



**NOVA SCOTIA RISK SHARING POOL**

**MAY 2017 OPERATIONAL REPORT**

**ACTUARIAL HIGHLIGHTS**

Related Bulletin: [F17-046 Nova Scotia RSP May 2017 Operational Report](#)

Related Quarterly Valuation Highlights:

[Actuarial Quarterly Valuation Highlights Risk Sharing Pools as at March 31, 2017](#)

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**ACTUARIAL HIGHLIGHTS**  
**RSP NOVA SCOTIA**  
**OPERATIONAL REPORT**  
**MAY 2017**

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## 1 Summary

### 1.1 Valuation Schedule (Fiscal Year 2017)

The May 2017 Operational Report incorporates the results of an updated valuation (as at March 31, 2017) – 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 2017.

NOVA SCOTIA RISK SHARING POOL FISCAL YEAR 2017 – SCHEDULE OF VALUATIONS			
Valuation Date	Discount Rate (per annum)	Operational Report	Description of Changes
Sep. 30, 2016 (completed)	0.51% mfad: 25 bp	Oct. 2016	updated valuation (roll forward): accident year 2016 loss ratio remained at 94.8%; discount rate decreased by 5 basis points; no change to selected margins for adverse deviations
Dec. 31, 2016 (completed)	1.01% mfad: 25 bp	Mar. 2017	updated valuation: accident year 2016 loss ratio decreased 5.0 points to 89.8%; accident year 2017 loss ratio decreased 1.0 points to 96.5%; discount rate increased by 50 basis points; no change to selected margins for adverse deviations
Mar. 31, 2017 (completed)	0.93% mfad: 25 bp	May 2017	updated valuation (roll forward): accident year 2017 loss ratio increased 0.9 points to 97.4%; discount rate decreased by 8 basis points; no change to selected margins for adverse deviations
Jun. 30, 2017		Aug. 2017	update valuation:
Sep. 30, 2017		Oct. 2017	update valuation (roll forward):

Under the proposed schedule for fiscal year 2017, the “off-half” valuation quarters ending March 31, 2017 and September 30, 2017 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 March 31, 2017 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 March 31, 2017<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	(18)	(1)	(19)	63	-	44
CAY	59	8	67	10	-	77
Prem Def	62	3	65	19	-	84
<b>TOTAL</b>	<b>103</b>	<b>10</b>	<b>113</b>	<b>92</b>	<b>-</b>	<b>205</b>

As indicated in the table above, the incorporation of the new valuation had an estimated **\$0.2 million unfavourable impact** on the month’s net result from operations, adding an estimated 3.2 points (see table below) to the **year-to-date Combined Operating Ratio** to end at **110.0%**.

During the valuation, we were advised that a member completing a claims system migration had closed out certain case reserves but were unable to send the “re-open” transactions to the **Nova Scotia RSP** in time for the March month close, resulting in significant favourable prior accident year recorded activity, impacting the 2017 Q1 valuation data. The member had advised and we have confirmed that the incorrectly closed case reserves were reinstated prior to the April 2017 month-end. Review and discussion with the member (FA member services/internal audit teams) continues, to ensure our records are accurate in relation to their own records on their RSP claims portfolio. With the **current valuation**, as the March 31, 2017 is a scheduled “roll-forward” valuation, for the **Nova Scotia RSP** we have **carried forward the prior accident year (AY2016 & prior) selected ultimate loss ratios from the prior valuation** (as at December 31, 2016). Hence, “nominal” changes in the “PAYs” row, column [1] of the table above reflect earned premium changes (updates).

*Summary of Impact (% YTD EP) of Implementing Result of Valuation as at March 31, 2017*

NS	ytd EP 6,411 (actual)					
	IMPACT unfav / (fav) as % ytd EP 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	(0.3%)	-	(0.3%)	1.0%	-	0.7%
CAY	0.9%	0.1%	1.0%	0.2%	-	1.2%
Prem Def	1.0%	-	1.0%	0.3%	-	1.3%
<b>TOTAL</b>	<b>1.6%</b>	<b>0.2%</b>	<b>1.8%</b>	<b>1.4%</b>	<b>-</b>	<b>3.2%</b>

The impact of the nominal changes is shown in column [1] of the two preceding summary tables.

<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.

The change in the selected nominal ultimates was unfavourable by \$0.1 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 an \$18 thousand favourable variance, which is attributed to earned premium variance (as previously indicated, selected PAYs' loss ratios with this valuation were left unchanged from the prior valuation). This favourable change is 0.1% of the prior accident years' nominal unpaid balance of \$28.9 million determined at the end of last month (April 2017). 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 ratio for accident year **2017** (up 1.0 point from 96.5% to **97.5%**). There was no change to the selected loss ratio for accident year **2018** (remains at **97.9%**). 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 (“apv”) adjustments are split into the impact prior to any change in the selected discount rate and margin changes (at the level they were selected i.e. coverage and accident half-year), the impact of then updating the discount rate, and finally the impact of any changes to the margins (at the level they were 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 an unfavourable change of \$10 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 March 2017. Column [4] accounts for the change in the **discount rate** selected (decreased 8 basis points to **0.93%**), indicating an unfavourable impact of \$92 thousand. The impact *related only to claims liabilities* (i.e. PAYs plus CAY) was \$73 thousand at May 2017 (projected \$86 thousand impact at December 31, 2017) – this compares to the \$94 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 (the addition of a discussion on the recent Supreme Court decision on *Saadati v. Moorhead* is new this month; we have also removed discussion related to Nova Scotia Bill 86 as being now 3 years since Phase II of the associated reforms were effective).

The **Supreme Court of Canada** rendered its judgment on **Saadati v Moorhead (2017 SCC 28, rendered on Jun 2, 2017)**. Saadati was involved in a collision in July of 2005 in British Columbia and sued the at-fault driver for damages. According to the Supreme Court decision, “*The trial judge found that the ... accident caused S psychological injuries, including personality change and cognitive difficulties. ...and awarded S \$100,000 for non-pecuniary damages.*” The trial decision was appealed to the BC Court of Appeal where the trial’s \$100,000 non-pecuniary award was dismissed. The Supreme Court upheld the \$100,000 non-pecuniary award, determining:

- “*A finding of legally compensable mental injury need not rest, in whole or in part, on the claimant proving a recognized psychiatric injury.*”
- “*...a trier of fact adjudicating a claim of mental injury is not concerned with diagnosis, but with symptoms and their effects.*”
- “*Expert evidence can assist in determining whether or not a mental injury has been shown, but where psychiatric diagnosis is unavailable, it remains open to a trier of fact to find on other evidence adduced by the claimant that he or she has proven on a balance of probabilities the occurrence of mental injury.*”

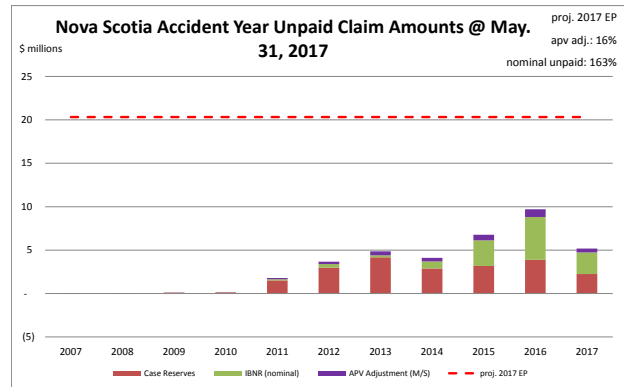
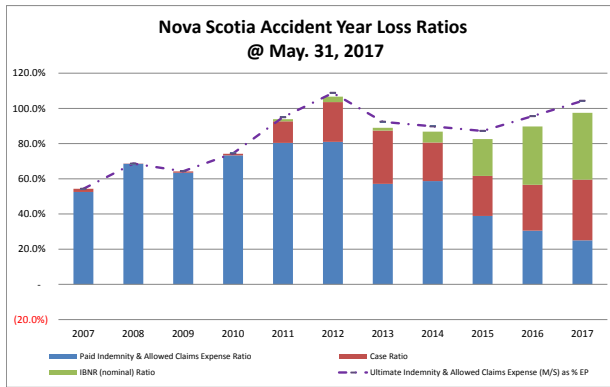
At the current time, no adjustments have been made to our valuation estimates or views based on the judgment as rendered, but we continue to review and consider the implications of the judgment.

#### **1.5 Current Provision Summary**

The charts at the top of the next page 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 2017 full year earned premium (the red hash-mark line) to provide some perspective.

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<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.



“M/S” refers to “Member Statement” values – that is, actuarial present value adjustments at the selected discount rate.

The current actuarial present value adjustments balance (\$3.3 million – see table immediately below) represents 16% of the earned premium projected for the full year 2017 (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	21,181	58.1%
ibnr	11,953	32.8%
M/S apv adjust.	3,294	9.0%
<b>M/S total</b>	<b>36,428</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 largest component of the claim liabilities for this pool is case reserves. Approximately 62% of the IBNR balance relates to accident years 2016 and 2017 (see Exhibit B). Approximately 84% of the M/S

total claim liabilities are related to accident years 2013-2017 inclusive (i.e. the most recent 5 accident years).

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

premium liabilities (\$000s)	amt	%
unearned prem	8,560	93.0%
prem def/(dpac)	(64)	(0.7%)
M/S apv adjust.	711	7.7%
<b>M/S total</b>	<b>9,207</b>	<b>100.0%</b>

policy liabilities (\$000s)	amt	%
claim	33,134	72.6%
premium	8,496	18.6%
M/S apv adjust.	4,005	8.8%
<b>M/S total</b>	<b>45,635</b>	<b>100.0%</b>

## 2 Activity During the Month of May 2017

### 2.1 Recorded Premium and Claims Activity

The table at the top of the next page 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>.

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

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

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	-	-	320	184	(372)	(265)	(52)	(81)
2015	(1)	(1)	70	(54)	(17)	(13)	54	(66)
2016	(10)	(10)	90	1	254	184	344	185
2017	1,408	(7)	324	(67)	443	392	767	325
TOTAL	1,398	(17)	804	64	308	297	1,112	362

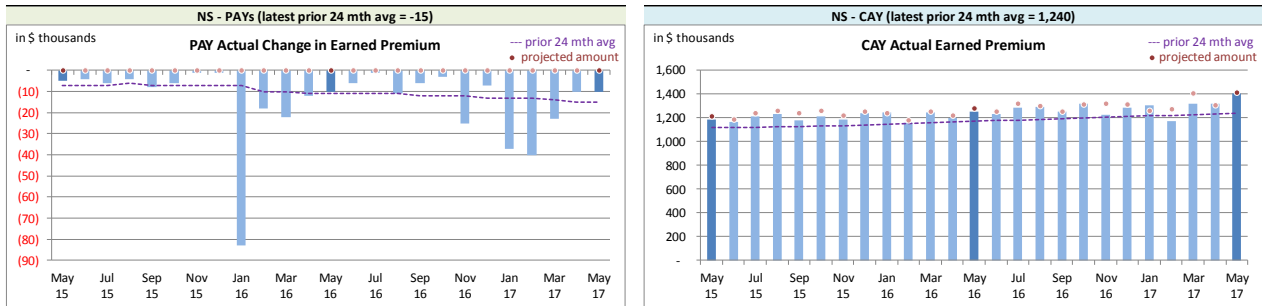
(Recorded transaction amounts exclude IBNR & other actuarial provisions)

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 immediately below 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.

*Nova Scotia RSP Actual Earned Premium by Calendar Month*



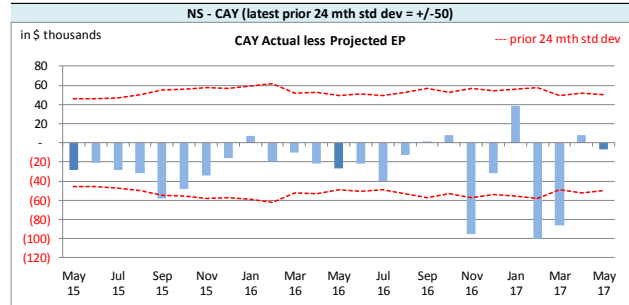
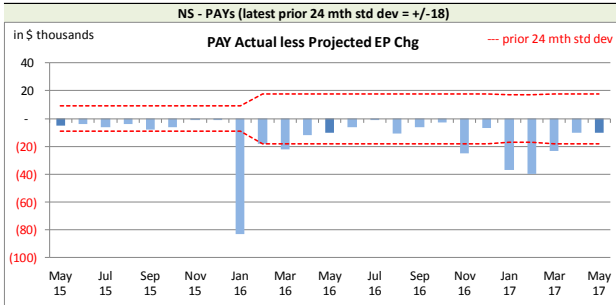
**Earned premium** changes during a given calendar month in relation to prior accident years tend to be at modest levels, although relatively high levels seem to occur in January each year.

The associated variance between the actual changes and the projections from the previous month are shown in the charts at the top of the next page. **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.

<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 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)	(15)	1,240
std dev	18	50
A-P <> std dev	6	4
% <> std dev	24.0%	16.0%
norm <> std dev	31.7%	31.7%

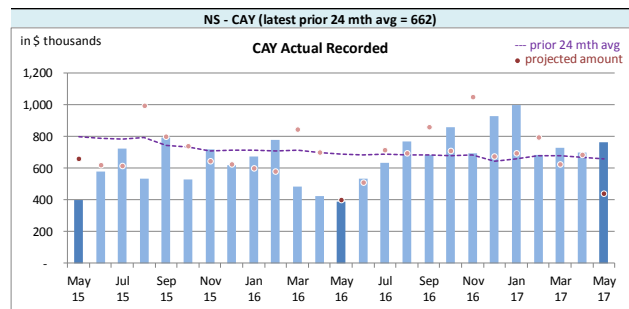
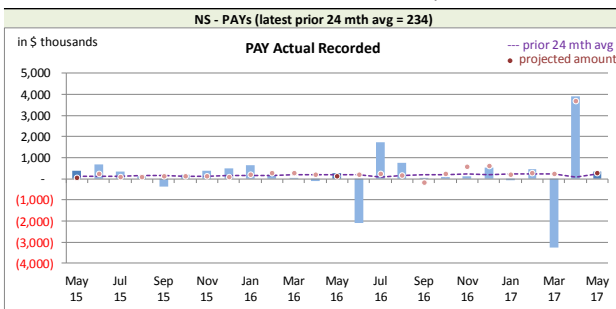
We project **earned premium** changes from known unearned premium and projected written premium levels, but upload the total projections as current accident year (CAY). This process has generated prior accident years' (PAYS) bias<sup>5</sup>, with actuals generally lower than projected. However, the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

monthly premium, and the variances are within the prior 24-month standard deviation slightly more often than indicated by a normal distribution (see table above and to the left). In addition to the PAYS' bias, the CAY has also shown bias, with actuals being generally lower than projected. Starting with the August 2016 projections, we have modified our projections processes in an attempt to account for CAY bias. 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 the charts immediately below, including the “prior 24-month average” level.

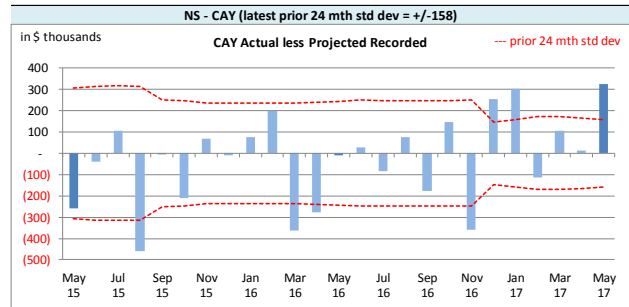
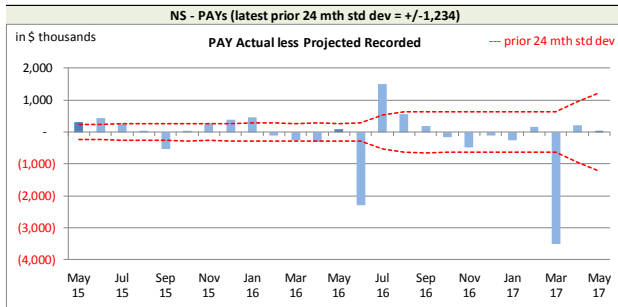
*Nova Scotia RSP Actual **Recorded** by Calendar Month*



**Recorded** activity variances from the previous month's projections are shown in the charts at the top of the next page, including the “prior 24-month standard deviation” levels.

<sup>5</sup>The PAYS' variances will show bias as the projection upload forces all earned premium projections to be attributed to the CAY.

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



On Latest \$ thousands			
	<b>Recorded</b>	PAYS	CAY
Mthly Avg Recorded (prior 24 mths)	234	662	
std dev	1,234	158	
A-P <> std dev	10	7	
% <> std dev	40.0%	28.0%	
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 (40%) with variances in excess of one standard deviation suggests the projection process performs worse than simply projecting based on a 24-month average.

As noted for the past few months, a member is in the process of completing a comprehensive review of their open claims transactions as reported to the FA RSP system. Our review over the three months July-September 2016 noted that correcting transactions were posted to reverse claim closures (and associated case reserve takedowns) posted by this member during the prior month (June 2016). Our investigation and discussion with the member continues, in conjunction with review by the FA internal audit team, to ensure our records are accurate in relation to their own records on their RSP claims portfolio.

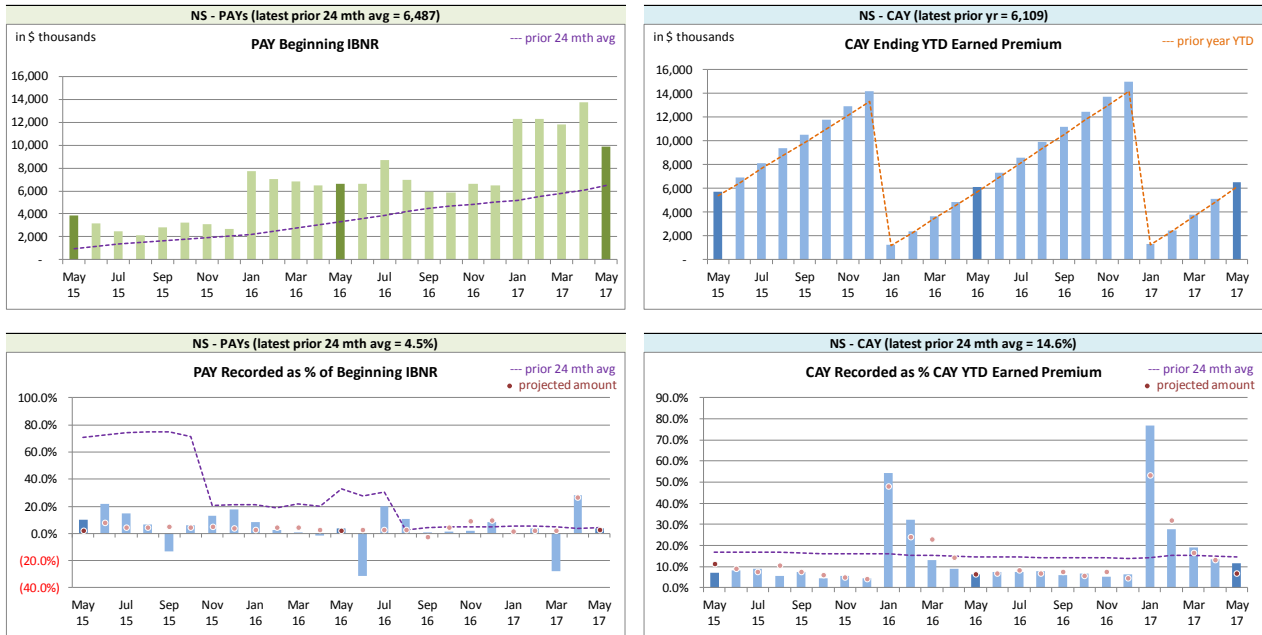
The current accident year (CAY) **recorded** variances (right chart at the top of the page), with 28% of months with variances in excess of a 24-month standard deviation suggests the projection process performs little better than simply projecting based on a 24-month average. We do not see evidence of bias in the variances.

The CAY **recorded** variance for the current month was outside the one standard deviation band. The activity 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 at the top of the next page related to levels influencing **recorded** activity. Note in particular the increase in the level of PAYS beginning IBNR. Part of this will be as a response to valuations and showing up as a beginning IBNR change one month after the valuation is implemented (i.e. April, June, September, and November), and part will also reflect the maturity level of the RSP.

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



We track beginning prior accident years’ IBNR as **recorded** activity “comes out of” IBNR. Changes in the prior accident years’ beginning IBNR (see left chart at bottom of previous page) occur for several possible reasons:

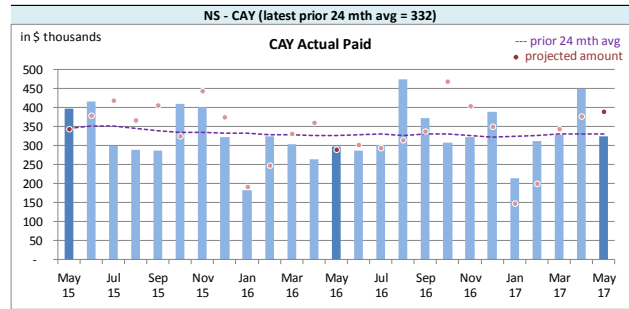
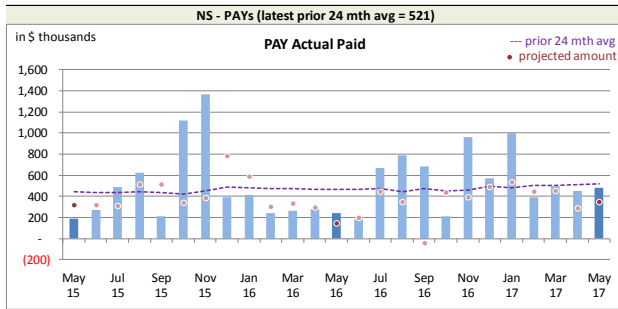
- to offset actual **recorded** activity (through loss ratio matching);
- the annual switchover as a current accident year becomes a prior accident year (occurs in January); and
- when a new valuation is implemented, where the valuation resulted in changes to the selection of prior accident years’ ultimate (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).

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

The charts at the top of the next page 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.

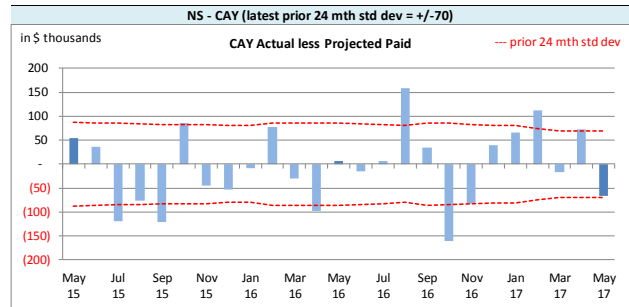
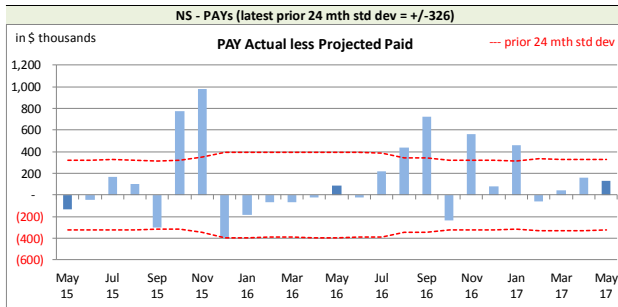
<sup>6</sup>Our recorded activity projections for the prior accident years are based on selected ratios of recorded activity to beginning unpaid balances, whereas the current accident year projections are based on selected ratios of year-to-date IBNR to year-to-date selected ultimate (i.e. selected LR 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.

*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)	521	332
std dev	326	70
A-P <> std dev	7	8
% <> std dev	28.0%	32.0%
norm <> std dev	31.7%	31.7%

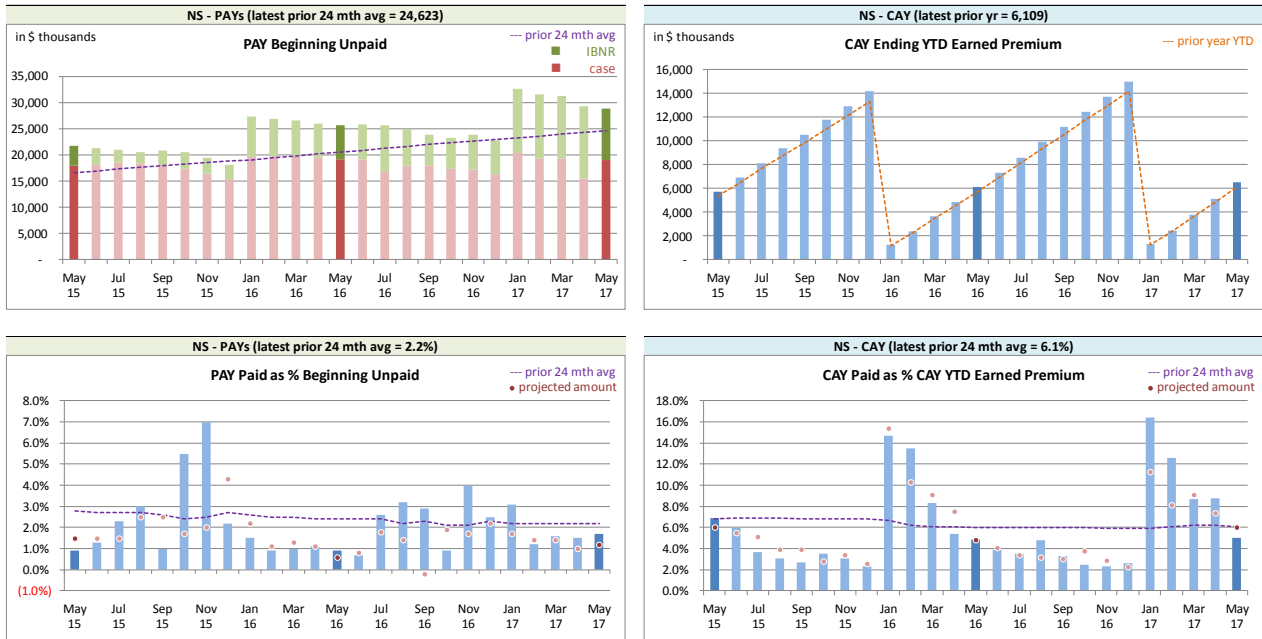
With respect to **paid** indemnity & allowed claims expense activity, caution must be exercised in reviewing the variances as this is a small pool and single claim transactions that are normal course for the business may look “unusual” and generate relatively “significant” variances that in nominal value 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 (see table above), this suggests the projection process has performed little better than one based simply on a 24-month average. We do not see evidence of bias in the projections.

The current accident year (CAY) **paid** variances (see right chart above) do not appear to indicate bias. Toward the end of 2015 and the beginning of 2016, it seemed that bias may have been creeping into the projections (with actuals higher than the projections), however, corrective measures were taken and any potential bias seems to be gone. At 32% of projections outside of one standard deviation (see table above), the projection process has not performed any better than simply projecting based on the previous 24-month average.

We have included, for reference, additional charts at the top of the next page related to levels influencing **paid** activity. Both case and IBNR increases contribute to the increase of PAYs beginning unpaid. This is somewhat expected, given the maturity level of the RSP.

*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 at bottom of previous page) 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).

**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 at the top of the next page summarizes variances in provisions included in the May 2017 Operational Report and the associated one-month projections from last month’s Report.

<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.

<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: 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	1,590	79	(261)	29	1,578	(18)	2,907	90
2015	2,950	66	(135)	11	780	8	3,595	85
2016	4,934	(209)	(238)	27	1,118	(8)	5,814	(190)
2017	2,479	(272)	(142)	6	594	17	2,931	(249)
<b>TOTAL</b>	<b>11,953</b>	<b>(336)</b>	<b>(776)</b>	<b>73</b>	<b>4,070</b>	<b>(1)</b>	<b>15,247</b>	<b>(264)</b>

The IBNR provision is \$0.3 million lower 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 below summarizes the variances in the provisions for premium deficiency liability / (deferred policy acquisition cost asset) included in the May 2017 Operational Report and the one-month projections from last month's Report. This RSP is in a deferred policy acquisition cost asset position (shown as a negative value) before actuarial present value adjustments and in a premium deficiency position (shown as a positive value) after actuarial present value adjustments. Actuarial present value adjustments increase the expected future policy obligations (costs) associated with the unearned premium and cause the write down of the asset value and the creation of the liability. The variances indicated are mainly due to the unearned premium variance and due to the valuation implementation.

*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:	(64)	60	711	36	647	96	
balance as % unearned premium:	(0.7%)	0.8%	8.3%	0.2%	7.6%	1.0%	
actual unearned premium:	8,560						
less projected:	161						

### 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 below 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 99.2% rather than 97.4% (the valuation ultimate ratio for accident year 2017), 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.)

*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	(1,428)	(22.3%)	(731)	(11.4%)	(2,159)	(33.7%)	(15)	9.1%
CAY	6,362	99.2%	452	7.0%	6,814	106.3%	1,531	0.9%
TOTAL	4,933	76.9%	(279)	(4.4%)	4,654	72.6%	1,516	10.0%

(“% EP” based on 2017 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 (CAY), 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.

<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.

## **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

		Amounts in \$000s				
IBNR + M/S actuarial present value adjustments	Accident Year	Actual Apr. 2017	Actual May. 2017	Projected Jun. 2017	Projected Jul. 2017	Projected Dec. 2017
	2007	4	-	-	-	-
	2008	2	2	2	2	2
	2009	16	16	16	16	15
	2010	16	16	16	16	15
	2011	215	284	278	274	253
discount rate	2012	698	684	674	662	612
0.93%	2013	633	684	675	667	624
	2014	1,277	1,221	1,200	1,162	1,053
interest rate margin	2015	3,643	3,595	3,470	3,338	2,787
25 basis pts	2016	6,172	5,814	5,557	5,290	4,145
	2017	2,167	2,931	3,924	5,071	7,622
	<b>TOTAL</b>	<b>14,843</b>	<b>15,247</b>	<b>15,812</b>	<b>16,498</b>	<b>17,128</b>
	Change		404	565	686	

*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 Apr. 2017	Actual May. 2017	Projected Jun. 2017	Projected Jul. 2017	Projected Dec. 2017
	54.2%	2007	1	(2)	(2)	(2)	(2)
	68.6%	2008	1	1	1	1	1
	64.2%	2009	5	5	5	5	5
	74.3%	2010	3	3	3	3	3
	93.8%	2011	69	142	139	136	122
	106.7%	2012	424	403	395	387	350
	89.0%	2013	163	216	212	208	188
	86.8%	2014	874	822	806	774	685
	82.6%	2015	3,004	2,950	2,832	2,719	2,239
	89.7%	2016	5,302	4,934	4,687	4,453	3,477
	97.4%	2017	1,828	2,479	3,368	4,381	6,273
		<b>TOTAL</b>	<b>11,674</b>	<b>11,953</b>	<b>12,446</b>	<b>13,065</b>	<b>13,341</b>
		Change		279	493	619	

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

## EXHIBIT C

## Premium Liabilities

TABLE EXHIBIT C

	Amounts in \$000s				
	Actual Apr. 2017	Actual May. 2017	Projected Jun. 2017	Projected Jul. 2017	Projected Dec. 2017
Premium Liabilities					
(1) unearned premium (UP)	7,876	8,560	10,714	12,609	17,747
FOR MEMBER SHARING					
(2) expected future costs ratio {% of (1)}	106.5%	107.6%	107.6%	107.7%	108.0%
(3) expected future costs {(1) x (2)}	8,386	9,207	11,530	13,577	19,166
(4) premium deficiency / (deferred policy acquisition cost)	510	647	816	968	1,419
Excluding Actuarial Present Value Adjustments					
(5) expected future costs ratio {% of (1)}	98.4%	99.3%	99.3%	99.4%	99.7%
(6) expected future costs {(1) x (5)}	7,752	8,496	10,639	12,529	17,685
(7) premium deficiency / (deferred policy acquisition cost)	(124)	(64)	(75)	(80)	(62)

EXHIBIT D

Projected Year-end Policy Liabilities

The table below presents the projected policy liabilities as at December 31, 2017, broken down by component.

Nova Scotia		Projected Balances as at Dec. 31, 2017 (\$000s)						
ending 2017		nominal values			actuarial present value adjustments (apvs)			
Acc Yr	Case	IBNR	Total Unpaid	discount	investment PFAD	development PFAD	Total apvs	TOTAL
2007	37	(2)	35	(1)	-	3	2	37
2008	12	1	13	-	-	1	1	14
2009	106	5	111	(1)	-	11	10	121
2010	130	3	133	(2)	1	13	12	145
2011	1,402	122	1,524	(26)	8	149	131	1,655
2012	2,810	350	3,160	(66)	19	309	262	3,422
2013	3,908	188	4,096	(82)	20	498	436	4,532
2014	2,733	685	3,418	(65)	17	416	368	3,786
2015	2,975	2,239	5,214	(115)	31	632	548	5,762
2016	3,219	3,477	6,696	(181)	47	802	668	7,364
<b>PAYs (sub-total):</b>	<b>17,332</b>	<b>7,068</b>	<b>24,400</b>	<b>(539)</b>	<b>143</b>	<b>2,834</b>	<b>2,438</b>	<b>26,838</b>
<b>CAY (2017)</b>	<b>7,865</b>	<b>6,273</b>	<b>14,138</b>	<b>(424)</b>	<b>113</b>	<b>1,660</b>	<b>1,349</b>	<b>15,487</b>
<b>claims liabilities:</b>	<b>25,197</b>	<b>13,341</b>	<b>38,538</b>	<b>(963)</b>	<b>256</b>	<b>4,494</b>	<b>3,787</b>	<b>42,325</b>
	Unearned Premium	Premium Deficiency / (DPAC)	Total Provision	discount	investment PFAD	development PFAD	Total apvs	TOTAL*
<b>premium liabilities:</b>	<b>17,747</b>	<b>(62)</b>	<b>17,685</b>	<b>(451)</b>	<b>121</b>	<b>1,811</b>	<b>1,481</b>	<b>19,166</b>
	*Total may not be sum of parts, as apvs apply to future costs within UPR							
<b>policy liabilities:</b>	<b>56,223</b>			<b>(1,414)</b>	<b>377</b>	<b>6,305</b>	<b>5,268</b>	<b>61,491</b>

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, 2017 from the valuation), followed by the selected discount rate and the associated margin for investment income.

Accident Year	Selected Claims Development MfADs (Mar. 31, 2017)			
	Third Party Liability	Accident Benefits	Other Coverages	Total
	Margins	Margins	Margins	Margins
2007	9.9%	10.0%	10.0%	10.0%
2008	10.0%	10.0%	10.0%	10.0%
2009	10.0%	10.0%	10.0%	10.0%
2010	10.0%	10.0%	5.0%	10.0%
2011	10.0%	10.0%	10.0%	10.0%
2012	10.0%	10.0%	10.0%	10.0%
2013	12.5%	10.0%	12.5%	12.4%
2014	12.5%	10.0%	12.5%	12.4%
2015	12.5%	10.0%	12.5%	12.4%
2016	12.5%	10.0%	12.5%	12.3%
2017	12.4%	10.0%	6.9%	12.1%
2018	12.5%	10.0%	12.5%	12.5%
prem liab	12.1%	10.0%	5.1%	10.7%

discount rate: 0.93%  
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, 2017 from the latest valuation date (projections in exhibits A to D are also to Dec. 31, 2017, but are based on more up-to-date information). We have included both the current valuation selection (0.93%), the prior valuation assumption (1.01%) and the prior fiscal year end valuation assumption (0.51%) for comparative purposes. A 25 basis point margin for investment return adverse deviation is used in all scenarios presented.

\$ Format: \$000s

AY	Actuarial Present Value of Provisions at Various Discount Rates - Dec. 31, 2017 projected Unpaid							
	0.43%	0.93%	1.43%	1.93%	2.43%	2.93%	1.01%	0.51%
2005	-	-	-	-	-	-	-	-
2006	-	-	-	-	-	-	-	-
2007	20	20	20	19	19	19	20	20
2008	7	7	7	7	7	7	7	7
2009	74	73	73	73	72	72	73	74
2010	115	114	113	112	111	111	114	115
2011	1,516	1,502	1,489	1,476	1,463	1,450	1,500	1,514
2012	2,961	2,928	2,895	2,863	2,832	2,801	2,923	2,956
2013	3,398	3,360	3,324	3,289	3,254	3,220	3,355	3,392
2014	3,588	3,551	3,514	3,478	3,443	3,409	3,545	3,582
2016	8,411	8,287	8,167	8,050	7,936	7,826	8,269	8,391
2017	14,677	14,439	14,209	13,987	13,768	13,558	14,404	14,638
<b>Total</b>	<b>40,851</b>	<b>40,291</b>	<b>39,750</b>	<b>39,224</b>	<b>38,707</b>	<b>38,209</b>	<b>40,209</b>	<b>40,761</b>
	curr - 50 bp	curr val assumption	curr + 50bp	curr + 100bp	curr + 150bp	curr + 200bp	prior val assumption	prior fyr end assumption

AY	Dollar Impact Relative to Valuation Assumption							
	0.43%	0.93%	1.43%	1.93%	2.43%	2.93%	1.01%	0.51%
<b>Total</b>	<b>560</b>	<b>-</b>	<b>(541)</b>	<b>(1,067)</b>	<b>(1,584)</b>	<b>(2,082)</b>	<b>(82)</b>	<b>470</b>
	curr - 50 bp	curr val assumption	curr + 50bp	curr + 100bp	curr + 150bp	curr + 200bp	prior val assumption	prior fyr end assumption

AY	Percentage Impact Relative to Valuation Assumption							
	0.43%	0.93%	1.43%	1.93%	2.43%	2.93%	1.01%	0.51%
2005	-	-	-	-	-	-	-	-
2006	-	-	-	-	-	-	-	-
2007	-	-	-	(5.0%)	(5.0%)	(5.0%)	-	-
2008	-	-	-	-	-	-	-	-
2009	1.4%	-	-	-	(1.4%)	(1.4%)	-	1.4%
2010	0.9%	-	(0.9%)	(1.8%)	(2.6%)	(2.6%)	-	0.9%
2011	0.9%	-	(0.9%)	(1.7%)	(2.6%)	(3.5%)	(0.1%)	0.8%
2012	1.1%	-	(1.1%)	(2.2%)	(3.3%)	(4.3%)	(0.2%)	1.0%
2013	1.1%	-	(1.1%)	(2.1%)	(3.2%)	(4.2%)	(0.1%)	1.0%
2014	1.0%	-	(1.0%)	(2.1%)	(3.0%)	(4.0%)	(0.2%)	0.9%
2016	1.5%	-	(1.4%)	(2.9%)	(4.2%)	(5.6%)	(0.2%)	1.3%
2017	1.6%	-	(1.6%)	(3.1%)	(4.6%)	(6.1%)	(0.2%)	1.4%
<b>Total</b>	<b>1.4%</b>	<b>-</b>	<b>(1.3%)</b>	<b>(2.6%)</b>	<b>(3.9%)</b>	<b>(5.2%)</b>	<b>(0.2%)</b>	<b>1.2%</b>
	curr - 50 bp	curr val assumption	curr + 50bp	curr + 100bp	curr + 150bp	curr + 200bp	prior val assumption	prior fyr end assumption

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	4	-	-	(4)	(4)	(100.0%)	-
2008	2	-	-	-	-	-	2
2009	16	-	-	-	-	-	16
2010	16	-	-	-	-	-	16
2011	215	(3)	69	3	69	32.1%	284
2012	698	(11)	(11)	8	(14)	(2.0%)	684
2013	633	(9)	50	10	51	8.1%	684
2014	1,277	(21)	(44)	9	(56)	(4.4%)	1,221
2015	3,643	(133)	72	13	(48)	(1.3%)	3,595
2016	6,172	(168)	(195)	5	(358)	(5.8%)	5,814
2017	2,167	1,013	(326)	77	764	35.3%	2,931
<b>Grand Total</b>	<b>14,843</b>	<b>668</b>	<b>(385)</b>	<b>121</b>	<b>404</b>	<b>2.7%</b>	<b>15,247</b>

## EXHIBIT G

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

RSP		Nova Scotia						IBNR - in \$000s
AccountCode Desc		IBNR - Undiscounted						
AccYear	Values			Sum of Change Due to Valuation Implementation	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					
2007	1	-	-	(3)	(3)	(300.0%)	(2)	
2008	1	-	-	-	-	-	1	
2009	5	-	-	-	-	-	5	
2010	3	-	-	-	-	-	3	
2011	69	(1)	74	-	73	105.8%	142	
2012	424	(8)	(13)	-	(21)	(5.0%)	403	
2013	163	(3)	56	-	53	32.5%	216	
2014	874	(17)	(35)	-	(52)	(5.9%)	822	
2015	3,004	(120)	66	-	(54)	(1.8%)	2,950	
2016	5,302	(159)	(194)	(15)	(368)	(6.9%)	4,934	
2017	1,828	923	(331)	59	651	35.6%	2,479	
<b>Grand Total</b>	<b>11,674</b>	<b>615</b>	<b>(377)</b>	<b>41</b>	<b>279</b>	<b>2.4%</b>	<b>11,953</b>	