

PENNSYLVANIA COMPENSATION RATING BUREAU  
F CLASS FILING

INTERNAL RATE OF RETURN MODEL

The attached pages present exhibits and a description of the internal rate of return model used in deriving the PCR B's loss ratio (including loss adjustment expenses and loss based assessments) and provision for profit and contingencies.

## **PENNSYLVANIA COMPENSATION RATING BUREAU**

### **PENNSYLVANIA “F” CLASS FILING**

#### **Internal Rate of Return Analysis**

The following pages present results of an economic analysis establishing the following items:

- The appropriate rate of return for writing workers compensation business, and
- The loss ratio (including loss adjustment expenses and loss-based assessments) which will allow the realization of that target rate of return in current economic conditions, based on current expense needs for stock carriers and cash flows for losses and expenses attendant with Pennsylvania workers compensation insurance.

Internal Rate of Return Table I shows Inputs, Assumptions and Outputs underlying the analysis.

Internal Rate of Return Tables II - VII show the various cash flows projected for the underwriting of Pennsylvania workers compensation “F” class business based on the inputs to the Internal Rate of Return model, assuming a base standard premium at PCRB level of \$1 million.

Exhibits titled “Pennsylvania Pre & Post Tax Returns” and “Pennsylvania Cost of Capital” present the derivation of the appropriate current target rate of return, which is 8.71 percent. Both Capital Asset Pricing Model (“CAPM”) and Discounted Cash Flow (“DCF”) analyses have been applied in the derivation of this target rate, producing results of 8.46 and 8.96 percent, respectively. The selected target rate of return, 8.71 percent, is the average of these two separate indications.

**INTERNAL RATE OF RETURN ANALYSIS**  
**PENNSYLVANIA "F" CLASS - 2018**  
**TABLE I: INPUTS, ASSUMPTIONS & OUTPUTS**

Section 1: Inputs & Assumptions		
(1)	Commissions *	5.44
(2)	Other Expenses	6.63
(2A)	Other Acquisitions *	2.82
(2B)	General Expenses *	3.48
(2C)	Other Tax **	0.33
(3)	State Premium Taxes & Uncollectible Premium	
(3A)	Tax1 - Premium Tax **	2.00
(3B)	Uncollectible Premium **	0.55
(3C)	Tax3 - Security Fund **	0.00
(4)	Premium Discount ***	7.92
(5)	Deviations	0.00
(6)	Dividends to Policyholders	0.00
(7)	Premium Written	1,000,000
Investment Income		
(8A)	Pre-Tax Return on Assets	4.49
(8B)	Investment Income Tax Rate	0.64
(8C)	Post-Tax Return on Assets	3.85
(10)	Reserve to Surplus Ratio	1.92
(11)	Internal Rate of Return (Cost of Capital)	8.71
* Applies to standard premium at PCR level (before premium discount)		
** Applies to net premium at company level (after deviations and premium discounts)		
*** Applies to standard premium at company level (after deviations)		

Section 2: Outputs		
(1)	Loss Ratio - including loss adjustment expense & loss based assessments	78.70
(2)	Profit & Contingencies	-1.24

**INTERNAL RATE OF RETURN ANALYSIS  
EXPLANATORY NOTES**

**TABLE II: CASH FLOW PATTERNS**

Column (1)	Premium Collection pattern provided by the PCRB based on Pennsylvania workers compensation data.
Column (2)	Policy Year Loss Payout pattern provided by the PCRB based on Pennsylvania workers compensation data.
Column (3)	Other Expense payout pattern as follows: All expenses except Commission and 1/2 General Expense flowing with earned premium. Commission flows with collected premium, and 1/2 General Expense flows with written premium.
Column (4)	Tax 1 flow assumes even quarterly payment of state premium taxes.
Column (5)	Uncollectible premium flow matches that of Column (1) – Premium collection pattern.
Column (6)	Tax 3 flow assumes even quarterly payment of Security Fund assessments.
Column (7)	No dividend provision is included in this IRR model.

F CLASS  
INTERNAL RATE OF RETURN ANALYSIS  
STATE OF PENNSYLVANIA - 2018  
TABLE II: CASH FLOW PATTERNS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
TIME FROM	INTERVAL TO	PREMIUM COLLECTED	POLICY YR LOSS PAYOUT	OTHER EXPENSES	TAX1	UNCOLL PREMIUM	TAX3	DIVIDENDS PAID	CUMULATIVE WRITTEN DISTRIBUTION	CUMULATIVE EARNED DISTRIBUTION
-1.00	-0.75	0.0000	0	0.0000	0	0.0000	0	0	0	0
-0.75	-0.50	0.0000	0	0.0000	0	0.0000	0	0	0	0
-0.50	-0.25	0.0000	0	0.0000	0	0.0000	0	0	0	0
-0.25	0.00	0.1900	0	0.0000	0	0.1900	0	0	0	0
0.00	0.25	4.5000	0.5	18.9050	25	4.5000	25	0	0.2452	0.0311
0.25	0.50	10.6000	1	21.2460	25	10.6000	25	0	0.4999	0.1265
0.50	0.75	15.5900	1.5	17.9372	25	15.5900	25	0	0.6875	0.2789
0.75	1.00	20.1400	2	28.7896	25	20.1400	25	0	1.0000	0.5023
1.00	1.25	19.1300	6.455	5.7410	0	19.1300	0	0	1.0000	0.7112
1.25	1.50	14.1300	6.455	4.1007	0	14.1300	0	0	1.0000	0.8631
1.50	1.75	9.3900	6.455	2.4604	0	9.3900	0	25	1.0000	0.9621
1.75	2.00	4.3900	6.455	0.8201	0	4.3900	0	25	1.0000	1.0000
2.00	2.25	1.0000	3.655	0.0000	0	1.0000	0	25	1.0000	1.0000
2.25	2.50	0.0600	3.655	0.0000	0	0.0600	0	25	1.0000	1.0000
2.50	2.75	-0.1200	3.655	0.0000	0	-0.1200	0	0	1.0000	1.0000
2.75	3.00	0.1000	3.655	0.0000	0	0.1000	0	0	1.0000	1.0000
3.00	3.25	0.1300	3.375	0.0000	0	0.1300	0	0	1.0000	1.0000
3.25	3.50	-0.0200	3.375	0.0000	0	-0.0200	0	0	1.0000	1.0000
3.50	3.75	-0.0300	3.375	0.0000	0	-0.0300	0	0	1.0000	1.0000
3.75	4.00	0.1100	3.375	0.0000	0	0.1100	0	0	1.0000	1.0000
4.00	4.25	0.2300	2.805	0.0000	0	0.2300	0	0	1.0000	1.0000
4.25	4.50	0.2200	2.805	0.0000	0	0.2200	0	0	1.0000	1.0000
4.50	4.75	0.1700	2.805	0.0000	0	0.1700	0	0	1.0000	1.0000
4.75	5.00	0.0800	2.805	0.0000	0	0.0800	0	0	1.0000	1.0000
5.00	6.00	0.0100	8.7000	0.0000	0	0.0100	0	0	1.0000	1.0000
6.00	7.00	0.0000	6.4300	0.0000	0	0.0000	0	0	1.0000	1.0000
7.00	8.00	0.0000	4.5900	0.0000	0	0.0000	0	0	1.0000	1.0000
8.00	9.00	0.0000	3.2200	0.0000	0	0.0000	0	0	1.0000	1.0000
9.00	10.00	0.0000	2.2200	0.0000	0	0.0000	0	0	1.0000	1.0000
10.00	11.00	0.0000	1.5200	0.0000	0	0.0000	0	0	1.0000	1.0000
11.00	12.00	0.0000	1.0300	0.0000	0	0.0000	0	0	1.0000	1.0000
12.00	13.00	0.0000	0.7000	0.0000	0	0.0000	0	0	1.0000	1.0000
13.00	14.00	0.0000	0.4700	0.0000	0	0.0000	0	0	1.0000	1.0000
14.00	15.00	0.0000	0.3100	0.0000	0	0.0000	0	0	1.0000	1.0000
15.00	16.00	0.0000	0.2200	0.0000	0	0.0000	0	0	1.0000	1.0000
16.00	17.00	0.0000	0.1400	0.0000	0	0.0000	0	0	1.0000	1.0000
17.00	18.00	0.0000	0.1000	0.0000	0	0.0000	0	0	1.0000	1.0000
18.00	19.00	0.0000	0.0600	0.0000	0	0.0000	0	0	1.0000	1.0000
19.00	20.00	0.0000	0.0400	0.0000	0	0.0000	0	0	1.0000	1.0000
20.00	21.00	0.0000	0.0300	0.0000	0	0.0000	0	0	1.0000	1.0000
21.00	22.00	0.0000	0.0200	0.0000	0	0.0000	0	0	1.0000	1.0000
22.00	23.00	0.0000	0.0100	0.0000	0	0.0000	0	0	1.0000	1.0000
23.00	24.00	0.0000	0.0100	0.0000	0	0.0000	0	0	1.0000	1.0000
24.00	25.00	0.0000	0.0100	0.0000	0	0.0000	0	0	1.0000	1.0000
25.00	26.00	0.0000	0.0000	0.0000	0	0.0000	0	0	1.0000	1.0000
26.00	27.00	0.0000	0.0000	0.0000	0	0.0000	0	0	1.0000	1.0000
27.00	28.00	0.0000	0.0100	0.0000	0	0.0000	0	0	1.0000	1.0000
28.00	29.00	0.0000	0.0000	0.0000	0	0.0000	0	0	1.0000	1.0000
29.00	30.00	0.0000	0.0000	0.0000	0	0.0000	0	0	1.0000	1.0000
30.00	31.00	0.0000	0.0000	0.0000	0	0.0000	0	0	1.0000	1.0000
31.00	32.00	0.0000	0.0000	0.0000	0	0.0000	0	0	1.0000	1.0000
32.00	33.00	0.0000	0.0000	0.0000	0	0.0000	0	0	1.0000	1.0000
33.00	34.00	0.0000	0.0000	0.0000	0	0.0000	0	0	1.0000	1.0000
34.00	35.00	0.0000	0.0000	0.0000	0	0.0000	0	0	1.0000	1.0000
35.00	36.00	0.0000	0.0000	0.0000	0	0.0000	0	0	1.0000	1.0000
36.00	37.00	0.0000	0.0000	0.0000	0	0.0000	0	0	1.0000	1.0000
37.00	38.00	0.0000	0.0000	0.0000	0	0.0000	0	0	1.0000	1.0000
38.00	39.00	0.0000	0.0000	0.0000	0	0.0000	0	0	1.0000	1.0000
39.00	40.00	0.0000	0.0000	0.0000	0	0.0000	0	0	1.0000	1.0000
40.00	41.00	0.0000	0.0000	0.0000	0	0.0000	0	0	1.0000	1.0000
41.00	42.00	0.0000	0.0000	0.0000	0	0.0000	0	0	1.0000	1.0000
42.00	43.00	0.0000	0.0000	0.0000	0	0.0000	0	0	1.0000	1.0000
43.00	44.00	0.0000	0.0000	0.0000	0	0.0000	0	0	1.0000	1.0000
44.00	45.00	0.0000	0.0000	0.0000	0	0.0000	0	0	1.0000	1.0000
45.00	46.00	0.0000	0.0000	0.0000	0	0.0000	0	0	1.0000	1.0000
46.00	47.00	0.0000	0.0000	0.0000	0	0.0000	0	0	1.0000	1.0000
47.00	48.00	0.0000	0.0000	0.0000	0	0.0000	0	0	1.0000	1.0000
48.00	49.00	0.0000	0.0000	0.0000	0	0.0000	0	0	1.0000	1.0000
49.00	50.00	0.0000	0.0000	0.0000	0	0.0000	0	0	1.0000	1.0000
		100.0000	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000		

**INTERNAL RATE OF RETURN ANALYSIS  
EXPLANATORY NOTES**

**TABLE III: CASH FLOW FOR LOSS AND UNEARNED PREMIUM RESERVES**

Column (1)	Premium Collected based on collection pattern from Table II, Column (1).  Example: $\$920,800 \times .0019 = \$1,749.52$
Column (2)	Agents' Balances reflects the difference between Written Premium and Collected Premium. Written Premium pattern provided by the PCRB for Pennsylvania workers compensation insurance.  Example: Written Premium, First Quarter = $.25 \times \$920,800 = \$230,200.00$ Collected Premium = $(.0019 + .0450) \times \$920,800 = \$43,185.52$ Written - Collected = $\$187,014.48$
Column (3)	Overdue Agents' Balances are all Agents' Balances due after the end of the 24-month period in which earnings of policy year premium occurs.
Column (4)	Admitted Agents' Balances reflect all Agents' Balances due prior to the end of the 24-month period in which earnings of policy year premium occurs.
Column (5)	Losses Incurred is computed by applying the loss ratio for the business to earned premiums at PCRB level (i.e., before premium discounts). Premium earning pattern provided by the PCRB for Pennsylvania workers compensation insurance.  Example: $.7870 \times \$1,000,000 \times .0311 = \$24,475.70$
Column (6)	Unearned Premiums is computed as Cumulative Written Premium less Cumulative Earned Premium.  Example: $(\$920,800 \times .2452) - (\$920,800 \times .0311) = \$197,143.28$
Column (7)	Total Premium Net of Reserves is computed as Collected Premium plus Admitted Agents' Balances less Losses Incurred less Unearned Premium Reserves.  Example: $\$43,185.52 + 187,014.48 - 24,475.70 - 197,143.28 = \$8,581.02$
Column (8)	Premium Net of Reserves is the periodic change in Column (7).  Example: $\$17,017.78 - 8,581.02 = \$8,436.76$

**INTERNAL RATE OF RETURN ANALYSIS  
EXPLANATORY NOTES**

**TABLE III: CASH FLOW FOR LOSS AND UNEARNED PREMIUM RESERVES**

Column (9) Cumulative Written Premium is total written premium times the cumulative written premium distribution (Table II, column (8))

Example:  $\$920,800 \times .2452 = \$225,780.16$

Column (10) Cumulative Earned Premium is total written premium times the cumulative earned premium distribution (Table II, column (9))

Example:  $\$920,800 \times .0311 = \$28,636.88$

F CLASS  
INTERNAL RATE OF RETURN ANALYSIS  
STATE OF PENNSYLVANIA - 2018  
TABLE III: CASH FLOW FOR LOSS AND UNEARNED PREMIUM RESERVES

TIME FROM	INTERVAL TO	(1) PREMIUM COLLECTED	(2) AGENTS BALANCES	(3) OVERDUE AGENTS BALANCE	(4) ADMITTED AGENTS BALANCES	(5) LOSSES INCURRED	(6) UNEARNED PREMIUMS	(7) TOTAL PREM NET OF RESERVES	(8) PREMIUM NET OF RESERVES	(9) CUMULATIVE WRITTEN PREMIUM	(10) CUMULATIVE EARNED PREMIUM
-1.00	-0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-0.75	-0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-0.50	-0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-0.25	0.00	1,749.52	-1,749.52	0.00	-1,749.52	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.25	43,185.52	187,014.48	0.00	187,014.48	24,475.70	197,143.28	8,581.02	8,581.02	225,780.16	28,636.88
0.25	0.50	140,790.32	319,609.68	0.00	319,609.68	99,555.50	343,826.72	17,017.78	8,436.76	460,307.92	116,481.20
0.50	0.75	284,343.04	406,256.96	0.00	406,256.96	219,494.30	376,238.88	94,866.82	77,849.04	633,050.00	256,811.12
0.75	1.00	469,792.16	451,007.84	0.00	451,007.84	395,310.10	458,282.16	67,207.74	-27,659.08	920,800.00	462,517.84
1.00	1.25	645,941.20	274,858.80	0.00	274,858.80	559,714.40	265,927.04	95,158.56	27,950.82	920,800.00	654,872.96
1.25	1.50	776,050.24	144,749.76	0.00	144,749.76	679,259.70	126,057.52	115,482.78	20,324.22	920,800.00	794,742.48
1.50	1.75	862,513.36	58,286.64	0.00	58,286.64	757,172.70	34,898.32	128,728.98	13,246.20	920,800.00	885,901.68
1.75	2.00	902,936.48	17,863.52	0.00	17,863.52	787,000.00	0.00	133,800.00	5,071.02	920,800.00	920,800.00
2.00	2.25	912,144.48	8,655.52	8,655.52	0.00	787,000.00	0.00	125,144.48	-8,655.52	0.00	0.00
2.25	2.50	912,696.96	8,103.04	8,103.04	0.00	787,000.00	0.00	125,696.96	552.48	0.00	0.00
2.50	2.75	911,592.00	9,208.00	9,208.00	0.00	787,000.00	0.00	124,592.00	-1,104.96	0.00	0.00
2.75	3.00	912,512.80	8,287.20	8,287.20	0.00	787,000.00	0.00	125,512.80	920.80	0.00	0.00
3.00	3.25	913,709.84	7,090.16	7,090.16	0.00	787,000.00	0.00	126,709.84	1,197.04	0.00	0.00
3.25	3.50	913,525.68	7,274.32	7,274.32	0.00	787,000.00	0.00	126,525.68	-184.16	0.00	0.00
3.50	3.75	913,249.44	7,550.56	7,550.56	0.00	787,000.00	0.00	126,249.44	-276.24	0.00	0.00
3.75	4.00	914,262.32	6,537.68	6,537.68	0.00	787,000.00	0.00	127,262.32	1,012.88	0.00	0.00
4.00	4.25	916,380.16	4,419.84	4,419.84	0.00	787,000.00	0.00	129,380.16	2,117.84	0.00	0.00
4.25	4.50	918,405.92	2,394.08	2,394.08	0.00	787,000.00	0.00	131,405.92	2,025.76	0.00	0.00
4.50	4.75	919,971.28	828.72	828.72	0.00	787,000.00	0.00	132,971.28	1,565.36	0.00	0.00
4.75	5.00	920,707.92	92.08	92.08	0.00	787,000.00	0.00	133,707.92	736.64	0.00	0.00
5.00	6.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	92.08	0.00	0.00
6.00	7.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
7.00	8.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
8.00	9.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
9.00	10.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
10.00	11.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
11.00	12.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
12.00	13.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
13.00	14.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
14.00	15.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
15.00	16.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
16.00	17.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
17.00	18.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
18.00	19.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
19.00	20.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
20.00	21.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
21.00	22.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
22.00	23.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
23.00	24.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
24.00	25.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
25.00	26.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
26.00	27.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
27.00	28.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
28.00	29.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
29.00	30.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
30.00	31.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
31.00	32.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
32.00	33.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
33.00	34.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
34.00	35.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
35.00	36.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
36.00	37.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
37.00	38.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
38.00	39.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
39.00	40.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
40.00	41.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
41.00	42.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
42.00	43.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
43.00	44.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
44.00	45.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
45.00	46.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
46.00	47.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
47.00	48.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
48.00	49.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00
49.00	50.00	920,800.00	0.00	0.00	0.00	787,000.00	0.00	133,800.00	0.00	0.00	0.00



**INTERNAL RATE OF RETURN ANALYSIS  
EXPLANATORY NOTES**

**TABLE IV: TAX CREDITS AVAILABLE FROM UNDERWRITING OPERATIONS  
PAGE 1**

Column (1) The net written premium underlying the model, i.e., \$1 million less premium discounts or \$920,800.

Column (2) The periodic change in the Unearned Premium Reserve shown in Table III, Column (6).

Example:  $\$458,282.16 - 0 = \$458,282.16$

Column (3) The sum of the products of the expense flows shown in Table II and their associated expense provisions as shown on Table I, multiplied times the premium base.

Example:

Item	Provision (%)	Year 1 Expense Flow	Year 1 Expense Ratio %	Premium Base	Year 1 Expense \$
	(a)	(b)	(c)=(a)*(b)	(d)	(e)=(c)*(d)
Commission	5.44	0.5083	2.7652	1,000,000	27,651.52
General Expense	3.48	0.7500	2.6100	1,000,000	26,100.00
Other Acquisition	2.82	1.0000	2.8200	1,000,000	28,200.00
Other Tax	0.33	1.0000	0.3300	920,800	3,038.64
Tax 1:	2.00	1.0000	2.0000	920,800	18,416.00
Security Fund:	0.00	1.0000	0.0000	920,800	0.00
Uncollectible Prem	0.55	0.5083	0.2796	920,800	2,574.23
Total					105,980.39

Column (4) & Column (5) The Losses Paid for Accident Years 1 and 2, respectively, are based on payout patterns provided by the PCRБ for Pennsylvania workers compensation insurance. Each Accident Year is assigned one-half the total policy year payout.

Example: Accident Year 1, Year 2 Payout

$$.1000 \times .7870 \times \$1,000,000 / 2 = \$39,350.00$$

**INTERNAL RATE OF RETURN ANALYSIS  
EXPLANATORY NOTES**

**TABLE IV: TAX CREDITS AVAILABLE FROM UNDERWRITING OPERATIONS  
PAGE 2**

Column (6) The IRS Discount Factors are a tabulation of discount factors published for carriers by the Internal Revenue Service.

Column (7) & Column (8) The Losses Discounted for Accident Years 1 and 2, respectively, are the change in discounted reserves for each accident year implied by the loss ratio, premium earnings pattern and IRS discount factors incorporated into the model.

Example: Accident Year 1, Year 2 Losses Discounted

Accident Year 1 Incurred at End of Year 2: \$395,231.40

Accident Year 1 Paid Through Year 2:

$\$39,350.00 + 101,601.70 = \$140,951.70$

Accident Year 1 Undiscounted Reserve, Year 2:

$\$395,231.40 - 140,951.70 = \$254,279.70$

IRS Discount Factor: .8574

Accident Year 1 Discounted Reserve, Year 2:

$\$254,279.70 \times .8574 = \$218,028.82$

Accident Year 1 Incurred at End of Year: \$395,231.40

Accident Year 1 Paid Through Year 1: \$39,350.00

Accident Year 1 Undiscounted Reserve, Year 1:

$\$395,231.40 - 39,350.00 = \$355,881.40$

IRS Discount Factor: .8755

Accident Year 1 Discounted Reserve, Year 1:

$\$355,881.40 \times .8755 = \$311,583.77$

Change in Discounted Reserves, Year 1 to 2:

$\$218,028.82 - 311,583.77 = -\$93,554.95$

Column (9) Tax Credits are computed as follows:

Underwriting Tax Rate x

( - Written Premium  
+ 0.8 x Change in Unearned Premium  
+ Expenses Paid  
+ Losses Paid  
+ Change in Discounted Loss Reserve )

F CLASS  
INTERNAL RATE OF RETURN ANALYSIS  
STATE OF PENNSYLVANIA - 2018  
TABLE IV: TAX CREDITS AVAILABLE FROM UNDERWRITING OPERATIONS

YEAR	(1)	(2)	(3)	(4)		(5)	(6)	(7)		(8)	(9)
	PREMIUM WRITTEN (POST-DEV)	CHANGE IN UNEARN PREM RESERVE	EXPENSES	LOSSES PAID ACCIDENT YEAR 1	ACCIDENT YEAR 2	IRS DISCOUNT FACTOR	LOSSES DISCOUNTED ACCIDENT YEAR 1	ACCIDENT YEAR 2	TAX CREDITS		
-1	0.00	0.00	112.98	0.00	0.00	0	0.00	0.00	23.73		
1	920,800.00	458,282.16	105,980.39	39,350.00	0.00	0.8755	311,583.77	0.00	-20,424.62		
2	0.00	-458,282.16	36,672.05	101,601.70	101,601.70	0.8574	-93,554.95	254,048.96	7,086.18		
3	0.00	0.00	618.43	56,388.55	58,670.85	0.8446	-50,880.85	-55,555.68	1,940.67		
4	0.00	0.00	112.98	50,210.60	56,034.40	0.8390	-43,249.16	-50,290.30	2,691.89		
5	0.00	0.00	416.25	41,356.85	46,944.55	0.8367	-34,934.58	-40,381.63	2,814.30		
6	0.00	0.00	5.95	31,873.50	36,595.50	0.8316	-27,048.61	-30,907.79	2,208.89		
7	0.00	0.00	0.00	23,098.45	27,505.65	0.8417	-18,690.49	-23,342.81	1,799.87		
8	0.00	0.00	0.00	16,212.20	19,911.10	0.8556	-13,159.49	-16,108.97	1,439.52		
9	0.00	0.00	0.00	11,293.45	14,047.95	0.8636	-9,472.22	-11,402.64	937.97		
10	0.00	0.00	0.00	7,712.60	9,758.80	0.8803	-6,391.33	-8,184.32	608.11		
11	0.00	0.00	0.00	5,272.90	6,689.50	0.8981	-4,448.36	-5,543.24	413.87		
12	0.00	0.00	0.00	3,541.50	4,564.60	0.9172	-3,040.63	-3,850.07	255.23		
13	0.00	0.00	0.00	2,400.35	3,108.65	0.9379	-2,099.67	-2,670.70	155.11		
14	0.00	0.00	0.00	1,613.35	2,085.55	0.9606	-1,438.15	-1,824.80	91.55		
15	0.00	0.00	0.00	1,062.45	1,377.25	0.9859	-964.06	-1,226.53	52.31		
16	0.00	0.00	0.00	747.65	983.75	0.9233	-830.57	-897.39	0.72		
17	0.00	0.00	0.00	472.20	629.60	0.9233	-436.00	-699.43	-7.06		
18	0.00	0.00	0.00	354.15	432.85	0.9233	-327.00	-399.66	12.67		
19	0.00	0.00	0.00	196.75	275.45	0.9233	-181.67	-254.33	7.60		
20	0.00	0.00	0.00	118.05	196.75	0.9233	-109.00	-181.67	5.07		
21	0.00	0.00	0.00	118.05	118.05	0.9233	-109.00	-109.00	3.80		
22	0.00	0.00	0.00	78.70	78.70	0.9233	-72.67	-72.67	2.53		
23	0.00	0.00	0.00	39.35	39.35	0.9233	-36.33	-36.33	1.27		
24	0.00	0.00	0.00	39.35	39.35	0.9233	-36.33	-36.33	1.27		
25	0.00	0.00	0.00	39.35	39.35	0.9233	-36.33	-36.33	1.27		
26	0.00	0.00	0.00	0.00	0.00	0.9233	0.00	0.00	0.00		
27	0.00	0.00	0.00	0.00	0.00	0.9233	0.00	0.00	0.00		
28	0.00	0.00	0.00	39.35	39.35	0.9233	-36.33	-36.33	1.27		
29	0.00	0.00	0.00	0.00	0.00	0.9233	0.00	0.00	0.00		
30	0.00	0.00	0.00	0.00	0.00	0.9233	0.00	0.00	0.00		
31	0.00	0.00	0.00	0.00	0.00	0.9233	0.00	0.00	0.00		
32	0.00	0.00	0.00	0.00	0.00	0.9233	0.00	0.00	0.00		
33	0.00	0.00	0.00	0.00	0.00	0.9233	0.00	0.00	0.00		
34	0.00	0.00	0.00	0.00	0.00	0.9233	0.00	0.00	0.00		
35	0.00	0.00	0.00	0.00	0.00	0.9233	0.00	0.00	0.00		
36	0.00	0.00	0.00	0.00	0.00	0.9233	0.00	0.00	0.00		
37	0.00	0.00	0.00	0.00	0.00	0.9233	0.00	0.00	0.00		
38	0.00	0.00	0.00	0.00	0.00	0.9233	0.00	0.00	0.00		
39	0.00	0.00	0.00	0.00	0.00	0.9233	0.00	0.00	0.00		
40	0.00	0.00	0.00	0.00	0.00	0.9233	0.00	0.00	0.00		
41	0.00	0.00	0.00	0.00	0.00	0.9233	0.00	0.00	0.00		
42	0.00	0.00	0.00	0.00	0.00	0.9233	0.00	0.00	0.00		
43	0.00	0.00	0.00	0.00	0.00	0.9233	0.00	0.00	0.00		
44	0.00	0.00	0.00	0.00	0.00	0.9233	0.00	0.00	0.00		
45	0.00	0.00	0.00	0.00	0.00	0.9233	0.00	0.00	0.00		
46	0.00	0.00	0.00	0.00	0.00	0.9233	0.00	0.00	0.00		
47	0.00	0.00	0.00	0.00	0.00	0.9233	0.00	0.00	0.00		
48	0.00	0.00	0.00	0.00	0.00	0.9233	0.00	0.00	0.00		
49	0.00	0.00	0.00	0.00	0.00	0.9233	0.00	0.00	0.00		
50	0.00	0.00	0.00	0.00	0.00	0.9233	0.00	0.00	0.00		
	920,800.00		143,919.04	395,231.40	391,768.60						

SOURCES: COL. 1: TABLE IV  
COL. 2: COL. 1  
COL. 3: COLS. 3, 4, 5, 6 & 7, TABLE III; AND TABLE IV  
COLS. 4 & 5: WEIGHTS FOR ACCIDENT YEAR DISTRIBUTION:  
SEE ACCIDENT YEAR DISTRIBUTION

COL. 6: U. S. INTERNAL REVENUE SERVICE DISCOUNT FACTORS  
COLS. 7 & 8: CHANGE IN DISCOUNTED OUTSTANDING USING IRS FACTORS  
COL. 9: .21 x (COL. 1 - (.8 x COL. 2)) - COL. 4 - COL. 5 - COL. 7 - COL. 8

**INTERNAL RATE OF RETURN ANALYSIS  
EXPLANATORY NOTES**

**TABLE V: NET CASH FLOWS FROM UNDERWRITING**

- Column (1) The Premium Flow Net of Reserves is Column (8) of Table III.
- Column (2) Tax Credits from Underwriting is a quarterly flow of those credits in Column (9) in Table IV.
- Column (3) Expenses show a quarterly flow of Expenses prepared in the same fashion as the annual flows in Column (3) of Table IV.
- Column (4) Dividends are not used in this model as no provision has been made for dividends in this analysis.
- Column (5) Net Cash Flow from Underwriting is computed by adding Column (1) and Column (2) and subtracting Column (3)

F CLASS  
INTERNAL RATE OF RETURN ANALYSIS  
STATE OF PENNSYLVANIA - 2018  
TABLE V: NET CASH FLOWS FROM UNDERWRITING

TIME FROM	INTERVAL TO	(1) PREMIUM FLOW NET OF RESERVES	(2) TAX CREDITS FROM UNDERWRITING	(3) EXPENSES	(4) DIVIDENDS	(5) NET CASH FLOW FROM UNDERWRITING
-1.00	-0.75	0.00	5.93	0.00	0.00	5.93
-0.75	-0.50	0.00	5.93	0.00	0.00	5.93
-0.50	-0.25	0.00	5.93	0.00	0.00	5.93
-0.25	0.00	0.00	5.93	112.98	0.00	-107.05
0.00	0.25	8,581.02	-5,106.16	19,749.84	0.00	-16,274.98
0.25	0.50	8,436.76	-5,106.16	24,926.74	0.00	-21,596.13
0.50	0.75	77,849.04	-5,106.16	25,717.86	0.00	47,025.03
0.75	1.00	-27,659.08	-5,106.16	35,585.96	0.00	-68,351.19
1.00	1.25	27,950.82	1,771.55	15,181.79	0.00	14,540.58
1.25	1.50	20,324.22	1,771.55	11,121.07	0.00	10,974.70
1.50	1.75	13,246.20	1,771.55	7,214.96	0.00	7,802.79
1.75	2.00	5,071.02	1,771.55	3,154.24	0.00	3,688.33
2.00	2.25	-8,655.52	485.17	594.64	0.00	-8,765.00
2.25	2.50	552.48	485.17	35.68	0.00	1,001.97
2.50	2.75	-1,104.96	485.17	-71.36	0.00	-548.43
2.75	3.00	920.80	485.17	59.46	0.00	1,346.50
3.00	3.25	1,197.04	672.97	77.30	0.00	1,792.71
3.25	3.50	-184.16	672.97	-11.89	0.00	500.71
3.50	3.75	-276.24	672.97	-17.84	0.00	414.57
3.75	4.00	1,012.88	672.97	65.41	0.00	1,620.44
4.00	4.25	2,117.84	703.58	136.77	0.00	2,684.65
4.25	4.50	2,025.76	703.58	130.82	0.00	2,598.51
4.50	4.75	1,565.36	703.58	101.09	0.00	2,167.85
4.75	5.00	736.64	703.58	47.57	0.00	1,392.64
5.00	6.00	92.08	2,208.89	5.95	0.00	2,295.03
6.00	7.00	0.00	1,799.87	0.00	0.00	1,799.87
7.00	8.00	0.00	1,439.52	0.00	0.00	1,439.52
8.00	9.00	0.00	937.97	0.00	0.00	937.97
9.00	10.00	0.00	608.11	0.00	0.00	608.11
10.00	11.00	0.00	413.87	0.00	0.00	413.87
11.00	12.00	0.00	255.23	0.00	0.00	255.23
12.00	13.00	0.00	155.11	0.00	0.00	155.11
13.00	14.00	0.00	91.55	0.00	0.00	91.55
14.00	15.00	0.00	52.31	0.00	0.00	52.31
15.00	16.00	0.00	0.72	0.00	0.00	0.72
16.00	17.00	0.00	-7.06	0.00	0.00	-7.06
17.00	18.00	0.00	12.67	0.00	0.00	12.67
18.00	19.00	0.00	7.60	0.00	0.00	7.60
19.00	20.00	0.00	5.07	0.00	0.00	5.07
20.00	21.00	0.00	3.80	0.00	0.00	3.80
21.00	22.00	0.00	2.53	0.00	0.00	2.53
22.00	23.00	0.00	1.27	0.00	0.00	1.27
23.00	24.00	0.00	1.27	0.00	0.00	1.27
24.00	25.00	0.00	1.27	0.00	0.00	1.27
25.00	26.00	0.00	0.00	0.00	0.00	0.00
26.00	27.00	0.00	0.00	0.00	0.00	0.00
27.00	28.00	0.00	1.27	0.00	0.00	1.27
28.00	29.00	0.00	0.00	0.00	0.00	0.00
29.00	30.00	0.00	0.00	0.00	0.00	0.00
30.00	31.00	0.00	0.00	0.00	0.00	0.00
31.00	32.00	0.00	0.00	0.00	0.00	0.00
32.00	33.00	0.00	0.00	0.00	0.00	0.00
33.00	34.00	0.00	0.00	0.00	0.00	0.00
34.00	35.00	0.00	0.00	0.00	0.00	0.00
35.00	36.00	0.00	0.00	0.00	0.00	0.00
36.00	37.00	0.00	0.00	0.00	0.00	0.00
37.00	38.00	0.00	0.00	0.00	0.00	0.00
38.00	39.00	0.00	0.00	0.00	0.00	0.00
39.00	40.00	0.00	0.00	0.00	0.00	0.00
40.00	41.00	0.00	0.00	0.00	0.00	0.00
41.00	42.00	0.00	0.00	0.00	0.00	0.00
42.00	43.00	0.00	0.00	0.00	0.00	0.00
43.00	44.00	0.00	0.00	0.00	0.00	0.00
44.00	45.00	0.00	0.00	0.00	0.00	0.00
45.00	46.00	0.00	0.00	0.00	0.00	0.00
46.00	47.00	0.00	0.00	0.00	0.00	0.00
47.00	48.00	0.00	0.00	0.00	0.00	0.00
48.00	49.00	0.00	0.00	0.00	0.00	0.00
49.00	50.00	0.00	0.00	0.00	0.00	0.00
				143,919.04		-7,994.04

**INTERNAL RATE OF RETURN ANALYSIS  
EXPLANATORY NOTES**

**TABLE VI: DERIVATION OF FUNDS IN SURPLUS ACCOUNT**

Column (1) Loss and Loss Adjustment Reserves is the difference between Losses Incurred (Column (5), Table III) and Losses Paid (Columns (4) and (5), Table IV).

$$\text{Example: } \$395,310.10 - 39,350.00 = \$355,960.10$$

Column (2) Unearned Premium Reserves is Column (6) of Table III.

Column (3) Admitted Agents Balances is Column (4) of Table III.

Column (4) Cash Level is computed by adding Columns (1) and (2) and subtracting Column (3).

$$\text{Example: } \$355,960.10 + 458,282.16 - 451,007.84 = \$363,234.42$$

Column (5) Funds in Surplus Account is derived by adding Columns (1) and (2) and dividing that total by the reserve-to-surplus ratio used in the model, in this case 1.92.

$$\text{Example: } (\$355,960.10 + 458,282.16) / 1.92 = \$424,084.51$$

F CLASS  
INTERNAL RATE OF RETURN ANALYSIS  
STATE OF PENNSYLVANIA - 2018  
TABLE VI: DERIVATION OF FUNDS IN SURPLUS ACCOUNT

TIME FROM	INTERVAL TO	(1) LOSS AND LOSS ADJ. RESERVES	(2) UNEARNED PREMIUM RESERVES	(3) ADMITTED AGENTS BALANCES	(4) CASH LEVEL	(5) FUNDS IN SURPLUS ACCOUNT
-1.00	-0.75	0.00	0.00	0.00	0.00	0.00
-0.75	-0.50	0.00	0.00	0.00	0.00	0.00
-0.50	-0.25	0.00	0.00	0.00	0.00	0.00
-0.25	0.00	0.00	0.00	-1,749.52	1,749.52	0.00
0.00	0.25	20,540.70	197,143.28	187,014.48	30,669.50	113,377.07
0.25	0.50	87,750.50	343,826.72	319,609.68	111,967.54	224,779.80
0.50	0.75	195,884.30	376,238.88	406,256.96	165,866.22	297,980.82
0.75	1.00	355,960.10	458,282.16	451,007.84	363,234.42	424,084.51
1.00	1.25	469,563.55	265,927.04	274,858.80	460,631.79	383,068.02
1.25	1.50	538,308.00	126,057.52	144,749.76	519,615.76	346,023.71
1.50	1.75	565,420.15	34,898.32	58,286.64	542,031.83	312,665.87
1.75	2.00	544,446.60	0.00	17,863.52	526,583.08	283,565.94
2.00	2.25	515,681.75	0.00	0.00	515,681.75	268,584.24
2.25	2.50	486,916.90	0.00	0.00	486,916.90	253,602.55
2.50	2.75	458,152.05	0.00	0.00	458,152.05	238,620.86
2.75	3.00	429,387.20	0.00	0.00	429,387.20	223,639.17
3.00	3.25	402,825.95	0.00	0.00	402,825.95	209,805.18
3.25	3.50	376,264.70	0.00	0.00	376,264.70	195,971.20
3.50	3.75	349,703.45	0.00	0.00	349,703.45	182,137.21
3.75	4.00	323,142.20	0.00	0.00	323,142.20	168,303.23
4.00	4.25	301,066.85	0.00	0.00	301,066.85	156,805.65
4.25	4.50	278,991.50	0.00	0.00	278,991.50	145,308.07
4.50	4.75	256,916.15	0.00	0.00	256,916.15	133,810.49
4.75	5.00	234,840.80	0.00	0.00	234,840.80	122,312.92
5.00	6.00	166,371.80	0.00	0.00	166,371.80	86,651.98
6.00	7.00	115,767.70	0.00	0.00	115,767.70	60,295.68
7.00	8.00	79,644.40	0.00	0.00	79,644.40	41,481.46
8.00	9.00	54,303.00	0.00	0.00	54,303.00	28,282.81
9.00	10.00	36,831.60	0.00	0.00	36,831.60	19,183.12
10.00	11.00	24,869.20	0.00	0.00	24,869.20	12,952.71
11.00	12.00	16,763.10	0.00	0.00	16,763.10	8,730.78
12.00	13.00	11,254.10	0.00	0.00	11,254.10	5,861.51
13.00	14.00	7,555.20	0.00	0.00	7,555.20	3,935.00
14.00	15.00	5,115.50	0.00	0.00	5,115.50	2,664.32
15.00	16.00	3,384.10	0.00	0.00	3,384.10	1,762.55
16.00	17.00	2,282.30	0.00	0.00	2,282.30	1,188.70
17.00	18.00	1,495.30	0.00	0.00	1,495.30	778.80
18.00	19.00	1,023.10	0.00	0.00	1,023.10	532.86
19.00	20.00	708.30	0.00	0.00	708.30	368.91
20.00	21.00	472.20	0.00	0.00	472.20	245.94
21.00	22.00	314.80	0.00	0.00	314.80	163.96
22.00	23.00	236.10	0.00	0.00	236.10	122.97
23.00	24.00	157.40	0.00	0.00	157.40	81.98
24.00	25.00	78.70	0.00	0.00	78.70	40.99
25.00	26.00	78.70	0.00	0.00	78.70	40.99
26.00	27.00	78.70	0.00	0.00	78.70	40.99
27.00	28.00	0.00	0.00	0.00	0.00	0.00
28.00	29.00	0.00	0.00	0.00	0.00	0.00
29.00	30.00	0.00	0.00	0.00	0.00	0.00
30.00	31.00	0.00	0.00	0.00	0.00	0.00
31.00	32.00	0.00	0.00	0.00	0.00	0.00
32.00	33.00	0.00	0.00	0.00	0.00	0.00
33.00	34.00	0.00	0.00	0.00	0.00	0.00
34.00	35.00	0.00	0.00	0.00	0.00	0.00
35.00	36.00	0.00	0.00	0.00	0.00	0.00
36.00	37.00	0.00	0.00	0.00	0.00	0.00
37.00	38.00	0.00	0.00	0.00	0.00	0.00
38.00	39.00	0.00	0.00	0.00	0.00	0.00
39.00	40.00	0.00	0.00	0.00	0.00	0.00
40.00	41.00	0.00	0.00	0.00	0.00	0.00
41.00	42.00	0.00	0.00	0.00	0.00	0.00
42.00	43.00	0.00	0.00	0.00	0.00	0.00
43.00	44.00	0.00	0.00	0.00	0.00	0.00
44.00	45.00	0.00	0.00	0.00	0.00	0.00
45.00	46.00	0.00	0.00	0.00	0.00	0.00
46.00	47.00	0.00	0.00	0.00	0.00	0.00
47.00	48.00	0.00	0.00	0.00	0.00	0.00
48.00	49.00	0.00	0.00	0.00	0.00	0.00
49.00	50.00	0.00	0.00	0.00	0.00	0.00

**INTERNAL RATE OF RETURN ANALYSIS  
EXPLANATORY NOTES**

**TABLE VII: NOMINAL CASH FLOWS TO INVESTORS**

- Column (1) Net Cash Flow Underwriting is Column (5) of Table V.
- Column (2) Cash Pre-Tax Income is computed by multiplying the pre-tax investment yield rate times the periodic average Cash Level from Column (4), Table VI.  
Example:  $(\$165,866.22 + 363,234.42) / 2 = \$264,550.32$   
 $\$264,550.32 \times .044876 / 4 = \$2,968.00$
- Column (3) Cash Income Taxes is computed by multiplying the investment income tax rate times the periodic average Cash Level from Column (4), Table VI.  
Example:  $(\$165,866.22 + 363,234.42) / 2 = \$264,550.32$   
 $\$264,550.32 \times .006367 / 4 = \$421.13$
- Column (4) Net Flow from Surplus is the periodic change in Surplus Balance posted in Column (5) of Table VI.  
Example:  $\$297,980.82 - 424,084.51 = -\$126,103.69$
- Column (5) Surplus Pre-Tax Income is computed by applying the pre-tax investment yield to average periodic surplus balance computed from Column (5) of Table VI.  
Example:  $(\$297,980.82 + 424,084.51) / 2 = \$361,032.67$   
 $\$361,032.67 \times .044876 / 4 = \$4,050.44$
- Column (6) Surplus Income Taxes is the product of the investment income tax rate and the average periodic surplus balance computed from Column (5) of Table VI.  
Example:  $(\$297,980.82 + 424,084.51) / 2 = \$361,032.67$   
 $\$361,032.67 \times .006367 / 4 = \$574.71$
- Column (7) Net Cash Flow is the sum of Columns (1) through (6) and represents the net flows to investors which result in a rate of return of 8.71 percent to investors in the insurance company as required by the Internal Rate of Return Model.  
Example:  $-\$68,351.19 + 2,968.00 - 421.13 - 126,103.69 + 4,050.44 - 574.71 = -\$188,432.28$



F CLASS  
INTERNAL RATE OF RETURN ANALYSIS  
STATE OF PENNSYLVANIA - 2018  
TABLE VII: NOMINAL CASH FLOWS TO INVESTORS

TIME FROM	INTERVAL TO	(1) NET CASH FLOW FROM UNDERWRITING	(2) CASH PRE-TAX INCOME	(3) CASH INCOME TAXES	(4) NET FLOW FOR SURPLUS ACCOUNT	(5) SURPLUS PRE-TAX INCOME	(6) SURPLUS INCOME TAXES	(7) NET CASH FLOW
-1.00	-0.75	5.93	0.00	0.00	0.00	0.00	0.00	5.93
-0.75	-0.50	5.93	0.00	0.00	0.00	0.00	0.00	5.93
-0.50	-0.25	5.93	0.00	0.00	0.00	0.00	0.00	5.93
-0.25	0.00	-107.05	9.81	-1.39	0.00	0.00	0.00	-98.63
0.00	0.25	-16,274.98	181.85	-25.80	-113,377.07	635.99	-90.24	-128,950.25
0.25	0.50	-21,596.13	800.12	-113.53	-111,402.73	1,896.90	-269.15	-130,684.52
0.50	0.75	47,025.03	1,558.51	-221.14	-73,201.02	2,932.43	-416.08	-22,322.27
0.75	1.00	-68,351.19	2,968.00	-421.13	-126,103.69	4,050.44	-574.71	-188,432.28
1.00	1.25	14,540.58	4,621.49	-655.74	41,016.49	4,527.73	-642.44	63,408.12
1.25	1.50	10,974.70	5,498.71	-780.21	37,044.31	4,089.85	-580.30	56,247.05
1.50	1.75	7,802.79	5,955.33	-845.00	33,357.84	3,694.93	-524.27	49,441.62
1.75	2.00	3,688.33	5,994.41	-850.54	29,099.93	3,344.57	-474.56	40,802.14
2.00	2.25	-8,765.00	5,846.60	-829.57	14,981.69	3,097.29	-439.47	13,891.55
2.25	2.50	1,001.97	5,624.09	-798.00	14,981.69	2,929.21	-415.62	23,323.35
2.50	2.75	-548.43	5,301.38	-752.21	14,981.69	2,761.13	-391.77	21,351.79
2.75	3.00	1,346.50	4,978.66	-706.42	14,981.69	2,593.05	-367.93	22,825.57
3.00	3.25	1,792.71	4,668.31	-662.38	13,833.98	2,431.41	-344.99	21,719.04
3.25	3.50	500.71	4,370.32	-620.10	13,833.98	2,276.21	-322.97	20,038.15
3.50	3.75	414.57	4,072.33	-577.82	13,833.98	2,121.00	-300.95	19,563.12
3.75	4.00	1,620.44	3,774.34	-535.54	13,833.98	1,965.80	-278.93	20,380.10
4.00	4.25	2,684.65	3,501.51	-496.83	11,497.58	1,823.70	-258.76	18,751.85
4.25	4.50	2,598.51	3,253.85	-461.69	11,497.58	1,694.71	-240.46	18,342.50
4.50	4.75	2,167.85	3,006.18	-426.54	11,497.58	1,565.72	-222.16	17,588.62
4.75	5.00	1,392.64	2,758.52	-391.40	11,497.58	1,436.73	-203.86	16,490.21
5.00	6.00	2,295.03	9,002.43	-1,277.35	35,660.94	4,688.77	-665.28	49,704.53
6.00	7.00	1,799.87	6,330.66	-898.25	26,356.30	3,297.22	-467.84	36,417.96
7.00	8.00	1,439.52	4,384.67	-622.14	18,814.22	2,283.68	-324.03	25,975.92
8.00	9.00	937.97	3,005.52	-426.45	13,198.65	1,565.37	-222.11	18,058.95
9.00	10.00	608.11	2,044.88	-290.15	9,099.69	1,065.04	-151.12	12,376.46
10.00	11.00	413.87	1,384.45	-196.44	6,230.42	721.07	-102.31	8,451.05
11.00	12.00	255.23	934.15	-132.55	4,221.93	486.54	-69.03	5,696.26
12.00	13.00	155.11	628.65	-89.20	2,869.27	327.42	-46.46	3,844.80
13.00	14.00	91.55	422.04	-59.88	1,926.51	219.81	-31.19	2,568.85
14.00	15.00	52.31	284.31	-40.34	1,270.68	148.08	-21.01	1,694.02
15.00	16.00	0.72	190.71	-27.06	901.77	99.33	-14.09	1,151.39
16.00	17.00	-7.06	127.14	-18.04	573.85	66.22	-9.40	732.72
17.00	18.00	12.67	84.76	-12.03	409.90	44.15	-6.26	533.18
18.00	19.00	7.60	56.51	-8.02	245.94	29.43	-4.18	327.29
19.00	20.00	5.07	38.85	-5.51	163.96	20.23	-2.87	219.73
20.00	21.00	3.80	26.49	-3.76	122.97	13.80	-1.96	161.34
21.00	22.00	2.53	17.66	-2.51	81.98	9.20	-1.30	107.56
22.00	23.00	1.27	12.36	-1.75	40.99	6.44	-0.91	58.39
23.00	24.00	1.27	8.83	-1.25	40.99	4.60	-0.65	53.78
24.00	25.00	1.27	5.30	-0.75	40.99	2.76	-0.39	49.17
25.00	26.00	0.00	3.53	-0.50	0.00	1.84	-0.26	4.61
26.00	27.00	0.00	3.53	-0.50	0.00	1.84	-0.26	4.61
27.00	28.00	1.27	1.77	-0.25	40.99	0.92	-0.13	44.56
28.00	29.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
29.00	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30.00	31.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31.00	32.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32.00	33.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33.00	34.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
34.00	35.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35.00	36.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
36.00	37.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
37.00	38.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
38.00	39.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
39.00	40.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40.00	41.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
41.00	42.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
42.00	43.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
43.00	44.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
44.00	45.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
45.00	46.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
46.00	47.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
47.00	48.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
48.00	49.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
49.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**INTERNAL RATE OF RETURN ANALYSIS  
EXPLANATORY NOTES**

**PENNSYLVANIA PRE & POST TAX RETURNS  
PAGE 1**

- Column (1) Invested Assets  
Categories taken from Best's Aggregates and Averages with values as of December 31, 2015.
- Column (2) 12/31/15 Market Values  
Treasuries, Exempt Bonds, Bonds for Unaffiliated and Affiliated Companies, Preferred Stock for Unaffiliated and Affiliated Companies and Common Stock for Unaffiliated and Affiliated Companies all taken from 2016 Best's Aggregates and Averages, Industry Total Schedule D.
- Column (3) Pre-Tax Return  
Treasuries based on yields by Maturity published in Federal Reserve Statistical Release H. 15 (July 7, 2017), weighted by loss payout pattern provided by the PCRB for Pennsylvania workers compensation insurance.  
  
Exempt Bonds based on yields by Maturity published in Bond Buyer, Municipal Market Statistics (July 6, 2017).  
  
Bonds based on yields published by the Federal Reserve Bank of St. Louis (July 7, 2017).  
  
Preferred stock yields based on Dividend Yield Hunter (July 10, 2017).  
  
Common Stock Yield based on three-month Treasury Bill rate (Federal Reserve) plus Ibbotson Differential (2017 Ibbotson SBBI).  
  
Mortgages based on yields published by the Federal Reserve Bank of St. Louis (July 7, 2017).  
  
Real Estate Yield based on three-month Treasury Bill rate (Federal Reserve) plus Ibbotson Differential (Ibbotson & Seigel, AREUA Journal, Vol 12, No. 3, 1984).  
  
Cash & Short Term Investment yield based on short-term treasury yield as published in Federal Reserve Statistical Release H. 15 (July 7, 2017).
- Column (4) Investment Gain  
Product of 12/31/15 Market Value times Pre-Tax Return expressed as a decimal value by asset type.

**INTERNAL RATE OF RETURN ANALYSIS  
EXPLANATORY NOTES**

**PENNSYLVANIA PRE & POST TAX RETURNS  
PAGE 2**

Column (5) Tax Rate  
(Percent Taxable x .21) + ((1.0 - Percent Taxable) x .15 x .21)

Percent Taxable Treasuries, Unaffiliated Bonds, Mortgages & Real Estate and Cash & Short Term Investments all assumed to be 100 percent taxable.

Exempt Bonds, Bonds in Affiliated Companies and Preferred Stock in Affiliated Companies all assumed to be tax-free.

Preferred Stock in Unaffiliated Companies: 30 percent of dividend income taxable per Tax Reform Act of 1986; all income attributed to dividends for preferred stock.

Common Stock of Affiliated Companies: 100 percent of capital gains in affiliated companies subject to income tax per Tax Reform Act of 1986. Portion of common stock income attributed to capital gains is 0.6581.

Common Stock of Unaffiliated Companies: Capital gains are taxed at the full rate, 30 percent of dividends are taxed at the full rate, and 15 percent of the remaining dividends (70 percent) are subject to tax.  $(0.6581 \times 0.21) + (0.30 \times 0.21 \times 0.3419) + (0.70 \times 0.3419 \times 0.15 \times 0.21) = 0.1673$ . Portions of common stock income attributable to dividend and capital gains from Duff & Phelps' 2017 SBBI Ibbotson (Large Company Stocks, Arithmetic Mean).

Column (6) Post Tax Return  
Pre-Tax Return x (1.0 - Tax Rate)

INTERNAL RATE OF RETURN ANALYSIS  
PENNSYLVANIA "F" CLASS - 2018  
PRE & POST TAX RETURNS

Invested Assets (1)	Assets (2)	Pre Tax Return (3)	Investment Gain (4)	Tax Rate (5)	Post Tax Return (6)
Treasuries	130,107,496	1.75	2,272,082	0.21000	1.379586
Exempt Bonds	437,658,766	3.60	15,755,716	0.03150	3.486600
Bonds (Unaffil)	425,878,988	3.74	15,927,874	0.21000	2.954600
Bonds (Affiliated)	14,010,086	3.74	523,977	0.03150	3.622190
Prefer Stk (Unaff)	15,520,311	5.24	813,264	0.08505	4.794338
Prefer Stk (Affil)	271,613	5.24	14,233	0.03150	5.074940
Common Stk (Unaff)	253,977,545	9.57	24,305,651	0.16730	7.968939
Common Stock (Affil)	76,035,202	9.57	7,276,569	0.14900	8.144070
Mortgage Loans	12,440,639	3.96	492,649	0.21000	3.128400
Real Estate	11,747,306	4.99	586,191	0.21000	3.942100
Cash and ST Invest	91,916,979	1.16	1,066,237	0.21000	0.916400
Average or Total	1,469,564,931		69,034,443		4.016768

1. Assets are from the latest (2016) Best's A&A, Market Value Dec 31, 2015

2. Yields are from:

- a) Treasuries and Cash & Short Term Invest are from: Federal Reserve H.15, July 7, 2017.
- b) Exempt Bonds are from: Bond Buyer, Municipal Market Statistics, Bond Buyer Index, general obligation, 20 years to maturity, mixed quality, July 6th, 2017.
- c) Bonds (Unaffiliated and Affiliated) are Moody's Seasoned Aaa Corporate Bond Yield from: Federal Reserve Bank of St. Louis, July 7th, 2017.
- d) Preferred Stocks are from: Preferred Stocks of Utilities, July 10, 2017, Dividend Yield Hunter
- e) Mortgage Loans are from: Federal Reserve Bank of St. Louis, July 7th, 2017.
- f) Common Stock: 3 month Treasury (1.05) + Ibbotson Differential (8.52%)
- g) Real Estate: 3 month Treasury (1.05) + Ibbotson Differential (3.94)  
Differential from: Ibbotson & Seigel, AREUA Journal, Vol 12, No. 3, 1984

PRE TAX WEIGHTED PORTFOLIO YIELD - INVEST EXPENSE = 4.4876109

POST TAX WEIGHTED YIELD - POST TAX EXPENSE = 3.8508681

## INTERNAL RATE OF RETURN ANALYSIS EXPLANATORY NOTES

### PENNSYLVANIA COST OF CAPITAL

- All data taken from Value Line Investment Survey of June 9, 2017.
- All Property/Casualty Companies Selected with limited exceptions, such as reinsurers and carriers without any workers compensation insurance writings.
- Individual carrier inclusions/exclusions from selected list noted as having limited effect on indicated results.
- DCF FORECAST COST OF CAPITAL
  - =  $.0215 \times (1.0 + 0.5 \times .0674) + .0674$
  - =  $.0222 + .0674 = .0896$
- DCF HISTORICAL COST OF CAPITAL
  - =  $.0215 \times (1.0 + 0.5 \times .0640) + .0640$
  - =  $.0221 + .0640 = .0861$
- DCF DIVIDENDS ONLY COST OF CAPITAL
  - =  $.0215 \times (1.0 + 0.5 \times .0606) + .0606$
  - =  $.0222 + .0606 = .0828$
  - Note:  $.0606 = \text{Average } (.0704, .0508)$

2018  
PENNSYLVANIA "F" CLASS  
COST OF CAPITAL

COMPANY	BETA	YIELD	DIVIDEND PAST 5 YEARS	EARNINGS PAST 5 YEARS	EARNINGS FORECAST	DIVIDEND FORECAST	RETAINED TO EQUITY FORECAST
Allstate	0.85	1.7	6.5	15.0	7.5	4.0	8.0
Amer Fnl	0.85	1.3	11.5	3.5	7.0	8.5	7.0
Berkley	0.80	0.8	11.0	8.0	7.0	4.5	9.0
Chubb	0.85	2.0	15.5	4.0	8.0	4.5	8.0
Cinc Fnl	0.85	2.9	4.0	12.0	6.5	3.0	4.5
Merc Gen	0.70	4.5	1.0	-2.0	14.0	2.5	4.5
Old Rep	1.10	3.9	1.5	0.0	9.0	3.5	5.0
Progressive	0.85	1.6	16.5	4.5	8.0	8.0	11.5
RLI Corp	0.90	1.5	5.5	-1.5	6.5	4.0	7.0
Selective	0.95	1.3	1.0	9.5	6.5	5.5	8.0
Travelers	0.85	2.3	10.5	14.5	1.0	4.0	7.5
XL Group	0.90	2.0	0.0	1.5	13.0	9.0	7.5
	0.87	2.15	7.04	5.75	7.83	5.08	7.29

SOURCE: VALUE LINE INVESTMENT SURVEY, June 9, 2017

DCF COST OF CAPITAL

FORECAST

A. EARNINGS	7.83
B. DIVIDEND	5.08
C. FUNDAMENT	7.29

FORECAST = (A+B+C)/3 6.74

FORECAST COST OF CAPITAL = 8.96 PERCENT

HISTORICAL

A. EARNINGS	5.75
B. DIVIDEND	7.04

HISTORICAL = (A+B)/2 6.40

HISTORICAL COST OF CAPITAL = 8.61 PERCENT

DIVIDENDS ONLY (GROWTH & HISTORICAL)  
8.28 PERCENT

2018  
PENNSYLVANIA "F" CLASS  
COST OF CAPITAL

A) CAPM COST OF CAPITAL	$1.05 + 0.87(8.52)$	=	8.46 PERCENT
B) FORECAST COST OF CAPITAL		=	8.96 PERCENT
C) COST OF CAPITAL	$(A + B)/2$	=	8.71 PERCENT

SOURCES:

A: CAPM: BETA - VALUE LINE INVESTMENT SURVEY JUNE 9, 2017

RF - 3 MONTH BILL RATE WEEK ENDED July 7, 2017. FEDERAL RESERVE H. 15 (July 12, 2017)  
1.05%

RM - RF = IBBOTSON DIFFERENTIAL (STOCK MARKET TO 3 MONTH BILL  
RATE, 1926 TO 2016 AVERAGE) = 8.52 IBBOTSON SBBI (2017)

B: DCF:  $K = Y (1+0.5G) + G$

Y IS THE CURRENT DIVIDEND YIELD (FROM VALUE LINE)

G IS THE DIVIDEND GROWTH RATE (FROM VALUE LINE)

**INTERNAL RATE OF RETURN ANALYSIS  
EXPLANATORY NOTES**

**PENNSYLVANIA RESERVE-TO-SURPLUS RATIOS**

Columns (1) – (4) Reserves and policyholder surplus for commercial casualty predomination carriers all taken from Best's Aggregates and Averages with values as of December 31, 2015.

Column (5) Reserve-to-Surplus ratio is the sum of the reserves in columns (1) through (3) divided by the policyholder surplus in column (4).

$$2,092,129,309 + 460,652,843 + 757,826,074 = 3,310,608,226$$
$$3,310,608,226 / 1,721,434,441 = 1.92$$



## STATE OF PENNSYLVANIA - 2018

INTERNAL RATE OF RETURN ANALYSIS  
PENNSYLVANIA - 2018  
RESERVE-TO-SURPLUS RATIO (\$000 OMITTED)

Year	Reserves			Total (4) =(1)+(2)+(3)	Policyholder Surplus (5)	Reserve to Surplus Ratio (6) =(4)/(5)
	Unpaid Losses (1)	Unpaid LAE (2)	Unearned Premium (3)			
2015	185,919,427	42,816,231	73,469,477	302,205,135	169,017,203	1.79
2014	214,239,981	48,564,685	83,674,315	346,478,981	192,947,461	1.80
2013	215,275,673	47,841,227	81,229,642	344,346,542	182,832,920	1.88
2012	212,275,479	46,533,070	75,723,720	334,532,269	174,892,306	1.91
2011	211,071,160	46,773,232	72,629,793	330,474,185	168,688,743	1.96
2010	205,216,164	46,218,644	70,321,822	321,756,630	169,994,041	1.89
2009	198,967,379	44,764,375	68,284,967	312,016,721	168,729,059	1.85
2008	202,795,932	44,362,097	71,195,426	318,353,455	153,498,767	2.07
2007	228,531,553	47,560,882	82,176,262	358,268,697	180,020,654	1.99
2006	217,836,561	45,218,400	79,120,650	342,175,611	160,813,287	2.13
Total	2,092,129,309	460,652,843	757,826,074	3,310,608,226	1,721,434,441	1.92

Source: AM Best's Aggregates & Averages - Property & Casualty  
Commercial Casualty Composite