



NOVA SCOTIA RISK SHARING POOL

OCTOBER 2018 OPERATIONAL REPORT

ACTUARIAL HIGHLIGHTS

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ACTUARIAL HIGHLIGHTS
RSP NOVA SCOTIA
OPERATIONAL REPORT
OCTOBER 2018

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1 Summary

1.1 Valuation Schedule (Fiscal Year 2018)

The October 2018 Operational Report incorporates the results of an updated valuation (as at September 30, 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 <u>increased</u> 1.1 points to 93.2%; discount rate <u>increased</u> 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 <u>increased</u> 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 <u>increased</u> 0.6 points to 94.2%; discount rate <u>increased</u> by 19 basis points; no change to selected margins for adverse deviations
Jun. 30, 2018 (completed)	1.86% mfad 25 bp	Aug. 2018	updated valuation: accident year 2018 loss ratio <u>decreased</u> 0.6 points to 93.6%; discount rate <u>decreased</u> by 0.6 basis points; selected margins for adverse deviations were updated
Sep. 30, 2018 (completed)	2.28% mfad 25 bp	Oct. 2018	updated valuation (roll forward): accident year 2018 loss ratio <u>decreased</u> 0.7 points to 92.9%; discount rate <u>increased</u> by 42 basis points; no change to selected margins for adverse deviations

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, 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 later in December. The valuation implementation impact is summarized in the tables below.

Summary of Impact (\$000s) of Implementing Result of Valuation as at September 30, 2018¹

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	1,061	131	1,192	(289)	-	903
CAY	(160)	2	(158)	(191)	-	(349)
Prem Def	(32)	4	(28)	(155)	-	(183)
TOTAL	869	137	1,006	(635)	-	371

As indicated in the table above, the incorporation of the new valuation had an estimated **\$0.4 million unfavourable impact** on the month’s net result from operations, adding an estimated 1.6 points (see table below) to the **year-to-date Combined Operating Ratio** to end at **131.4%**.

Summary of Impact (% YTD EP) of Implementing Result of Valuation as at September 30, 2018

NS	ytd EP 22,827 (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	4.6%	0.6%	5.2%	(1.3%)	-	4.0%
CAY	(0.7%)	-	(0.7%)	(0.8%)	-	(1.5%)
Prem Def	(0.1%)	-	(0.1%)	(0.7%)	-	(0.8%)
TOTAL	3.8%	0.6%	4.4%	(2.8%)	-	1.6%

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 \$0.9 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 \$1.1 million unfavourable nominal variance, which is attributed to two large loss Bodily Injury claims settlements during the quarter. This overall unfavourable prior accident years change is 3.7% of the prior accident years’ nominal unpaid balance of \$29.1 million determined at the end of last month (September 2018). As a smaller pool, it is

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.

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** (down 0.7 points from 93.6% to **92.9%**) and **2019** remained unchanged at **96.5%**. 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 a unfavourable change of \$0.1 million in the actuarial present value adjustments, prior to any changes in the selected discount rate and/or MfADs.

Updated projected cash flows were reviewed against the selected risk-free yield curve, derived from Government of Canada benchmark bond yields monthly series using values for September 2018. Column [4] accounts for the change in the **discount rate** selected (increased 42 basis point to **2.28%**), indicating a favourable impact of \$0.6 million. The impact *related only to claims liabilities* (i.e. PAYs plus CAY) was \$0.4 million at October 2018 – this compares to the \$0.5 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, other than that we do not believe the Saadati judgment will have a further impact on our valuation results.

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.

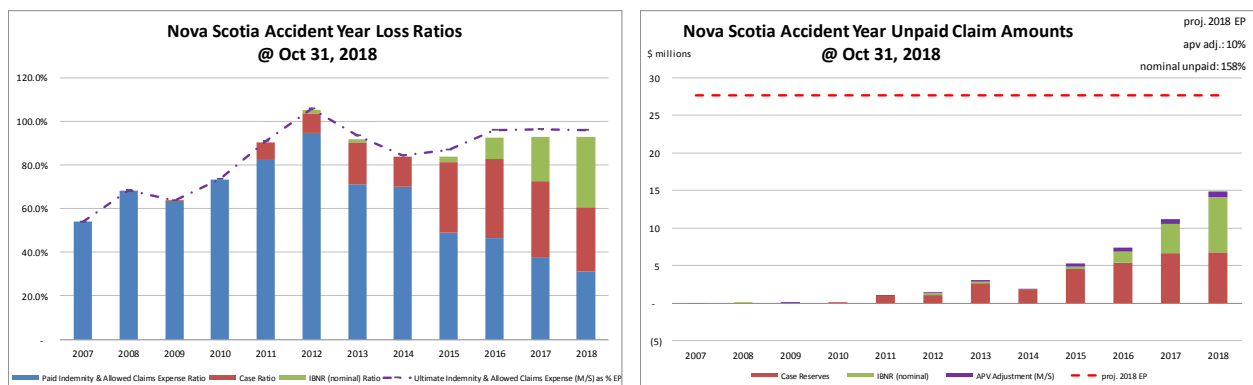
The **Supreme Court of Canada** rendered its judgment on **Saadati v Moorhead (2017 SCC 28, rendered on Jun 2, 2017)**. Saadati was involved in a collision in July of 2005 in British Columbia and sued the at-fault driver for damages. According to the Supreme Court decision, *“The trial judge found that 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, and at this point we do not believe this judgment will have a further impact on our valuation results.

1.5 Current Provision Summary

The charts 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.

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.

The current actuarial present value adjustments balance (\$2.7 million – see table immediately below) represents 10% of the earned premium projected for the full year 2018 (see the right chart at the bottom of the previous page). 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	29,930	64.7%
ibnr	13,615	29.4%
M/S apv adjust.	2,696	5.8%
M/S total	46,241	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 83% of the IBNR balance relates to accident years 2017 and 2018 (see Exhibit B). Approximately 88% 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)			policy liabilities (\$000s)		
	amt	%		amt	%
unearned prem	16,277	98.3%	claim	43,545	69.3%
prem def/(dpac)	(466)	(2.8%)	premium	15,811	25.2%
M/S apv adjust.	739	4.5%	M/S apv adjust.	3,435	5.5%
M/S total	16,550	100.0%	M/S total	62,791	100.0%

2 Activity During the Month of October 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	-	-	652	451	(692)	(562)	(40)	(111)
2016	(0)	(0)	50	(136)	(49)	129	1	(7)
2017	(1)	(1)	37	(280)	189	381	226	101
2018	2,428	(9)	913	3	960	386	1,873	389
TOTAL	2,428	(10)	1,652	38	408	334	2,060	372

(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

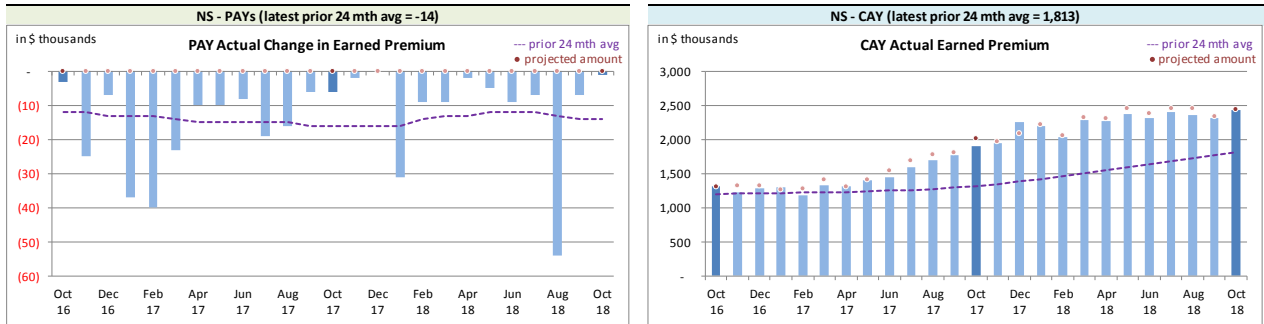
³There may be rounding differences in values in this document compared with the associated Bulletin and/or Operational Report.

signs of projection bias and to identify potential ways to reduce the level of the variance. Commentary from our review is provided in the sub-sections that follow.

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

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

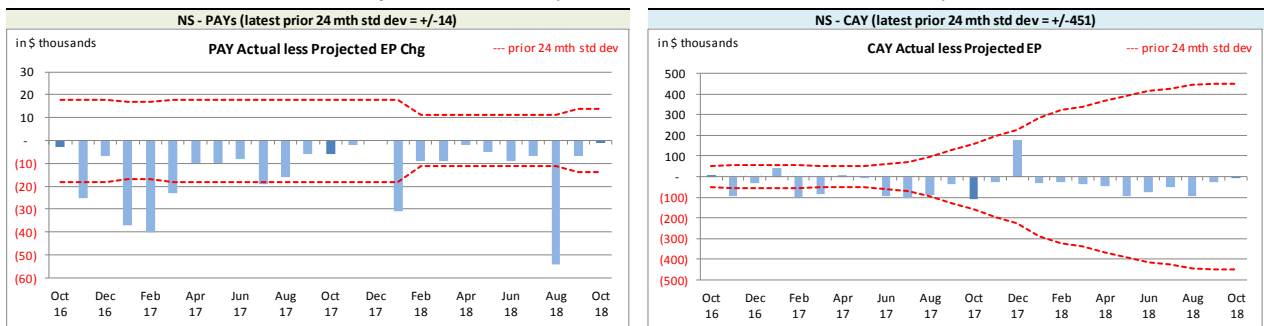
Nova Scotia RSP Actual Earned Premium by Calendar Month



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 heightened prior accident years’ activity in August 2018 was investigated and FA management was advised by the member that the variance was related to ineligible risks being removed from the RSP.

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



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.

On Latest \$ thousands		
Earned Premium	PAYs	CAY
Mthly Avg EP Chg (prior 24 mths)	(14)	1,813
std dev	14	451
A-P <> std dev	7	5
% <> std dev	28.0%	20.0%
norm <> std dev	31.7%	31.7%

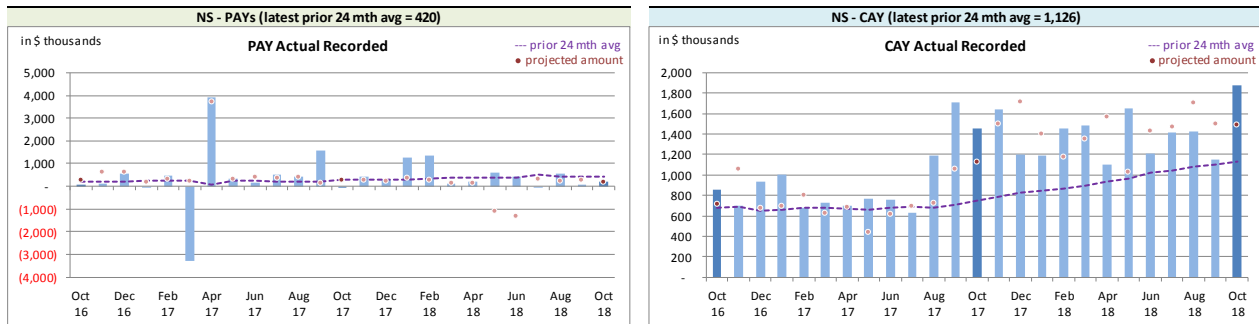
We project **earned premium** changes from known unearned premium and projected written premium levels, but upload the total projections as current accident year (CAY). This process has generated prior accident years’ (PAYs) bias⁵, with actuals generally lower than projected, although the magnitude is not high relative to

monthly premium. In addition to the PAYs’ bias, the CAY has also shown bias⁶, 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

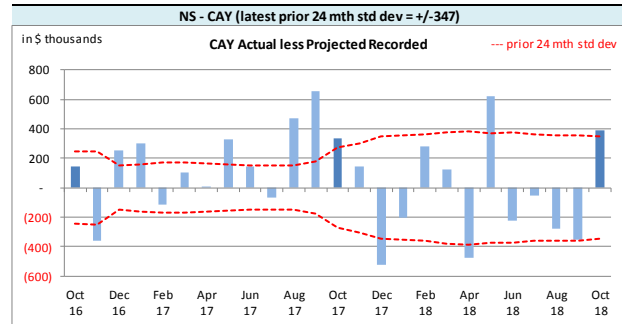
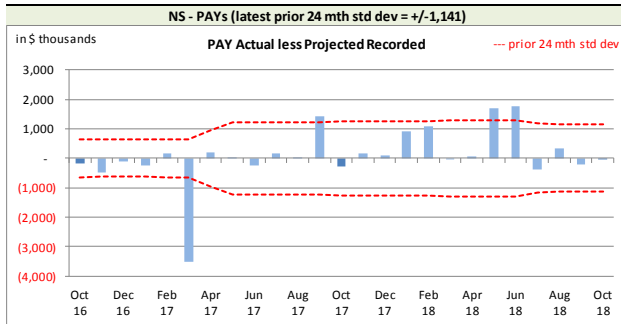


Recorded activity variances from the previous month’s projections are shown in the charts immediately at the top of the next page, including the “prior 24-month standard deviation” levels to show how the variances from projection compare with historical standard deviations.

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 October 2018 has only 3 months where the actuals were higher than projected, and as the 95% confidence range is 7 to 17, bias continues to be indicated.

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



On Latest \$ thousands		
Recorded	PAYs	CAY
Mthly Avg Recorded (prior 24 mths)	420	1,126
std dev	1,141	347
A-P <> std dev	4	11
% <> std dev	16.0%	44.0%
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, 16% of prior accident years’ (PAYs) **recorded** variances over the last 25 calendar months have fallen outside of one standard deviation of the actual **recorded** amounts (see table above), suggesting the projection process has performed better than simply projecting the prior 24-month average amount (assuming it follows a normal distribution). Bias has not been indicated at a 95% confidence level on a lagging 24-month basis.

The current accident year (CAY) **recorded** variances fell outside of one standard deviation 44% of the time over the last 25 calendar months (see table above), suggesting that the projection process has performed worse than simply projecting the prior 24-month average amount. We are considering ways to improve our projection process as a result. Bias has not 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 process variance.

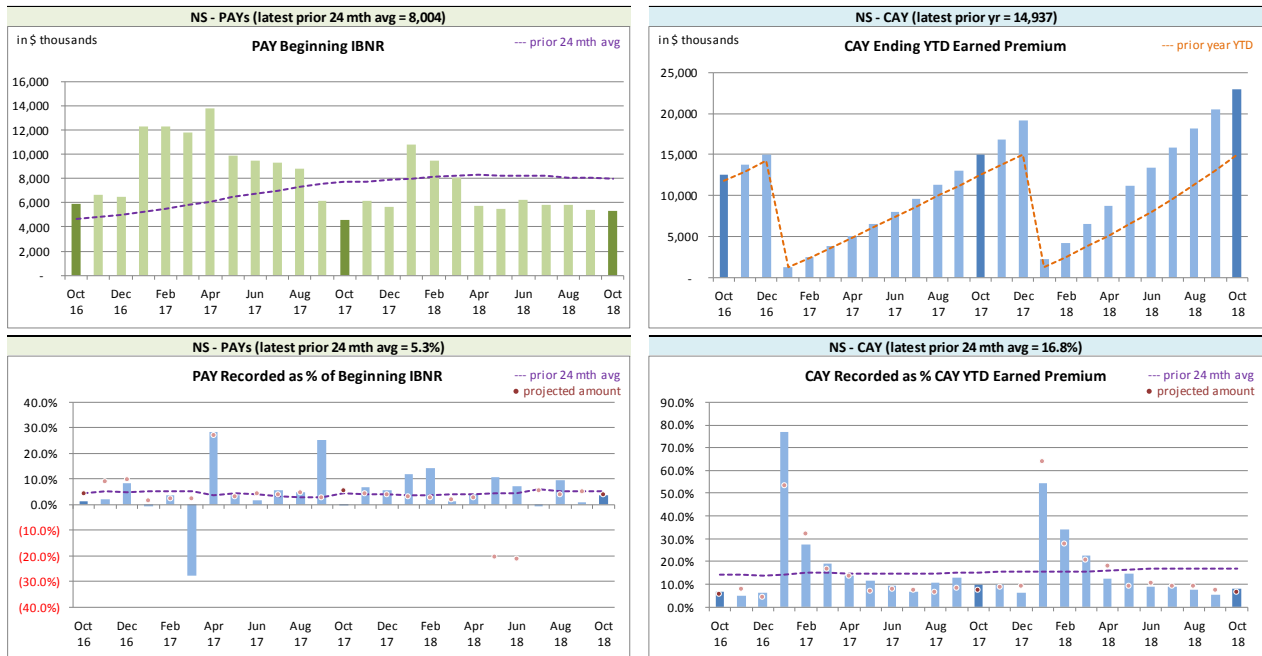
As noted in the last nine monthly Actuarial Highlights, FA management was notified on January 31, 2018 by a member of a potential recorded case reserve overstatement. Furthermore, during the March 31, 2018 valuation, FA management was advised of an additional and separate recorded case reserve understatement primarily due to incorrect reporting after FA’s October 31, 2017 fiscal year end. During the month of September 2018, the member submitted correcting case reserve transactions for which provisions have been held since last year (and discussed further on in this section). The corrections were reasonably aligned with FA management’s previously held provisions (which have now been released as a result).

With the latest valuation (September 30, 2018), as the corrections submitted in the month of September 2018 were largely in line with FA management’s expectations, the associated provisions previously held by FA management have been removed as a result.

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:

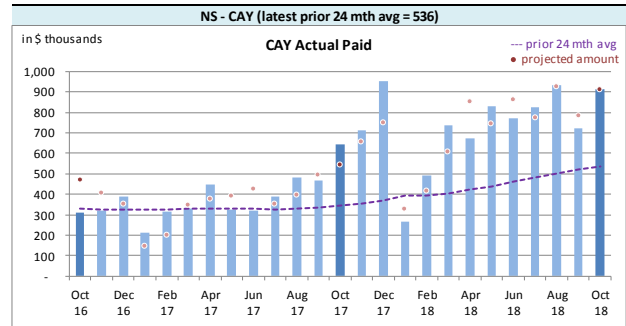
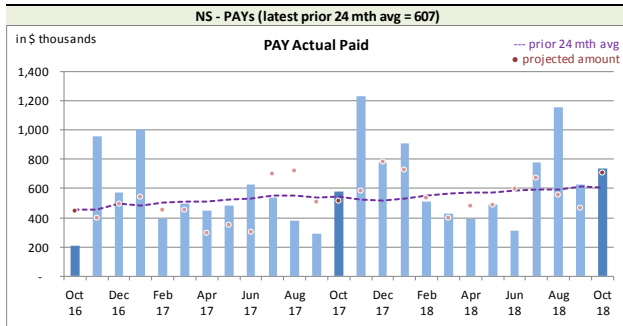
- to offset actual **recorded** activity (through loss ratio matching);
- the annual switchover as a current accident year becomes a prior accident year (occurs in January); and
- when a new valuation is implemented, where the valuation resulted in changes to the selection of prior accident years’ ultimate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

2.1.c AvsP: Paid Indemnity & Allowed Claims Expense

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

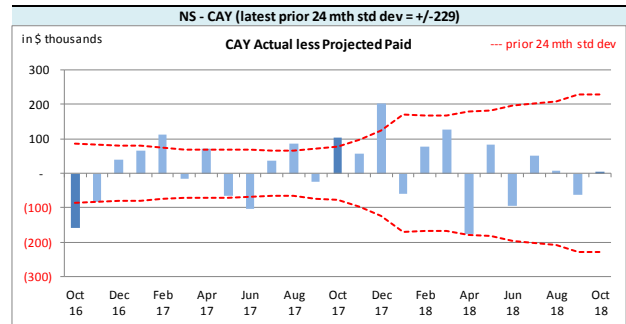
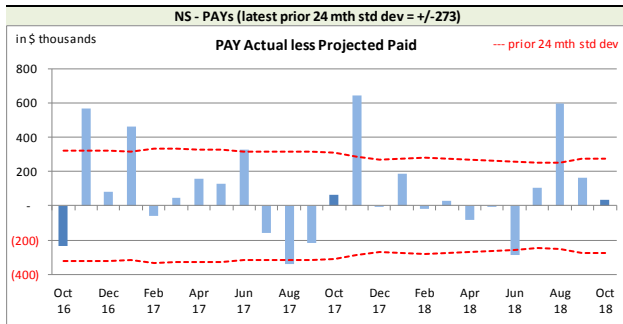
⁷Our recorded activity projections for the prior accident years are based on selected ratios of recorded activity to beginning unpaid balances, whereas the current accident year projections are based on selected ratios of year-to-date IBNR to year-to-date selected ultimate (i.e. selected LR x earned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

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



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)	607	607	536
std dev	273	273	229
A-P <> std dev	7	7	7
% <> std dev	28.0%	28.0%	28.0%
norm <> std dev	31.7%	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.

That said, 28% of the prior accident years’ (PAYS) variances over the last 25 calendar months have fallen outside of one standard deviation of the actual **paid** amounts (see table on left above), suggesting the projection process has performed no better than simply projecting the prior 24-month average amount (assuming it follows a normal distribution). Bias has not been indicated at a 95% confidence level on a lagging 24-month basis.

The current accident year (CAY) **paid** variances fell outside of one standard deviation 28% of the time over the last 25 calendar months (see table above), suggesting that the projection process has performed no better than simply projecting the prior 24-month average amount. 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 influence⁸ Paid activity by Calendar Month



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

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

2.2 Actuarial Provisions

An “ultimate loss ratio matching method” (described in section 3) was used to determine the month’s IBNR⁹, and factors were applied to the nominal unpaid claims liability (case plus IBNR) to determine the discount amount (shown as a negative value to indicate its impact of reducing the liability) and the Provisions for Adverse Deviations. The loss ratios and the factors used to determine the current month’s provisions and projections were based on the applicable valuation. The table at the top of the next page summarizes variances in provisions included in this month’s Operational Report and the associated one-month projections from last month’s Report.

⁸Our paid projections for the prior accident years are based on selected ratios of paid to beginning unpaid balances, whereas the current accident year projections are based on selected ratios of year-to-date paid to year-to-date selected ultimate indemnity (i.e. selected LR x earned premium). In both cases, the ratio selection is based on our review of the more recent recorded activity and recent AvsP analyses.

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

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

Table 02		actuarial present value adjustments						
		IBNR		Discount Amount		Provisions for Adverse Deviations		IBNR + actuarial present value adjustments
Accident Year	Actual	Actual less Projected	Actual	Actual less Projected	Actual	Actual less Projected	Actual	Actual less Projected
Prior	829	479	(436)	(68)	1,302	-	1,695	411
2016	1,482	719	(350)	(91)	835	102	1,967	730
2017	3,906	(120)	(652)	(129)	1,278	27	4,532	(222)
2018	7,398	(558)	(964)	(161)	1,683	(28)	8,117	(747)
TOTAL	13,615	520	(2,402)	(449)	5,098	101	16,311	172

The IBNR provision is \$0.5 million higher 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 this month's 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 the valuation implementation.

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

Table 03

	Premium Deficiency / (Deferred Policy Acquisition Costs)		actuarial present value adjustments		Premium Deficiency / (DPAC) including actuarial present value adjustments	
	Actual	Actual less Projected	Actual	Actual less Projected	Actual	Actual less Projected
balance:	(466)	(54)	739	(137)	273	(191)
balance as % unearned premium:	(2.9%)	(0.3%)	4.5%	(0.9%)	1.7%	(1.2%)
actual unearned premium:	16,277					
less projected:	238					

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 93.4% rather than 92.9% (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	194	0.9%	(577)	(2.5%)	(383)	(1.7%)	853	4.4%
CAY	21,333	93.4%	719	3.1%	22,052	96.6%	2,010	(1.6%)
TOTAL	21,527	94.3%	142	0.6%	21,669	94.9%	2,863	2.7%

("% 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

		Amounts in \$000s				
IBNR + M/S actuarial present value adjustments	Accident Year	Actual Sep. 2018	Actual Oct. 2018	Projected Nov. 2018	Projected Dec. 2018	Projected Dec. 2019
	2007	(1)	(1)	(1)	(1)	(1)
	2008	2	2	2	2	2
	2009	10	9	9	9	10
	2010	93	-	-	-	-
	2011	(29)	57	55	54	49
	2012	754	336	330	327	232
discount rate	2013	(164)	430	422	418	279
2.28%	2014	304	74	72	69	62
	2015	400	788	771	756	559
interest rate margin	2016	1,259	1,967	1,879	1,733	1,188
25 basis pts	2017	4,900	4,532	4,273	4,139	2,745
	2018	7,980	8,117	8,574	9,004	5,619
	2019	-	-	-	-	9,287
	TOTAL	15,508	16,311	16,386	16,510	20,031
	Change		803	75	124	

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 Sep. 2018	Actual Oct. 2018	Projected Nov. 2018	Projected Dec. 2018	Projected Dec. 2019
	53.9%	2007	(1)	(1)	(1)	(1)	(1)
	68.3%	2008	2	2	2	2	2
	63.8%	2009	5	5	5	5	4
	73.4%	2010	87	-	-	-	-
	90.2%	2011	(85)	1	1	1	1
	105.2%	2012	603	256	253	250	165
	91.9%	2013	(359)	221	219	217	145
	83.4%	2014	156	(54)	(53)	(45)	(33)
	84.0%	2015	13	399	395	391	234
	92.5%	2016	771	1,482	1,408	1,281	749
	93.0%	2017	4,151	3,906	3,672	3,562	2,175
	92.9%	2018	7,158	7,398	7,790	8,154	4,933
	96.5%	2019	-	-	-	-	8,266
		TOTAL	12,501	13,615	13,691	13,817	16,640
		Change		1,114	76	126	

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

EXHIBIT C

Premium Liabilities

TABLE EXHIBIT C

	Amounts in \$000s				
	Actual Sep. 2018	Actual Oct. 2018	Projected Nov. 2018	Projected Dec. 2018	Projected Dec. 2019
Premium Liabilities					
(1) unearned premium (UP)	15,870	16,277	16,167	15,790	15,654
FOR MEMBER SHARING					
(2) expected future costs ratio {% of (1)}	102.4%	101.7%	102.3%	102.8%	105.8%
(3) expected future costs {(1) x (2)}	16,253	16,550	16,535	16,237	16,566
(4) premium deficiency / (deferred policy acquisition cost)	383	273	368	447	912
Excluding Actuarial Present Value Adjustments					
(5) expected future costs ratio {% of (1)}	97.0%	97.1%	97.7%	98.2%	101.1%
(6) expected future costs {(1) x (5)}	15,391	15,811	15,796	15,513	15,826
(7) premium deficiency / (deferred policy acquisition cost)	(479)	(466)	(371)	(277)	172

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	-	2	2	-	-	-	-	-	-	2	
2009	65	5	70	(3)	-	7	-	7	4	74	
2010	4	-	4	-	-	-	-	-	-	4	
2011	894	1	895	(37)	4	90	(4)	86	53	948	
2012	1,080	250	1,330	(57)	7	133	(6)	127	77	1,407	
2013	2,561	217	2,778	(75)	6	278	(8)	270	201	2,979	
2014	1,617	(45)	1,572	(44)	5	157	(4)	153	114	1,686	
2015	4,240	391	4,631	(195)	19	565	(24)	541	365	4,996	
2016	5,108	1,281	6,389	(326)	32	786	(40)	746	452	6,841	
2017	6,136	3,562	9,698	(601)	68	1,183	(73)	1,110	577	10,275	
PAYs (sub-total):	21,705	5,663	27,368	(1,338)	141	3,199	(159)	3,040	1,843	29,211	
CAY (2018)	8,542	8,154	16,696	(1,135)	117	2,004	(136)	1,868	850	17,546	
claims liabilities:	30,247	13,817	44,064	(2,473)	258	5,203	(295)	4,908	2,693	46,757	
	Unearned Premium	Premium Deficiency / (DPAC)	Total Provision	discount	investment PfAD	nominal development PfAD	development PfAD discount	development PfAD	Total apvs	TOTAL*	
premium liabilities:	15,790	(277)	15,513	(823)	91	1,539	(83)	1,456	724	16,237	
							*Total may not be sum of parts, as apvs apply to future costs within UPR				
policy liabilities:			59,577	(3,296)	349	6,742	(378)	6,364	3,417	62,994	

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 (Sep. 30,
2018)

Accident Year	Third Party Liability Margins	Accident Benefits Margins	Other Coverages Margins	Total 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	10.0%	10.0%	10.0%	10.0%
2015	12.5%	10.0%	12.3%	12.2%
2016	12.5%	10.0%	12.5%	12.3%
2017	12.5%	10.0%	9.7%	12.2%
2018	12.4%	10.0%	5.8%	12.0%
2019	11.9%	10.0%	5.1%	10.1%
prem liab	11.9%	10.0%	5.1%	10.1%

discount rate: 2.28%
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 (2.28%), the prior valuation assumption (1.86%) 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	1.28%	1.78%	2.28%	2.78%	3.28%	3.78%	1.86%	1.73%
2007	-	-	-	-	-	-	-	-
2008	-	-	-	-	-	-	-	-
2009	63	63	62	62	61	61	63	63
2010	4	4	4	4	4	4	4	4
2011	908	900	892	884	877	869	899	901
2012	1,834	1,817	1,800	1,783	1,767	1,751	1,814	1,818
2013	2,374	2,360	2,346	2,332	2,318	2,305	2,357	2,361
2014	1,808	1,797	1,786	1,775	1,764	1,753	1,795	1,798
2015	5,062	5,015	4,968	4,922	4,877	4,834	5,007	5,019
2016	7,189	7,108	7,027	6,949	6,873	6,798	7,095	7,116
2017	10,705	10,557	10,413	10,273	10,137	10,003	10,534	10,572
2018	18,241	17,964	17,694	17,430	17,176	16,927	17,921	17,992
Total	48,188	47,585	46,992	46,414	45,854	45,305	47,489	47,644
	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	1.28%	1.78%	2.28%	2.78%	3.28%	3.78%	1.86%	1.73%
Total	1,196	593	-	(578)	(1,138)	(1,687)	497	652
	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	1.28%	1.78%	2.28%	2.78%	3.28%	3.78%	1.86%	1.73%
2007	-	-	-	-	-	-	-	-
2008	-	-	-	-	-	-	-	-
2009	1.6%	1.6%	-	-	(1.6%)	(1.6%)	1.6%	1.6%
2010	-	-	-	-	-	-	-	-
2011	1.8%	0.9%	-	(0.9%)	(1.7%)	(2.6%)	0.8%	1.0%
2012	1.9%	0.9%	-	(0.9%)	(1.8%)	(2.7%)	0.8%	1.0%
2013	1.2%	0.6%	-	(0.6%)	(1.2%)	(1.7%)	0.5%	0.6%
2014	1.2%	0.6%	-	(0.6%)	(1.2%)	(1.8%)	0.5%	0.7%
2015	1.9%	0.9%	-	(0.9%)	(1.8%)	(2.7%)	0.8%	1.0%
2016	2.3%	1.2%	-	(1.1%)	(2.2%)	(3.3%)	1.0%	1.3%
2017	2.8%	1.4%	-	(1.3%)	(2.7%)	(3.9%)	1.2%	1.5%
2018	3.1%	1.5%	-	(1.5%)	(2.9%)	(4.3%)	1.3%	1.7%
Total	2.5%	1.3%	-	(1.2%)	(2.4%)	(3.6%)	1.1%	1.4%
	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

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	(1)	-	-	-	-	-	(1)
2008	2	(1)	1	-	-	-	2
2009	10	(1)	1	(1)	(1)	(10.0%)	9
2010	93	(23)	23	(93)	(93)	(100.0%)	-
2011	(29)	22	(22)	86	86	(296.6%)	57
2012	754	(165)	58	(311)	(418)	(55.4%)	336
2013	(164)	92	115	387	594	(362.2%)	430
2014	304	(6)	(74)	(150)	(230)	(75.7%)	74
2015	400	(3)	(21)	412	388	97.0%	788
2016	1,259	(22)	17	713	708	56.2%	1,967
2017	4,900	(146)	(82)	(140)	(368)	(7.5%)	4,532
2018	7,980	884	(398)	(349)	137	1.7%	8,117
Grand Total	15,508	631	(382)	554	803	5.2%	16,311

EXHIBIT G

Page 2 of 2

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

RSP **Nova Scotia**

AccountCode Desc **IBNR - Undiscounted**

IBNR - in \$000s

AccYear	Values				Sum of Total Change	Sum of % Total Change	Sum of Current Month Final Amount
	Sum of Prior Month Actual Amount	Sum of Projected Change	Sum of Change Due to AvsP Variances	Sum of Change Due to Valuation Implementation			
2007	(1)	-	-	-	-	-	(1)
2008	2	(1)	1	-	-	-	2
2009	5	(1)	1	-	-	-	5
2010	87	(23)	23	(87)	(87)	(100.0%)	-
2011	(85)	23	(23)	86	86	(101.2%)	1
2012	603	(163)	94	(278)	(347)	(57.5%)	256
2013	(359)	97	111	372	580	(161.6%)	221
2014	156	(3)	(75)	(132)	(210)	(134.6%)	(54)
2015	13	-	(20)	406	386	2,969.2%	399
2016	771	(8)	6	713	711	92.2%	1,482
2017	4,151	(125)	(101)	(19)	(245)	(5.9%)	3,906
2018	7,158	798	(398)	(160)	240	3.4%	7,398
Grand Total	12,501	594	(381)	901	1,114	8.9%	13,615