



NOVA SCOTIA RISK SHARING POOL

MARCH 2017 OPERATIONAL REPORT

ACTUARIAL HIGHLIGHTS

Related Bulletin: [F17-029 Nova Scotia RSP March 2017 Operational Report](#)

Related Quarterly Valuation Highlights:

[Actuarial Quarterly Valuation Highlights Risk Sharing Pools as at December 31, 2016](#)

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ACTUARIAL HIGHLIGHTS
RSP NOVA SCOTIA
OPERATIONAL REPORT
MARCH 2017

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1 Summary

1.1 Valuation Schedule (Fiscal Year 2017)

The March 2017 Operational Report incorporates the results of an updated valuation (as at December 31, 2016) – 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		May 2017	update valuation (roll forward):
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 December 31, 2016 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, 2016¹

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	(1,299)	(117)	(1,416)	(387)	-	(1,803)
CAY	(38)	(7)	(45)	(47)	-	(92)
Prem Def	(79)	(16)	(95)	(101)	-	(196)
TOTAL	(1,416)	(140)	(1,556)	(535)	-	(2,091)

As indicated in the table above, the incorporation of the new valuation had an estimated **\$2.1 million favourable impact** on the month's net result from operations, subtracting an estimated 56.4 points (see table below) from the **year-to-date Combined Operating Ratio** to end at **73.4%**.

Summary of Impact (% YTD EP) of Implementing Result of Valuation as at December 31, 2016

NS	ytd EP 3,705 (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	(35.1%)	(3.2%)	(38.2%)	(10.4%)	-	(48.7%)
CAY	(1.0%)	(0.2%)	(1.2%)	(1.3%)	-	(2.5%)
Prem Def	(2.1%)	(0.4%)	(2.6%)	(2.7%)	-	(5.3%)
TOTAL	(38.2%)	(3.8%)	(42.0%)	(14.4%)	-	(56.4%)

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 \$1.4 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 \$1.3 million favourable variance, which is attributed to recorded activity process variance. This favourable change is 4.2% of the prior accident years' nominal unpaid balance of \$31.2 million determined at the end of last month (February 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 ratios for accident year **2017** (down 1.0 points from 97.5% to **96.5%**) and for accident year

¹In 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.

2018 (down 2.1 points from 100.0% to **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 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 a favourable change of \$140 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 2016. Column [4] accounts for the change in the **discount rate** selected (increased 50 basis points to **1.01%**), indicating a favourable impact of \$535 thousand. The impact *related only to claims liabilities* (i.e. PAYS plus CAY) was \$434 thousand (projected \$523 thousand impact at December 31, 2017) – this compares to the \$471 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

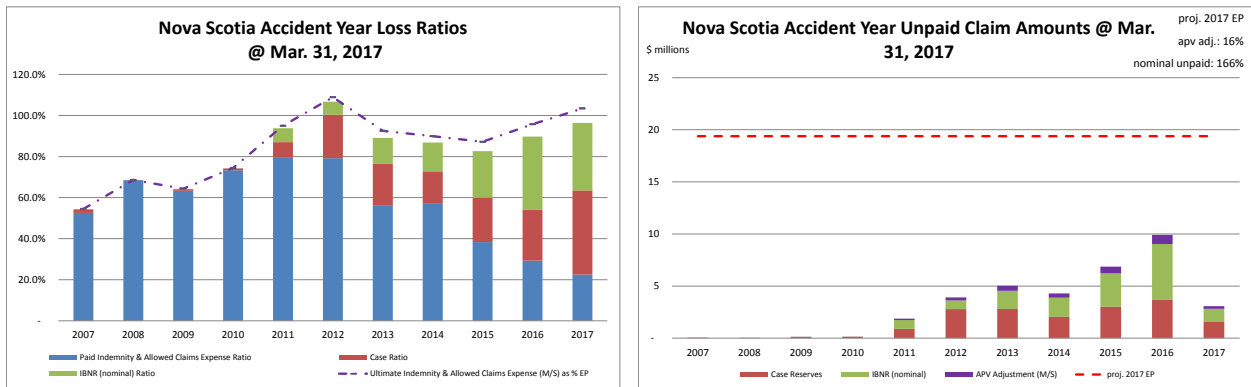
Consideration and assessment of potential impacts of legal decisions and changes in legislation / regulation constitutes a regular part of the valuation process. Descriptions of some of the more recent changes are provided below (there have been no changes in these descriptions since last month’s Highlights, other than updating that the most recent valuation is December 31, 2016).

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. With the most recent valuation (December 31, 2016), reform adjustments (originally introduced with the June 30, 2014 valuation) were explicitly taken into account with the industry trend analysis (completed using industry data as at December 31, 2015²), impacting the selection of ultimates.

1.5 Current Provision Summary

The charts immediately below show the current levels of claim liabilities³ 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.



"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 (\$3.1 million – see table at the top of the next page) 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.

²As per our usual practice, we did not perform a trend analysis based on June 30 industry private passenger data for Nova Scotia (we usually only perform trend analyses for Nova Scotia private passenger using Dec 31 industry data).

³Claim 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.

claim liabilities (\$000s)	amt	%
case	17,165	48.6%
ibnr	15,016	42.5%
M/S apv adjust.	3,134	8.9%
M/S total	35,315	100.0%

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 44% of the IBNR balance relates to accident years 2016 and 2017 (see Exhibit B). Approximately 83% 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)			policy liabilities (\$000s)		
	amt	%		amt	%
unearned prem	7,309	94.0%	claim	32,181	74.7%
prem def/(dpac)	(122)	(1.6%)	premium	7,187	16.7%
M/S apv adjust.	586	7.5%	M/S apv adjust.	3,720	8.6%
M/S total	7,773	100.0%	M/S total	43,088	100.0%

2 Activity During the Month of March 2017

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 Report⁴.

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	(1)	(1)	345	194	(3,817)	(3,707)	(3,473)	(3,514)
2015	(2)	(2)	69	(34)	265	285	333	250
2016	(20)	(20)	85	(113)	(211)	(132)	(126)	(245)
2017	1,323	(86)	329	(16)	403	120	732	104
TOTAL	1,300	(109)	828	30	(3,361)	(3,435)	(2,533)	(3,404)

(Recorded transaction amounts exclude IBNR & other actuarial provisions)

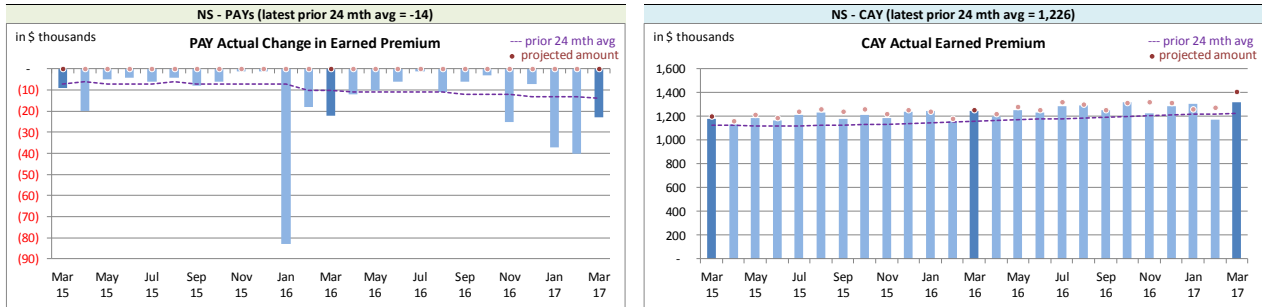
Claims transaction activity is generally volatile and changes from one month to the next are anticipated due to this natural "process variance" (this is particularly true where volumes are low). Each month, the projection variances are reviewed for signs of projection bias and to identify potential ways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

⁴There may be rounding differences in values in this document compared with the associated Bulletin and/or Operational Report.

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

The charts immediately below show actual **earned premium**⁵ 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.

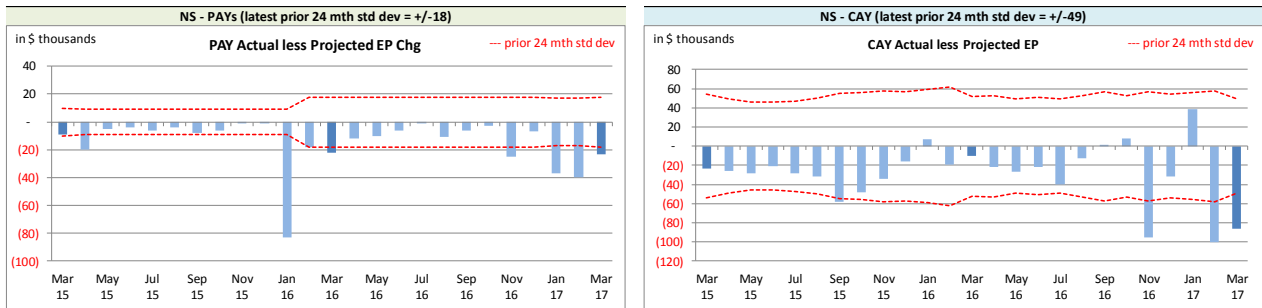
Nova Scotia RSP Actual Earned Premium by Calendar Month



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 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			
Earned Premium	PAYS	CAY	
Mthly Avg EP Chg (prior 24 mths)	(14)	1,226	
std dev	18	49	
A-P <> std dev	7	4	
% <> std dev	28.0%	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’ bias⁶, with actuals generally lower than projected. However, the

⁵Premium 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.

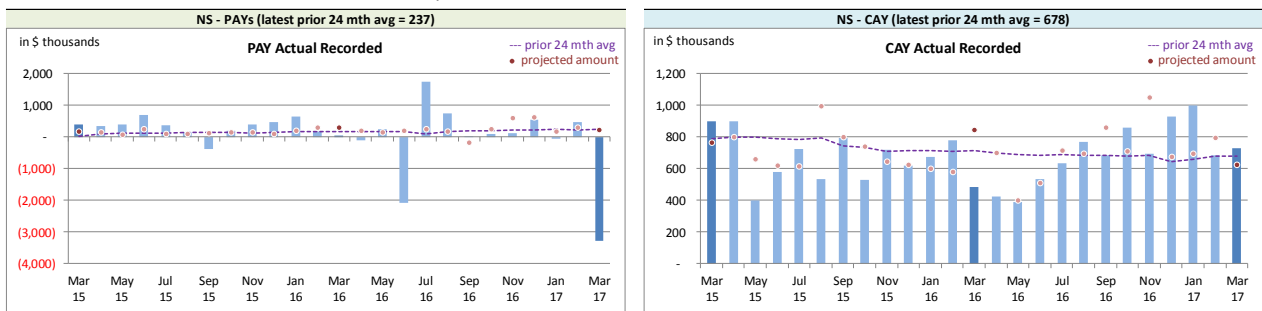
⁶The prior accident years (PAYS) variances will show bias as the projection upload forces all earned premium projections to be attributed to the current accident year.

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 at the bottom of the previous page). In addition to the prior accident years’ 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

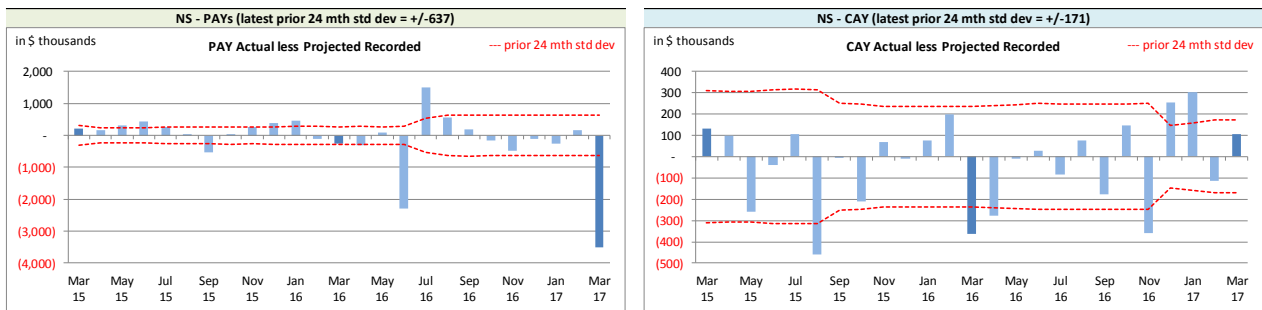
Actual **recorded** activity (**paid** and case reserve changes) over the last 25-month period are shown in the charts immediately below, including the “prior 24-month average” level.

Nova Scotia RSP Actual Recorded by Calendar Month



Recorded activity variances from the previous month’s projections are shown in the charts 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			
	Recorded	PAYS	CAY
Mthly Avg Recorded (prior 24 mths)		237	678
std dev		637	171
A-P <> std dev		10	6
% <> std dev		40.0%	24.0%
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.

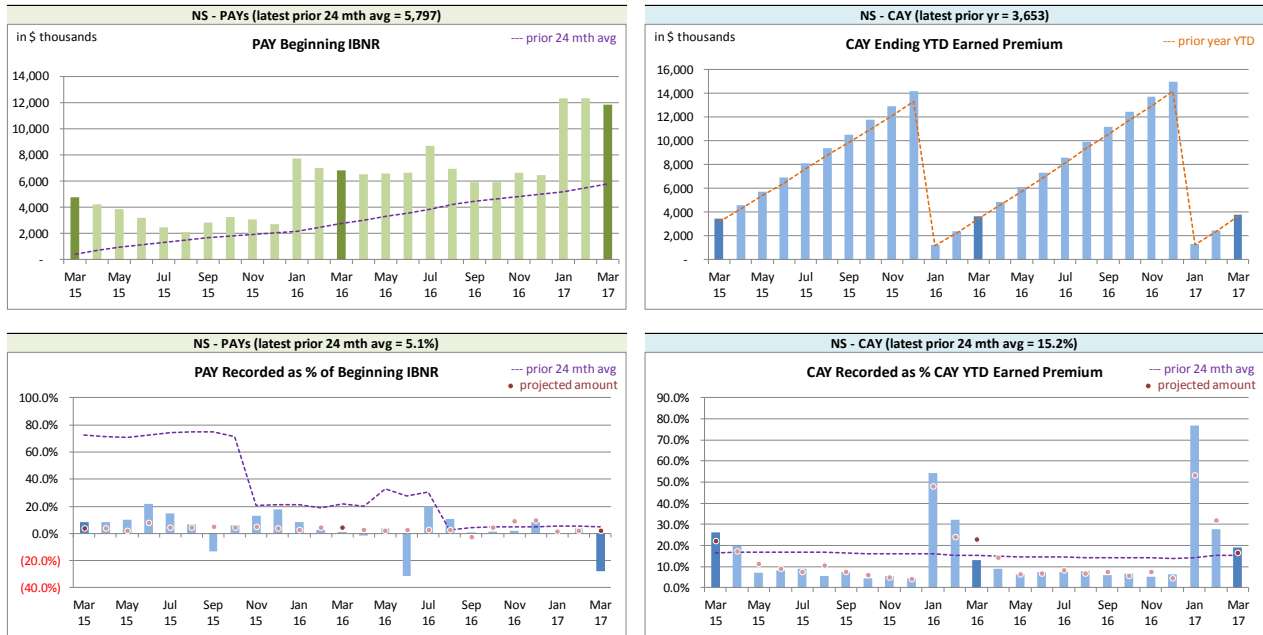
The PAY **recorded** variance for the current month was outside the one standard deviation band, and was an unusually high level in magnitude. At -\$3.3 million, it is the highest single month recorded activity level for prior accident years for May 2011 and onward (and likely the highest level ever for this RSP for prior accident years). The activity for this month was reviewed and the investigation revealed that one member company performed a claims system conversion, resulting in the closing of several open claims (with no associated payments) on the “old” system, with the case reserve take downs in total amounting to \$3.5 million. The closure amounts have been confirmed as correct with the member, and these claims are to be reopened in April (on the new system). Our investigation and discussion with the member continues 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 bottom of previous page), with 24% 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 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 influence⁷ 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 above) occur for several possible reasons:

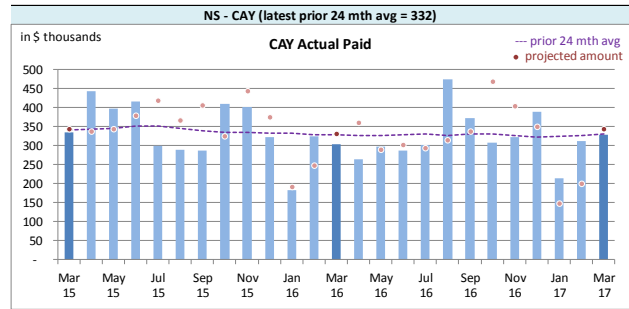
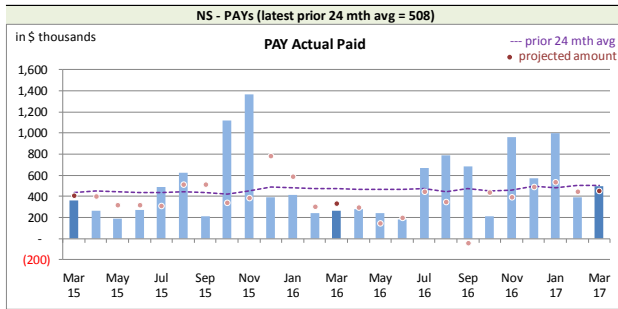
- to offset actual **recorded** activity (through loss ratio matching);
- the annual switchover as a current accident year becomes a prior accident year (occurs in January); and
- when a new valuation is implemented, where the valuation resulted in changes to the selection of prior accident years’ ultimate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

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.

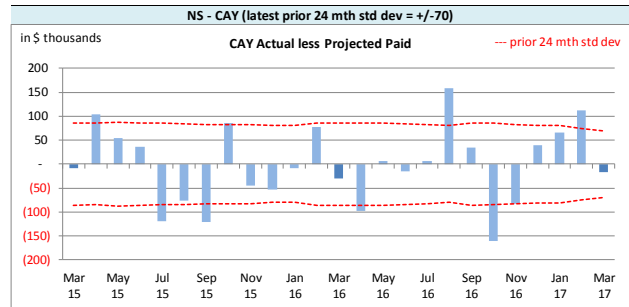
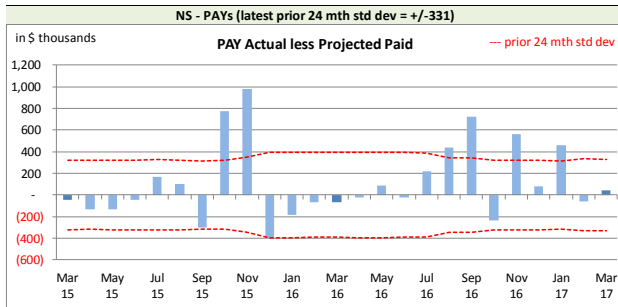
⁷Our recorded activity projections for the prior accident years are based on selected ratios of recorded activity to beginning unpaid balances, whereas the current accident year projections are based on selected ratios of year-to-date IBNR to year-to-date selected ultimate (i.e. selected LR x earned 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		
Paid	PAYs	CAY
Mthly Avg Paid (prior 24 mths)	508	332
std dev	331	70
A-P <> std dev	7	8
% <> std dev	28.0%	32.0%
norm <> std dev	31.7%	31.7%

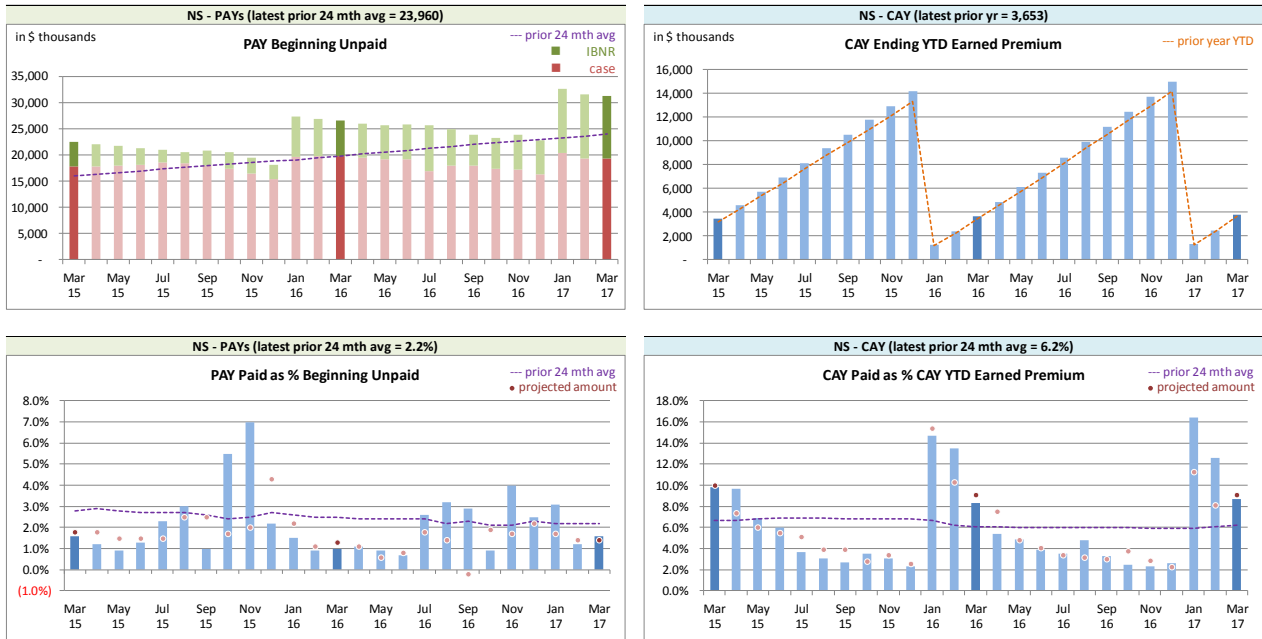
With respect to **paid** indemnity & allowed claims expense activity, caution must be exercised in reviewing the variances as this is a small pool and single claim transactions that are normal course for the business may look “unusual” and generate relatively “significant” variances that in nominal value 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 chart 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 (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. Further, 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 influence⁸ 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).

2.2 Actuarial Provisions

An “ultimate loss ratio matching method” (described in section 3) was used to determine the month’s IBNR⁹, 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 March 2017 Operational Report and the associated one-month projections from last month’s Report.

⁸Our 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.

⁹For 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	5,272	3,563	(300)	(141)	1,653	(39)	6,625	3,383
2015	3,187	(856)	(149)	(67)	790	(70)	3,828	(993)
2016	5,304	(520)	(271)	(126)	1,149	(72)	6,182	(718)
2017	1,253	(226)	(90)	(43)	352	(18)	1,515	(287)
TOTAL	15,016	1,961	(810)	(377)	3,944	(199)	18,150	1,385

The IBNR provision is \$2.0 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 below summarizes the variances in the provisions for premium deficiency liability / (deferred policy acquisition cost asset) included in the March 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:	(122)	(77)	586	(194)	464	(271)	
balance as % unearned premium:	(1.7%)	(1.1%)	8.0%	(1.7%)	6.3%	(2.8%)	
actual unearned premium:	7,309						
less projected:	(804)						

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 loss¹⁰ 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 expenses¹¹, 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 99.1% rather than 96.5% (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	(1,392)	(37.6%)	(701)	(18.9%)	(2,093)	(56.5%)	(1,887)	(47.9%)
CAY	3,670	99.1%	262	7.1%	3,932	106.2%	1,304	(3.1%)
TOTAL	2,277	61.5%	(439)	(11.9%)	1,838	49.6%	(583)	(51.1%)

(“% 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.

¹⁰“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).

¹¹Allowed 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 Feb. 2017	Actual Mar. 2017	Projected Apr. 2017	Projected May. 2017	Projected Dec. 2017
	2007	5	4	4	4	4
	2008	142	2	2	2	2
	2009	18	16	16	16	15
	2010	(17)	16	16	16	15
	2011	41	980	144	143	133
discount rate	2012	824	1,123	1,102	1,082	958
1.01%	2013	749	2,225	314	312	301
	2014	1,538	2,259	1,423	1,399	1,236
interest rate margin	2015	4,916	3,828	3,790	3,721	3,111
25 basis pts	2016	7,041	6,182	6,093	5,954	4,666
	2017	943	1,515	2,177	3,170	3,940
	TOTAL	16,200	18,150	15,081	15,819	14,381
	Change		1,950	(3,069)	738	

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. 2017	Actual Mar. 2017	Projected Apr. 2017	Projected May. 2017	Projected Dec. 2017
	54.3%	2007	1	1	1	1	1
	68.6%	2008	129	1	1	1	1
	64.2%	2009	7	5	5	5	5
	74.3%	2010	(27)	3	3	3	3
	93.8%	2011	(108)	834	-	-	-
	106.7%	2012	490	829	812	796	691
	89.0%	2013	185	1,749	(157)	(154)	(133)
	86.8%	2014	1,073	1,850	1,017	997	865
	82.6%	2015	4,126	3,187	3,155	3,092	2,576
	89.8%	2016	5,943	5,304	5,224	5,093	4,029
	96.5%	2017	733	1,253	1,831	2,738	2,820
		TOTAL	12,552	15,016	11,892	12,572	10,858
		Change		2,464	(3,124)	680	

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				
	Actual Feb. 2017	Actual Mar. 2017	Projected Apr. 2017	Projected May. 2017	Projected Dec. 2017
Premium Liabilities					
(1) unearned premium (UP)	7,117	7,309	7,642	8,117	16,828
FOR MEMBER SHARING					
(2) expected future costs ratio {% of (1)}	108.9%	106.3%	106.4%	106.6%	107.8%
(3) expected future costs {(1) x (2)}	7,752	7,773	8,134	8,651	18,137
(4) premium deficiency / (deferred policy acquisition cost)	635	464	492	534	1,309
Excluding Actuarial Present Value Adjustments					
(5) expected future costs ratio {% of (1)}	99.3%	98.3%	98.4%	98.5%	99.6%
(6) expected future costs {(1) x (5)}	7,067	7,187	7,521	7,997	16,768
(7) premium deficiency / (deferred policy acquisition cost)	(50)	(122)	(121)	(120)	(60)

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 ending 2017		Projected Balances as at Dec. 31, 2017 (\$000s)							
		nominal values			actuarial present value adjustments (apvs)				TOTAL
Acc Yr	Case	IBNR	Total Unpaid	discount	investment PFAD	development PFAD	Total apvs		
2007	37	1	38	(1)	-	4	3	41	
2008	12	1	13	-	-	1	1	14	
2009	109	5	114	(1)	-	11	10	124	
2010	128	3	131	(2)	1	13	12	143	
2011	1,582	-	1,582	(28)	6	155	133	1,715	
2012	2,621	691	3,312	(76)	20	323	267	3,579	
2013	4,294	(133)	4,161	(92)	21	505	434	4,595	
2014	2,653	865	3,518	(74)	18	427	371	3,889	
2015	2,611	2,576	5,187	(124)	31	628	535	5,722	
2016	2,513	4,029	6,542	(196)	52	781	637	7,179	
PAYs (sub-total):	16,560	8,038	24,598	(594)	149	2,848	2,403	27,001	
CAY (2017)	9,210	2,820	12,030	(385)	96	1,409	1,120	13,150	
claims liabilities:	25,770	10,858	36,628	(979)	245	4,257	3,523	40,151	
	Unearned Premium	Premium Deficiency / (DPAC)	Total Provision	discount	investment PFAD	development PFAD	Total apvs	TOTAL*	
premium liabilities:	16,828	(60)	16,768	(445)	115	1,699	1,369	18,137	
*Total may not be sum of parts, as apvs apply to future costs within UPR									
policy liabilities:			53,396	(1,424)	360	5,956	4,892	58,288	

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.

Selected Claims Development MfADs (Dec. 31, 2016)				
Accident Year	Third Party Liability	Accident Benefits	Other Coverages	Total
2007	10.0%	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%	10.0%	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%
prem liab	12.0%	10.0%	5.2%	10.6%
			discount rate:	1.01%
			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 (1.01%), the prior valuation assumption (0.51%) 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

Actuarial Present Value of Provisions at Various Discount Rates - Dec. 31, 2017 projected Unpaid								
AY	0.51%	1.01%	1.51%	2.01%	2.51%	3.01%	0.51%	0.51%
2007	14	14	14	14	14	14	14	14
2008	29	29	29	29	28	28	29	29
2009	67	67	67	66	66	65	67	67
2010	233	231	230	228	226	225	233	233
2011	1,494	1,481	1,468	1,455	1,443	1,430	1,494	1,494
2012	2,718	2,687	2,657	2,628	2,600	2,572	2,718	2,718
2013	3,345	3,309	3,273	3,238	3,204	3,171	3,345	3,345
2014	3,550	3,513	3,477	3,442	3,407	3,373	3,550	3,550
2016	8,399	8,276	8,156	8,040	7,926	7,815	8,399	8,399
2017	16,982	16,711	16,445	16,188	15,937	15,694	16,982	16,982
Total	42,881	42,295	41,721	41,165	40,620	40,090	42,881	42,881
	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	0.51%	1.01%	1.51%	2.01%	2.51%	3.01%	0.51%	0.51%
Total	586	-	(574)	(1,130)	(1,675)	(2,205)	586	586
	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	0.51%	1.01%	1.51%	2.01%	2.51%	3.01%	0.51%	0.51%
2007	-	-	-	-	-	-	-	-
2008	-	-	-	-	(3.4%)	(3.4%)	-	-
2009	-	-	-	(1.5%)	(1.5%)	(3.0%)	-	-
2010	0.9%	-	(0.4%)	(1.3%)	(2.2%)	(2.6%)	0.9%	0.9%
2011	0.9%	-	(0.9%)	(1.8%)	(2.6%)	(3.4%)	0.9%	0.9%
2012	1.2%	-	(1.1%)	(2.2%)	(3.2%)	(4.3%)	1.2%	1.2%
2013	1.1%	-	(1.1%)	(2.1%)	(3.2%)	(4.2%)	1.1%	1.1%
2014	1.1%	-	(1.0%)	(2.0%)	(3.0%)	(4.0%)	1.1%	1.1%
2016	1.5%	-	(1.4%)	(2.9%)	(4.2%)	(5.6%)	1.5%	1.5%
2017	1.6%	-	(1.6%)	(3.1%)	(4.6%)	(6.1%)	1.6%	1.6%
Total	1.4%	-	(1.4%)	(2.7%)	(4.0%)	(5.2%)	1.4%	1.4%
	curr - 50 bp	curr val assumption	curr + 50bp	curr + 100bp	curr + 150bp	curr + 200bp	prior val assumption	prior fyr end assumption

EXHIBIT G

Page 1 of 2

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	5	-	-	(1)	(1)	(20.0%)	4
2008	142	(3)	2	(139)	(140)	(98.6%)	2
2009	18	-	(2)	-	(2)	(11.1%)	16
2010	(17)	1	-	32	33	(194.1%)	16
2011	41	(1)	794	146	939	2,290.2%	980
2012	824	(14)	298	15	299	36.3%	1,123
2013	749	(10)	1,525	(39)	1,476	197.1%	2,225
2014	1,538	(31)	871	(119)	721	46.9%	2,259
2015	4,916	(95)	(248)	(745)	(1,088)	(22.1%)	3,828
2016	7,041	(141)	235	(953)	(859)	(12.2%)	6,182
2017	943	859	(195)	(92)	572	60.7%	1,515
Grand Total	16,200	565	3,280	(1,895)	1,950	12.0%	18,150

EXHIBIT G

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

RSP Nova Scotia
AccountCode Desc IBNR - Undiscounted

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	1	-	-	-	-	-	1
2008	129	(3)	2	(127)	(128)	(99.2%)	1
2009	7	-	(2)	-	(2)	(28.6%)	5
2010	(27)	1	-	29	30	(111.1%)	3
2011	(108)	2	792	148	942	(872.2%)	834
2012	490	(10)	296	53	339	69.2%	829
2013	185	(4)	1,554	14	1,564	845.4%	1,749
2014	1,073	(27)	870	(66)	777	72.4%	1,850
2015	4,126	(83)	(252)	(604)	(939)	(22.8%)	3,187
2016	5,943	(119)	226	(746)	(639)	(10.8%)	5,304
2017	733	746	(188)	(38)	520	70.9%	1,253
Grand Total	12,552	503	3,298	(1,337)	2,464	19.6%	15,016