOP states the following:

Estimating the Cost of Capital and the Underwriting Profit Provision –

Property/casualty insurance rates should provide for all expected costs, including an appropriate cost of capital associated with the specific risk transfer. This cost of capital can be provided for by estimating that cost and translating it into an underwriting profit provision, after taking leverage and investment income into account. Alternatively, the actuary may develop an underwriting profit provision and test that profit provision for consistency with the cost of capital. The actuary may use any appropriate method, as long as such method is consistent with the considerations in this standard.

The procedure utilized by the Rate Bureau is exactly the approach articulated in this section (i.e., "the actuary may develop an underwriting profit provision and test that profit provision for consistency with the cost of capital").

Q. Although most of these calculations are self-explanatory, could you please clarify how you selected your investment yield rate and premium to surplus ratio?

A. Yes. To select the investment yield rate, I took the average of what are known as the "embedded" and "current" yields, where each was based on the actual asset portfolios insurers currently hold. The Commissioner adopted this approach in his 1994 automobile insurance rate case, and, in his decision in the 1996 auto case, he selected a yield which approximated the yield obtained from this approach. Since then, the Rate Bureau has consistently followed this approach.

To estimate the embedded yield, I calculated the ratio of the most recent available industrywide investment income to average invested assets and added to that an estimate of the ten year average ratio of realized capital gains to invested assets. The sum of these two is the estimated embedded yield.

To estimate the current yield, I determined the yields available in today's capital markets for the portfolio of securities currently held by the property-casualty insurance industry. I then calculated a weighted average of these yield rates, based on the proportion of assets held by the industry in each of the various securities such as stocks, bonds, real estate and the like.

As far as the premium to surplus ratio is concerned, I relied on information which reflects the actual degree of leverage for insurers writing workers compensation insurance in North Carolina over the past ten years. My selected premium to surplus ratio is based on the ten year average premium to surplus ratio for the top 30 insurers which wrote workers compensation in North Carolina over that time period.

Q. Can you please provide the results of your calculations regarding the projected rate of return to the insurance transaction?

A. Yes. Assuming that the inputs to the pro forma model materialize exactly as expected, I estimate that insurers would expect to earn a statutory return on net worth of 8.1%. If one includes consideration of investment income on surplus, the total return on GAAP equity equals 10.4%.

The total return on GAAP equity is near the midpoint of Dr. Vander Weide's range for the industry's fair return on equity. The statutory return on net worth falls below the lower bound of Dr. Vander Weide's range for the industry's fair return on equity.

## **VII. CONCLUSION**

Q. Based on the studies you have conducted, have you come to any conclusions regarding the selected underwriting profit provision of 10.0% that has been filed by the NCRB in this case?

A. Yes. Based on my evaluation of Dr. Vander Weide's cost of capital estimates, my consideration of insurer specific risk characteristics, and my estimation of the projected pro forma return associated with underwriting workers compensation assigned risk insurance in North Carolina, I believe that the selected underwriting profit provision, and the return expected to be realized by insurers, comply with North Carolina law.

Q. Does this conclude your testimony?

A. Yes, it does.

**DAVID APPEL**

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**PROFESSIONAL EXPERIENCE:**

1989 to present	<b>MILLIMAN, INC.</b> Principal & Director - Economics Consulting  Responsible for the formation, development and management of a national consulting practice in insurance economics.
1980 to 1989	<b>NATIONAL COUNCIL ON COMPENSATION INSURANCE</b> Economic and Social Research Division
1985 to 1989	Vice President
1983	Assistant Vice President Responsible for all economic and social research of NCCI
1982	Director of Economic and Social Research
1981	Senior Research Economist
1980	Associate Research Economist
1976 to 1997	<b>RUTGERS UNIVERSITY</b>
1981-97	Associate of the Graduate Faculty, Department of Economics, Newark, New Jersey
1981-93	Teach variety of graduate courses including: Microeconomic Theory, Industrial Organization, Public Finance
1978-80	Instructor, Department of Economics, New Brunswick, New Jersey
1976-78	Adjunct Instructor, Department of Economics, Newark, New Jersey
<b>EDUCATION:</b>	
1980	Ph.D., Economics, Rutgers University
1976	M.A., Economics, Rutgers University
1972	B.A., Economics, Brooklyn College, CUNY Fellow: National Academy of Social Insurance

## PAPERS AND PUBLICATIONS

"Comment on Jaffee and Russell" in Deregulating Property-Liability Insurance, J. David Cummins, Editor, Brookings Institution Press, Washington, DC, 2002

"Dynamic Financial Analysis of a Workers Compensation Insurer", CAS Call Papers Program, 1997 (with Susan Witcraft and Mark Mulvaney)

"The Impact of Managed Care on Workers Compensation Claim Costs," in a volume of conference proceedings published by the Workers' Compensation Research Institute, September 1994, (with Philip Borba).

"Health Care Costs in Workers' Compensation", Benefits Quarterly, Vol. 9, No. 4, Fourth Quarter, 1993

"The Transition From Temporary to Permanent Disability: A Longitudinal Analysis" in Workers' Compensation Insurance: Claims Costs, Prices and Regulation, David Durbin and Philip Borba, Editors, Kluwer Academic Publishers, Boston, 1992, (with Richard Butler, David Durbin and John Worrall)

"Leverage, Interest Rates and Workers' Compensation Survival" in Workers' Compensation Insurance: Claims Costs, Prices and Regulation, David Durbin and Philip Borba, Editors, Kluwer Academic Publishers, Boston, 1992, (with Richard Butler, David Durbin and John Worrall)

Benefits, Costs and Cycles in Workers' Compensation, Kluwer Academic Publishers, Boston, 1990, (co-editor with Philip Borba)

"Benefit Increases in Workers' Compensation", Southern Economics Journal, January 1990, (with Richard J. Butler)

"Internal Rate of Return Criteria in Ratemaking", NCCI Digest, Vol. IV, Issue III, September 1990, (with Richard J. Butler).

"Social Inflation in Workers' Compensation: The Phenomenon of Benefit Utilization", Proceedings of the Casualty Loss Reserve Seminar, 1988. Also in Contingencies, Nov./Dec., 1989.

Workers' Compensation Insurance Pricing: Current Programs and Proposed Reforms, Kluwer Academic Publishers, Boston, 1988,(co-editor with Philip Borba)

"Prices and Costs of Workers' Compensation" in Workers' Compensation Insurance Pricing: Current Programs and Proposed Reforms, Kluwer Academic Publishers, Boston, 1988, (with Philip Borba)

"1986 Tax Reform Act: Effects on Workers' Compensation Profitability", NCCI Digest, Vol. II, Issue II, July 1987 (with James Gerofsky)

"The Propensity for Permanently Disabled Workers to Hire Legal Services", Industrial and Labor Relations Review, April 1987, (with Philip Borba)

"Sex, Marital Status, and Medical Utilization by Injured Workers", Journal of Risk and Insurance, Vol. LIV, No. 1, March 1987, (with John Worrall and Richard Butler)

"The Impact of Workers' Compensation Benefits on Low Back Claims" in Clinical Concepts in Regional Musculoskeletal Illness, Nortin M. Hadler, ed. (Boston: 1986, Grune and Stratton), (with John Worrall)

"Workers' Compensation and Employment: An Industry Analysis" in Disability and the Labor Market: Economic Problems, Policies and Programs, M. Anne Hill and Monroe Berkowitz, eds., (Ithaca:1986 ILR Press), (with James Lambrinos)

"Some Benefit Issues in Workers' Compensation", in Workers' Compensation Benefits: Adequacy, Equity, Efficiency, (Ithaca:1985 ILR Press), (with John Worrall)

Workers' Compensation Benefits: Adequacy, Equity, Efficiency, (co-editor with John Worrall), (Ithaca:1985 ILR Press)

"Survivorship and the Size Distribution of the Property-Liability Insurance Industry", Journal of Risk and Insurance, October 1985, (with John Worrall and Richard Butler).

"Regulating Competition-The Case of Workers' Compensation Insurance", Journal of Insurance Regulation, (with James Gerofsky), June 1985.

"The Wage Replacement Rate and Benefit Utilization in Workers' Compensation Insurance", Journal of Risk and Insurance, September 1982 (with John Worrall)

"Property Damages", in Joseph Seneca and Peter Asch, The Benefits of Air Pollution Control in New Jersey, Center for Coastal and Environmental Studies, Rutgers University, 1979

#### WORKING PAPERS

"Workers' Compensation Pricing: The Role of Policyholder Dividends" (with David Durbin)

"The Impact of Lifetime Work on Mortality: Do Unisex Pensions Matter?" (with Richard J. Butler)

"Regulatory Survival: Rate Changes in Workers' Compensation" (with Richard J. Butler and John D. Worrall)

"Framing, Firm Size and Financial Incentives in Workers' Compensation Insurance" (with Richard J. Butler and John D. Worrall)

"Application of NAIC Profitability Models to Long Tailed Lines of Insurance" (with James Gerofsky)

## **INVITED PRESENTATIONS**

Huntington Beach, California, March 11, 2013

CAS RPM Seminar

“Risk Loads for Property Catastrophe Covers: Primary and Reinsurer Perspectives”

Huntington Beach, California, March 11, 2013

CAS RPM Seminar

“The Actuary as Expert Witness”

Philadelphia, Pennsylvania, March 20, 2012

CAS Ratemaking Seminar

“How Reinsurers Consider Risk Loads and Cost of Capital for Property Cat Covers”

Chicago, IL , March 17, 2010

CAS Ratemaking Seminar

“Logic, Fallacies and Paradoxes in Risk/Profit Loading in Ratemaking: A Socratic Dialogue”

Chicago, IL , March 16, 2010

CAS Ratemaking Seminar

“Quantifying Risk Loads for Property Catastrophe Exposure”

Las Vegas, NV, March 10, 2009

CAS Ratemaking Seminar

“Using Catastrophe Bonds to Infer Risk Loads/Profit Margins/Reinsurance Costs”

Boston, MA, March 17, 2008

CAS Ratemaking Seminar

“Using Catastrophe Bonds to Infer Risk Loads/Profit Margins/Reinsurance Costs”

Pinehurst, North Carolina, May 21, 2007

Workers Compensation Insurance Organizations Annual Meeting

“Enterprise Risk Management: What Is It and Why Is It Important?”

Salt Lake City, Utah, March 13, 2006

CAS Ratemaking Seminar

“Including Reinsurance Costs in Primary Insurance Rates”

New Orleans, Louisiana, March 11, 2005

CAS Ratemaking Seminar

“Including Reinsurance Costs in Primary Insurance Rates”

Philadelphia, Pennsylvania, March 11, 2004

CAS Ratemaking Seminar

“The Consideration of Risk Loads and Reinsurance Costs in Primary Insurance Ratemaking”

New York, New York, December 12, 2003

Goldman Sachs Insurance Conference

“Interest Rate Changes and Insurance Underwriting”

San Antonio, Texas, March 28, 2003

CAS Ratemaking Seminar

"The Consideration of Risk Loads and Reinsurance Costs in Primary Insurance Ratemaking"

San Antonio, Texas, March 27, 2003

CAS Ratemaking Seminar

"Rate of Return Models in Insurance Ratemaking"

San Diego, California, May 20, 2002  
CAS Annual Meeting  
"The Actuary as an Expert Witness"

Tampa, Florida, March 7, 2002  
CAS Ratemaking Seminar  
"Parameterizing Rate of Return Models in Insurance Ratemaking"

Chicago, Illinois, December 10, 2001  
NAIC Meeting  
"The Impact of Proposition 103 in California"

Kansas City, Missouri, April 30, 2001  
NAIC Meeting  
"Personal Lines Regulation"

Las Vegas, Nevada, March 12, 2001  
CAS Ratemaking Seminar  
"Parameterizing Rate of Return Models in Insurance Ratemaking"

Washington DC, January 18, 2001  
Brookings Institution Conference on Insurance Regulation  
"Auto Insurance Experience in California"

Bermuda, September 14, 2000  
Ace Insurance Worldwide Actuarial Conference  
"Rate of Return Models In Property Casualty Insurance Ratemaking"

Orlando, Florida, June 9, 1998  
Florida Managed Care Institute Annual Conference  
"Issues in Integrated Health Care"

Seattle, Washington, July 21, 1997  
CAS Dynamic Financial Analysis Seminar  
"Dynamic Financial Analysis of a Workers Compensation Insurer"

Boston, Massachusetts, March 14, 1997  
CAS Ratemaking Seminar  
"Discounted Cash Flow Models in Insurance Ratemaking"

East Lansing, Michigan, July 15, 1996  
National Symposium on Workers Compensation  
"Managed Care in Workers Compensation"

New Orleans, Louisiana, March 20, 1996  
Global Business Research Seminar: Partnerships Between Insurers and Providers  
"Integrating the Data Systems"

Orlando, Florida, November 15, 1995  
Global Business Research Seminar: Documenting Savings From Managed Care  
"Evaluating Savings From Managed Care"

Orlando, Florida, October 27, 1995  
Self Insurance Association of America Annual Meeting  
"Managed Care in Workers Compensation: A Magic Act or Humbug?"

San Diego, California, October 16, 1995

Global Business Research Seminar: Documenting Savings From Managed Care  
"Technical Issues in Measuring Savings From Managed Care"

Durham, North Carolina, September 6, 1995

North Carolina HMO Association Annual Meeting  
"Workers Compensation in North Carolina: Risks and Opportunities for HMO's"

Washington, DC, May 22, 1995

Global Business Research Seminar: Outcomes for Workers' Compensation Managed Care  
"Measuring and Reporting the Savings"

Orlando, Florida, April 13, 1995

NCCI Annual Meeting  
"Managed Care in Workers Compensation"

Phoenix, Arizona, April 3, 1995

Casualty Actuarial Society Seminar on Profitability  
"Rate of Return Models - Selecting the Parameters"

New Orleans, Louisiana, March 16, 1995

Casualty Actuarial Society Ratemaking Seminar  
"Discounted Cash Flow Models for Insurance Ratemaking"

Orlando, Florida, March 14, 1995

Standard & Poor's Rating Conference  
"Consolidation in the Property/Casualty Insurance Industry"

Minneapolis, Minnesota, October 11, 1994

Casualty Actuarial Society Seminar on Medical Cost Containment  
"Managed Care and Workers' Compensation"

Toronto, Ontario, August 22, 1994

American Risk and Insurance Association Annual Meeting  
"Current Issues in Workers' Compensation"

Boston, Massachusetts, May 17, 1994

Casualty Actuarial Society Annual Meeting  
"Standard Of Practice on Profit and Contingency"

Hartford, Connecticut, April 20, 1994

University of Connecticut Blue Cross/Blue Shield Symposium  
"24 Hour Coverage - What Will It Involve"

Atlanta, Georgia, March 10, 1994

Casualty Actuarial Society Ratemaking Seminar  
"Cash Flow Models for Insurance Ratemaking"

Cambridge, Massachusetts, March 2, 1994

Workers' Compensation Research Institute Health Care Reform Conference  
"Early Results of the Florida Pilot Project"

Phoenix, Arizona, November 15, 1993

Casualty Actuarial Society Annual Meeting  
"The Use Of Managed Care in Workers' Compensation"

New York, New York, October 20, 1993  
Insurance Information Institute/Reinsurance Association of America Research Conference  
"The Impact of Health Care Reform on Casualty Insurance"

Somerset, New Jersey, July 13, 1993  
National Symposium on Workers' Compensation  
"Economic Analysis of Workers' Compensation Issues"

Boston, Massachusetts, June 30, 1993  
Institute of Actuaries of Japan Special Meeting  
"Health Care Costs in Workers' Compensation"

Dallas, Texas, June 15, 1993  
Stirling-Cooke Workers' Compensation Seminar  
"Workers' Compensation Medical Costs: Trends, Causes and Solutions"

New York, New York, June 3, 1993  
New York Business Group On Health  
"The Crisis in Workers' Compensation Health Care"

Mauna Lani Bay, Hawaii, May 3, 1993  
Western Association of Insurance Brokers Annual Meeting  
"Trends in Insurance Insolvency"

Kingston, Ontario, April 28, 1993  
Queen's University Workers' Compensation Conference  
"Exposure Bases for Workers' Compensation: Equity vs. Practicality"

Sanibel Island, Florida, March 29, 1993  
Workers' Compensation Reinsurance Bureau Annual Meeting  
"The Use of Managed Care in Workers' Compensation"

Baltimore, Maryland, March 23, 1993  
CAMAR Annual Meeting  
"Estimating the Cost of Capital in Insurance Ratemaking"

Philadelphia, Pennsylvania, December 1, 1992  
Economic Issues in Workers' Compensation Seminar,  
"Rate of Return Regulation in Workers' Compensation"

Seattle, Washington, October 16, 1992  
Casualty Actuarial Society Seminar on Profitability  
"Risk Based Capital Standards for Property Casualty Insurers"

Washington, DC, August 18, 1992  
American Risk and Insurance Association Annual Meeting  
"The Crisis in Workers' Compensation"

New York, New York, May 19, 1992  
Executive Enterprises Institute Seminar: Winning Approval of Rate and Form Filings  
"Determining a Fair Rate of Return for Property/Casualty Insurers"

Palm Beach, Florida, April 23, 1992  
NCCI Annual Meeting  
"Is the Workers' Compensation Industry Competitive?"

Philadelphia, Pennsylvania, March 20, 1992  
University of Pennsylvania/Duncanson & Holt Special Seminar  
"Current Issues in Workers' Compensation"

Dallas, Texas, March 12, 1992  
Casualty Actuarial Society Ratemaking Seminar  
"Profitability Models in Insurance Ratemaking: Estimating the Parameters"

Houston, Texas, December 11, 1991  
NCCI/NAIC Commissioners Symposium  
"Rate Adequacy: Solvency and Safety Implications"

New York, New York, November 17, 1991  
Executive Enterprises Institute Seminar: Winning Approval of Rate and Form Filings  
"Determining a Fair Rate of Return for Property/Casualty Insurers"

Philadelphia, Pennsylvania, November 12, 1991  
Casualty Actuarial Society Annual Meeting  
"The Impact of Medical Costs on Casualty Coverages"

New York, New York, May 17, 1991  
Executive Enterprises Institute Seminar: Winning Approval of Rate and Form Filings  
"Determining a Fair Rate of Return for Property/Casualty Insurers"

Kiawah Island, South Carolina, April 15 & 16, 1991  
Casualty Actuarial Society Seminar on Profitability  
"Cost of Capital Estimation: Lessons From Public Utilities"

Chicago, Illinois, March 14, 1991  
Casualty Actuarial Society Ratemaking Seminar  
"The Use of Profitability Models in Insurance Ratemaking"

Orlando, Florida, October 24, 1990,  
Financial Management Association Annual Meeting,  
"Current Issues in Insurance Rate Regulation: California Prop. 103 and Pennsylvania Act 6"

New Brunswick, New Jersey, May 18, 1990,  
Joint Conference on Workers' Compensation,  
"Current State Issues and Benefit Reforms"

Orlando, Florida, May 8, 1990,  
National Association of Insurance Commissioners Southeast Zone Raters Conference,  
"Loss Cost Rating for Workers' Compensation"

Orlando, Florida, April 3, 1990,  
Workers' Compensation Reinsurance Bureau Annual Meeting,  
"Medical Costs in Workers' Compensation: Recent Trends in Cost Containment"

Philadelphia, Pennsylvania, March 15, 1990,  
CAS Ratemaking Seminar,  
"Rate of Return Models in Insurance Regulation: Return on Sales vs. Return on Equity"

Chicago, Illinois, November 10, 1989,  
Alliance of American Insurers Research Committee,  
"Recent Developments in Rate Regulation: California Proposition 103"

New York, New York, October 5, 1989,  
NCCI Legal Trends Seminar,  
"Medical Cost Containment in Workers' Compensation"

Philadelphia, Pennsylvania, September 7, 1989,  
Workers' Compensation Congress,  
"Medical Cost Containment in Workers' Compensation"

Denver, Colorado, August 21, 1989,  
American Risk and Insurance Association Annual Meeting,  
"Regulatory Survival: Rate Changes in Workers' Compensation" (with Richard J. Butler)

Hilton Head, South Carolina, April 4, 1989,  
Workers' Compensation Reinsurance Bureau Annual Meeting,  
"Prospects for Workers' Compensation in the 1990's"

Mountain Lakes, New Jersey, March 29, 1989,  
St. Clares-Riverside Medical Center,  
"Stress in the Workplace"

Dallas, Texas, March 16, 1989,  
Casualty Actuarial Society Ratemaking Seminar,  
"The Impact of Tax Reform on Insurance Profitability"

New Orleans, Louisiana, December 15, 1988,  
NAIC-NCCI Commissioners School,  
"A Forecast for Workers' Compensation"

Philadelphia, Pennsylvania, November 17, 1988,  
Economic Issues in Workers' Compensation Seminar,  
"The Impact of Regulation on the Probability of Insolvency" (with John D. Worrall and David Durbin)

Boston, Massachusetts, November 14, 1988,  
American Public Health Association Annual Meeting,  
"Stress in the Workplace"

Atlanta, Georgia, September 14, 1988,  
Casualty Loss Reserve Seminar,  
"Estimating the Cost of Social Inflation in Workers' Compensation"

Reno, Nevada, August 15, 1988,  
American Risk and Insurance Association Annual Meeting,  
"Benefit Increases in Workers' Compensation"

New York, New York, June 13, 1988,  
National Association Of Insurance Commissioners Annual Meeting,  
"Alternative Rate of Return Models for Insurance Regulation"

Syracuse, New York, May 5, 1988,  
Current Issues in Workers' Compensation Symposium,  
"Workers' Compensation Stress Claims"

Hilton Head, South Carolina, April 22, 1988,  
Workers' Compensation Reinsurance Bureau Annual Meeting,  
"A Forecast for Workers' Compensation Insurers"

Absecon, New Jersey, April 19, 1988,  
Pennsylvania Coal Mine Rating Bureau Annual Meeting,  
"The Use of Rate of Return Models in Insurance Rate Regulation"

Philadelphia, Pennsylvania, November 17, 1987,  
Economic Issues in Workers' Compensation Seminar,  
"The Transition to Permanent Disability Status" (with John D. Worrall and David Durbin)

Charlotte, North Carolina, October 20, 1987,  
American Insurance Association Government Affairs Conference,  
"Prospects for Workers' Compensation in 1988"

Minneapolis, Minnesota, September 29, 1987,  
Minnesota Workers' Compensation Reinsurance Association Annual Meeting,  
"Economic and Demographic Characteristics of Workers' Compensation Claims"

Airlie, Virginia, July 7, 1987,  
National Symposium on Workers' Compensation,  
"Forecasting Workers' Compensation Experience"

Santa Clara, California, June 30, 1987,  
Symposium on Recent Advances in Ratemaking,  
"Econometric Models of Workers' Compensation Losses"

Storrs, Connecticut, May 1, 1987,  
University of Connecticut Symposium on Current Issues in Workers' Compensation,  
"Current Research in Workers' Compensation"

Philadelphia, Pennsylvania, April 16, 1987,  
Wharton School Graduate Seminar Series,  
"Impact of Tax Reform on Workers' Compensation Profitability"

Boca Raton, Florida, December 4, 1986,  
National Association of Insurance Commissioners/NCCI Commissioners School,  
Panel Discussion on Current Issues in Workers' Compensation

Philadelphia, Pennsylvania, November 7, 1985,  
Wharton School, University of Pennsylvania, Graduate Seminar Series,  
"Litigation in Workers' Compensation"

Vancouver, British Columbia, August 19, 1985,  
American Risk and Insurance Association Annual Meeting,  
"Earnings Loss and Permanent Disability"

Washington, D.C., April 23, 1985,  
Washington Conference on the Economics of Disability,  
"Employment Effects of Workers' Compensation Insurance"

Schenectady, New York, January 18, 1985,  
Union University Graduate Business Seminar Series,  
"The Use of Modern Portfolio Theory in Insurance Regulation"

**EXPERT TESTIMONY**

Raleigh, North Carolina, October 27, 2014  
Homeowners Insurance Rate Hearing

Tallahassee, Florida, October 14, 2014  
NCCI Workers Compensation Insurance Rate Hearing

New York, NY, June 24, 2014  
Omar Tigbao and Dorothy Tigbao, et. al., v. QBE Financial Institutions Risk Services, Deposition

New York, NY, March 7, 2014  
Thrift Development Corporation v. American International Group, et. al., Deposition

New York, New York, January 28, 2014  
Cheryl Hall, et. al. v. Bank of America, N.A., et. al., Deposition

Santa Fe, New Mexico, November 7, 2013  
Biennial Title Insurance Rate Hearing

Tallahassee, Florida, October 1, 2013  
NCCI Workers Compensation Insurance Rate Hearing

New York, New York, July 10, 2013  
Larry Arnett and Ronda Arnett, et. al. v. Bank of America, N.A., et. al., Deposition

Austin, Texas, April 25, 2013  
State Farm Lloyds Homeowners Rate Hearing

Tallahassee, Florida, October 4, 2012  
NCCI Workers Compensation Insurance Rate Hearing

Boston, Massachusetts, May 14, 2012  
Massachusetts Workers Compensation Rate Hearing

New York, New York, February 17, 2012  
Temporary Services, Inc. et. al. v. American International Group, et. al., Deposition

San Francisco, California, January 19, 2012  
Mercury Insurance Company Homeowners Insurance Rate Hearing

Santa Fe, New Mexico, November 16, 2011  
Biennial Title Insurance Rate Hearing

Tallahassee, Florida, October 11, 2011  
NCCI Workers Compensation Insurance Rate Hearing

Tampa, Florida, September 13, 2011  
Citizens Property Insurance Corporation Homeowners Insurance Hearing

Raleigh, North Carolina, July 25, 2011  
Dwelling Fire and Extended Coverage Insurance Rate Hearing

Tallahassee, Florida, October 6, 2010  
NCCI Workers Compensation Insurance Rate Hearing

Irvine, CA, April 21, 2010  
Eastwood Insurance Services, Inc. et. al., vs. Titan Auto Insurance of NM, et. al. Deposition

San Francisco, California, March 9, 2010  
Century National Insurance Company Proposition 103 Rollback Hearing

Santa Fe, New Mexico, November 18, 2009  
Annual Title Insurance Rate Hearing

Tallahassee, Florida, October 29, 2009  
NCCI Workers Compensation Insurance Rate Hearing

Austin, Texas, September 14, 2009  
Biennial Title Insurance Rate Hearing

Austin, Texas, April 1, 2009  
State Farm Lloyds Homeowners Rate Hearing

Santa Fe, New Mexico, November 19, 2008  
Annual Title Insurance Rate Hearing

New York, New York, November 13, 2008  
Georgia Hensley, et. al., vs. Computer Sciences Corp. et. al., Deposition

Tallahassee, Florida, October 29, 2008  
State Farm Florida Homeowners Insurance Hearing

Raleigh, North Carolina, July 1, 2008  
Auto Insurance Rate Hearing

San Francisco, California, May 5, 2008  
GeoVera Insurance Company Earthquake Rate Hearing

Tallahassee, Florida, January 23, 2008  
Hartford Insurance Group Homeowners Insurance Rate Hearing

Boston, Massachusetts, January 9, 2008  
Commerce Insurance Group Auto Insurance Rate Hearing

San Francisco, California, November 29, 2007  
Explorer Insurance Company Automobile Rate Hearing

Santa Fe, New Mexico, November 19, 2007  
Annual Title Insurance Rate Hearing

Reno, Nevada, June 14, 2007  
Public Hearing Regarding Merger Between UnitedHealth Group and Sierra Health Systems

Austin, Texas, May 31, 2007  
State Farm Lloyds Homeowners Rate Hearing

Reno, Nevada, October 26, 2006  
Public Hearing Regarding Demutualization of Employers Insurance Group

San Francisco, California, August 30, 2006  
Hearing on Proposed Title Insurance Rate Regulations

Austin, Texas, August 14, 2006  
Biennial Title Insurance Rate Hearing

Raleigh, North Carolina, September 28, 2005  
Auto Insurance Rate Hearing

Providence, Rhode Island, September 27, 2005  
Norcal Medical Malpractice Insurance Rate Hearing

San Francisco, California, August 23, 2005  
Safeo Insurance Company Earthquake Rate Hearing

Boston, Massachusetts, April 15, 2005  
Massachusetts Workers Compensation Rate Hearing

Lawrence, Massachusetts, February 14, 2005  
Highground, Inc. v. Mazonson

New York, NY, January 21, 2005  
NFHA v. Prudential Deposition

Austin, Texas, July 13, 2004  
Medical Protective Insurance Company Medical Malpractice Insurance Rate Hearing

Austin, Texas, December 16, 2003  
Biennial Title Insurance Rate Hearing

Providence, Rhode Island, November 17, 2003  
Norcal Medical Malpractice Insurance Rate Hearing

San Francisco, California, September 16, 2003  
Century National Proposition 103 Rollback Hearing

Austin, Texas, September 11, 2003  
Farmers Insurance Exchange Homeowner Rate Rollback Hearing

Austin, Texas, September 2, 2003  
State Farm Lloyds Homeowners Rate Rollback Hearing

Austin, Texas, May 21, 2003  
Farmers Insurance Group Settlement Hearing

Boston, Massachusetts, April 29, 2003  
Massachusetts Workers Compensation Rate Hearing

Los Angeles, California, March 12, 2003  
SCPIE Medical Malpractice Rate Hearing

Raleigh, North Carolina, July 17, 2002  
Auto Insurance Rate Hearing

Tallahassee, Florida, February 25, 2002  
NCCI Workers Compensation Insurance Rate Hearing

Austin, Texas, February 5, 2002  
Biennial Title Insurance Rate Hearing

Raleigh, North Carolina, September 24, 2001  
Auto Insurance Rate Hearing

Boston, Massachusetts, August 14, 2001  
Massachusetts Auto Insurance Bureau Rate Hearing

Austin, Texas, March 6, 2001  
Texas Auto Benchmark Rate Hearing

Boston, Massachusetts, August 23, 2000  
Massachusetts Auto Insurance Bureau Rate Hearing

Austin, Texas, December 7, 1999  
Texas Auto Insurance Plan Association Rate Hearing

Raleigh, North Carolina, December 3, 1999  
Auto Insurance Rate Hearing

Austin, Texas, November 3, 1999  
Biennial Title Insurance Rate Hearing

Austin, Texas, September 8, 1999  
Texas Auto Benchmark Rate Hearing

Boston, Massachusetts, August 13, 1999  
Massachusetts Auto Insurance Bureau Rate Hearing

Austin, Texas, June 22, 1999  
Texas Property Benchmark Rate Hearing

Honolulu, Hawaii, December 16, 1998  
NCCI Workers Compensation Insurance Rate Hearing

Richmond, Virginia, November 15, 1998  
NCCI Workers Compensation Insurance Rate Hearing

Boston, Massachusetts, October 9, 1998  
Massachusetts Auto Insurance Bureau Rate Hearing

Austin, Texas, May 19, 1998  
Texas Auto Insurance Plan Association Rate Hearing

Austin, Texas, April 7, 1998  
Auto Insurance Benchmark Rate Hearing

Austin, Texas, February 17, 1998  
Property Insurance Benchmark Rate Hearing

Austin, Texas, November 18, 1997  
Biennial Title Insurance Rate Hearing

Tallahassee, Florida, September 8, 1997  
NCCI Workers Compensation Insurance Rate Hearing

Austin, Texas, April 8, 1997  
Texas Auto Insurance Plan Association Rate Hearing

Austin, Texas, March 10, 1997  
Auto Insurance Benchmark Rate Hearing

San Francisco, California, March 4, 1997  
Insurance Department Hearing on Rating Factors

Raleigh, North Carolina, July 16, 1996  
Auto Insurance Rate Hearing

San Francisco, California, March 11, 1996  
Century National Proposition 103 Rollback Hearing

Sacramento, California, January 30, 1996  
Hartford Steam Boiler Proposition 103 Rollback Hearing

San Francisco, California, January 8, 1996  
SAFECO Insurance Company Earthquake Rate Hearing

Austin, Texas, December 21, 1995  
Residential Property Insurance Benchmark Rate Hearing

Clearwater, Florida, December 8, 1995  
Florida Windstorm Underwriting Association Rate Hearing

Austin, Texas, November 28, 1995  
Private Passenger Auto Insurance Benchmark Rate Hearing

Austin, Texas, October 31, 1995  
Texas Automobile Insurance Plan Association Rate Hearing

Sacramento, California, April 18, 1995  
California Insurance Department Hearing on Auto Insurance Rating Factors

Portland, Maine, April 13, 1995  
Workers Compensation Assigned Risk Pool Fresh Start Hearing

San Francisco, California, February 6, 1995  
Farmers Insurance Group Earthquake Insurance Rate Hearing

Austin, Texas, January 6, 1995  
Special Hearing on Classification Rules for Automobile Insurance

Austin, Texas, December 15, 1994  
Residential Property Insurance Benchmark Rate Hearing

Austin, Texas, October 4, 1994  
Texas Automobile Insurance Plan Association Rate Hearing

Austin, Texas, September 27, 1994  
Private Passenger Auto Insurance Benchmark Rate Hearing

Raleigh, North Carolina, July 19, 1994  
Private Passenger Auto Insurance Rate Hearing

San Francisco, California, December 22, 1993  
Century National Homeowner's Insurance Rate Hearing

Raleigh, North Carolina, October 13, 1993  
Homeowners/Farmowners Insurance Rate Hearing

Tallahassee, Florida, October 4, 1993  
Workers' Compensation Insurance Rate Hearing

Boston, Massachusetts, September 9, 1993  
Automobile Insurance Rate Hearing

Austin, Texas, March 4, 1993  
Residential Property Insurance Benchmark Rate Hearing

Austin, Texas, February 10, 1993  
Automobile Insurance Benchmark Rate Hearing

Honolulu, Hawaii, November 18, 1992  
Liberty Mutual Insurance Automobile Rate Hearing

Raleigh, North Carolina, November 13, 1992  
Workers' Compensation Insurance Rate Hearing

Tallahassee, Florida, October 29, 1992  
Workers' Compensation Insurance Rate Hearing

San Francisco, California, October 14, 1992  
Workers' Compensation Insurance Rate Hearing

Atlanta, Georgia, September 24, 1992  
Workers' Compensation Insurance Rate Hearing

Nashville, Tennessee, May 27, 1992  
Workers' Compensation Insurance Rate Hearing

San Francisco, California, May 13, 1992  
Workers' Compensation Insurance Rate Hearing

Los Angeles, California, April 10, 1992  
Mercury General Proposition 103 Rollback Proceedings

Austin, Texas, January 27, 1992  
Texas Automobile Insurance Plan Rate Hearing

Austin, Texas, December 17, 1991  
Automobile Insurance Rate Hearing

Raleigh, North Carolina, December 16, 1991  
Workers' Compensation Insurance Rate Hearing

San Francisco, California, October 22, 1991  
Workers' Compensation Rate Hearing

Los Angeles, California, May 23, 1991,  
Proposition 103 RCD-2 Proceedings

San Francisco, California, April 9, 1991  
California Workers' Compensation Rate Study Commission

Nashville, Tennessee, March 20, 1991  
Workers' Compensation Insurance Rate Hearing

Los Angeles, California, March 12, 1991,  
California Workers' Compensation Rate Study Commission

Olympia, Washington, February 26, 1991,  
House Financial Institutions/Insurance Committee Hearing on Rules for Insurance Regulatory Legislation

Olympia, Washington, November 27, 1990,  
Insurance Department Public Hearing on Proposed Rules for Ratemaking

Harrisburg, Pennsylvania, November 12, 1990,  
Allstate Insurance Company Automobile Insurance Rate Hearing

Tallahassee, Florida, November 1, 1990,  
Scanlan v. Martinez, et.al., Superior Court of Leon County

San Bruno, California, October 1, 1990,  
SAFECO Insurance Group Proposition 103 Rate Rollback Hearing

Austin, Texas, July 23, 1990,  
Texas State Board of Insurance Special Hearing on Investment Income in Ratemaking

Harrisburg, Pennsylvania, July 18, 1990,  
Pennsylvania National Mutual Insurance Company Automobile Insurance Rate Hearing

Harrisburg, Pennsylvania, June 28, 1990,  
Harleysville Mutual Insurance Company Automobile Insurance Rate Hearing

Columbia, South Carolina, March 30, 1990,  
Workers' Compensation Insurance Rate Hearing

San Bruno, California, March 19, 1990,  
California Proposition 103 Generic Hearing

Denver, Colorado, December 12, 1989,  
Workers' Compensation Insurance Rate Hearing

Tampa, Florida, October 23, 1989,  
Workers' Compensation Insurance Rate Hearing

Austin, Texas, October 17, 1989,  
Workers' Compensation Insurance Rate Hearing

Los Angeles, California, September 25, 1989,  
SAFECO Insurance Company of America Proposition 103 Rate Hearing

Austin, Texas, August 29, 1989,  
Texas Insurance Advisory Association Property Insurance Rate Hearing

Providence, Rhode Island, April 13, 1989,  
Workers' Compensation Insurance Rate Hearing

Augusta, Maine, January 24, 1989,  
Workers' Compensation Insurance Rate Hearing

Hartford, Connecticut, November 14, 1988,  
Workers' Compensation Insurance Rate Hearing

Tallahassee, Florida, November 3, 1988,  
Workers' Compensation Insurance Rate Hearing

Austin, Texas, November 2, 1988,  
Workers' Compensation Insurance Rate Hearing

Montgomery, Alabama, June 30, 1988,  
Workers' Compensation Insurance Rate Hearing

Augusta, Maine, March 24, 1988,  
Workers' Compensation Insurance Rate Hearing

Austin, Texas, October 27, 1987,  
Workers' Compensation Insurance Rate Hearing

Tallahassee, Florida, October 9, 1987,  
Workers' Compensation Insurance Rate Hearing

Atlanta, Georgia, August 6, 1987,  
Workers' Compensation Insurance Rate Hearing

Augusta, Maine, February 24, 1987,  
Workers' Compensation Insurance Rate Hearing

Tallahassee, Florida, November 14, 1986,  
Workers' Compensation Insurance Rate Hearing

Austin, Texas, November 18, 1986,  
Workers' Compensation Insurance Rate Hearing

Augusta, Maine, May 28, 1986,  
Workers' Compensation Insurance Rate Hearing

Tallahassee, Florida, December 6, 1985,  
Workers' Compensation Insurance Rate Hearing

Oklahoma City, Oklahoma, October 10, 1985,  
Workers' Compensation Insurance Rate Hearing

Austin, Texas, July 23, 1985,  
Workers' Compensation Insurance Rate Hearing

Austin Texas, June 14, 1985,  
Workers' Compensation Insurance Rate Hearing

Tallahassee, Florida, November 18, 1984,  
Workers' Compensation Insurance Rate Hearing

Austin, Texas, August 29, 1984,  
Workers' Compensation Insurance Rate Hearing

Portland, Oregon, March 6, 1984,  
NAIC Public Hearing on Investment Income and Insurance Profitability

Tallahassee, Florida, February 25, 1984,  
Workers' Compensation Insurance Rate Hearing

Tallahassee, Florida, August 18, 1983,  
Workers' Compensation Insurance Rate Hearing

Austin Texas, July 13, 1983,  
Workers' Compensation Insurance Rate Hearing

Oklahoma City, Oklahoma, March 6, 1983,  
Workers' Compensation Insurance Rate Hearing

Baton Rouge, Louisiana, March 16, 1982,  
Louisiana Insurance Commission Public Hearing on Investment Income

Providence, Rhode Island, February 3, 1982,  
Workers' Compensation Insurance Rate Hearing

Augusta, Maine, October 1, 1981,  
Workers' Compensation Insurance Rate Hearing

**NCRB - PRO FORMA STATUTORY RETURN**

**WORKERS COMPENSATION**

	Pre-Tax	Tax Liability	Post-Tax
1. Premiums	100.00%		
Loss & Loss Adjustment Expense	49.28%		
Commissions & Brokerage	5.00%		
Taxes, Licenses and Fees	2.96%		
General & Other Acquisition Expenses	3.05%		
Servicing Carrier Allowance plus Other Expenses	19.71%		
Uncollectible Premium Income	10.00%		
2. Pro-Forma Underwriting Profit	10.00%		
3. Regular tax		3.50%	
4. Additional tax due to TRA		0.28%	
5. Total Return from Underwriting (post-tax)			6.22%
6. Investment Gain on Insurance Transaction	5.37%	1.38%	3.99%
7. Total Return as a % of Premium (post-tax)			10.21%
8. Premium-to-Net Worth Ratio			0.796
9. Total Return as a % of Net Worth (post-tax)			8.12%

**Note: Lines (1) to (7) are all expressed as a % of premium.**

Assumptions

(a) UW Tax Rate =	35.00%
(b) Inv. Income Tax Rate =	25.69%
(c) Inv. Yield =	3.32%
(d) P/S Ratio =	0.93
(e) NW/S Ratio =	1.16
(f) Uncollectible Premium Income	10.00%
(g) Additional TRA tax=	0.28%
(h) Prepaid Expense Ratio	27.86%
(i) Unearned Premium Reserve to Premium Ratio	34.12%

**NOTES TO EXHIBIT RB-13, Page 1**

1. Selected expense provisions, reflecting the average of servicing carrier and direct assignment carrier market shares and expense provisions. Servicing carrier share = 77.25 %; direct assignment carrier share = 22.75%. Therefore, General & OAE for direct assignment carriers =  $13.41\% * 22.75\% = 3.05\%$ , of total market premium, while the servicing carrier allowance plus other expenses =  $(23.32\% + 2.20\%) * 77.25\% = 19.71\%$  of total market premium. Commission and brokerage expenses are the same for all carriers. For uncollectible premium, see RB-1, Exhibit II-F
2. Selected underwriting profit provision
3. (2) x (a.)
4. See RB-13, p. 3
5. [(2) - (3) - (4)]
6. See RB-13, pp.4-7
7. (5) + (6)
8. (d)/(e)
9. (7) x (8)

**ASSUMPTIONS**

- (a) Internal Revenue Code
- (b) See RB-13, pp. 8-10; 1-avg post-tax yield/avg pre-tax yield
- (c) See RB-13, pp. 8-10; average of current and embedded yields
- (d) See RB-13, p. 11
- (e) See RB-13, p. 12
- (f) See RB-1, Exhibit II-F
- (g) See RB-13, p. 3
- (h) See RB-13, p. 4
- (i) See RB-13, p. 5

**NCRB - PRO FORMA STATUTORY RETURN  
ADJUSTED TO INCLUDE INVESTMENT INCOME ON SURPLUS  
WORKERS COMPENSATION**

	Pre-Tax	Tax Liability	Post-Tax
1. Premiums	100.00%		
Loss & Loss Adjustment Expense	49.28%		
Commissions & Brokerage	5.00%		
Taxes, Licenses and Fees	2.96%		
General & Other Acquisition Expenses	3.05%		
Servicing Carrier Allowance plus Other Expenses	19.71%		
Uncollectible Premium Income	10.00%		
2. Pro-Forma Underwriting Profit	10.00%		
3. Regular tax		3.50%	
4. Additional tax due to TRA		0.28%	
5. Total Return from Underwriting (post-tax)			6.22%
6. Investment Gain on Insurance Transaction	5.37%	1.38%	3.99%
7. Investment Gain on Surplus (Including Prepaid Expense Adjustment)	3.90%	1.00%	2.90%
8. Total Return as a % of Premium (post-tax)			13.10%
9. Premium-to-Net Worth Ratio			0.796
10. Total Return as a % of Net Worth (post-tax)			10.43%

**Note: Lines (1) to (9) are all expressed as a % of premium.**

Assumptions

(a) UW Tax Rate =	35.00%
(b) Inv. Income Tax Rate =	25.69%
(c) Inv. Yield =	3.32%
(d) P/S Ratio =	0.93
(e) NW/S Ratio =	1.16
(f) Uncollectible Premium Income	10.00%
(g) Additional TRA tax=	0.28%
(h) Prepaid Expense Ratio	27.86%
(i) Unearned Premium Reserve to Premium Ratio	34.12%

**NOTES TO EXHIBIT RB-13, Page 1A**

1. Selected expense provisions, reflecting the average of servicing carrier and direct assignment carrier market shares and expense provisions. Servicing carrier share = 77.25 %; direct assignment carrier share = 22.75%. Therefore, General & OAE for direct assignment carriers =  $13.41\% * 22.75\% = 3.05\%$ , of total market premium, while the servicing carrier allowance plus other expenses =  $(23.32\% + 2.20\%) * 77.25\% = 19.71\%$  of total market premium. Commission and brokerage expenses are the same for all carriers. For uncollectible premium, see RB-1, Exhibit II-F
2. Selected underwriting profit provision
3. (2) x (a.)
4. See RB-13, p. 3
5. [(2) - (3) - (4)]
6. See RB-13, pp. 4-7
7. (c) x [1/(d) + (h)x(i)]
8. (5) + (6) + (7)
9. (d)/(e)
10. (8) x (9)

**ASSUMPTIONS**

- (a) Internal Revenue Code
- (b) See RB-13, pp. 8-10; 1-avg post-tax yield/avg pre-tax yield
- (c) See RB-13, pp. 8-10; average of current and embedded yields
- (d) See RB-13, p. 11
- (e) See RB-13, p. 12
- (f) See RB-1, Exhibit II-F
- (g) See RB-13, p. 3
- (h) See RB-13, p. 4
- (i) See RB-13, p. 5

**NORTH CAROLINA  
WORKERS COMPENSATION**

**CALCULATION OF TAXABLE INCOME**

The Tax Reform Act of 1986 increased taxable income for property casualty insurers, by including in the tax base several items that were previously not considered taxable income. These items include:

1. Inclusion of 20% of the annual increase in unearned premium reserve as income.
2. The use of discounted loss reserves in the calculation of underwriting income.
3. Inclusion of 15% of tax exempt income and the deductible portion of dividends received from investments made after August 7, 1986.

Of these three items, the first two (revenue offset and loss reserve discounting) must be accounted for directly in the calculation of the underwriting profit tax. The third item must be accounted for in the calculation of the investment income tax rate. The calculations below assume annual premium growth of 4.0%

(a) Earned Premium (current year)	100.00%
(b) UEPR (previous year)	33.45%
(c) UEPR (current year)	34.79%
(d) Increase = (c)-(b)	1.34%
(e) 20% of Increase = Taxable Income	0.27%
(f) Tax Liability = (e)x.35	0.09%

The additional taxable income derived from treating unpaid losses on a discounted basis is given by the difference between unpaid losses and undiscounted unpaid losses in year N, minus the difference between unpaid losses and undiscounted unpaid losses in year N-1.

Discounting is on the basis of payment patterns provided by NCCI.

(g) Unpaid Losses (current year)	153.19%
(h) Discounted unpaid losses (current year)	139.21%
(i) Unpaid Losses (previous year)	147.30%
(j) Discounted unpaid losses (previous year)	133.85%
(k) Additional Income	0.54%
(l) Tax Liability	0.19%

The sum of these two calculations results in the following:

Other Tax Liabilities	
(m) UEP	0.09%
(n) Discounting of Loss Reserves	0.19%
(o) Total	<b>0.28%</b>

NORTH CAROLINA  
WORKERS COMPENSATION

CALCULATION OF TAXABLE INCOME

(1) AY Avg Acc Date	(2) AY Pay Pattern	(3) Percent Unpaid	(4) Volume as % of Premium	(5) Combined Weight	(6) AY at 12/31 of Current Yr.	(7) Discount Factor	(8) Discounted Weight	(9) AY at 12/31 of Previous Yr.	(10) Weight	(11) Discount Factor	(12) Discounted Weight
0.5	26.1%	73.9%	49.275	36.4	2014	91.8388%	33.5				
1.5	46.0%	54.0%	47.380	25.6	2013	90.6509%	23.2	2013	35.0	91.8388%	32.2
2.5	57.7%	42.4%	45.558	19.3	2012	89.8231%	17.3	2012	24.6	90.6509%	22.3
3.5	65.7%	34.3%	43.805	15.0	2011	89.4717%	13.5	2011	18.6	89.8231%	16.7
4.5	71.6%	28.4%	42.120	12.0	2010	89.3530%	10.7	2010	14.5	89.4717%	12.9
5.5	76.2%	23.8%	40.500	9.7	2009	89.0563%	8.6	2009	11.5	89.3530%	10.3
6.5	79.8%	20.2%	38.943	7.9	2008	89.7517%	7.1	2008	9.3	89.0563%	8.3
7.5	82.7%	17.3%	37.445	6.5	2007	90.6854%	5.9	2007	7.6	89.7517%	6.8
8.5	85.1%	14.9%	36.005	5.4	2006	91.2368%	4.9	2006	6.2	90.6854%	5.7
9.5	87.1%	12.9%	34.620	4.5	2005	92.3427%	4.1	2005	5.2	91.2368%	4.7
10.5	89.0%	11.0%	33.288	3.6	2004	93.5104%	3.4	2004	4.3	92.3427%	4.0
11.5	91.0%	9.0%	32.008	2.9	2003	94.7524%	2.7	2003	3.5	93.5104%	3.3
12.5	93.0%	7.0%	30.777	2.2	2002	96.0846%	2.1	2002	2.8	94.7524%	2.6
13.5	95.0%	5.0%	29.593	1.5	2001	97.5293%	1.4	2001	2.1	96.0846%	2.0
14.5	97.0%	3.0%	28.455	0.9	2000	99.1168%	0.9	2000	1.4	97.5293%	1.4
15.5	100.0%	0.0%	27.361	0.0	1999	99.1168%	0.0	1999	0.8	99.1168%	0.8
16.5	100.0%	0.0%	26.308	0.0	1998	99.1168%	0.0	1998	0	99.1168%	0.0
17.5	100.0%	0.0%	25.296	0.0	1997	99.1168%	0.0	1997	0	99.1168%	0.0
18.5	100.0%	0.0%	24.324	0.0	1996	99.1168%	0.0	1996	0	99.1168%	0.0
19.5	100.0%	0.0%	23.388	0.0	1995	99.1168%	0.0	1995	0	99.1168%	0.0
20.5	100.0%	0.0%	22.488	0.0	1994	99.1168%	0.0	1994	0	99.1168%	0.0
21.5	100.0%	0.0%	21.624	0.0	1993	99.1168%	0.0	1993	0	99.1168%	0.0
22.5	100.0%	0.0%	20.792	0.0	1992	99.1168%	0.0	1992	0	99.1168%	0.0
23.5	100.0%	0.0%	19.992	0.0	1991	99.1168%	0.0	1991	0	99.1168%	0.0
24.5	100.0%	0.0%	19.223	0.0	1990	99.1168%	0.0	1990	0	99.1168%	0.0
25.5	100.0%	0.0%	18.484	0.0	1989	99.1168%	0.0	1989	0	99.1168%	0.0
26.5	100.0%	0.0%	17.773	0.0	1988	99.1168%	0.0	1988	0	99.1168%	0.0
27.5	100.0%	0.0%	17.089	0.0	1987	99.1168%	0.0	1987	0	99.1168%	0.0
28.5	100.0%	0.0%	16.432	0.0	1986	99.1168%	0.0	1986	0	99.1168%	0.0
29.5	100.0%	0.0%	15.800	0.0	1985	99.1168%	0.0	1985	0	99.1168%	0.0
30.5	100.0%	0.0%	15.192	0.0	1984	99.1168%	0.0	1984	0	99.1168%	0.0
31.5	100.0%	0.0%	14.608	0.0	1983	99.1168%	0.0	1983	0	99.1168%	0.0
32.5	100.0%	0.0%	14.046	0.0	1982	99.1168%	0.0	1982	0	99.1168%	0.0
33.5	100.0%	0.0%	13.506	0.0	1981	99.1168%	0.0	1981	0	99.1168%	0.0
34.5	100.0%	0.0%	12.987	0.0	1980	99.1168%	0.0	1980	0	99.1168%	0.0
35.5	100.0%	0.0%	12.487	0.0	1979	99.1168%	0.0	1979	0	99.1168%	0.0
36.5	100.0%	0.0%	12.007	0.0	1978	99.1168%	0.0	1978	0	99.1168%	0.0
37.5	100.0%	0.0%	11.545	0.0	1977	99.1168%	0.0	1977	0	99.1168%	0.0
38.5	100.0%	0.0%	11.101	0.0	1976	99.1168%	0.0	1976	0	99.1168%	0.0
39.5	100.0%	0.0%	10.674	0.0	1975	99.1168%	0.0	1975	0	99.1168%	0.0
40.5	100.0%	0.0%	10.263	0.0	1974	99.1168%	0.0	1974	0	99.1168%	0.0
41.5	100.0%	0.0%	9.869	0.0	1973	99.1168%	0.0	1973	0	99.1168%	0.0
42.5	100.0%	0.0%	9.489	0.0	1972	99.1168%	0.0	1972	0	99.1168%	0.0
43.5	100.0%	0.0%	9.124	0.0	1971	99.1168%	0.0	1971	0	99.1168%	0.0
44.5	100.0%	0.0%	8.773	0.0	1970	99.1168%	0.0	1970	0	99.1168%	0.0
45.5	100.0%	0.0%	8.436	0.0	1969	99.1168%	0.0	1969	0	99.1168%	0.0
46.5	100.0%	0.0%	8.111	0.0	1968	99.1168%	0.0	1968	0	99.1168%	0.0
47.5	100.0%	0.0%	7.799	0.0	1967	99.1168%	0.0	1967	0	99.1168%	0.0
48.5	100.0%	0.0%	7.499	0.0	1966	99.1168%	0.0	1966	0	99.1168%	0.0
49.5	100.0%	0.0%	7.211	0.0	1965	99.1168%	0.0	1965	0	99.1168%	0.0
50.5	100.0%	0.0%	6.934	0.0	1964	99.1168%	0.0	1964	0	99.1168%	0.0
51.5	100.0%	0.0%	6.667	0.0	1963	99.1168%	0.0	1963	0	99.1168%	0.0
52.5	100.0%	0.0%	6.411	0.0	1962	99.1168%	0.0	1962	0	99.1168%	0.0
53.5	100.0%	0.0%	6.164	0.0	1961	99.1168%	0.0	1961	0	99.1168%	0.0
54.5	100.0%	0.0%	5.927	0.0	1960	99.1168%	0.0	1960	0	99.1168%	0.0
55.5	100.0%	0.0%	5.699	0.0	1959	99.1168%	0.0	1959	0	99.1168%	0.0
56.5	100.0%	0.0%	5.480	0.0	1958	99.1168%	0.0	1958	0	99.1168%	0.0
57.5	100.0%	0.0%	5.269	0.0	1957	99.1168%	0.0	1957	0	99.1168%	0.0
58.5	100.0%	0.0%	5.066	0.0	1956	99.1168%	0.0	1956	0	99.1168%	0.0
59.5	100.0%	0.0%	4.871	0.0	1955	99.1168%	0.0	1955	0	99.1168%	0.0
60.5	100.0%	0.0%	4.684	0.0	1954	99.1168%	0.0	1954	0	99.1168%	0.0
61.5	100.0%	0.0%	4.504	0.0	1953	99.1168%	0.0	1953	0	99.1168%	0.0
62.5	100.0%	0.0%	4.331	0.0	1952	99.1168%	0.0	1952	0	99.1168%	0.0
63.5	100.0%	0.0%	4.164	0.0	1951	99.1168%	0.0	1951	0	99.1168%	0.0
64.5	100.0%	0.0%	4.004	0.0	1950	99.1168%	0.0	1950	0	99.1168%	0.0
65.5	100.0%	0.0%	3.850	0.0	1949	99.1168%	0.0	1949	0	99.1168%	0.0
66.5	100.0%	0.0%	3.702	0.0	1948	99.1168%	0.0	1948	0	99.1168%	0.0
Sum	Total Res @ 12/31 current year			153.19	Sum		139.21	Sum			133.85
	Total Res @ 12/31 previous year			147.30							

**NOTES TO PAGES 3 AND 3A**

Page 3

- (a) - (c) Annual Statement, statutory page 14, for all companies writing workers compensation insurance in North Carolina, and assumed growth rate.
- (d) Line (c) - line (b)
- (e) Line (d) x .20.
- (f) Line (e) x .35.
- (g) Unpaid current-year losses at year-end as a percent of premium. Sum of Page 3A, Column (5).
- (h) Discounted unpaid current-year losses at year-end as a percent of premium. Sum of Page 3A, Column (8).
- (i) Unpaid prior-year losses at year-end as a percent of premium. Sum of Page 3A, Column (5) divided by 5% growth rate.
- (j) Discounted unpaid prior-year losses at year-end as a percent of premium. Sum of Page 3A, Column (12).
- (k) Line (g) - Line (h) - [ Line (i) - Line (j) ]
- (l) Line (k) x .35
- (m) Line (f)
- (n) Line (l)
- (o) Line (m) + Line (n)

Page 3A

- 1 Midpoint of number of years since end of accident period.
- 2 Accident year payout pattern developed from policy year developed losses.
- 3 1 - Column (2)
- 4 Losses, given a 5% historical growth rate.
- 5 Column (3) x Column (4)
- 6 Accident Year at December 31, current year.
- 7 Discount factor per IRS Regulations.
- 8 Column (5) x Column (7)
- 9 Accident Year at December 31, previous year.
- 10 Column (3), previous period x Column (4), current period.
- 11 Discount factor per IRS Regulations.
- 12 Column (10) x Column (11)

**NCRB INVESTMENT INCOME CALCULATION  
WORKERS COMPENSATION**

Projected Investment Earnings on Loss, Loss  
Adjustment Expense and Unearned Premium Reserves

<b>A. UNEARNED PREMIUM RESERVES</b>		
1. Direct Earned Premiums		1,000,000
2. Mean UEPR	34.12%	341,183
3. Deductions for prepaid expenses: % of Total Market Premium		
Total Market		
Commissions & Brokerage	5.00%	
Taxes, Licenses and Fees	2.47%	
Direct Assignment Carriers (=22.75% of the market)		
One-Half of General & Other Acquisition Expenses	1.53%	
Servicing Carriers (=77.25% of the market)		
Servicing Carrier Allowance	18.86%	
Total	27.86%	
4. Deduction for Prepaid Expenses: (2) x (3)		95,042
5. Net UEPR		341,183
6. Net UEPR Subject to Inv (5) - (4)		246,141
<b>B. Delayed Remission of Premis (Ag Bals)</b>		
1. Direct Earned Premium		1,000,000
2. Average Agents Balances		0.089
3. Delayed Remissions (1)x(2)		89,000
<b>C. Loss and Loss Expense Reserves</b>		
1. Direct Earned Premium		1,000,000
2. Expected Inc L & LAE to Premium Ratio	0.4928	492,750
3. Expected Mean L&LAE Reserve to Inc. L & LAE Ratio	2.964	1,460,508
<b>D. Net PH Funds Subj to Inv</b>		
(A6 - B3 + C3)		1,617,649
<b>E. Average Rate of Return</b>		
		3.32%
<b>F. Investment Earnings from Net Reserves (D) x (E)</b>		
		53,706
<b>G. Average Rate of Return as a Percent of</b>		
Direct Earned Premium (F) / (A1)		5.37%

**NORTH CAROLINA  
WORKERS' COMPENSATION INSURANCE  
ASSIGNED RISK**

**ESTIMATED INVESTMENT EARNINGS ON UNEARNED  
PREMIUM RESERVES AND ON LOSS RESERVES**

**EXPLANATORY NOTES**

Line A-1

All calculations are displayed per \$1,000,000 of earned premium

Line A-2

The mean unearned premium reserve is determined by multiplying the direct earned premiums in line (1) by the ratio of the unearned premium reserve to the collected earned premium for the current calendar year and assuming 5% annual growth in premiums for all companies.

(1) Earned Premium (current year)	1,397,338,659
(2) UEPR (previous year)	467,399,610
(3) UEPR (current year)	486,095,594
(4) Mean Unearned Premium Reserve $(1/2) * [(2) + (3)]$	476,747,602
(5) Ratio (4) / (1)	<b>34.12%</b>

Line A-3

Deduction for prepaid expenses:	
Servicing Carriers Market Share	77.25%
Direct Assignment Writers Market Share	22.75%

Commission and brokerage expenses are the same for all carriers.

General and other acquisition expenses, and OPA, for direct assignment writers are 13.41%, one half of which are prepaid. Since direct assignment carriers are 22.75% of the market, these account for  $.5 * 22.75% * 13.41% = 1.53%$  of the market as a whole.

For servicing carriers, the entire servicing carrier allowance and half of OPA are prepaid expenses. These expenses account for 18.86% for the market as a whole.

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 date of premium collection is calculated. The difference between that date and 6 months is divided by 12 months to calculate the effect of delayed remission of premium.

## Line C-2

The expected loss and loss adjustment ratio reflects the expense provisions used in this filing.

## Line C-3

The mean loss & LAE reserve to incurred loss and LAE ratio is the weighted average of the ratios for direct assignment and servicing carriers:  
 $(3.238 * 0.2275 + 3.374 / 1.170 * 0.7725) = 2.964$ .

## Line E

The average rate of return is calculated as the arithmetic mean of the embedded and current yields. The embedded yield is the sum of two ratios: the most recent ratio of investment income to invested assets from Best's Aggregates & Averages, plus the 10-year average ratio of capital gains to invested assets (see Exhibit RB-13, page 9).

The current yield is the estimated, currently available rate of return (including income and expected capital gains) on the property/casualty industry investment portfolio (see Exhibit RB-13, page 8).

Embedded yield =	3.80%
Current Yield =	2.85%
Average	<b>3.32%</b>

<b>Reserve to Incurred Loss Ratio*</b>					
	(1)	(2)	(3)	(4)	(5)
Year	Loss Reserve	LAE Reserve	Incurred Loss	Incurred LAE	(L+LAER)/ (IL+ILAE)
2005	2.364	0.280	1.000	0.1345	2.331
2006	2.684	0.321	1.000	0.1656	2.578
2007	3.061	0.369	1.000	0.1721	2.926
2008	3.141	0.387	1.000	0.1634	3.032
2009	3.568	0.443	1.000	0.1756	3.412
2010	3.763	0.469	1.000	0.1836	3.575
2011	3.664	0.462	1.000	0.1596	3.558
2012	3.504	0.449	1.000	0.1714	3.375
2013	3.964	0.524	1.000	0.1811	3.800
2014	4.022	0.556	1.000	0.2088	3.788
10 - yr avg	<b>3.374</b>				<b>3.238</b>
* Columns (1) - (4) shown as ratio to incurred loss					

Source: NCCI

<b>PORTFOLIO YIELD AND TAX RATE - CURRENT YIELD</b>				
(1)	(2)	(3)	(4)	(5)
	Percent of Assets	Estimated Prospective Pre-Tax Return	Tax Rate	Estimated Prospective Post-Tax Return
Bonds				
U.S. Govt	9.57%	1.02%	35.00%	0.66%
States & territories	10.51%	1.45%	5.25%	1.37%
Special revenue	19.82%	1.72%	5.25%	1.63%
Industrial	28.80%	1.72%	35.00%	1.12%
Preferred stock	0.83%	0.00%	14.18%	0.00%
Common stock	22.83%	8.91%	30.73%	6.17%
Mortgage Loans	0.57%	3.73%	35.00%	2.42%
Real estate	0.72%	3.97%	35.00%	2.58%
Cash & short-term invs.	6.36%	0.03%	35.00%	0.02%
Rate of Return Pre-Inv Exp	100.00%	3.17%	27.64%	2.30%
Investment Expenses		0.33%	35.00%	0.21%
Portfolio Rate of Return		<b>2.85%</b>	26.79%	<b>2.08%</b>

## Sources:

Various issues of Federal Reserve Statistical Release, H.15(519).

Mergent Bond Record.

Standard & Poor's CreditWeek.

Value Line Investment Survey, Part II.

Ibbotson Associates, SBBI Valuation Edition 2015 Yearbook.

Ibbotson and Siegel, AREUEA Journal, 1984.

A.M. Best's Aggregates & Averages, 2014 edition.

<b>PORTFOLIO YIELD AND TAX RATE EMBEDDED YIELD</b>		
	Income	Tax Rate
Bonds		
Taxable	23,168,306	35.00%
Non-Taxable	12,013,235	5.25%
Stocks		
Taxable	5,965,219	14.18%
Non-Taxable	2,264,498	5.25%
Mortgage Loans	360,714	35.00%
Real Estate	1,745,619	35.00%
Contract Loans	1,277	35.00%
Cash / Short Term Inv.	150,120	35.00%
All Other	8,628,884	35.00%
Total	54,297,872	24.89%
Inv. Expenses	4,815,613	35.00%
Net Inv. Income	49,482,259	23.91%
Mean Invested Assets	1,423,600,934	
Inv. Inc. Yield Rate	3.48%	23.91%
Capital Gains (10 yr. avg) (% Of Inv. Assets)	0.33%	35.00%
Invest. Yield Rate (pre-tax)	<b>3.80%</b>	<b>24.87%</b>
Invest. Yield Rate (post-tax)	<b>2.86%</b>	

Source: Best's Aggregates and Averages, 2014 Edition, p. 12 (Exhibit of Net Investment Income, Col. 2 (Earned During Year)).

**CAPITAL GAINS OR LOSSES  
AS A PERCENT OF MEAN ASSETS**  
(All amounts in thousands of dollars)

Calendar Year	Mean Total Invested Assets	Realized Capital Gains	
		Amount	Percent
2004	1,018,810,319	9,113,199	0.89%
2005	1,120,112,663	12,194,908	1.09%
2006	1,217,432,187	3,587,228	0.29%
2007	1,297,478,130	9,031,778	0.70%
2008	1,288,393,875	(21,018,623)	-1.63%
2009	1,274,678,809	(8,079,575)	-0.63%
2010	1,330,998,082	8,100,143	0.61%
2011	1,366,568,026	7,563,305	0.55%
2012	1,350,656,619	9,035,405	0.67%
2013	1,423,600,934	12,163,890	0.85%
Total	12,688,729,641	41,691,658	0.33%

Source: "Best's Aggregates & Averages--Property-Casualty,"  
various editions

**NORTH CAROLINA  
WORKERS COMPENSATION**

**PREMIUM-TO-SURPLUS RATIOS**

<u>Year</u>	Premium to Surplus <u>Ratio</u>
2004	1.34
2005	1.18
2006	1.06
2007	0.93
2008	1.01
2009	0.72
2010	0.69
2011	0.77
2012	0.76
2013	0.80
Ten-Year Average	0.93
Selected	<b>0.93</b>

Notes:

Ratios based on net premium written and average surplus  
Top 30 Groups in each year  
From Best's DataBase Service and  
Best's Aggregates & Averages.

**NORTH CAROLINA WORKERS COMPENSATION  
CALCULATION OF GAAP NET WORTH TO SURPLUS RATIO**

	2009	2010	2011	2012	2013
Policyholder Surplus	511,396,566,997	559,247,073,797	553,794,328,471	587,061,063,988	653,380,281,255
+ Deferred Acquisition Costs	26,770,216,415	27,142,965,854	27,670,594,098	28,717,782,350	30,010,149,317
+ Non-Admitted DTA Provision	24,344,929,355	17,507,669,410	16,898,320,478	12,829,214,564	11,638,345,594
+ Non-admitted Assets (non-tax part)	31,004,819,190	33,948,822,530	34,839,553,748	36,238,971,886	33,348,888,924
+ Provision for Reinsurance	3,457,351,496	3,217,305,985	2,981,599,506	2,595,871,371	2,471,928,096
+ Provision for FASB 115(after-tax)	16,691,215,237	19,411,210,713	35,069,557,742	42,220,449,087	14,722,750,582
- Surplus Notes	(13,916,580,127)	(15,935,710,149)	(14,704,469,032)	(12,279,333,642)	(12,190,299,603)
	0	0	0	0	0
GAAP-adjusted Net Worth	599,748,518,562	644,539,338,140	656,549,485,011	697,384,019,604	733,382,044,165
Ratio of GAAP Net Worth to Statutory Surplus	1.17	1.15	1.19	1.19	1.12
Five Year Average	1.16				

Source: ISO