



# **NOVA SCOTIA RISK SHARING POOL**

## **MARCH 2016 OPERATIONAL REPORT**

### **ACTUARIAL HIGHLIGHTS**

Related Bulletin: [F16-027 Nova Scotia RSP March 2016 Operational Report](#)

Related Quarterly Valuation Highlights:

[Actuarial Quarterly Valuation Highlights Risk Sharing Pools as at December 31, 2015](#)

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**ACTUARIAL HIGHLIGHTS****RSP NOVA SCOTIA****OPERATIONAL REPORT****MARCH 2016**

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## 1 Summary

### 1.1 Valuation Schedule (Fiscal Year 2016)

The March 2016 Operational Report incorporates the results of an updated valuation (as at December 31, 2015) – the impact of the implementation of the valuation is discussed in section 1.2. The table immediately below summarizes the implemented valuations and future scheduled valuations for fiscal year 2016.

NOVA SCOTIA RISK SHARING POOL FISCAL YEAR 2016 – SCHEDULE OF VALUATIONS			
Valuation Date	Discount Rate (per annum)	Operational Report	Description of Changes
Sep. 30, 2015 (completed)	0.70% mfad: 25 bp	Oct. 2015	updated valuation (roll forward): accident year 2015 loss ratio decreased 2.2 points to 95.1%; discount rate decreased by 20 basis points; no change to selected margins for adverse deviations
Dec. 31, 2015 (completed)	0.64% mfad: 25 bp	Mar. 2016	updated valuation: accident year 2015 loss ratio decreased 4.9 points to 90.2%; accident year 2016 loss ratio decreased 5.1 points to 94.7%; discount rate decreased by 6 basis points; no change to selected margins for adverse deviations
Mar. 31, 2016		May 2016	update valuation (roll forward):
Jun. 30, 2016		Aug. 2016	update valuation:
Sep. 30, 2016		Oct. 2016	update valuation (roll forward):

Under the proposed schedule for fiscal year 2016, the “off-half” valuation quarters ending March 31, 2016 and September 30, 2016 would not reflect a full valuation update of assumptions, but would rather “roll-forward” key assumptions from the previous valuation.

### 1.2 New Valuation

A valuation of the Nova Scotia Risk Sharing Pool (“RSP”) as at December 31, 2015 has been completed since last month’s Operational Report and the results of that valuation have been incorporated into this month’s Report. The valuation was completed by the Facility Association’s internal actuarial group in conjunction with, and approved by, the appointed actuary, under the hybrid model for actuarial services. Additional detail will be provided in an “Actuarial Highlights – Quarterly Valuation” report to be posted to the FA website at the same time as this report.

The valuation implementation impact is summarized in the tables at the top of the next page.

*Summary of Impact (\$000s) of Implementing Result of Valuation as at December 31, 2015<sup>1</sup>*

NS	unfav / (fav) for the month and ytd					
	IMPACT in \$000s from changes in:					
	ults & payout patterns			dsct rate	margins	TOTAL
	Nominal	apv adj.	sub-tot	apv adj.	apv adj.	
	[1]	[2]	[3]	[4]	[5]	[6]
PAYs	(251)	14	(237)	36	-	(201)
CAY	(186)	(23)	(209)	6	-	(203)
Prem Def	(336)	(50)	(386)	7	-	(379)
TOTAL	(773)	(59)	(832)	49	-	(783)

As indicated in the table above, the incorporation of the new valuation had an estimated **\$0.8 million favourable impact** on the month's net result from operations, subtracting an estimated 22.2 points (see table below) to the **year-to-date Combined Operating Ratio** to end at **111.7%**.

*Summary of Impact (% YTD EP) of Implementing Result of Valuation as at December 31, 2015*

NS	ytd EP	3,529	(actual)			
	IMPACT unfav / (fav) as % ytd EP from changes in:					
	ults & payout patterns			dsct rate	margins	
	Nominal	apv adj.	sub-tot	apv adj.	apv adj.	TOTAL
	[1]	[2]	[3]	[4]	[5]	[6]
PAYs	(7.1%)	0.4%	(6.7%)	1.0%	-	(5.7%)
CAY	(5.3%)	(0.7%)	(5.9%)	0.2%	-	(5.8%)
Prem Def	(9.5%)	(1.4%)	(10.9%)	0.2%	-	(10.7%)
TOTAL	(21.9%)	(1.7%)	(23.6%)	1.4%	-	(22.2%)

The impact of the nominal changes is shown in column [1] of the two preceding summary tables. The change in the selected nominal ultimates was favourable by \$0.8 million overall. This reflects the impact attributable to the change in the selected ultimate loss ratio (i.e. for each accident year, it is the product of life-to-date earned premium for the accident year and the change in the selected ultimate loss ratio).

The prior accident years overall showed a \$0.3 million favourable variance, which is attributed to recorded activity process variance. This favourable change is 0.9% of the prior accident years' nominal unpaid balance of \$26.6 million determined at the end of last month (February 2016). As a smaller pool, it is subject to higher levels of process variance, driving volatility in the ultimate selection.

The current accident year and premium deficiency impacts are a result of the changes in the selected loss ratios for accident years **2016** (down 5.1 points from 99.8% to **94.7%**) and for accident year

<sup>1</sup>In these tables, "PAYs" refers to prior accident years, "CAY" refers to the current accident year, and "Prem Def" refers to the provision for premium deficiency or the deferred policy acquisition asset (as applicable). "Nominal" refers to changes excluding any actuarial present value adjustments, whereas "apv adj." refers to actuarial present value adjustments.

The columns under the heading "ults & payout patterns" reflect the impact of changes in the valuation selected ultimates and claims payment patterns (i.e. based on unchanged selection of discount rates and margins for adverse deviation). The column "dsct rate" reflects the impact of the change in the selected discount rate and the column "margins" reflects the impact of any changes in selected margins for adverse deviations.

**2017** (down 4.6 points from 101.3% to **96.7%**). Again, as a smaller pool, one can expect more volatility around projections of current and future expected loss ratios.

The impacts related to actuarial present value adjustments are split into the impact prior to any change in the selected discount rate and margin changes (at the level they were selected, which was at the coverage and accident half-year level), the impact of then updating the discount rate, and finally the impact of any changes to the margins (at the level they are selected). The changes in actuarial present value adjustments are shown in the summary tables in columns [2], [4], and [5].

Column [2] recognizes that changing the nominal selections also changed the unpaid estimates (including changes to the relative mix by government line, which had an impact on the weighted-average margins for adverse deviations or “MfADs”). It also reflects the fact that we updated the projected emergence of claims payments, resulting in a change in the projected cash flows. These changes generated a favourable change of \$59 thousand in the actuarial present value adjustments, prior to any changes in the selected discount rate and/or MfADs.

Claims payment emergence patterns were updated and cash flows were reviewed against the selected risk-free yield curve, derived from Government of Canada benchmark bond yields monthly series using values for December 2015. Column [4] accounts for the change in the **discount rate** selected (decreased 6 basis points to **0.64%**), indicating an unfavourable impact of \$49 thousand. The impact *related only to claims liabilities* (i.e. PAYs plus CAY) was \$42 thousand (projected \$49 thousand impact at December 31, 2016) – this compares to the \$51 thousand change one would estimate as the impact by interpolation using the interest rate sensitivity table provided in last month’s Actuarial Highlights.

Column [5] accounts for any changes to selected MfADs. The selected **investment rate MfAD** was **left unchanged at 25 basis points** and the selected **claims development MfADs** at the coverage and accident year level were **left unchanged** as well.

Consideration was given to recent legal decisions and changes in legislation / regulation as outlined in the section 1.4.

### **1.3 Appointed Actuary and Hybrid Actuarial Services Model**

Liam McFarlane of Ernst & Young LLP is Facility Association’s Appointed Actuary (effective as of June 1, 2013).

Facility Association operates under a “hybrid” model in relation to the management and provision of actuarial services. Under this model, actuarial services are performed by both Facility Association’s internal staff and its external actuarial consulting firm. The hybrid model approach maximizes the efficiency of resource allocation while providing access to additional expertise and capacity as needed.

### **1.4 Consideration of Recent Legal Decisions and Changes in Legislation / Regulation**

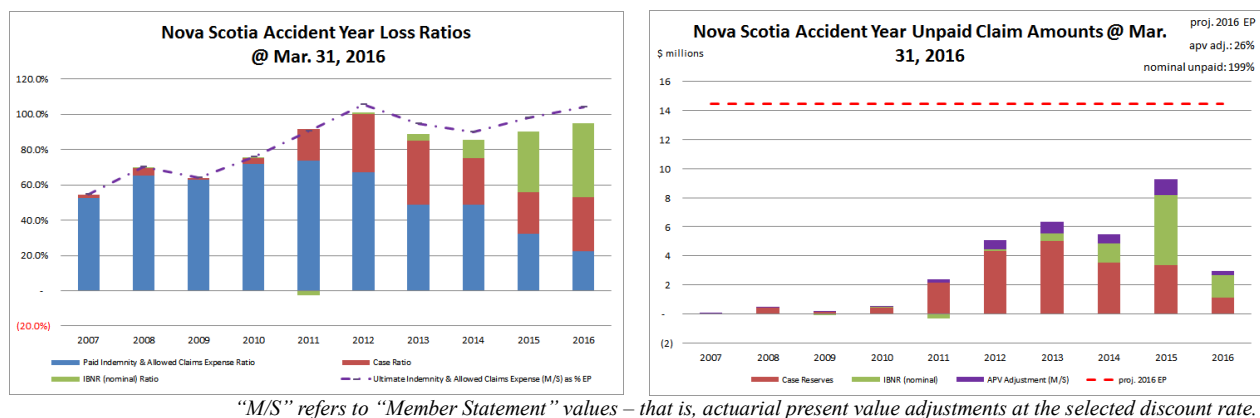
Consideration and assessment of potential impacts of legal decisions and changes in legislation / regulation constitutes a regular part of the valuation process. Descriptions of some of the more recent changes are provided below.

**Nova Scotia Bill 86**, known as the “**Fair Auto Insurance Reforms**” (FAIR) was introduced on November 9, 2011. FAIR was implemented in two phases. Regulations related to FAIR Phase I

(effective April 1, 2012) was published in the Royal Gazette Part 11, on January 13, 2012. These include provisions for: enhanced mandatory benefits under Section B (these include medical, rehabilitation, funeral, death and loss of income benefits), prohibiting premium increases if no claim is made, assistance for volunteer Fire Departments, and periodic review of Auto Insurance Law. FAIR Phase II (effective April 1, 2013) includes provisions for: diagnostic and treatment protocols for minor injuries, introduction of direct compensation for property damage, and limited liability and new priority of pay rules for rental companies. At the June 30, 2015 valuation, reform adjustments (originally introduced with the June 30, 2014 valuation) were explicitly taken into account with the updated industry trend analysis (completed using industry data as at December 31, 2014), impacting the selection of ultimates.

## 1.5 Current Provision Summary

The charts immediately below show the current levels of claim liabilities<sup>2</sup> booked by accident year. The left chart displays life-to-date payments, case reserves, IBNR, and the total including actuarial present value adjustments against accident year earned premium. The right chart shows the associated dollar amounts for the components of the claim liabilities and the current projected amount of 2016 full year earned premium (the red hash-mark line) to provide some perspective.



The current actuarial present value adjustments balance (\$3.8 million – see table immediately below) represents 26% of the earned premium projected for the full year 2016 (see the upper right corner of the right chart above). If our current estimates of the nominal unpaid amounts prove to match actual claims payments, the actuarial present value adjustments will be released into the net operating result over future periods.

### claim liabilities (\$000s)

	amt	%
case	20,660	63.7%
ibnr	8,020	24.7%
M/S apv adjust.	3,777	11.6%
<b>M/S total</b>	<b>32,457</b>	<b>100.0%</b>

The table to the left breaks down the Member Statement (M/S) claim liabilities total into component parts, showing that the majority of the claim liabilities for this pool is in case reserves. Approximately 79% of the IBNR balance relates to accident years 2015 and 2016 (see Exhibit B). Approximately 90% of the M/S total claim

<sup>2</sup>Claim liabilities refer to provision for unpaid indemnity and allowed claims expenses. Allowed claims expenses are first party legal and other expenses as listed in the RSP Claims Guide. Claims expenses paid through the member company expense allowance are NOT included in this discussion.

liabilities are related to accident years 2012-2016 inclusive (i.e. the most recent 5 accident years) – this is a relatively high percentage, reflecting the relatively recent start time for this pool (2007).

The tables immediately below summarize the premium liabilities and the total policy liabilities.

premium liabilities (\$000s)			policy liabilities (\$000s)		
	amt	%		amt	%
unearned prem	6,633	94.0%	claim	28,680	72.6%
prem def/(dpac)	(221)	(3.1%)	premium	6,412	16.2%
M/S apv adjust.	648	9.2%	M/S apv adjust.	4,425	11.2%
M/S total	7,060	100.0%	M/S total	39,517	100.0%

## 2 Activity During the Month of March 2016

### 2.1 Recorded Premium and Claims Activity

The table immediately below summarizes the extent to which premiums and claims amounts recorded during the month differ from projections reflected in the prior month's Operational Report<sup>3</sup>.

*Nova Scotia RSP Actual vs Projected Summary: Recorded Transaction Amounts (\$ thousands)*

Table 01 Accident Year	Earned Premium		Paid Indemnity & Allowed Claims Expense		Case increase / (decrease)		Recorded increase / (decrease)	
	Actual	Actual less Projected	Actual	Actual less Projected	Actual	Actual less Projected	Actual	Actual less Projected
Prior	(6)	(6)	144	(2)	(147)	3	(2)	2
2014	(6)	(6)	24	(28)	140	156	164	128
2015	(10)	(10)	100	(35)	(216)	(351)	(116)	(386)
2016	1,243	(10)	303	(30)	181	(332)	484	(362)
TOTAL	1,222	(31)	571	(95)	(42)	(524)	529	(619)

(Recorded transaction amounts exclude IBNR & other actuarial provisions)

Claims transaction activity is generally volatile and changes from one month to the next are anticipated due to this natural “process variance” (this is particularly true where volumes are low). Each month, the projection variances are reviewed for signs of projection bias and to identify potential ways to reduce the level of the variance. Commentary from our review is provided in the sub-sections that follow.

#### 2.1.a Actual vs. Projected (AvsP): Earned Premium

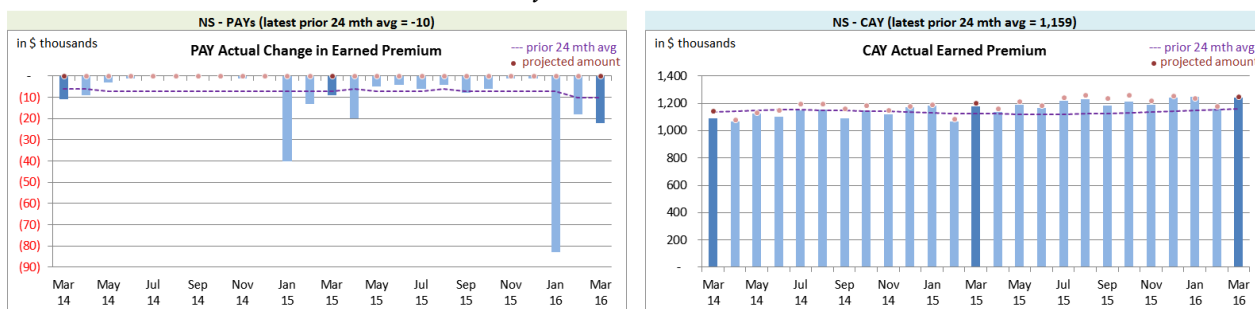
The charts at the top of the next page show actual **earned premium**<sup>4</sup> activity in each of the most recent 25 calendar months, along with a “prior 24-month average” to show how each month's actual compares with the average amount of the preceding 24 calendar months.

<sup>3</sup>There may be rounding differences in values in this document compared with the associated Bulletin and/or Operational Report.

<sup>4</sup>Premium is earned on a daily basis based on the transaction term measured in days. As a result, months with 31 days earned relatively more than those with 30 days, and February earns the least.



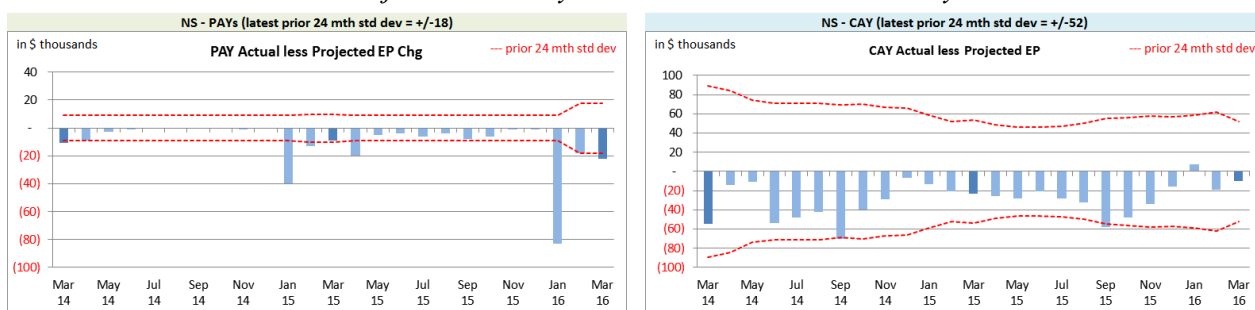
### Nova Scotia RSP Actual **Earned Premium** by Calendar Month



**Earned premium** changes during a given calendar month in relation to prior accident years tend to be at modest levels, although relatively high levels seem to occur in January each year.

The associated variance between the actual changes and the projections from the previous month are shown in the charts immediately below. **Earned premium** change projections are all attributed to the current accident year as the projection upload does not accept **earned premium** changes for other accident years. We do not see this limitation as being significant for our purposes, but it does mean that the actual less projection variance will equal the actual **earned premium** change in relation to prior accident years.

### Nova Scotia RSP Actual vs. Projected Summary: **Earned Premium** Variances by Calendar Month



On Latest \$ thousands		
<b>Earned Premium</b>	PAYs	CAY
Mthly Avg EP Chg (prior 24 mths)	(10)	1,159
std dev	18	52
A-P <> std dev	6	2
% <> std dev	24.0%	8.0%
norm <> std dev	31.7%	31.7%

We project **earned premium** changes from known unearned premium and projected written premium levels, but upload the total projections as current accident year (CAY). This process has generated bias<sup>5</sup>, with actuals generally lower than projected. However, the magnitude is not high relative to monthly premium, and the

variances are within the prior 24-month standard deviation more often than indicated by a normal distribution (see table above). Over time, we may consider other projection approaches to narrow monthly variance levels further, but it is not currently deemed a priority.

### 2.1.b AvsP: Recorded Indemnity & Allowed Claims Expense

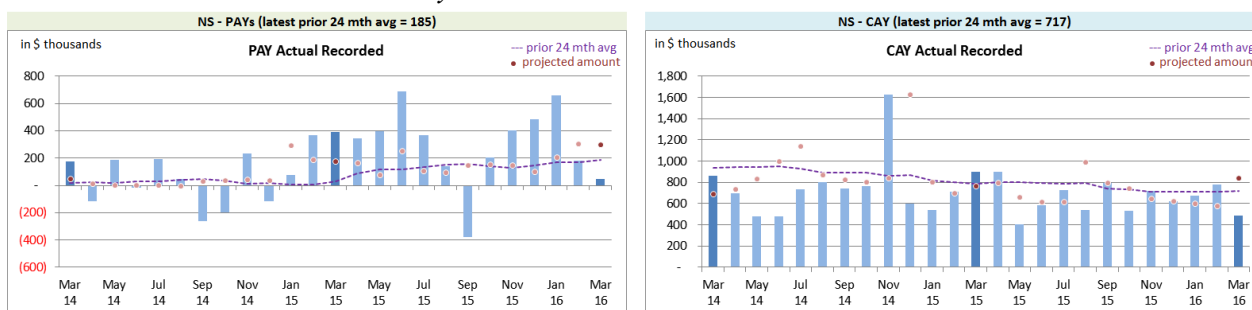
Actual **recorded** activity (**paid** and case reserve changes) over the last 25-month period are shown in

<sup>5</sup>The prior accident years (PAYs) variances will show bias as the projection upload forces all earned premium projections to be attributed to the current accident year.



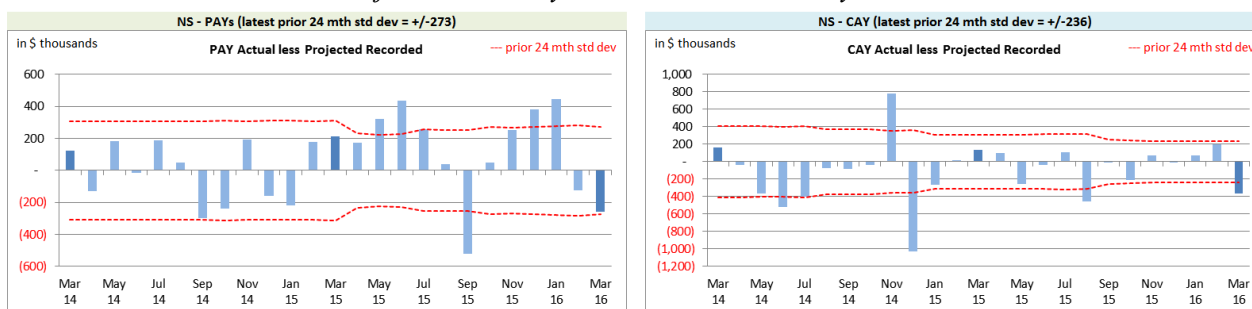
the charts immediately below, including the “prior 24-month average” level.

*Nova Scotia RSP Actual **Recorded** by Calendar Month*



**Recorded** activity variances from the previous month’s projections are shown in the charts immediately below, including the “prior 24-month standard deviation” levels.

*Nova Scotia RSP Actual vs Projected Summary: **Recorded** Variances by Calendar Month*



On Latest \$ thousands		
	<b>Recorded</b>	
Mthly Avg Recorded (prior 24 mths)	185	717
std dev	273	236
A-P <> std dev	6	5
% <> std dev	24.0%	20.0%
norm <> std dev	31.7%	31.7%

With respect to **recorded** indemnity & allowed claims expense activity, caution must be exercised in reviewing the variances as this is a small pool and single claim transactions that are normal course for the business may look “unusual” and generate relatively “significant” variances that in nominal value terms are not that

significant. That said, for prior accident years’ (PAYs) **recorded** variances (left chart above), the percentage of months (24%) with variances in excess of one standard deviation suggests the projection process performs little better than simply projecting based on a 24-month average. We have also noticed that 10 of the last 14 months have shown PAY **recorded** activity in the \$300 thousand plus level, whereas this would be considered unusual prior to 2015. This is creating repeated variances outside the one-standard deviation band (6 of the last 11 months are outside of this band). We are continuing to monitor this situation and have adjusted our projections somewhat in light of this.

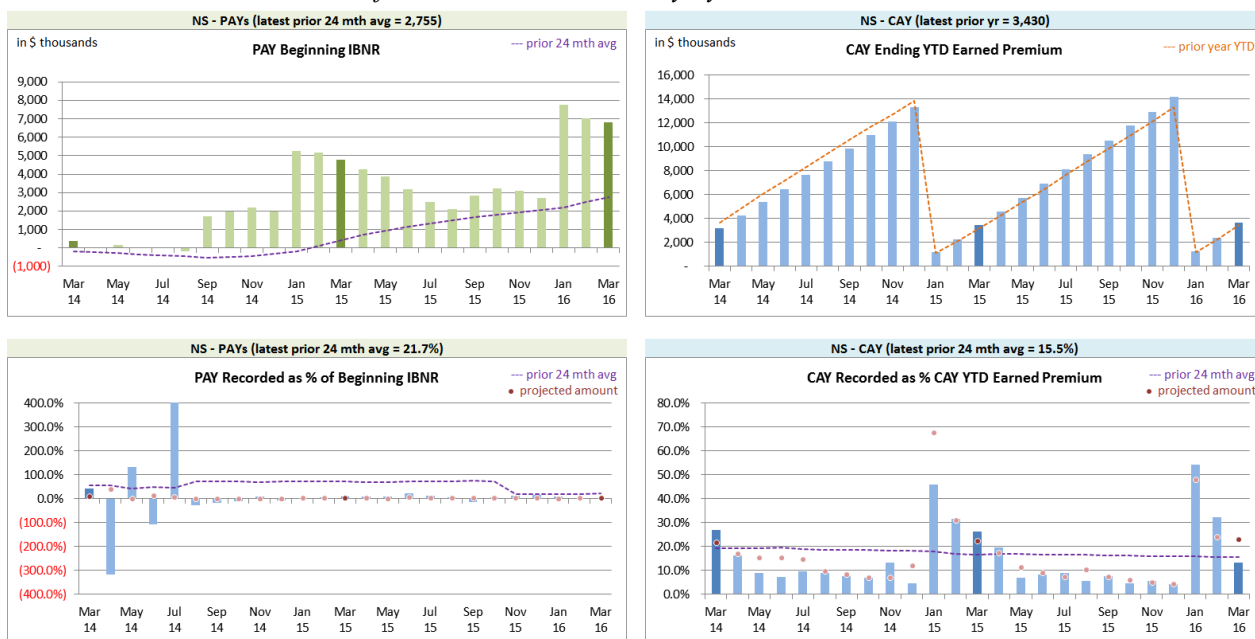
The current accident year (CAY) **recorded** variances (right chart above), with 20% of months with variances in excess of a 24-month standard deviation suggests the projection process performs better than simply projecting based on a 24-month average. We do not see evidence of bias in the variances.

The CAY **recorded** variance for the current month was outside the one standard deviation band. The

activity for this month was reviewed and confirmed, with the variance attributed to process variance. The method for establishing IBNR adjusts automatically for changes in **earned premium** and **recorded** claims activity level (see sections 2.2 and 3).

We have included, for reference, additional charts immediately below related to levels influencing **recorded** activity.

*Nova Scotia RSP Levels that influence<sup>6</sup> Recorded activity by Calendar Month*



(Note: July 2014 PAYs recorded as % of Beginning IBNR was 704% the axis in the left chart above was limited to focus the discussion.)

We track beginning prior accident years' IBNR as **recorded** activity "comes out of" IBNR. Changes in the prior accident years' beginning IBNR (see upper left chart above) occur for several possible reasons:

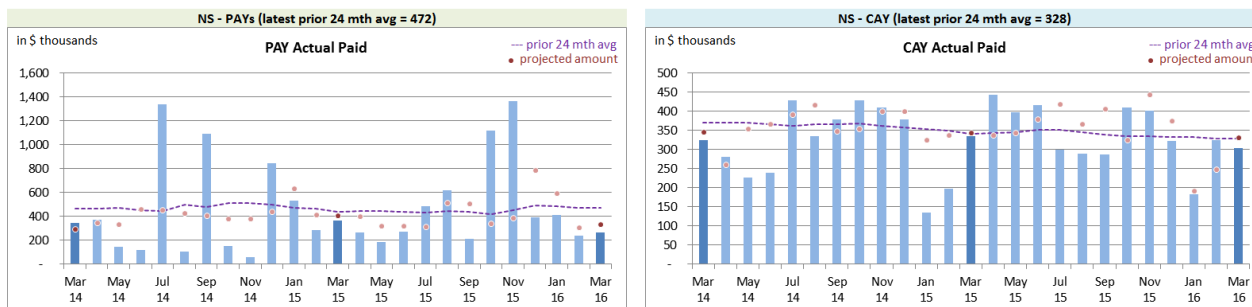
- to offset actual **recorded** activity (through loss ratio matching);
- the annual switchover as a current accident year becomes a prior accident year (occurs in January); and
- when a new valuation is implemented, where the valuation resulted in changes to the selection of prior accident years' ultimate (will show up as a beginning IBNR change one month after the valuation is implemented, i.e. the change will generally show in April, June, September, and November).

<sup>6</sup>Our recorded activity projections for the prior accident years are based on selected ratios of recorded activity to beginning unpaid balances, whereas the current accident year projections are based on selected ratios of year-to-date IBNR to year-to-date selected ultimate (i.e. selected LR x earned premium), deriving year-to-date recorded as selected ultimate less IBNR. In both cases, the ratio selection is based on our review of the more recent recorded activity and recent AvsP analyses.

## 2.1.c AvsP: Paid Indemnity & Allowed Claims Expense

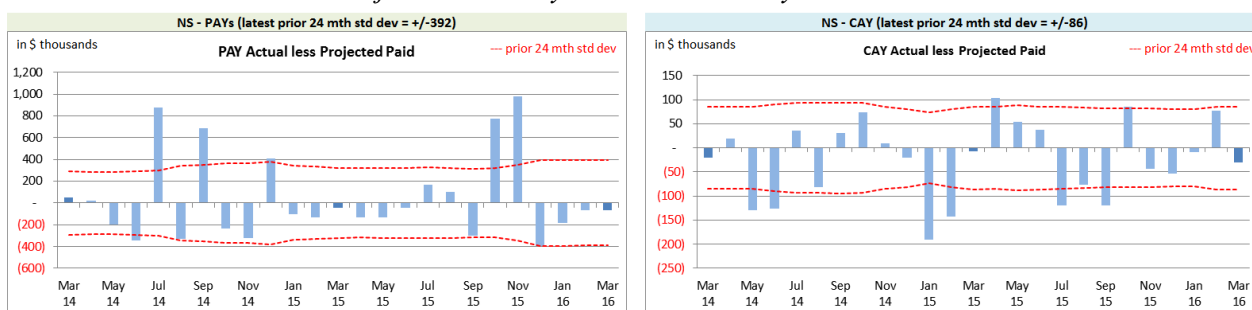
The charts immediately below show actual **paid** activity in each of the most recent 25 calendar months, along with a “prior 24-month average” to show how each month’s actual compares with the average amount of the preceding 24 calendar months.

*Nova Scotia RSP Actual **Paid** by activity Calendar Month*



The charts immediately below show the actual less projected **paid** variances for the last 25 calendar months, along with bands for the “prior 24-month standard deviations” to show how the variances from projection compare with historical standard deviations.

*Nova Scotia RSP Actual vs Projected Summary: **Paid** Variances by Calendar Month*



On Latest \$ thousands		
	<b>Paid</b>	
	PAYS	CAY
Mthly Avg Paid (prior 24 mths)	472	328
std dev	392	86
A-P <> std dev	7	8
% <> std dev	28.0%	32.0%
norm <> std dev	31.7%	31.7%

With respect to **paid** indemnity & allowed claims expense activity, caution must be exercised in reviewing the variances as this is a small pool and single claim transactions that are normal course for the business may look “unusual” and generate relatively “significant” variances that in nominal value terms are not that

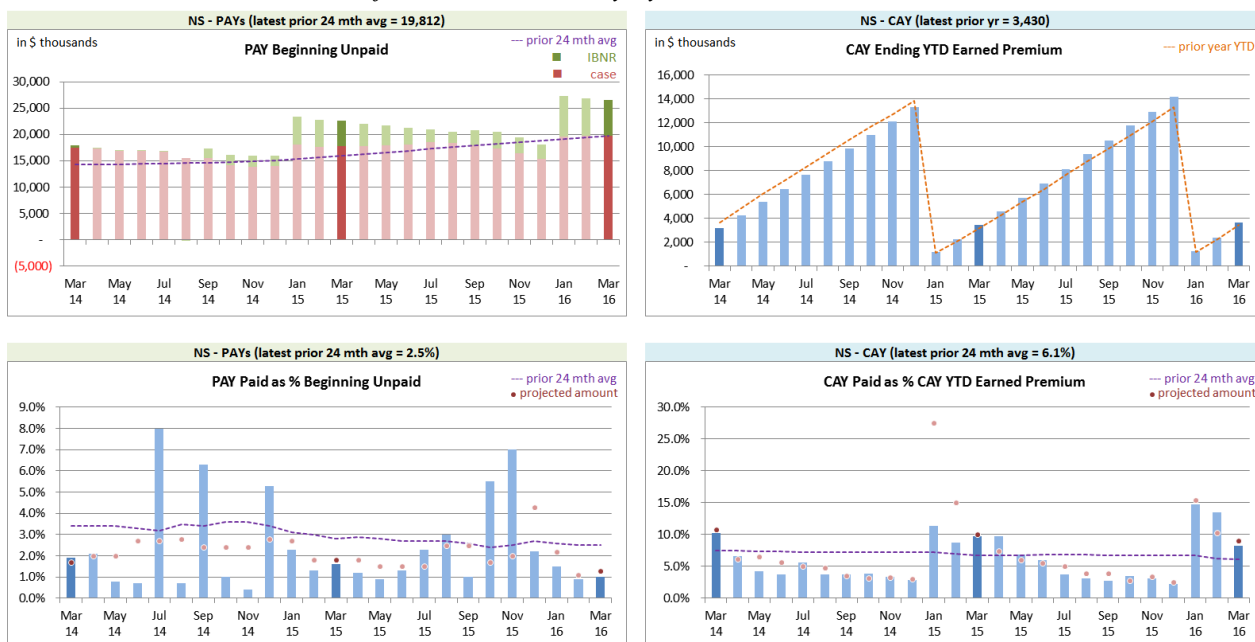
significant. With 28% of months with prior accident years (PAYS) **paid** variances in excess of a prior 24-month standard deviation (left chart above), this suggests the projection process has performed little better than one based simply on a 24-month average. That said, there may be evidence of bias in the variances (with actuals tending to be lower than our projections). At this point, while we note the evidence of bias, the magnitudes (small) make it difficult to adjust our projection process in response.

The current accident year (CAY) **paid** variances (right chart above) do not appear to indicate bias. However, at 32%, the percentage of months with variances in excess of a prior 24-month standard deviation suggests the projection process performs no better than projections based simply on a 24-

month average. We also note that actuals have been lower than projected for seven of the last nine months (and two of those months had the variance outside of a standard deviation). For these months, actuals have been lower than the corresponding months in the prior year, and we also note that the key ratio we use (**paid** to ytd **earned premium**) has also been “unusually” low. We continue to monitor and look for ways to improve projections.

We have included, for reference, additional charts immediately below related to levels influencing **paid** activity.

### *Nova Scotia RSP Levels that influence<sup>7</sup> Paid activity by Calendar Month*



We track beginning prior accident years’ unpaid balance (case and IBNR) as **paid** activity “comes out of” the unpaid balance. Changes in the prior accident years’ beginning unpaid balance (see upper left chart above) occur for several possible reasons:

- to offset actual **paid** activity (may reduce case or IBNR or both);
- the annual switchover as a current accident year becomes a prior accident year (occurs in January); and
- when a new valuation is implemented, where the valuation resulted in changes to the selection of prior accident years’ ultimate (will show up as a beginning unpaid balance change one month after the valuation is implemented, i.e. the change will generally show in April, June, September, and November).

<sup>7</sup>Our paid projections for the prior accident years are based on selected ratios of paid to beginning unpaid balances, whereas the current accident year projections are based on selected ratios of year-to-date paid to year-to-date selected ultimate indemnity (i.e. selected LR x earned premium). In both cases, the ratio selection is based on our review of the more recent recorded activity and recent AvsP analyses.

## 2.2 Actuarial Provisions

An “ultimate loss ratio matching method” (described in section 3) was used to determine the month’s IBNR<sup>8</sup>, and factors were applied to the nominal unpaid claims liability (case plus IBNR) to determine the discount amount (shown as a negative value to indicate its impact of reducing the liability) and the Provisions for Adverse Deviations. The loss ratios and the factors used to determine the current month’s provisions and projections were based on the applicable valuation. The table immediately below summarizes variances in provisions included in the March 2016 Operational Report and the associated one-month projections from last month’s Report.

*Nova Scotia RSP Actual vs Projected Summary: IBNR and APV Amounts (\$ thousands)*

Table 02			actuarial present value adjustments					
	IBNR		Discount Amount		Provisions for Adverse Deviations		IBNR + actuarial present value adjustments	
Accident Year	Actual	Actual less Projected	Actual	Actual less Projected	Actual	Actual less Projected	Actual	Actual less Projected
Prior	367	736	(181)	14	1,888	104	2,074	854
2014	1,315	(436)	(72)	15	723	(41)	1,966	(462)
2015	4,819	(314)	(148)	20	1,232	(55)	5,903	(349)
2016	1,519	166	(53)	6	388	(21)	1,854	151
TOTAL	8,020	152	(454)	55	4,231	(13)	11,797	194

The IBNR provision is \$0.2 million higher than projected last month, counterbalancing the recorded claims activity and adjusting for the earned premium variance impacts indicated in section 2.1, and due to the valuation implementation.

Exhibit G shows the accident year IBNR amount change from last month to this month broken down into:

- (i) the change projected last month;
- (ii) the additional change due to variances in earned premium (because we apply a loss ratio to earned premium in determining ultimate level) and/or recorded claims (as IBNR is calculated as ultimate less recorded) differences; and
- (iii) the additional change due to valuation implementation impacts (as applicable)

The variances associated with (ii) above are discussed in sections 2.1.a and 2.1.b.

The table at the top of the next page summarizes the variances in the provisions for the premium deficiency amounts included in the March 2016 Operational Report and the one-month projections from last month’s Report. Note, that this RSP is in a deferred policy acquisition cost asset position before actuarial present value adjustments, and in a premium deficiency position after actuarial present value adjustments. The variances are mainly driven by the variance in unearned premium and due to the valuation implementation.

<sup>8</sup>For ease of discussion, “IBNR” is used in place of “provisions for incurred but not recorded (IBNR) and development”.

*Nova Scotia RSP Actual vs Projected Summary: Premium Deficiency / (DPAC) Amounts (\$ thousands)*

Table 03

	Premium Deficiency / (Deferred Policy Acquisition Costs)		actuarial present value adjustments		Premium Deficiency / (DPAC) including actuarial present value adjustments	
	Actual	Actual less Projected	Actual	Actual less Projected	Actual	Actual less Projected
balance:	(221)	(334)	648	(31)	427	(365)
balance as % unearned premium:	(3.3%)	(5.0%)	9.8%	(0.7%)	6.4%	(5.7%)
actual unearned premium:	6,633					
less projected:	96					

### 3 Ultimate Loss Ratio Matching Method

An “ultimate loss ratio matching method” continues to be applied to the current month and two projected months shown in the Operational Reports, with IBNR determined by accident year as follows:

- (a) Earned premium to-date
- (b) Ultimate loss<sup>9</sup> ratio per latest valuation
- (c) Estimated ultimate incurred = (a) x (b)
- (d) Recorded indemnity & allowed claims expense to-date
- (e) IBNR = (c) – (d)

### 4 Calendar Year-to-Date Results

The table at the top of the next page summarizes the calendar year-to-date results for indemnity & allowed claims expenses<sup>10</sup>, including IBNR.

In calculating the amounts as percentages of earned premium, the calendar year-to-date earned premium has been used, which includes not only the earned premium associated with the current accident year, but also earned premium adjustments related to prior accident years. Specifically, the current accident year (CAY) ratio in the table is 98.0% rather than 94.7% (the valuation ultimate ratio for accident year 2016), as the calendar year-to-date earned premium includes prior accident year earned premium adjustments. (Note that the ratios in this table may differ slightly from those shown in the Nova Scotia RSP Summary of Operations due to rounding).

<sup>9</sup>“Loss” here refers to indemnity and allowed claims expenses, but does not include the claims expense allowance included in member company overall expense allowances (“Expense Allowance” in the Operational Report).

<sup>10</sup>Allowed claims expenses are first party legal and other expenses as listed in the RSP Claims Guide. Claims expenses paid through the member company expense allowance are NOT included in this analysis.

*Nova Scotia RSP Calendar Year-to-Date Indemnity & Allowed Claims Expense Summary (\$ thousands)*

Table 04

	YTD Nominal Values		YTD actuarial present value adjustment		YTD Total		Change from Prior Month YTD	
	Amount	% EP	Amount	% EP	Amount	% EP	Amount	LR pts
PAYs	(366)	(10.4%)	(51)	(1.4%)	(417)	(11.8%)	(256)	(4.9%)
CAY	3,460	98.0%	335	9.5%	3,795	107.5%	1,156	(6.8%)
TOTAL	3,094	87.6%	284	8.0%	3,378	95.7%	900	(11.7%)

("EP" based on 2016 calendar year-to-date earned premium; ratios may not total due to rounding)

The prior accident years (PAYs) changes from last month are due to the release of the actuarial present value adjustments with claims payments and due to the valuation implementation. The loss ratio change year-to-date reflects not only changes in the prior accident year levels, but also the increase in the calendar year-to-date earned premium with an additional month's earned premium and due to the valuation implementation.

For the current accident year, changes in the year-to-date total reflects the additional month's exposure and regular changes to actuarial present value adjustments as the year ages and due to the valuation implementation.

## 5 Current Operational Report – Additional Exhibits

Section 6 provides exhibits pertaining to the actuarial provisions reflected in the current month's Operational Report.

IBNR (including actuarial present value adjustments) presented in section 6, Exhibit A, were derived on a discounted basis, and therefore reflect the time value of money and include an explicit provision for adverse deviations in accordance with accepted actuarial practice in Canada.

IBNR presented in section 6, Exhibit B, does NOT include any actuarial present value adjustments. The "Total IBNR" from this exhibit is shown in the Operational Report as "Undiscounted IBNR".

The ultimate loss ratios detailed in section 6, Exhibit B, refer to the estimates derived on the basis of various actuarial methodologies applied to the experience of the Nova Scotia Risk Sharing Pool for the purposes of the most recent quarterly valuation. As discussed in section 3, IBNR reflected in the current month's Operational Report was derived as the difference between the estimated ultimate for the claims amount (i.e. earned premium x ultimate loss ratio) and the associated current recorded amounts (life-to-date payments plus current case reserves).



## **6 EXHIBITS**

The exhibits listed below are provided on the pages that follow:

- EXHIBIT A IBNR for Member Sharing – includes Actuarial Present Value Adjustments
- EXHIBIT B IBNR
- EXHIBIT C Premium Liabilities
- EXHIBIT D Projected Year-end Policy Liabilities
- EXHIBIT E Discount Rate & Margins for Adverse Deviations
- EXHIBIT F Interest Rate Sensitivity
- EXHIBIT G Components of IBNR Change During Month

**EXHIBIT A**
**IBNR for Member Sharing – includes Actuarial Present Value Adjustments**
**TABLE EXHIBIT A**
**IBNR + M/S actuarial present  
 value adjustments**

 discount rate  
 0.64%

 interest rate margin  
 25 basis pts

Amounts in \$000s					
Accident Year	Actual Feb. 2016	Actual Mar. 2016	Projected Apr. 2016	Projected May. 2016	Projected Dec. 2016
2007	6	6	6	6	6
2008	(190)	61	61	61	61
2009	31	13	12	12	10
2010	79	79	78	77	70
2011	(139)	(108)	(106)	(101)	(88)
2012	364	749	733	725	630
2013	1,083	1,274	1,261	1,247	1,081
2014	2,471	1,966	1,934	1,906	1,619
2015	6,539	5,903	5,725	5,650	4,549
2016	1,182	1,854	2,412	3,327	5,088
<b>TOTAL</b>	<b>11,426</b>	<b>11,797</b>	<b>12,116</b>	<b>12,910</b>	<b>13,026</b>
Change		371	319	794	

*Please see Exhibit G, page 1 for Components of Change during Current Month*

**EXHIBIT B**
**IBNR**
**TABLE EXHIBIT B**

Amounts in \$000s

**IBNR**

Ultimate Loss Ratio	Accident Year	Actual Feb. 2016	Actual Mar. 2016	Projected Apr. 2016	Projected May. 2016	Projected Dec. 2016
54.3%	2007	1	1	1	1	1
69.5%	2008	(217)	6	6	6	6
64.0%	2009	14	(2)	(2)	(2)	(2)
75.3%	2010	22	23	23	23	23
88.8%	2011	(345)	(316)	(310)	(304)	(264)
100.9%	2012	(209)	137	134	131	114
88.9%	2013	361	518	508	498	432
85.2%	2014	1,787	1,315	1,289	1,263	1,062
90.2%	2015	5,403	4,819	4,650	4,580	3,621
94.7%	2016	948	1,519	1,977	2,778	3,931
	<b>TOTAL</b>	<b>7,765</b>	<b>8,020</b>	<b>8,276</b>	<b>8,974</b>	<b>8,924</b>
	<b>Change</b>		<b>255</b>	<b>256</b>	<b>698</b>	

*Please see Exhibit G, page 2 for Components of Change during Current Month*

**EXHIBIT C**
**Discount Rate & Margins for Adverse Deviations**
**TABLE EXHIBIT C**

	Amounts in \$000s				
Premium Liabilities	Actual Feb. 2016	Actual Mar. 2016	Projected Apr. 2016	Projected May. 2016	Projected Dec. 2016
(1) unearned premium (UP)	6,800	6,633	6,639	6,804	7,301
FOR MEMBER SHARING					
(2) expected future costs ratio {% of (1)}	112.1%	106.4%	106.6%	106.7%	108.5%
(3) expected future costs {(1) x (2)}	7,621	7,060	7,075	7,262	7,923
(4) premium deficiency / (deferred policy acquisition cost)	821	427	436	458	622
Excluding Actuarial Present Value Adjustments					
(5) expected future costs ratio {% of (1)}	101.7%	96.7%	96.8%	96.9%	98.6%
(6) expected future costs {(1) x (5)}	6,914	6,412	6,424	6,594	7,195
(7) premium deficiency / (deferred policy acquisition cost)	114	(221)	(215)	(210)	(106)

**EXHIBIT D**
**Projected Year-end Policy Liabilities**

The table below presents the projected policy liabilities as at December 31, 2016, broken down by component.

Nova Scotia ending 2016	Projected Balances as at Dec. 31, 2016 (\$000s)							
	nominal values			actuarial present value adjustments (apvs)				TOTAL
	Case	IBNR	Total Unpaid	discount	investment PfAD	development PfAD	Total apvs	
Acc Yr								
2007	37	1	38	-	-	5	5	43
2008	450	6	456	(3)	1	57	55	511
2009	116	(2)	114	(1)	-	13	12	126
2010	389	23	412	(5)	2	50	47	459
2011	1,833	(264)	1,569	(22)	8	190	176	1,745
2012	3,655	114	3,769	(57)	23	550	516	4,285
2013	4,343	432	4,775	(67)	24	692	649	5,424
2014	3,071	1,062	4,133	(62)	25	594	557	4,690
2015	3,388	3,621	7,009	(126)	49	1,005	928	7,937
PAYs (sub-total):	17,282	4,993	22,275	(343)	132	3,156	2,945	25,220
CAY (2016)	5,241	3,931	9,172	(183)	73	1,267	1,157	10,329
claims liabilities:	22,523	8,924	31,447	(526)	205	4,423	4,102	35,549
	Unearned Premium	Premium Deficiency / (DPAC)	Total Provision	discount	investment PfAD	development PfAD	Total apvs	TOTAL*
premium liabilities:	7,301	(106)	7,195	(113)	42	799	728	7,923
*Total may not be sum of parts, as apvs apply to future costs within UPR								
policy liabilities:			38,642	(639)	247	5,222	4,830	43,472

## EXHIBIT E

### Discount Rate & Margins for Adverse Deviations

The tables below present selected margins for adverse development by coverage (the total is a weighted average, based on the unpaid claims projection for December 31, 2016 from the valuation), followed by the selected discount rate and the associated margin for investment income.

Selected Claims Development MfADs (Dec. 31, 2015)				
Accident Year	Third Party Liability	Accident Benefits	Other Coverages	Total
2007	12.5%	10.0%	12.5%	12.5%
2008	12.5%	10.0%	12.5%	12.5%
2009	11.7%	10.0%	12.5%	11.6%
2010	12.5%	10.0%	12.5%	12.4%
2011	12.5%	10.0%	12.5%	12.3%
2012	15.0%	10.0%	14.9%	14.8%
2013	15.0%	10.0%	13.0%	14.7%
2014	15.0%	10.0%	14.6%	14.6%
2015	15.0%	10.0%	15.0%	14.6%
2016	14.8%	10.0%	7.9%	14.1%
prem liab	13.9%	10.0%	5.2%	11.5%

discount rate: 0.64%  
 margin (basis points): 25

## EXHIBIT F

### Interest Rate Sensitivity

The tables below present sensitivity to the member statement claims liability as projected to Dec. 31, 2016 from the latest valuation date (projections in exhibits A to D are to Dec. 31, 2016 and based on more up-to-date information). We have included both the current valuation selection (0.64%), the prior valuation assumption (0.70%) and the prior fiscal year end valuation assumption (0.70%) for comparative purposes. A 25 basis point margin for investment return adverse deviation is used in all scenarios presented.

\$ Format: \$000s

Actuarial Present Value of Provisions at Various Discount Rates - Dec. 31, 2016 projected Unpaid								
AY	0.14%	0.64%	1.14%	1.64%	2.14%	2.64%	0.70%	0.70%
2007	15	15	15	15	15	15	15	15
2008	271	269	268	267	265	264	269	269
2009	107	107	106	105	105	104	107	107
2010	419	416	412	409	405	401	416	416
2011	1,517	1,503	1,487	1,471	1,455	1,439	1,501	1,501
2012	3,310	3,280	3,242	3,206	3,171	3,137	3,275	3,275
2013	4,386	4,346	4,297	4,249	4,203	4,158	4,339	4,339
2014	4,398	4,355	4,304	4,254	4,205	4,157	4,349	4,349
2015	8,066	7,975	7,866	7,760	7,657	7,557	7,963	7,963
2016	9,753	9,629	9,479	9,334	9,194	9,058	9,611	9,611
Total	32,242	31,895	31,476	31,070	30,675	30,290	31,845	31,845
	curr - 50 bp	curr val assumption	curr + 50bp	curr + 100bp	curr + 150bp	curr + 200bp	prior val assumption	prior fyr end assumption

Dollar Impact Relative to Valuation Assumption								
AY	0.14%	0.64%	1.14%	1.64%	2.14%	2.64%	0.70%	0.70%
Total	347	-	(419)	(825)	(1,220)	(1,605)	(50)	(50)
	curr - 50 bp	curr val assumption	curr + 50bp	curr + 100bp	curr + 150bp	curr + 200bp	prior val assumption	prior fyr end assumption

Percentage Impact Relative to Valuation Assumption								
AY	0.14%	0.64%	1.14%	1.64%	2.14%	2.64%	0.70%	0.70%
2007	-	-	-	-	-	-	-	-
2008	0.7%	-	(0.4%)	(0.7%)	(1.5%)	(1.9%)	-	-
2009	-	-	(0.9%)	(1.9%)	(1.9%)	(2.8%)	-	-
2010	0.7%	-	(1.0%)	(1.7%)	(2.6%)	(3.6%)	-	-
2011	0.9%	-	(1.1%)	(2.1%)	(3.2%)	(4.3%)	(0.1%)	(0.1%)
2012	0.9%	-	(1.2%)	(2.3%)	(3.3%)	(4.4%)	(0.2%)	(0.2%)
2013	0.9%	-	(1.1%)	(2.2%)	(3.3%)	(4.3%)	(0.2%)	(0.2%)
2014	1.0%	-	(1.2%)	(2.3%)	(3.4%)	(4.5%)	(0.1%)	(0.1%)
2015	1.1%	-	(1.4%)	(2.7%)	(4.0%)	(5.2%)	(0.2%)	(0.2%)
2016	1.3%	-	(1.6%)	(3.1%)	(4.5%)	(5.9%)	(0.2%)	(0.2%)
Total	1.1%	-	(1.3%)	(2.6%)	(3.8%)	(5.0%)	(0.2%)	(0.2%)
	curr - 50 bp	curr val assumption	curr + 50bp	curr + 100bp	curr + 150bp	curr + 200bp	prior val assumption	prior fyr end assumption



## 6.1.a.1 EXHIBIT G

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## Components of Member Statement IBNR (i.e. “Discounted”) Change During Month

 RSP Nova Scotia  
 AccountCode Desc IBNR - Discour

M/S IBNR - in \$000s

AccYear	Values				Sum of Total Change	Sum of % Total Change	Sum of Current Month Final Amount
	Sum of Prior Month Actual Amount	Sum of Projected Change	Sum of Change Due to AvsP Variances	Sum of Change Due to Valuation Implementation			
2007	6	-	-	-	-	-	6
2008	(190)	-	-	251	251	(132.1%)	61
2009	31	(1)	(1)	(16)	(18)	(58.1%)	13
2010	79	(1)	16	(15)	-	-	79
2011	(139)	4	(1)	28	31	(22.3%)	(108)
2012	364	(2)	7	380	385	105.8%	749
2013	1,083	(14)	(28)	233	191	17.6%	1,274
2014	2,471	(43)	(129)	(333)	(505)	(20.4%)	1,966
2015	6,539	(287)	380	(729)	(636)	(9.7%)	5,903
2016	1,182	521	354	(203)	672	56.9%	1,854
<b>Grand Total</b>	<b>11,426</b>	<b>177</b>	<b>598</b>	<b>(404)</b>	<b>371</b>	<b>3.2%</b>	<b>11,797</b>

## 6.1.a.2 EXHIBIT G

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## Components of IBNR (i.e. “Undiscounted”) Change During Month

RSP	Nova Scotia							
AccountCode Desc	IBNR - Undiscounted							IBNR - in \$000s
AccYear	Sum of Prior Month Actual Amount	Sum of Projected Change	Sum of Change Due to AvsP Variances	Sum of Change Due to Valuation Implementation	Sum of Total Change	Sum of % Total Change	Sum of Current Month Final Amount	
2007	1	-	-	-	-	-	1	
2008	(217)	-	-	223	223	(102.8%)	6	
2009	14	-	(2)	(14)	(16)	(114.3%)	(2)	
2010	22	-	15	(14)	1	4.5%	23	
2011	(345)	7	(3)	25	29	(8.4%)	(316)	
2012	(209)	4	12	330	346	(165.6%)	137	
2013	361	(7)	(29)	193	157	43.5%	518	
2014	1,787	(36)	(133)	(303)	(472)	(26.4%)	1,315	
2015	5,403	(270)	377	(691)	(584)	(10.8%)	4,819	
2016	948	405	352	(186)	571	60.2%	1,519	
<b>Grand Total</b>	<b>7,765</b>	<b>103</b>	<b>589</b>	<b>(437)</b>	<b>255</b>	<b>3.3%</b>	<b>8,020</b>	