



NOVA SCOTIA RISK SHARING POOL

MARCH 2018 OPERATIONAL REPORT

ACTUARIAL HIGHLIGHTS

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ACTUARIAL HIGHLIGHTS
RSP NOVA SCOTIA
OPERATIONAL REPORT
MARCH 2018

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1 Summary

1.1 Valuation Schedule (Fiscal Year 2018)

The March 2018 Operational Report incorporates the results of an updated valuation (as at December 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 2018.

NOVA SCOTIA RISK SHARING POOL FISCAL YEAR 2018 – SCHEDULE OF VALUATIONS			
Valuation Date	Discount Rate (per annum)	Operational Report	Description of Changes
Sep. 30, 2017 (completed)	1.73% mfad: 25 bp	Oct. 2017	updated valuation (roll forward): accident year 2017 loss ratio increased 1.1 points to 93.2%; discount rate increased by 56 basis points; no change to selected margins for adverse deviations
Dec. 31, 2017 (completed)	1.73% mfad: 25 bp	Mar. 2018	update valuation: accident year 2018 loss ratio increased 1.2 points to 93.6%; no change to selected discount rate; no change to selected margins for adverse deviations
Mar. 31, 2018		May 2018	update valuation (roll forward):
Jun. 30, 2018		Aug. 2018	update valuation:
Sep. 30, 2018		Oct. 2018	update valuation (roll forward):

Under the proposed schedule for fiscal year 2018, the “off-half” valuation quarters ending March 31, 2018 and September 30, 2018 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 September 30, 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 which we anticipate will be posted to the FA website in early May.

The valuation implementation impact is summarized in the tables on the next page.

Summary of Impact (\$000s) of Implementing Result of Valuation as at December 31, 2017¹

NS	unfav / (fav) for the month and ytd					
	IMPACT in \$000s 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	(2,271)	(13)	(2,284)	-	-	(2,284)
CAY	78	16	94	-	-	94
Prem Def	155	23	178	-	-	178
TOTAL	(2,038)	26	(2,012)	-	-	(2,012)

As indicated in the table above, the incorporation of the new valuation had an estimated **\$2.0 million favourable impact** on the month's net result from operations, subtracting an estimated 31.1 points (see table below) from the **year-to-date Combined Operating Ratio** to end at **95.2%**.

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

NS	ytd EP 6,467 (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	(35.1%)	(0.2%)	(35.3%)	-	-	(35.3%)
CAY	1.2%	0.2%	1.5%	-	-	1.5%
Prem Def	2.4%	0.4%	2.8%	-	-	2.8%
TOTAL	(31.5%)	0.4%	(31.1%)	-	-	(31.1%)

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 \$2.0 million overall. This reflects the impact attributable to the changes in the selected ultimate loss ratios (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 \$2.3 million favourable variance. Of this amount, \$1.3 million was directly attributable to valuation adjustments made to reflect a known overstatement of a member's reported case reserves. Specifically, as noted in the last two month's Actuarial Highlights, FA management was notified on January 31, 2018 by a member of a potential recorded case reserve overstatement. Furthermore, during the current valuation review, FA management was advised of an additional and separate recorded case reserve understatement primarily due to incorrect reporting after FA's October 31, 2017 fiscal year end. Management

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.

investigated and estimated the overall overstatement for the Nova Scotia RSP as at December 31, 2017 as indicated in the table immediately below.

Estimated case reserve overstatement as at Dec 31, 2017

Accident Year	Total Case Reserve Adjustment (\$'000s)
2012	36
2013	204
2014	42
2015	91
2016	583
2017	349
Total	1,305

A decision was made by management and the Appointed Actuary, after receiving the initial January 2018 notification, to not make an adjustment to selected loss ratios until the 2017 Q4 RSP valuation was completed (however, for the purposes of the fiscal year-end financial reporting, an adjustment was made). With this valuation, prior accident years’ ultimates selections have now taken into account the member’s overstatement (both the original amount as notified, and the subsequent amount, with the combination of the two being summarized in the table above). FA management is working with the member on a process to correct the reported levels, and we currently anticipate that this will be either partially or entirely completed in time for the 2018 Q2 valuation.

The overall favourable prior accident years change is 6.7% of the prior accident years’ nominal unpaid balance of \$34.1 million determined at the end of last month (February 2018). 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 **2018** (up 1.2 points from 92.4% to **93.6%**) and **2019** (up 0.4 point from 94.9% to **95.3%**). Generally, as a smaller pool, we would 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 selected margins for adverse deviations or “MfADs” (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 MfADs (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 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 \$26 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 2017. Column [4] accounts for any changes to the selected **discount rate**. The current selected **discount rate** was unchanged from the prior selected at **1.73%** and, as a result, there was no associated impact.

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 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

There have been no changes in these descriptions since last month's Highlights.

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 **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[aadati] psychological injuries, including personality change and cognitive difficulties. ...and awarded S[aadati] \$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:

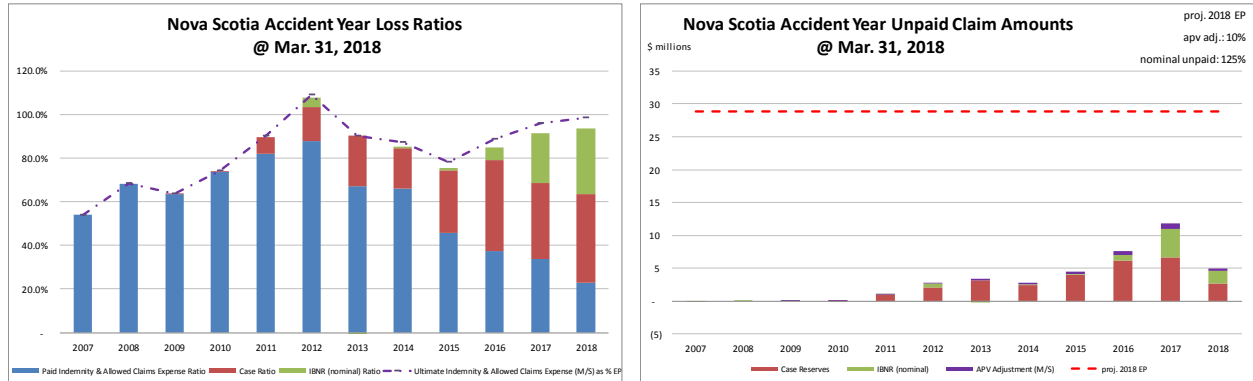
- "*A finding of legally compensable mental injury need not rest, in whole or in part, on the claimant proving a recognized psychiatric injury.*"
- "*...a trier of fact adjudicating a claim of mental injury is not concerned with diagnosis, but with symptoms and their effects.*"
- "*Expert evidence can 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 immediately below show the current levels of claim liabilities² 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 2018 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 (\$2.9 million – see table immediately below) represents 10% of the earned premium projected for the full year 2018 (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	28,264	72.8%
ibnr	7,694	19.8%
M/S apv adjust.	2,874	7.4%
M/S total	38,832	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 82% of the IBNR balance relates to accident years 2017 and 2018 (see Exhibit B). Approximately 82% of the M/S

total claim liabilities are related to accident years 2014-2018 inclusive (i.e. the most recent 5 accident years).

The tables at the top of the next page summarize the premium liabilities and the total policy liabilities.

²Claim 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.

premium liabilities (\$000s)			policy liabilities (\$000s)		
	amt	%		amt	%
unearned prem	13,377	98.8%	claim	35,958	68.7%
prem def/(dpac)	(610)	(4.5%)	premium	12,767	24.4%
M/S apv adjust.	772	5.7%	M/S apv adjust.	3,646	7.0%
M/S total	13,539	100.0%	M/S total	52,371	100.0%

2 Activity During the Month of March 2018

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 Report³.

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	0	0	99	(106)	112	262	211	156
2016	(1)	(1)	225	148	(137)	(100)	88	48
2017	(8)	(8)	104	(11)	(307)	(237)	(203)	(248)
2018	2,291	(36)	735	128	745	(1)	1,480	127
TOTAL	2,282	(45)	1,162	159	413	(75)	1,575	83

(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” (i.e. random variation), and this is particularly true where volumes are low as found in this RSP. 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.

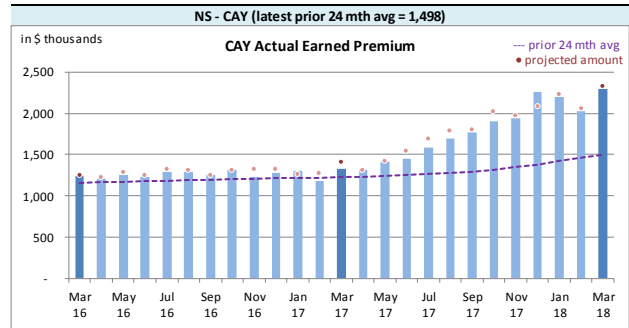
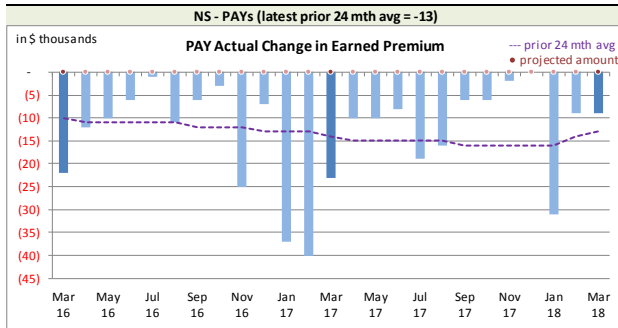
2.1.a Actual vs. Projected (AvsP): Earned Premium

The charts at the top of the next page show actual **earned premium**⁴ 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.

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

⁴Premium 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.

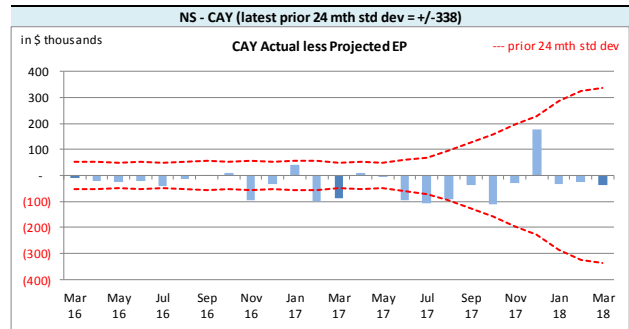
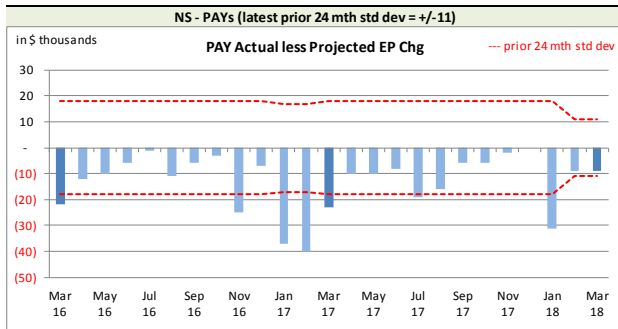
Nova Scotia RSP Actual Earned Premium by Calendar Month



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		
Earned Premium	PAYs	CAY
Mthly Avg EP Chg (prior 24 mths)	(13)	1,498
std dev	11	338
A-P <> std dev	7	5
% <> std dev	28.0%	20.0%
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) bias⁵, 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 left table above). In addition to the PAYs' bias, the CAY has also shown bias⁶, with actuals being generally lower than projected, and we have modified

⁵The PAYs' variances will show bias as the projection upload forces all earned premium projections to be attributed to the CAY.

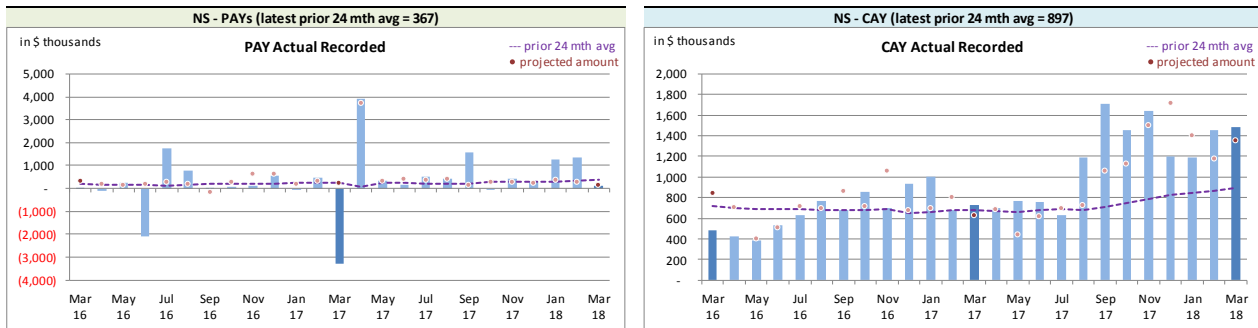
⁶We measure bias based on a 95% confidence range for a binominal distribution with trials based on the range being considered (24 in this case) and 50% probability of success. The 24-month variances at March 2018 has only 5 months where the projection was higher than projected, and as the 95% confidence range is 7 to 17, bias continues to be indicated.

our projections processes in response. Over time, we may consider other projection approaches to narrow monthly variance levels further, but it is not currently deemed a priority. Projection variances have also been exacerbated by written premium variances, where our projections, based on information provided by larger RSP users, have been proven to be too high. Notwithstanding the projection misses, readers will also note the significant widening of the CAY standard deviation band, reflecting the recent and sustained volume increases and the impact as those increases are earned.

2.1.b AvsP: Recorded Indemnity & Allowed Claims Expense

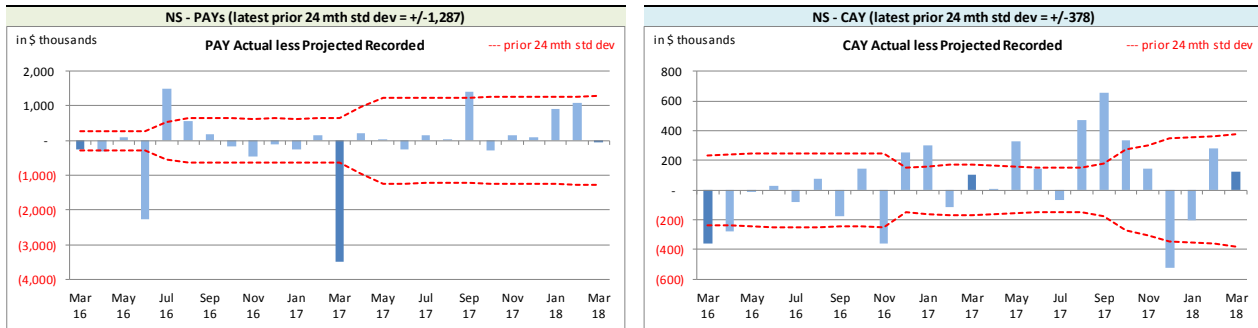
The charts immediately below show actual **recorded** activity (**paid** and case reserve changes), in each of the most recent 25 calendar months, along with a “prior 24-month average” to show how each month’s actual compares with the average amount of the preceding 24 calendar months.

Nova Scotia RSP Actual 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 to show how the variances from projection compare with historical standard deviations.

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



On Latest \$ thousands		
Recorded	PAYS	CAY
Mthly Avg Recorded (prior 24 mths)	367	897
std dev	1,287	378
A-P <> std dev	5	10
% <> std dev	20.0%	40.0%
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), 20% of

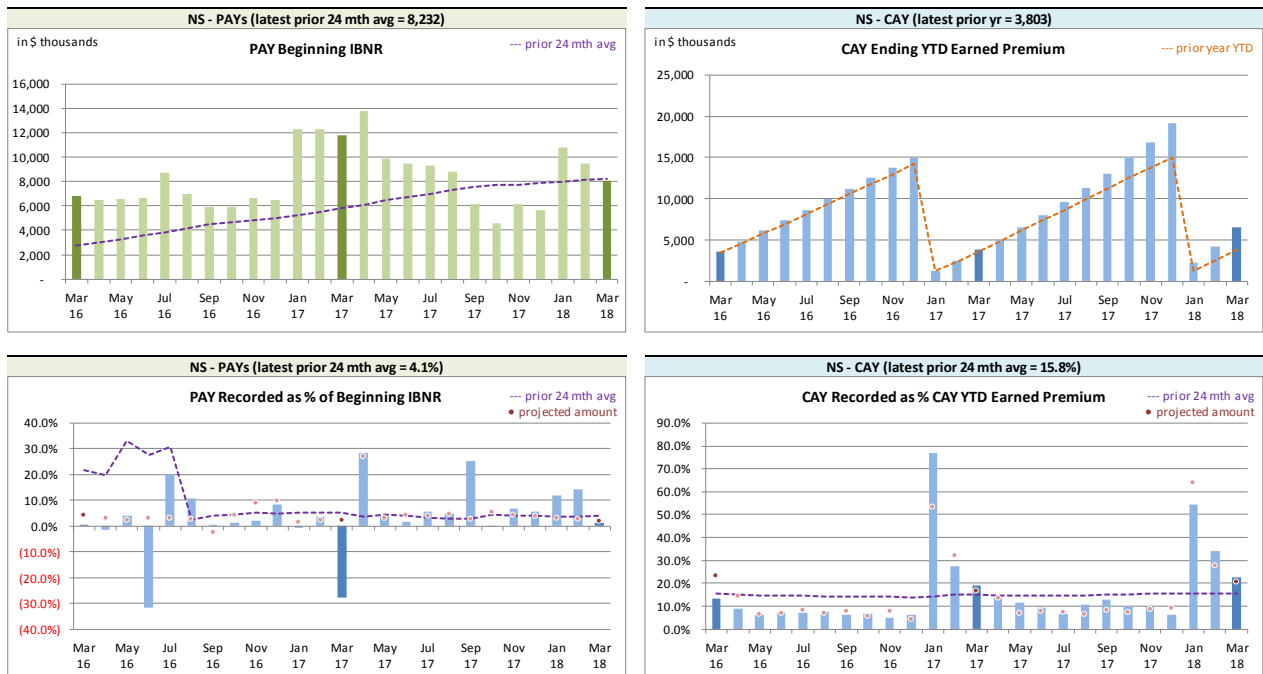
variances in excess of one standard deviation suggests the projection process has performed better than simply projecting based on a 24-month average. No bias has been indicated at a 95% confidence level on a lagging 24-month basis.

The current accident year (CAY) **recorded** variances (right chart at the bottom of the prior page) have resulted in 40% of the last 24 months generating variances in excess of a 24-month standard deviation, suggesting the projection process has performed worse than simply projecting based on a 24-month average. We are considering ways to improve our projection process as a result. No bias has been indicated at a 95% confidence level on a lagging 24-month basis.

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. 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);

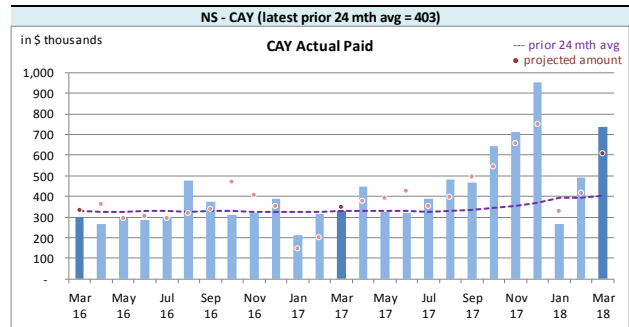
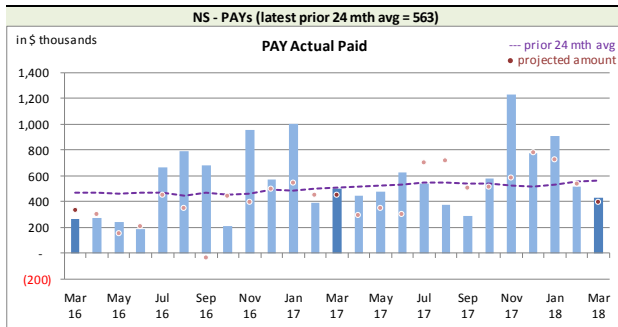
⁷Our recorded activity projections for the prior accident years are based on selected ratios of recorded activity to beginning unpaid balances, whereas the current accident year projections are based on selected ratios of year-to-date IBNR to year-to-date selected ultimate (i.e. selected LR x earned 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.

- 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

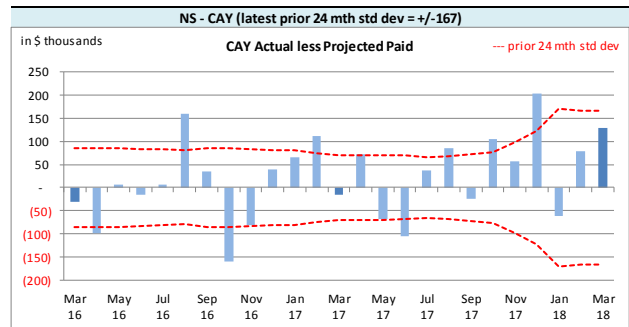
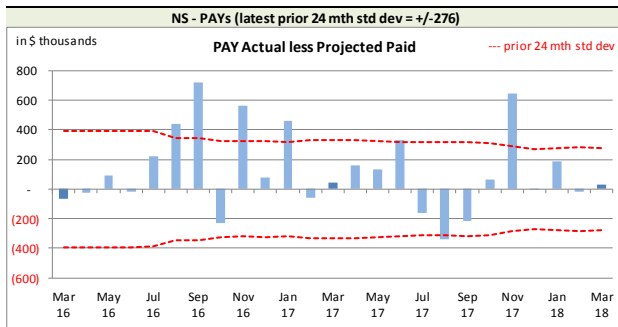
The charts immediately below show actual **paid** activity in each of the most recent 25 calendar months, along with a “prior 24-month average” to show how each month’s actual compares with the average amount of the preceding 24 calendar months.

Nova Scotia RSP Actual Paid by activity Calendar Month



Paid activity variances from the previous month’s projections are shown in the charts immediately below, including the “prior 24-month standard deviation” levels 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)		563	403
std dev		276	167
A-P <> std dev		7	9
% <> std dev		28.0%	36.0%
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.

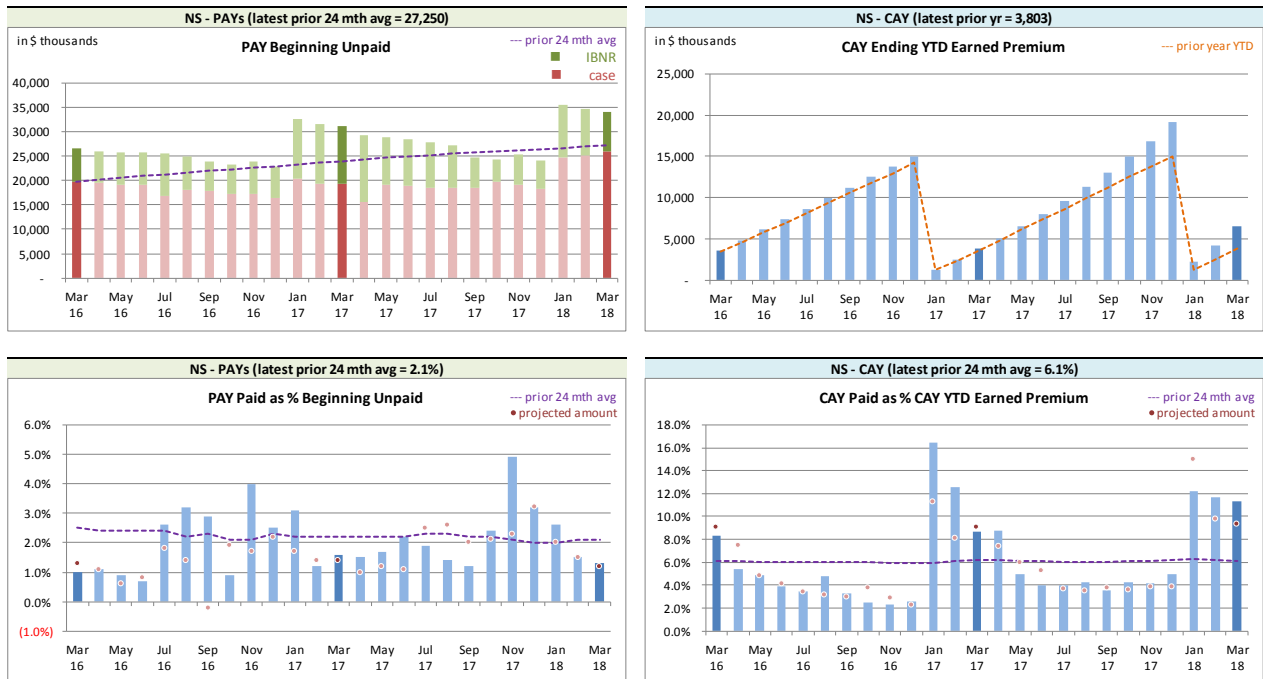
28% of months with prior accident years (PAYS) **paid** variances were in excess of a prior 24-month

standard deviation (see table at the bottom of the previous page), suggesting the projection process has performed no better than simply projecting based on the previous 24-month average. No bias has been indicated at a 95% confidence level on a lagging 24-month basis.

The current accident year (CAY) **paid** variances (see right chart at the bottom of the prior page), do not appear to indicate bias. At 36% of projections outside of one standard deviation (see table at the bottom of the previous page), the projection process has performed no better than simply projecting based on the previous 24-month average. No bias has been indicated at a 95% confidence level on a lagging 24-month basis.

We have included, for reference, additional charts immediately below 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

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.

- 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 immediately below summarizes variances in provisions included in the March 2018 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

Accident Year	IBNR		actuarial present value adjustments				IBNR + actuarial present value adjustments	
	Actual	Actual less Projected	Discount Amount		Provisions for Adverse Deviations		Actual	Actual less Projected
			Actual	Actual less Projected	Actual	Actual less Projected		
Prior	553	(1,650)	(376)	127	1,502	(159)	1,679	(1,682)
2016	823	(479)	(267)	52	858	(68)	1,414	(495)
2017	4,343	(103)	(506)	50	1,346	(17)	5,183	(70)
2018	1,975	(83)	(235)	13	552	(9)	2,292	(79)
TOTAL	7,694	(2,315)	(1,384)	242	4,258	(253)	10,568	(2,326)

The IBNR provision is \$2.3 million lower than projected from 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:

- the change projected last month;
- 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
- 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 premium deficiency liability / (deferred policy acquisition cost asset) included in the March 2018 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) prior to actuarial present value adjustments and in a premium deficiency position (shown as a positive value) after actuarial present

⁹For ease of discussion, “IBNR” is used in place of “provisions for incurred but not recorded (IBNR) and development”.

value adjustments. Actuarial present value adjustments increase the liability value as the adjustments increase the expected future policy obligations (costs) associated with the unearned premium. The variances noted are mainly driven by the unearned premium variance and due to 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:	(610)	159	772	17	162	176
balance as % unearned premium:	(4.6%)	1.1%	5.8%	0.2%	1.2%	1.3%
actual unearned premium:	13,377					
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 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 at the top of the next page 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 94.3% rather than 93.6% (the valuation ultimate ratio for accident year 2018), 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.)

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.

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	(2,314)	(35.8%)	3	-	(2,311)	(35.7%)	(2,324)	(36.0%)
CAY	6,098	94.3%	317	4.9%	6,415	99.2%	2,303	0.9%
TOTAL	3,784	58.5%	320	4.9%	4,104	63.5%	(22)	(35.1%)

(“% EP” based on 2018 calendar year-to-date earned premium; ratios may not total due to rounding)

In general, prior accident years (PAYs) changes from last month are due to the release of the actuarial present value adjustments with claims payments, except when valuations are implemented. The loss ratio change year-to-date in Table 04 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.

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. 2018	Actual Mar. 2018	Projected Apr. 2018	Projected May. 2018	Projected Dec. 2018
	2007	9	(1)	(1)	(1)	(1)
	2008	2	2	2	2	1
	2009	57	10	10	10	7
	2010	20	3	2	2	3
	2011	287	71	70	69	60
	2012	790	751	742	735	456
discount rate	2013	164	(49)	(49)	(49)	59
1.73%	2014	565	365	353	350	262
	2015	1,540	527	518	505	429
interest rate margin	2016	1,956	1,414	1,337	1,303	1,022
25 basis pts	2017	5,306	5,183	5,088	4,943	3,742
	2018	1,469	2,292	2,976	4,341	9,366
	TOTAL	12,165	10,568	11,048	12,210	15,406
	Change		(1,597)	480	1,162	

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. 2018	Actual Mar. 2018	Projected Apr. 2018	Projected May. 2018	Projected Dec. 2018
	53.9%	2007	8	(1)	(1)	(1)	(1)
	68.3%	2008	2	2	2	2	1
	63.8%	2009	47	5	5	5	3
	74.0%	2010	14	(1)	(1)	(1)	(1)
	89.5%	2011	201	4	4	4	2
	107.7%	2012	598	573	567	561	298
	88.4%	2013	(35)	(277)	(274)	(271)	(143)
	85.3%	2014	323	104	100	99	59
	75.3%	2015	1,100	144	143	134	92
	84.7%	2016	1,342	823	757	734	518
	91.4%	2017	4,491	4,343	4,256	4,128	3,005
	93.6%	2018	1,260	1,975	2,569	3,821	8,125
		TOTAL	9,351	7,694	8,127	9,215	11,958
		Change		(1,657)	433	1,088	

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

EXHIBIT C

Premium Liabilities

TABLE EXHIBIT C

	Amounts in \$000s				
	Actual Feb. 2018	Actual Mar. 2018	Projected Apr. 2018	Projected May. 2018	Projected Dec. 2018
Premium Liabilities					
(1) unearned premium (UP)	13,495	13,377	13,717	14,350	15,840
FOR MEMBER SHARING					
(2) expected future costs ratio {% of (1)}	99.8%	101.2%	101.3%	101.4%	102.9%
(3) expected future costs {(1) x (2)}	13,467	13,539	13,898	14,558	16,302
(4) premium deficiency / (deferred policy acquisition cost)	(28)	162	181	208	462
Excluding Actuarial Present Value Adjustments					
(5) expected future costs ratio {% of (1)}	94.2%	95.4%	95.5%	95.7%	97.0%
(6) expected future costs {(1) x (5)}	12,712	12,767	13,105	13,728	15,372
(7) premium deficiency / (deferred policy acquisition cost)	(783)	(610)	(612)	(622)	(468)

EXHIBIT D

Projected Year-end Policy Liabilities

The table below presents the projected policy liabilities as at December 31, 2018, broken down by component.

Nova Scotia ending 2018		Projected Balances as at Dec. 31, 2018 (\$000s)									
Acc Yr	nominal values			actuarial present value adjustments (apvs)						TOTAL	
	Case	IBNR	Total Unpaid	discount	investment PfAD	nominal development PfAD	development PfAD discount	development PfAD	Total apvs		
2007	-	(1)	(1)	-	-	-	-	-	-	(1)	
2008	1	1	2	-	-	-	-	-	-	2	
2009	60	3	63	(2)	-	6	-	6	4	67	
2010	50	(1)	49	(1)	-	5	-	5	4	53	
2011	832	2	834	(26)	4	83	(3)	80	58	892	
2012	2,031	298	2,329	(79)	12	233	(8)	225	158	2,487	
2013	2,740	(143)	2,597	(62)	10	260	(6)	254	202	2,799	
2014	1,935	59	1,994	(46)	8	247	(6)	241	203	2,197	
2015	3,548	92	3,640	(109)	15	444	(13)	431	337	3,977	
2016	5,453	518	5,971	(227)	30	729	(28)	701	504	6,475	
2017	6,645	3,005	9,650	(444)	58	1,177	(54)	1,123	737	10,387	
PAYs (sub-total):	23,295	3,833	27,128	(996)	137	3,184	(118)	3,066	2,207	29,335	
CAY (2018)	9,885	8,125	18,010	(919)	126	2,143	(109)	2,034	1,241	19,251	
claims liabilities:	33,180	11,958	45,138	(1,915)	263	5,327	(227)	5,100	3,448	48,586	
	Unearned Premium	Premium Deficiency / (DPAC)	Total Provision	discount	investment PfAD	nominal development PfAD	development PfAD discount	development PfAD	Total apvs	TOTAL*	
premium liabilities:	15,840	(468)	15,372	(649)	91	1,555	(67)	1,488	930	16,302	
							*Total may not be sum of parts, as apvs apply to future costs within UPR				
policy liabilities:			60,510	(2,564)	354	6,882	(294)	6,588	4,378	64,888	

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, 2018 from the valuation), followed by the selected discount rate and the associated margin for investment income.

Selected Claims Development MfADs (Dec. 31, 2017)

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	10.0%	10.0%	9.9%	10.0%
2014	12.5%	10.0%	6.6%	12.4%
2015	12.4%	10.0%	6.3%	12.2%
2016	12.5%	10.0%	6.7%	12.2%
2017	12.5%	10.0%	7.1%	12.2%
2018	12.4%	10.0%	5.8%	11.9%
prem liab	12.0%	10.0%	5.1%	10.3%

discount rate:	1.73%
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, 2018 from the latest valuation date (projections in exhibits A to D are also to Dec. 31, 2018, but are based on more up-to-date information). We have included the most recent valuation selection (1.73%), the prior valuation assumption (1.73%) and the prior fiscal year end valuation assumption (1.73%) 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, 2018 projected Unpaid								
AY	0.73%	1.23%	1.73%	2.23%	2.73%	3.23%	1.73%	1.73%
2007	-	-	-	-	-	-	-	-
2008	-	-	-	-	-	-	-	-
2009	29	28	28	28	28	28	28	28
2010	26	25	25	25	25	25	25	25
2011	676	671	666	662	657	653	666	666
2012	1,763	1,747	1,732	1,717	1,702	1,687	1,733	1,733
2013	2,391	2,365	2,339	2,314	2,289	2,264	2,340	2,340
2014	1,806	1,786	1,766	1,747	1,728	1,709	1,767	1,767
2015	3,685	3,646	3,608	3,571	3,534	3,498	3,609	3,609
2016	6,811	6,727	6,644	6,565	6,487	6,410	6,648	6,648
2017	10,603	10,448	10,297	10,149	10,006	9,866	10,302	10,302
2018	22,058	21,712	21,374	21,049	20,731	20,420	21,389	21,389
Total	49,848	49,155	48,479	47,827	47,187	46,560	48,507	48,507
	curr - 100 bp	curr - 50 bp	curr val assumption	curr + 50bp	curr + 100bp	curr + 150bp	prior val assumption	prior fyr end assumption

Dollar Impact Relative to Valuation Assumption								
AY	0.73%	1.23%	1.73%	2.23%	2.73%	3.23%	1.73%	1.73%
Total	1,369	676	-	(652)	(1,292)	(1,919)	28	28
	curr - 100 bp	curr - 50 bp	curr val assumption	curr + 50bp	curr + 100bp	curr + 150bp	prior val assumption	prior fyr end assumption

Percentage Impact Relative to Valuation Assumption								
AY	0.73%	1.23%	1.73%	2.23%	2.73%	3.23%	1.73%	1.73%
2007	-	-	-	-	-	-	-	-
2008	-	-	-	-	-	-	-	-
2009	3.6%	-	-	-	-	-	-	-
2010	4.0%	-	-	-	-	-	-	-
2011	1.5%	0.8%	-	(0.6%)	(1.4%)	(2.0%)	-	-
2012	1.8%	0.9%	-	(0.9%)	(1.7%)	(2.6%)	0.1%	0.1%
2013	2.2%	1.1%	-	(1.1%)	(2.1%)	(3.2%)	0.0%	0.0%
2014	2.3%	1.1%	-	(1.1%)	(2.2%)	(3.2%)	0.1%	0.1%
2015	2.1%	1.1%	-	(1.0%)	(2.1%)	(3.0%)	0.0%	0.0%
2016	2.5%	1.2%	-	(1.2%)	(2.4%)	(3.5%)	0.1%	0.1%
2017	3.0%	1.5%	-	(1.4%)	(2.8%)	(4.2%)	0.0%	0.0%
2018	3.2%	1.6%	-	(1.5%)	(3.0%)	(4.5%)	0.1%	0.1%
Total	2.8%	1.4%	-	(1.3%)	(2.7%)	(4.0%)	0.1%	0.1%
	curr - 100 bp	curr - 50 bp	curr val assumption	curr + 50bp	curr + 100bp	curr + 150bp	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 - Discou -td

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	9	-	-	(10)	(10)	(111.1%)	(1)
2008	2	-	-	-	-	-	2
2009	57	(1)	1	(47)	(47)	(82.5%)	10
2010	20	-	-	(17)	(17)	(85.0%)	3
2011	287	(3)	3	(216)	(216)	(75.3%)	71
2012	790	(8)	10	(41)	(39)	(4.9%)	751
2013	164	(3)	(133)	(77)	(213)	(129.9%)	(49)
2014	565	(10)	2	(192)	(200)	(35.4%)	365
2015	1,540	(48)	(28)	(937)	(1,013)	(65.8%)	527
2016	1,956	(47)	(59)	(436)	(542)	(27.7%)	1,414
2017	5,306	(53)	241	(311)	(123)	(2.3%)	5,183
2018	1,469	902	(173)	94	823	56.0%	2,292
Grand Total	12,165	729	(136)	(2,190)	(1,597)	(13.1%)	10,568

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	8	-	-	(9)	(9)	(112.5%)	(1)
2008	2	-	-	-	-	-	2
2009	47	-	-	(42)	(42)	(89.4%)	5
2010	14	-	-	(15)	(15)	(107.1%)	(1)
2011	201	(2)	2	(197)	(197)	(98.0%)	4
2012	598	(6)	8	(27)	(25)	(4.2%)	573
2013	(35)	-	(131)	(111)	(242)	691.4%	(277)
2014	323	(3)	(5)	(211)	(219)	(67.8%)	104
2015	1,100	(44)	(28)	(884)	(956)	(86.9%)	144
2016	1,342	(40)	(48)	(431)	(519)	(38.7%)	823
2017	4,491	(45)	241	(344)	(148)	(3.3%)	4,343
2018	1,260	798	(161)	78	715	56.7%	1,975
Grand Total	9,351	658	(122)	(2,193)	(1,657)	(17.7%)	7,694