NOVA SCOTIA RISK SHARING POOL

MAY 2018 OPERATIONAL REPORT

ACTUARIAL HIGHLIGHTS

Related Bulletin: F18-046 Nova Scotia RSP May 2018 Operational Report

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FACILITY Association

ACTUARIAL HIGHLIGHTS

RSP NOVA SCOTIA

OPERATIONAL REPORT

MAY 2018

TABLE OF CONTENTS

1 Summary

1.1 Valuation Schedule (Fiscal Year 2018)

The May 2018 Operational Report incorporates the results of an updated valuation (as at March 31, 2018) – 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 (completed)	1.92% mfad: 25 bp	May 2018	update valuation (roll forward): accident year 2018 loss ratio increased 0.6 point to 94.2%; discount rate increased by 19 basis points; no change to selected margins for adverse deviations
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 March 31, 2018 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 July.

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

Summary of Impact ($000s) of Implementing Result of Valuation as at March 31, 2018[1]

NS	unfav / (fav) for the month and ytd					
	IMPACT in $000s from changes in:					
	ults & payout patterns			dsct rate	margins	
	Nominal [1]	apv adj. [2]	sub-tot [3]	apv adj. [4]	apv adj. [5]	TOTAL [6]
PAYs	1,371	93	1,464	(137)	-	1,327
CAY	67	4	71	(50)	-	21
Prem Def	67	(1)	66	(69)	-	(3)
TOTAL	1,505	96	1,601	(256)	-	1,345

As indicated in the table above, the incorporation of the new valuation had an estimated ***$1.3 million unfavourable impact*** on the month's net result from operations, adding an estimated 12.1 points (see table below) to the **year-to-date Combined Operating Ratio** to end at **122.7%**.

Summary of Impact (% YTD EP) of Implementing Result of Valuation as at March 31, 2018

NS	ytd EP 11,090 (actual)					
	IMPACT unfav / (fav) as % ytd EP from changes in:					
	ults & payout patterns			dsct rate	margins	
	Nominal [1]	apv adj. [2]	sub-tot [3]	apv adj. [4]	apv adj. [5]	TOTAL [6]
PAYs	12.4%	0.8%	13.2%	(1.2%)	-	12.0%
CAY	0.6%	-	0.6%	(0.5%)	-	0.2%
Prem Def	0.6%	-	0.6%	(0.6%)	-	-
TOTAL	13.6%	0.9%	14.4%	(2.3%)	-	12.1%

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 unfavourable by $1.5 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 $1.4 million unfavourable nominal variance, which is attributed to unfavourable claims development. This overall unfavourable prior accident years change is 4.4% of the prior accident years' nominal unpaid balance of $31.0 million determined at the end of last month (April 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 0.6 point from 93.6% to **94.2%**) while **2019** remained

[1]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.

unchanged at **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 $0.1 million 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 2018. Column [4] accounts for the change in the **discount rate** selected (increased 19 basis point to **1.92%**), indicating a favourable impact of $0.3 million. The impact *related only to claims liabilities* (i.e. PAYs plus CAY) was $0.2 million at May 2018 – this compares to the $0.2 million 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 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.

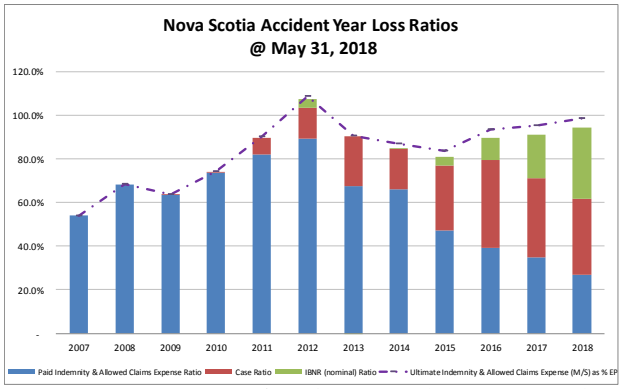
The **Supreme Court of Canada** rendered its judgment on **Saadati v Moorhead** (**2017** SCC 28, **rendered on Jun 2, 2017**). Saadati was involved in a collision in July of 2005 in British Columbia and sued the at-fault driver for damages. According to the Supreme Court decision, "*The trial judge 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:

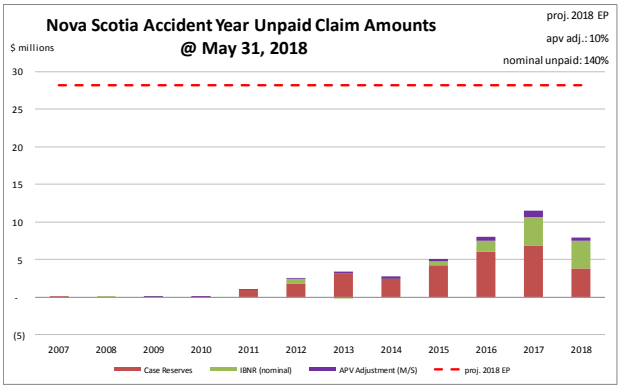
- "*A finding of legally compensable mental injury need not rest, in whole or in part, on the claimant proving a recognized psychiatric injury.*"
- "*...a trier of fact adjudicating a claim of mental injury is not concerned with diagnosis, but with symptoms and their effects.*"
- "*Expert evidence can 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 liabilities[2] 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 at the top of the next page) 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

[2]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.

operating result over future periods.

claim liabilities ($000s)

	amt	%
case	29,448	69.7%
ibnr	9,893	23.4%
M/S apv adjust.	2,913	6.9%
M/S total	42,254	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 76% of the IBNR balance relates to accident years 2017 and 2018 (see Exhibit B). Approximately 84% 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 immediately below summarize the premium liabilities and the total policy liabilities.

premium liabilities ($000s)

	amt	%
unearned prem	13,732	98.6%
prem def/(dpac)	(529)	(3.8%)
M/S apv adjust.	725	5.2%
M/S total	13,928	100.0%

policy liabilities ($000s)

	amt	%
claim	39,341	70.0%
premium	13,203	23.5%
M/S apv adjust.	3,638	6.5%
M/S total	56,182	100.0%

2 Activity During the Month of May 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 Report[3].

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

Table 01	Earned Premium		Paid Indemnity & Allowed Claims Expense		Case increase / (decrease)		Recorded increase / (decrease)	
Accident Year	Actual	Actual less Projected	Actual	Actual less Projected	Actual	Actual less Projected	Actual	Actual less Projected
Prior	-	-	187	56	40	352	227	408
2016	(1)	(1)	182	43	(220)	462	(38)	505
2017	(4)	(4)	117	(101)	293	900	410	799
2018	2,367	(93)	830	84	818	535	1,648	619
TOTAL	2,362	(98)	1,316	83	931	2,248	2,247	2,332

(Recorded transaction amounts exclude IBNR & other actuarial provisions)

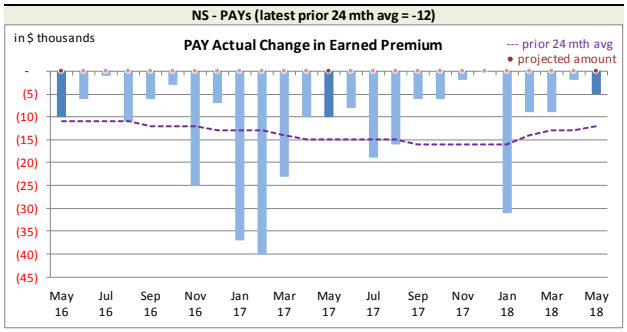
Claims transaction activity is generally volatile and changes from one month to the next are anticipated due to this natural "process variance" (i.e. random variation), and this is particularly true where volumes are low as found in this RSP. Each month, the projection variances are reviewed for signs 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.

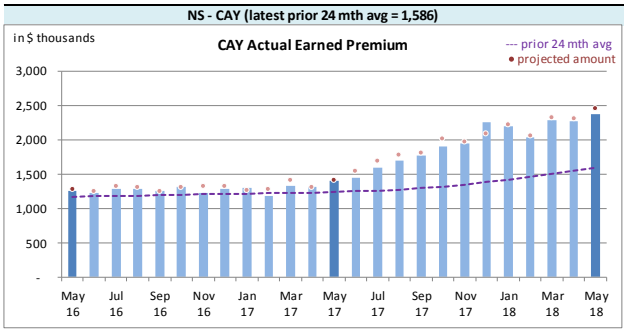
[3]There may be rounding differences in values in this document compared with the associated Bulletin and/or Operational Report.

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

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

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

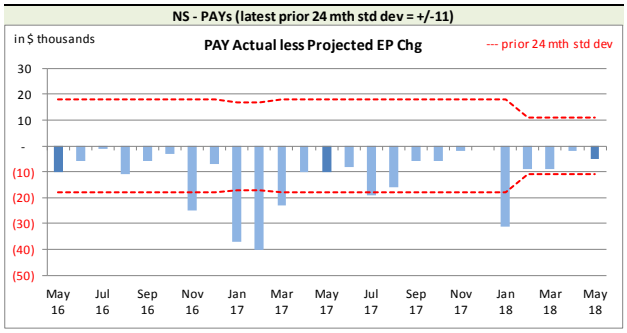


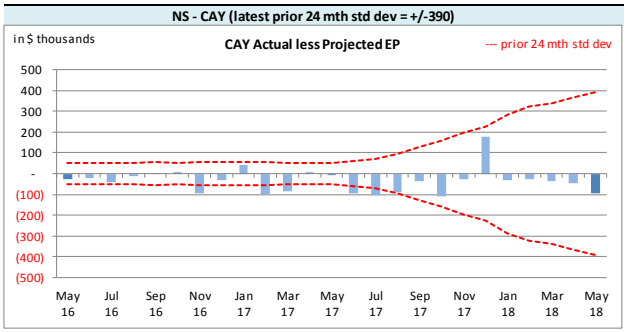


Earned premium changes during a given calendar month in relation to prior accident years tend to be at modest levels, although relatively high levels seem to occur in January each year.

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)	(12)	1,586
std dev	11	390
A-P <> std dev	6	5
% <> std dev	24.0%	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) bias[5], with actuals generally lower than projected, although

[4]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.

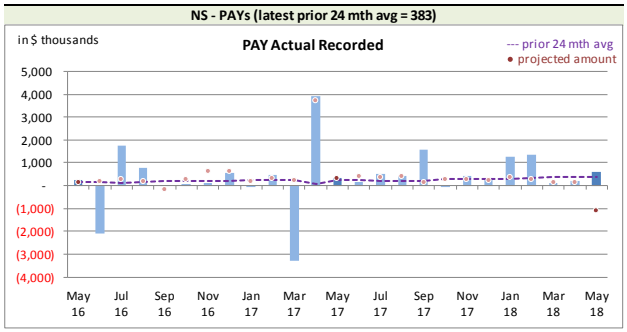
[5]The PAYs' variances will show bias as the projection upload forces all earned premium projections to be attributed to the CAY.

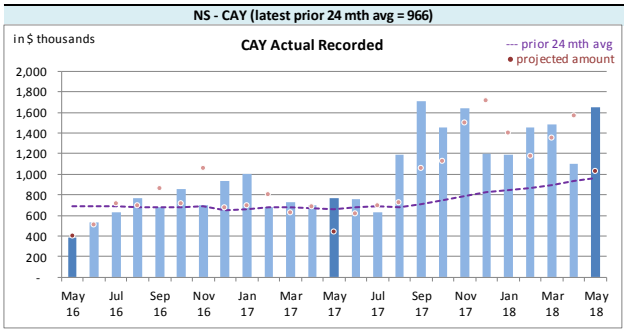
the magnitude is not high relative to monthly premium. In addition to the PAYs' bias, the CAY has also shown bias[6], with actuals being generally lower than projected, and we have modified our projections processes in response. Over time, we may consider other projection approaches to narrow monthly 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.

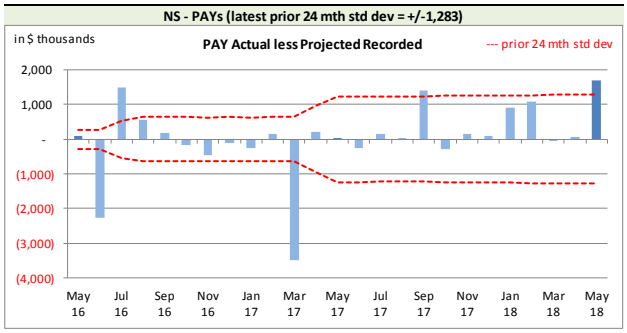
*Nova Scotia RSP Actual **Recorded** by Calendar Month*

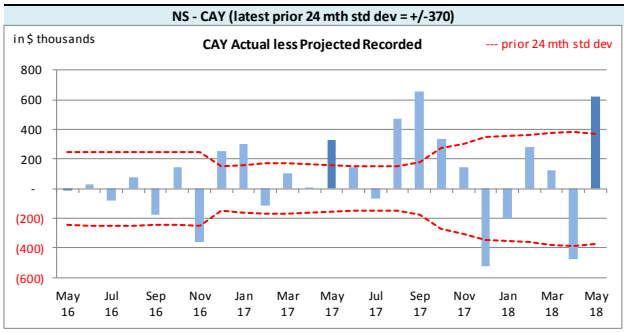




Recorded activity variances from the previous month's projections are shown in the charts immediately below, including the "prior 24-month standard deviation" levels to show how the variances from projection compare with historical standard deviations.

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





[6]We 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 May 2018 has only 5 months where the actuals were higher than projected, and as the 95% confidence range is 7 to 17, bias continues to be indicated.

On Latest $ thousands		
Recorded	PAYs	CAY
Mthly Avg Recorded (prior 24 mths)	383	966
std dev	1,283	370
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 (bottom left chart on the previous page), 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 PAY **recorded** variance was outside of one standard deviation, mainly driven by an adjustment made to the recorded projection for the month of May, as FA expected a correction in recorded case reserve overstatement, as previously advised by a member (see following sections for more details). As the correction did not go through during the month, the PAY **recorded** activity was higher than the projected. Based on discussions with the member, the case reserves correction is now expected to go through next month, and as such our recorded projections for June have been adjusted.

The current accident year (CAY) **recorded** variances (bottom right chart on the previous 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 CAY **recorded** variance was outside of one standard deviation. The activity was reviewed and confirmed, with the variance attributed to a combination of process variance and a poor projection.

As noted in the last four 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 latest valuation, 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 investigated and estimated the overall overstatement for the Nova Scotia RSP as at March 31, 2018 as indicated in the table at the top of the next page.

Estimated case reserve overstatement as at Mar 31, 2018

overstatement / (understatement)

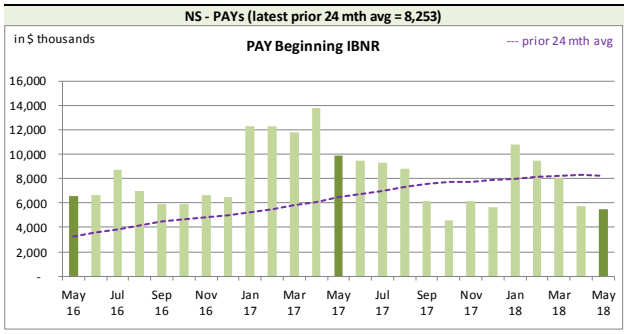
Accident Year	Total Case Reserve Adjustment ($'000s)
2012	36
2013	204
2014	42
2015	91
2016	583
2017	349
Total	**1,305**

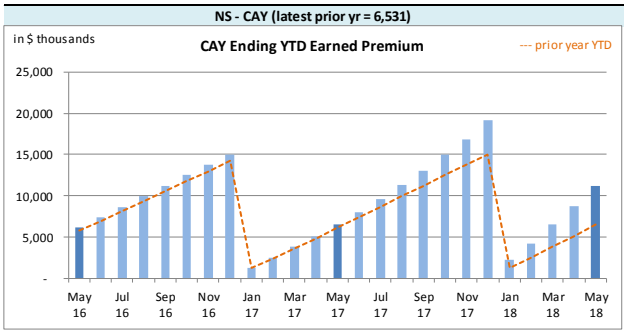
With this valuation, prior accident years' ultimates selections have taken into account the member's overstatement (both the original amount as notified, and the subsequent amount, with the combination of the two being summarized in the table above). FA management is working with the member on a process to correct the reported levels, and we currently anticipate that this may be partially completed in time for the 2018 Q2 valuation.

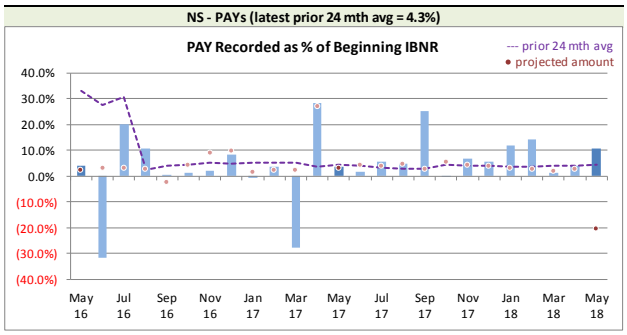
The method for establishing IBNR adjusts automatically for changes in **earned premium** and **recorded** claims activity level (see sections 2.2 and 3).

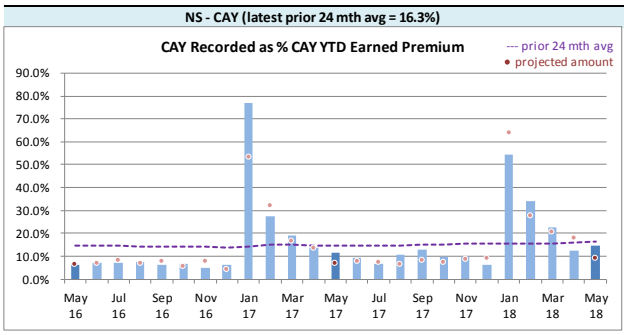
We have included, for reference, additional charts at the top of the next page related to levels influencing **recorded** activity. Note in particular the increase in the level of PAYs beginning IBNR. Part of this will be as a response to valuations and showing up as a beginning IBNR change one month 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[7] ***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:

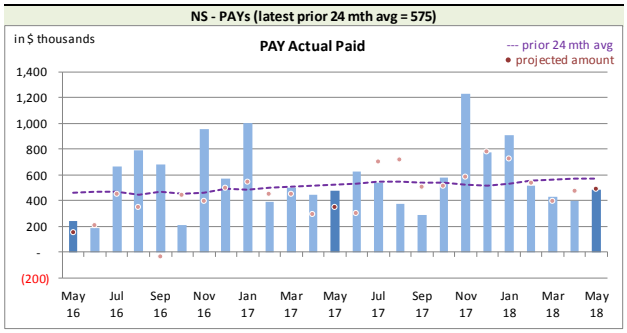
- to offset actual **recorded** activity (through loss ratio matching);
- the annual switchover as a current accident year becomes a prior accident year (occurs in January); and
- when a new valuation is implemented, where the valuation resulted in changes to the selection of prior accident years' ultimate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

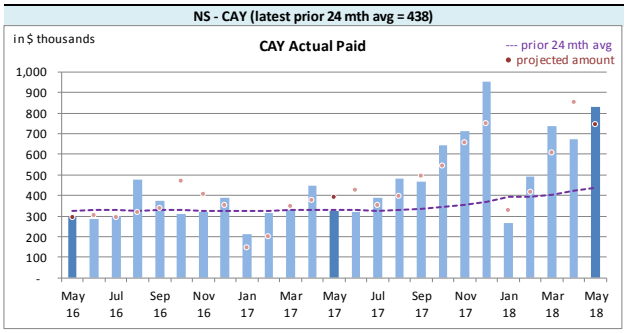
2.1.c AvsP: Paid Indemnity & Allowed Claims Expense

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.

[7]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.

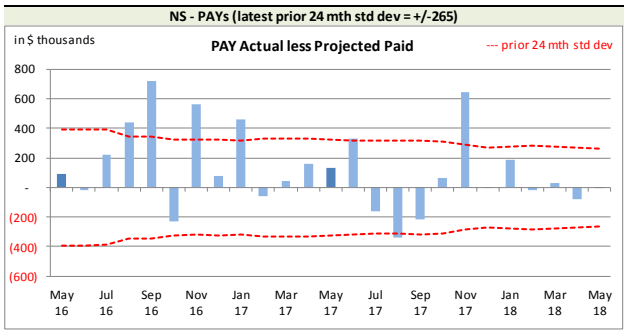
*Nova Scotia RSP Actual **Paid** by activity Calendar Month*

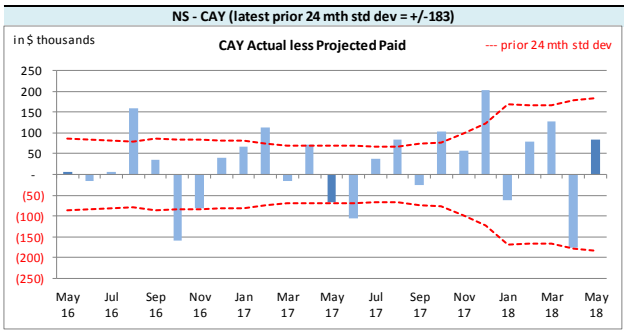




Paid activity variances from the previous month's projections are shown in the charts immediately below, including the "prior 24-month standard deviation" levels to show how the variances from projection compare with historical standard deviations.

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





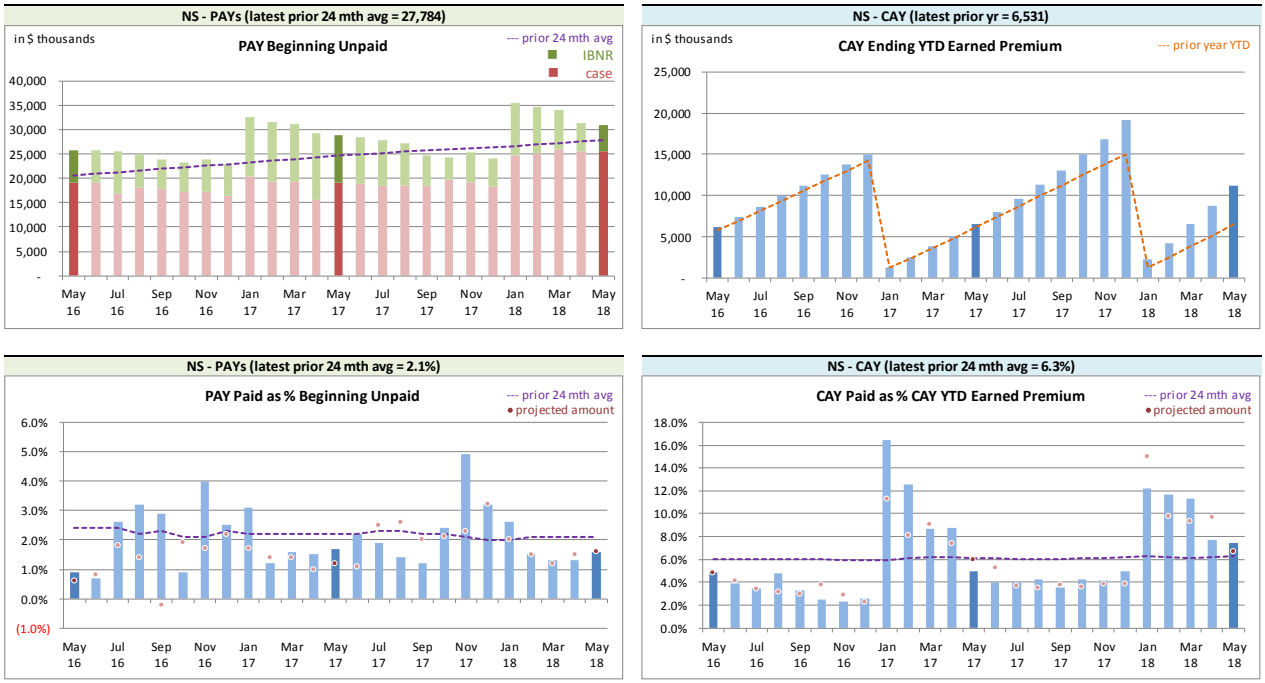
On Latest $ thousands		
Paid	PAYs	CAY
Mthly Avg Paid (prior 24 mths)	575	438
std dev	265	183
A-P <> std dev	7	8
% <> std dev	28.0%	32.0%
norm <> std dev	31.7%	31.7%

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. 28% of months with prior accident years (PAYs) **paid** variances were in excess of a prior 24-month standard deviation (see left chart above), 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 above), do not appear to indicate bias. At 32% of projections outside of one standard deviation, 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 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[8] **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 IBNR[9], 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 2018

[8]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.

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

Operational Report and the associated one-month projections from last month's Report.

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

Table 02

			actuarial present value adjustments					
	IBNR		Discount Amount		Provisions for Adverse Deviations		IBNR + actuarial present value adjustments	
Accident Year	Actual	Actual less Projected	Actual	Actual less Projected	Actual	Actual less Projected	Actual	Actual less Projected
Prior	936	340	(427)	(62)	1,527	67	2,036	345
2016	1,490	193	(314)	(55)	904	70	2,080	208
2017	3,835	(879)	(556)	(65)	1,312	5	4,591	(939)
2018	3,632	(639)	(428)	(40)	895	(17)	4,099	(696)
TOTAL	9,893	(985)	(1,725)	(222)	4,638	125	12,806	(1,082)

The IBNR provision is $1.0 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:

(i) the change projected last month;

(ii) the additional change due to variances in earned premium (because we apply a loss ratio to earned premium in determining ultimate level) and/or recorded claims (as IBNR is calculated as ultimate less recorded) differences; and

(iii) the additional change due to valuation implementation impacts (as applicable)

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

The table at the top of the next page summarizes the variances in the provisions for premium deficiency liability / (deferred policy acquisition cost asset) included in the May 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 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:	(529)	86	725	(95)	196	(9)
balance as % unearned premium:	(3.9%)	0.4%	5.3%	(0.4%)	1.4%	-
actual unearned premium:	13,732					
less projected:	(455)					

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[10] ratio per latest valuation
(c) Estimated ultimate incurred = (a) x (b)
(d) Recorded indemnity & allowed claims expense to-date
(e) IBNR = (c) – (d)

4 Calendar Year-to-Date Results

The table at the top of the next page summarizes the calendar year-to-date results for indemnity & allowed claims expenses[11], 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 94.7% rather than 94.2% (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).

[11] Allowed claims expenses are first party legal and other expenses as listed in the RSP Claims Guide. Claims expenses paid through the member company expense allowance are NOT included in this analysis.

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

Table 04	YTD Nominal Values		YTD actuarial present value adjustment		YTD Total		Change from Prior Month YTD	
	Amount	% EP	Amount	% EP	Amount	% EP	Amount	LR pts
PAYs	(948)	(8.5%)	(108)	(1.0%)	(1,056)	(9.5%)	1,287	17.3%
CAY	10,499	94.7%	467	4.2%	10,966	98.9%	2,333	-
TOTAL	9,551	86.1%	359	3.2%	9,910	89.4%	3,620	17.3%

("% 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 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

IBNR + M/S actuarial present value adjustments

discount rate 1.92%

interest rate margin 25 basis pts

Amounts in $000s					
Accident Year	Actual Apr 2018	Actual May 2018	Projected Jun 2018	Projected Jul 2018	Projected Dec 2018
2007	(1)	(1)	(1)	(1)	(1)
2008	2	2	2	2	1
2009	10	10	10	10	8
2010	3	3	2	2	2
2011	71	67	66	64	58
2012	733	688	682	671	418
2013	(39)	46	169	164	175
2014	367	289	282	273	226
2015	374	932	892	840	722
2016	1,342	2,080	3,081	2,971	2,434
2017	5,157	4,591	4,805	4,629	3,864
2018	3,414	4,099	5,001	5,791	9,106
TOTAL	11,433	12,806	14,991	15,416	17,013
Change		1,373	2,185	425	

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 2018	Actual May 2018	Projected Jun 2018	Projected Jul 2018	Projected Dec 2018
53.9%	2007	(1)	(1)	(1)	(1)	(1)
68.3%	2008	2	2	2	2	1
63.8%	2009	5	5	5	5	3
74.0%	2010	(1)	(1)	(1)	(1)	(1)
89.5%	2011	4	4	4	4	2
107.3%	2012	556	536	531	526	280
89.0%	2013	(266)	(176)	(51)	(50)	(27)
84.9%	2014	107	41	40	34	24
80.8%	2015	9	526	494	450	359
89.4%	2016	754	1,490	2,503	2,403	1,916
91.0%	2017	4,325	3,835	4,065	3,902	3,180
94.2%	2018	2,997	3,632	4,448	5,140	8,002
	TOTAL	8,491	9,893	12,039	12,414	13,738
	Change		1,402	2,146	375	

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

EXHIBIT C

Premium Liabilities

TABLE EXHIBIT C — Amounts in $000s

Premium Liabilities	Actual Apr 2018	Actual May 2018	Projected Jun 2018	Projected Jul 2018	Projected Dec 2018
(1) unearned premium (UP)	13,501	13,732	14,468	14,994	16,014
FOR MEMBER SHARING					
(2) expected future costs ratio {% of (1)}	101.3%	101.4%	101.5%	101.6%	102.4%
(3) expected future costs {(1) x (2)}	13,679	13,928	14,688	15,238	16,395
(4) premium deficiency / (deferred policy acquisition cost)	178	196	220	244	381
Excluding Actuarial Present Value Adjustments					
(5) expected future costs ratio {% of (1)}	95.5%	96.1%	96.2%	96.3%	97.1%
(6) expected future costs {(1) x (5)}	12,899	13,203	13,924	14,446	15,542
(7) premium deficiency / (deferred policy acquisition cost)	(602)	(529)	(544)	(548)	(472)

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	Projected Balances as at Dec. 31, 2018 ($000s)									
ending 2018	nominal values			actuarial present value adjustments (apvs)						
Acc Yr	Case	IBNR	Total Unpaid	discount	investment PfAD	nominal development PfAD	development PfAD discount	development PfAD	Total apvs	TOTAL
2007	-	(1)	(1)	-	-	-	-	-	-	(1)
2008	1	1	2	-	-	-	-	-	-	2
2009	62	3	65	(2)	-	7	-	7	5	70
2010	51	(1)	50	(2)	-	5	-	5	3	53
2011	846	2	848	(29)	3	85	(3)	82	56	904
2012	1,890	280	2,170	(82)	11	217	(8)	209	138	2,308
2013	2,734	(27)	2,707	(70)	8	271	(7)	264	202	2,909
2014	1,995	24	2,019	(50)	8	250	(6)	244	202	2,221
2015	3,865	359	4,224	(144)	17	507	(17)	490	363	4,587
2016	4,637	1,916	6,553	(275)	33	793	(33)	760	518	7,071
2017	6,492	3,180	9,672	(503)	68	1,180	(61)	1,119	684	10,356
PAYs (sub-total):	22,573	5,736	28,309	(1,157)	148	3,315	(135)	3,180	2,171	30,480
CAY (2018)	9,736	8,002	17,738	(1,011)	124	2,111	(120)	1,991	1,104	18,842
claims liabilities:	32,309	13,738	46,047	(2,168)	272	5,426	(255)	5,171	3,275	49,322
	Unearned Premium	Premium Defiency / (DPAC)	Total Provision	discount	investment PfAD	nominal development PfAD	development PfAD discount	development PfAD	Total apvs	TOTAL*
premium liabilities:	16,014	(472)	15,542	(748)	92	1,587	(78)	1,509	853	16,395
										*Total may not be sum of parts, as apvs apply to future costs within UPR
policy liabilities:			**61,589**	**(2,916)**	**364**	**7,013**	**(333)**	**6,680**	**4,128**	**65,717**

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 (Mar. 31, 2018)

Accident Year	Third Party Liability	Accident Benefits	Other Coverages	Total
	Margins	Margins	Margins	Margins
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%	10.0%	10.0%
2014	12.5%	10.0%	6.4%	12.4%
2015	12.4%	10.0%	6.3%	12.0%
2016	12.4%	10.0%	6.5%	12.1%
2017	12.5%	10.0%	6.8%	12.2%
2018	12.4%	10.0%	5.7%	11.9%
2019	12.0%	10.0%	5.1%	10.4%
prem liab	12.0%	10.0%	5.1%	10.4%

discount rate:	1.92%
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 (1.92%), 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	0.92%	1.42%	1.92%	2.42%	2.92%	3.42%	1.73%	1.73%
2007	-	-	-	-	-	-	-	-
2008	-	-	-	-	-	-	-	-
2009	46	45	45	44	44	44	45	45
2010	36	35	35	35	35	34	35	35
2011	776	769	762	756	749	743	765	765
2012	1,542	1,527	1,512	1,497	1,483	1,469	1,518	1,518
2013	1,822	1,810	1,797	1,786	1,774	1,762	1,802	1,802
2014	2,099	2,085	2,072	2,059	2,046	2,034	2,077	2,077
2015	4,425	4,385	4,346	4,307	4,270	4,233	4,361	4,361
2016	7,821	7,735	7,649	7,565	7,483	7,404	7,681	7,681
2017	10,590	10,444	10,302	10,165	10,028	9,897	10,356	10,356
2018	20,142	19,837	19,541	19,253	18,973	18,701	19,654	19,654
Total	49,299	48,672	48,061	47,467	46,885	46,321	48,294	48,294
	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	0.92%	1.42%	1.92%	2.42%	2.92%	3.42%	1.73%	1.73%
Total	1,238	611	-	(594)	(1,176)	(1,740)	233	233
	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	0.92%	1.42%	1.92%	2.42%	2.92%	3.42%	1.73%	1.73%
2007	-	-	-	-	-	-	-	-
2008	-	-	-	-	-	-	-	-
2009	2.2%	-	-	(2.2%)	(2.2%)	(2.2%)	-	-
2010	2.9%	-	-	-	-	(2.9%)	-	-
2011	1.8%	0.9%	-	(0.8%)	(1.7%)	(2.5%)	0.4%	0.4%
2012	2.0%	1.0%	-	(1.0%)	(1.9%)	(2.8%)	0.4%	0.4%
2013	1.4%	0.7%	-	(0.6%)	(1.3%)	(1.9%)	0.3%	0.3%
2014	1.3%	0.6%	-	(0.6%)	(1.3%)	(1.8%)	0.2%	0.2%
2015	1.8%	0.9%	-	(0.9%)	(1.7%)	(2.6%)	0.3%	0.3%
2016	2.2%	1.1%	-	(1.1%)	(2.2%)	(3.2%)	0.4%	0.4%
2017	2.8%	1.4%	-	(1.3%)	(2.7%)	(3.9%)	0.5%	0.5%
2018	3.1%	1.5%	-	(1.5%)	(2.9%)	(4.3%)	0.6%	0.6%
Total	2.6%	1.3%	-	(1.2%)	(2.4%)	(3.6%)	0.5%	0.5%
	curr - 100 bp	curr - 50 bp	curr val assumption	curr + 50bp	curr + 100bp	curr + 150bp	prior val assumption	prior fyr end assumption

EXHIBIT G

Components of Member Statement IBNR (i.e. "Discounted") Change During Month

RSP	Nova Scotia
AccountCode Desc	IBNR - Discou d

M/S IBNR - in $000s

AccYear	Values Sum of Prior Month Actual Amount	Sum of Projected Change	Sum of Change Due to AvsP Variances	Sum of Change Due to Valuation Implementation	Sum of Total Change	Sum of % Total Change	Sum of Current Month Final Amount
2007	(1)	-	-	-	-	-	(1)
2008	2	-	-	-	-	-	2
2009	10	-	-	-	-	-	10
2010	3	(1)	1	-	-	-	3
2011	71	(1)	1	(4)	(4)	(5.6%)	67
2012	733	(7)	28	(66)	(45)	(6.1%)	688
2013	(39)	187	(181)	79	85	(217.9%)	46
2014	367	(4)	(9)	(65)	(78)	(21.3%)	289
2015	374	(3)	(250)	811	558	149.2%	932
2016	1,342	530	(509)	717	738	55.0%	2,080
2017	5,157	373	(794)	(145)	(566)	(11.0%)	4,591
2018	3,414	1,381	(717)	21	685	20.1%	4,099
Grand Total	**11,433**	**2,455**	**(2,430)**	**1,348**	**1,373**	**12.0%**	**12,806**

EXHIBIT G

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

RSP	**Nova Scotia**
AccountCode Desc	**IBNR - Undisc nted**

IBNR - in $000s

AccYear	Values: Sum of Prior Month Actual Amount	Sum of Projected Change	Sum of Change Due to AvsP Variances	Sum of Change Due to Valuation Implementation	Sum of Total Change	Sum of % Total Change	Sum of Current Month Final Amount
2007	(1)	-	-	-	-	-	(1)
2008	2	-	-	-	-	-	2
2009	5	-	-	-	-	-	5
2010	(1)	-	-	-	-	-	(1)
2011	4	-	-	-	-	-	4
2012	556	(6)	38	(52)	(20)	(3.6%)	536
2013	(266)	189	(182)	83	90	(33.8%)	(176)
2014	107	(1)	(12)	(53)	(66)	(61.7%)	41
2015	9	(1)	(253)	771	517	5,744.4%	526
2016	754	543	(506)	699	736	97.6%	1,490
2017	4,325	389	(802)	(77)	(490)	(11.3%)	3,835
2018	2,997	1,274	(706)	67	635	21.2%	3,632
Grand Total	**8,491**	**2,387**	**(2,423)**	**1,438**	**1,402**	**16.5%**	**9,893**