



NOVA SCOTIA RISK SHARING POOL

AUGUST 2019 OPERATIONAL REPORT

ACTUARIAL HIGHLIGHTS

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ACTUARIAL HIGHLIGHTS**RSP NOVA SCOTIA****OPERATIONAL REPORT****AUGUST 2019**

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1 Summary

1.1 Valuation Schedule (Fiscal Year 2019)

The August 2019 Operational Report incorporates the results of an updated valuation (as at June 30, 2018) – the impact of the implementation of the valuation is discussed in section **Error! Reference source not found.** The table immediately below summarizes the implemented valuations and future scheduled valuations for fiscal year 2019.

NOVA SCOTIA RISK SHARING POOL FISCAL YEAR 2019 – SCHEDULE OF VALUATIONS			
Valuation Date	Discount Rate (per annum)	Operational Report	Description of Changes
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
Dec. 31, 2018 (completed)	1.93% mfad 25 bp	Mar. 2019	updated valuation: accident year 2019 loss ratio <u>decreased</u> 0.2 points to 96.3%; discount rate <u>decreased</u> by 35 basis points; no change to selected margins for adverse deviations
Mar. 31, 2019 (completed)	1.43% mfad 25 bp	May 2019	updated valuation (roll forward): accident year 2019 loss ratio <u>increased</u> 1.4 points to 97.7%; discount rate <u>decreased</u> by 50 basis points; no change to selected margins for adverse deviations
Jun. 30, 2019 (completed)	1.41% mfad 25 bp	Aug. 2019	updated valuation: accident year 2019 loss ratio <u>decreased</u> 0.9 points to 96.8%; discount rate <u>decreased</u> by 2 basis points; selected margins for adverse deviations were updated
Sep. 30, 2019		Oct. 2019	update valuation (roll forward)

Under the proposed schedule for fiscal year 2019, the “off-half” valuation quarters ending March 31, 2019 and September 30, 2019 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 June 30, 2019 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 October 2019.

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

abbreviations PAYs refers to prior accident years, CAY refers to the current accident year (2019), and Prem Def refers to premium deficiency / deferred acquisition costs impacts..

Summary of Impact (\$000s) of Implementing Result of Valuation as at June 30, 2019¹

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	(512)	(27)	(539)	10	(71)	(600)
CAY	(179)	(14)	(193)	14	-	(179)
Prem Def	(144)	9	(135)	-	-	(135)
TOTAL	(835)	(32)	(867)	24	(71)	(914)

As indicated in the table above, the incorporation of the new valuation had an estimated **\$0.9 million favourable impact** on the month's net result from operations, subtracting an estimated 4.7 points (see table below) to the **year-to-date Combined Operating Ratio** to end at **140.8%**.

Summary of Impact (% YTD EP) of Implementing Result of Valuation as at June 30, 2019

NS	ytd EP		19,598	(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	(2.6%)	(0.1%)	(2.8%)	0.1%	(0.4%)	(3.1%)
CAY	(0.9%)	(0.1%)	(1.0%)	0.1%	-	(0.9%)
Prem Def	(0.7%)	-	(0.7%)	-	-	(0.7%)
TOTAL	(4.3%)	(0.2%)	(4.4%)	0.1%	(0.4%)	(4.7%)

The impact of the **nominal changes** is shown in column [1] of the two preceding summary tables. The change in the selected nominal ultimates was **favourable by \$0.8 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 **PAYs** overall showed a **\$0.5 million favourable** nominal variance or 1.4% of the PAYs nominal unpaid balance of \$37.3 million determined at the end of last month beginning, driven by favourable claims development and updates to a priori loss ratios to include more recent data and updated trends. While the valuation implementation impact does differ from the valuation changes themselves (as they

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.

apply to different periods), the valuation result by government line provides insight into the relative PAYs nominal changes. As per below, the primary changes were in relation to TPL and accident benefits.

Valuation as at June 30, 2019 – PAYs Nominal Changes by Government Line

Nova Scotia RSP - valuation changes in selected ultimate (favourable) / unfavourable during Quarter				
Accident Year	Third Party Liability	Accident Benefits	Other Coverages	Total
2014 & Prior	100	15	(1)	114
2015	237	18	(3)	252
2016	(13)	(37)	(9)	(59)
2017	(273)	(34)	(12)	(319)
2018	(423)	(222)	(50)	(695)
TOTAL	(372)	(260)	(75)	(707)

The CAY and premium deficiency impacts are a result of the change in the selected loss ratios for accident year **2019** (decreased 0.9 points to **96.8%**).and **2020** (decreased 0.6 points to **98.6%**).

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 on the previous page 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 favourable change of \$32 thousand 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 June 2019. Column [4] accounts for the change in the **discount rate** selected (decreased 2 basis point to **1.41%**), indicating an unfavourable impact of \$24 thousand. The impact *related only to claims liabilities* (i.e. PAYs plus CAY) was \$24 thousand at May 2019 (projected \$31 thousand impact at December 31, 2019) – this compares to the \$30 thousand change one would estimate as the impact by interpolation using the interest rate sensitivity table provided in last month’s Actuarial Highlights.

Column [5] accounts for any changes to selected MfADs. The selected **investment rate MfAD** was **left unchanged at 25 basis points** but the selected **claims development MfADs** at the coverage and accident year level were **updated** as per usual practice with the June 30 valuation, resulting in a favourable impact of \$71 thousand, as margins on older PAYs were aged.

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 / Regulation²

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 **Nova Scotia Court of Appeal** confirmed, in a unanimous decision released on **January 18, 2019** in relation to **Sparks v Holland (2019 NSCA 3)**, that future Canada Pension Plan (CPP) disability benefits are deductible from future income loss awards in motor-vehicle accident claims in that province. Sparks sustained injuries as a result of a motor vehicle accident in Nova Scotia and sought damages for personal injuries and loss of income. The decision supported an earlier decision (*Tibbets v Murphy*, 2017 NSCA 35) that both past and future CPP disability benefits are deductible under section 133A of the Insurance Act.

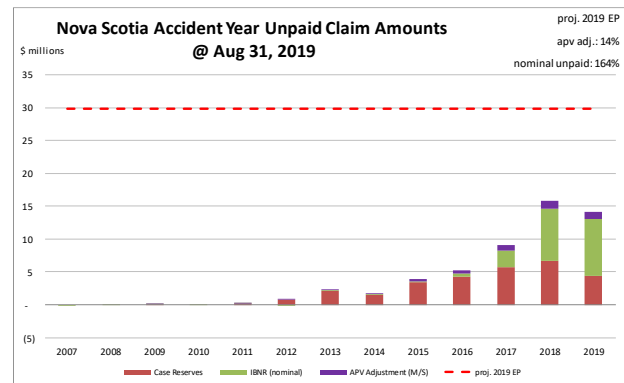
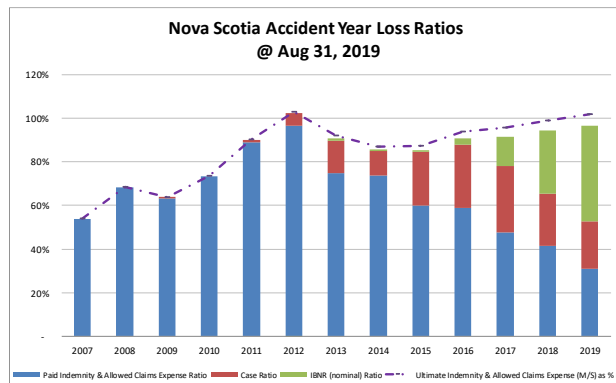
At the current time, no adjustments have been made to our valuation estimates as a result of this decision.

1.5 Current Provision Summary

The charts at the top of the next page show the current levels of claim liabilities³ booked by accident year. The left chart displays life-to-date payments, case reserves, IBNR, and the total including actuarial present value adjustments against accident year earned premium. The right chart shows the associated dollar amounts for the components of the claim liabilities and the current projected amount of 2019 full year earned premium (the red hash-mark line) to provide some perspective.

²This link is to a helpful guide on how bills become laws: <http://www.ontla.on.ca/lao/en/media/laointernet/pdf/bills-and-lawmaking-background-documents/how-bills-become-law-en.pdf>.

³Claim liabilities refer to provision for unpaid indemnity and allowed claims expenses. Allowed claims expenses are first party legal and other expenses as listed in the RSP Claims Guide. Claims expenses paid through the member company expense allowance are NOT included in this discussion.



"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 (\$4.2 million – see table immediately below) represents 14% of the earned premium projected for the full year 2019 (see the upper right corner of the right chart above). If our current estimates of the nominal unpaid amounts prove to match actual claims payments, the actuarial present value adjustments will be released into the net operating result over future periods.

claim liabilities (\$000s)

	amt	%
case	29,040	54.5%
ibnr	20,035	37.6%
M/S apv adjust.	4,191	7.9%
M/S total	53,266	100.0%

The table to the left breaks down the Member Statement (M/S) claim liabilities total into component parts, showing that the majority of the claim liabilities for this RSP is in case reserves. Approximately 83% of the IBNR balance relates to accident years 2018 and 2019 (see Exhibit B). Approximately 90% of the M/S total claim

liabilities are related to accident years 2015-2019 inclusive (i.e. the most recent 5 accident years) and less than 1% is related to accident years 2009 and prior (i.e. prior to the most recent 10 accident years).

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

premium liabilities (\$000s)

	amt	%
unearned prem	16,350	94.4%
prem def/(dpac)	(142)	(0.8%)
M/S apv adjust.	1,106	6.4%
M/S total	17,314	100.0%

policy liabilities (\$000s)

	amt	%
claim	49,075	69.5%
premium	16,208	23.0%
M/S apv adjust.	5,297	7.5%
M/S total	70,580	100.0%

2 Activity During the Month of August 2019

2.1 Recorded Premium and Claims Activity

The table at the top of the next page summarizes the extent to which premiums and claims amounts recorded during the month differ from projections reflected in the prior month's Operational Report⁴.

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

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

Table 01 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	2	2	113	(122)	60	270	173	148
2017	2	2	449	269	(48)	(29)	401	240
2018	(2)	(2)	185	(122)	(108)	(59)	77	(181)
2019	2,595	(26)	753	(152)	946	568	1,699	416
TOTAL	2,596	(25)	1,501	(127)	850	750	2,350	623

(Recorded transaction amounts exclude IBNR & other actuarial provisions)

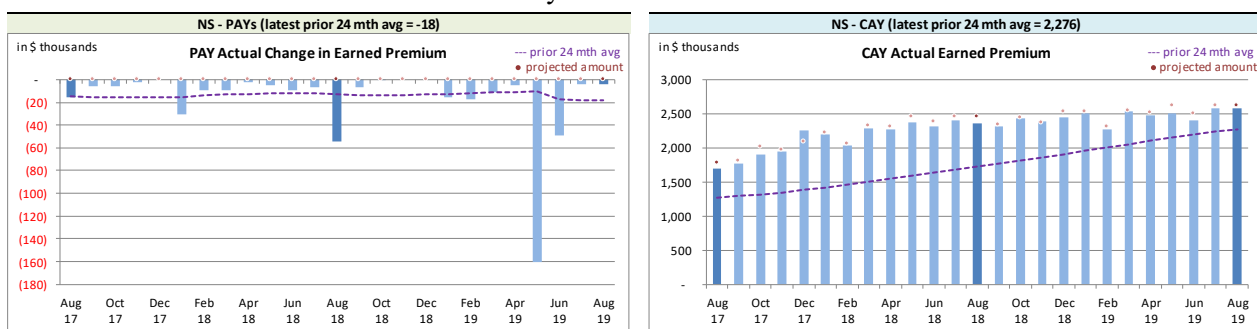
It is typically unusual to see actual earned premium transactions affecting accident years older than the first prior accident year, the changes in 2018 and prior accident years reflect activity undertaken by a member reflecting recent audit findings.

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

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

The charts immediately below show actual **earned premium**⁵ activity in each of the most recent 25 calendar months, along with a “prior 24-month average” to show how each month’s actual compares with the average amount of the preceding 24 calendar months.

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



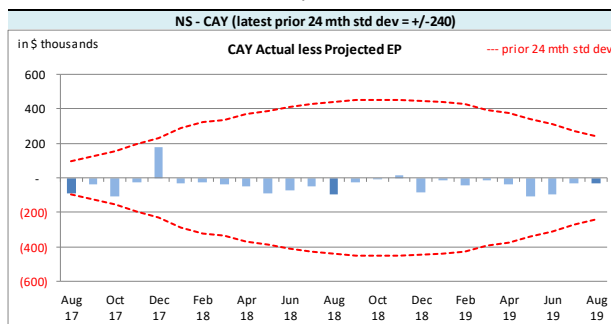
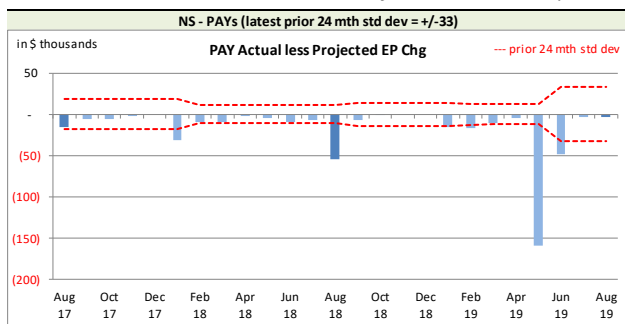
Earned premium changes during a given calendar month in relation to prior accident years tend to be at modest levels, although relatively high levels generally occur at the beginning of each year.

The associated variance between the actual changes and the projections from the previous month are shown in the charts at the top of the next page. **Earned premium** change projections are all attributed to the current accident year as the projection upload does not accept **earned premium** changes for other accident years. We do not see this limitation as being significant for our purposes, but it does

⁵Premium is earned on a daily basis based on the transaction term measured in days. As a result, months with 31 days earned relatively more than those with 30 days, and February earns the least.

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)	(18)	2,276
std dev	33	240
A-P <> std dev	6	-
% <> std dev	24.0%	0.0%
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) bias⁶, 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 bias⁷, 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.

Readers will note the significant widening of the CAY standard deviation band, reflecting volume increases and the impact as those increases are earned.

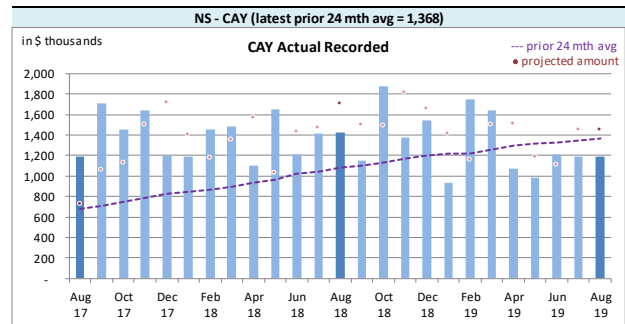
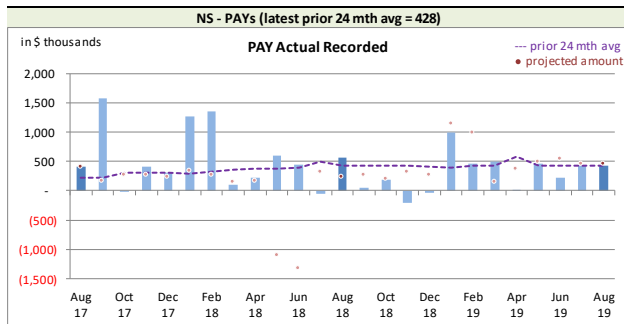
2.1.b AvsP: Recorded Indemnity & Allowed Claims Expense

The charts at the top of the next page 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.

⁶The PAYS' variances will show bias as the projection upload forces all earned premium projections to be attributed to the CAY.

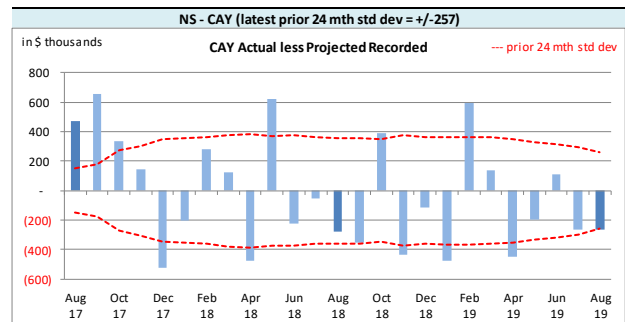
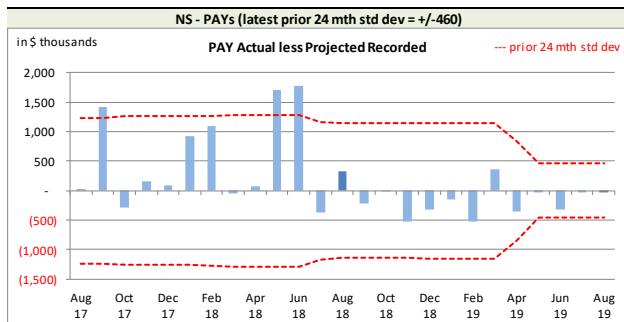
⁷We measure bias based on a 95% confidence range for a binominal distribution with trials based on the range being considered (25 in this case) and 50% probability of success. The rolling 25-month variances at August 2019 has only 2 months where the actuals were higher than projected, and as the 95% confidence range is 8 to 17, bias continues to be indicated.

Nova Scotia RSP Actual Recorded by Calendar Month



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

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



On Latest \$ thousands			
	Recorded	PAYs	CAY
Mthly Avg Recorded (prior 24 mths)	428	428	1,368
std dev	460	460	257
A-P <> std dev	3	3	12
% <> std dev	12.0%	12.0%	48.0%
norm <> std dev	31.7%	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 in

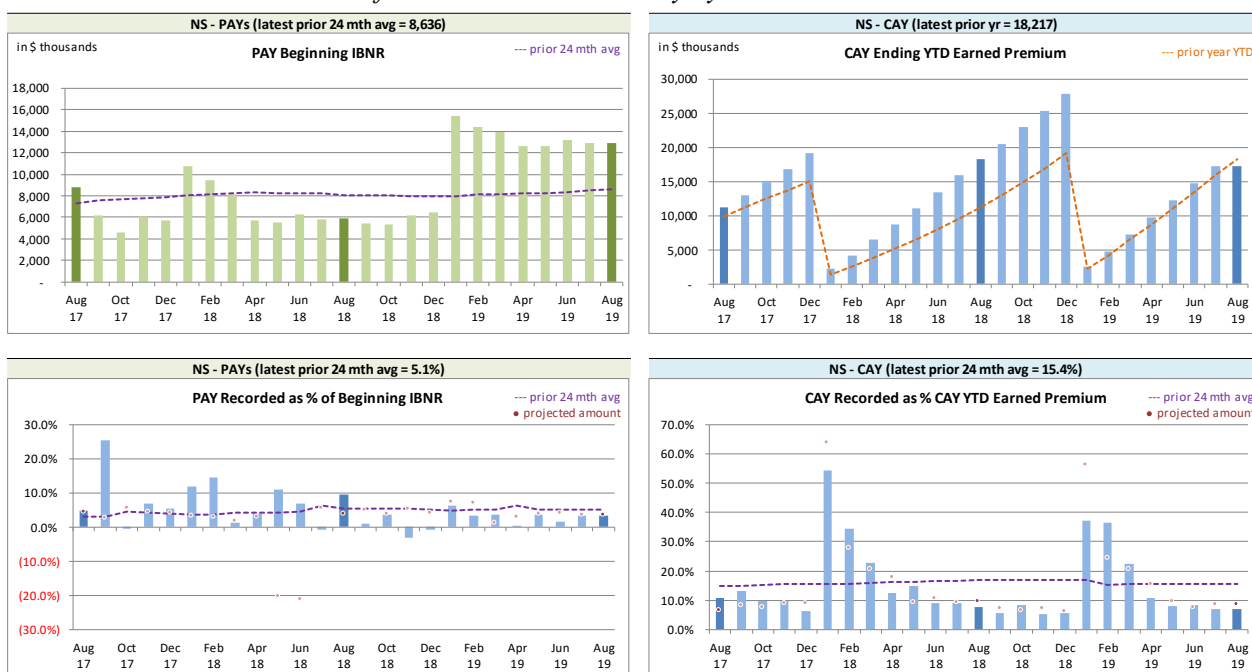
relative or overall terms. That said, 12% of prior accident years' (PAYs) **recorded** variances over the last 25 calendar months have fallen outside of one standard deviation of the actual **recorded** amounts (see table above), suggesting the projection process has performed better than simply projecting the prior 24-month average amount (assuming it follows a normal distribution). Bias has not been indicated at a 95% confidence level on a rolling 25-month basis (11 of 25 variances are positive), but on a lagging 12-month basis, bias is indicated (our projections tend to be too high and we are considering this for future projections).

The current accident year (CAY) **recorded** variances fell outside of one standard deviation 48% 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, but efforts so far have fallen short (although rapid growth may be hampering our projection capabilities). Bias has not been indicated at a 95% confidence level on a rolling 25-month basis (16 of 25 variances are positive).

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 influence⁸ 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).

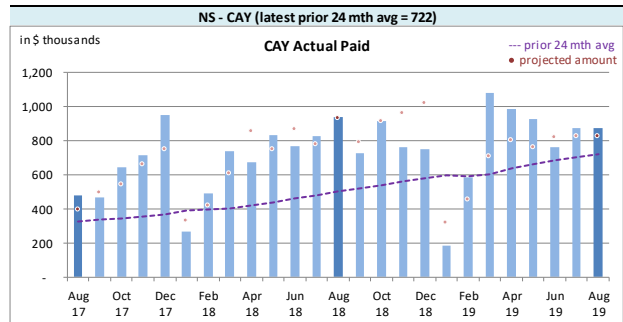
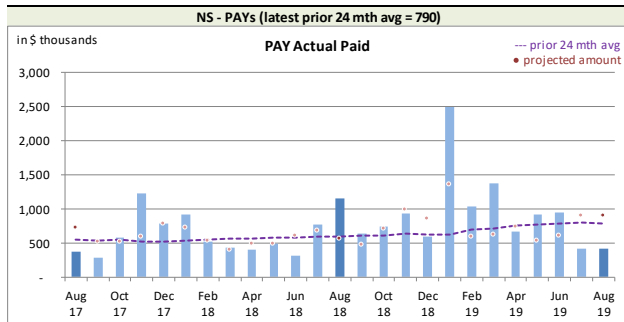
2.1.c AvsP: Paid Indemnity & Allowed Claims Expense

The charts at the top of the next page show actual **paid** activity in each of the most recent 25 calendar

⁸Our 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.

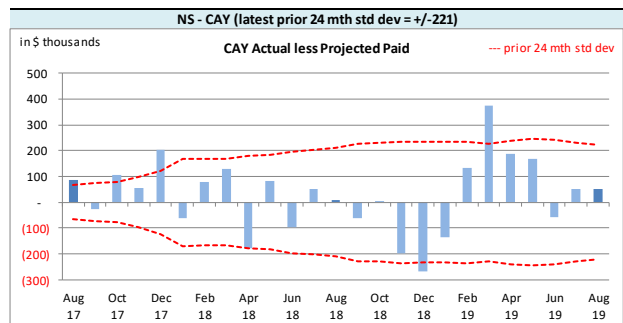
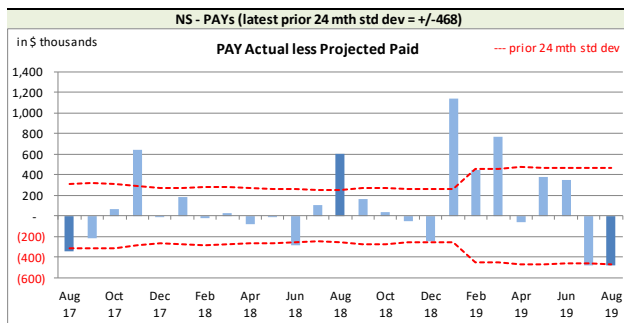
months, along with a “prior 24-month average” to show how each month’s actual compares with the average amount of the preceding 24 calendar months.

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



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

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



On Latest \$ thousands			
	Paid	PAYs	CAY
Mthly Avg Paid (prior 24 mths)		790	722
std dev		468	221
A-P <> std dev		8	5
% <> std dev		32.0%	20.0%
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 in relative or

overall terms. That said, 32% 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 rolling 25-month basis (13 of 25 variances are positive).

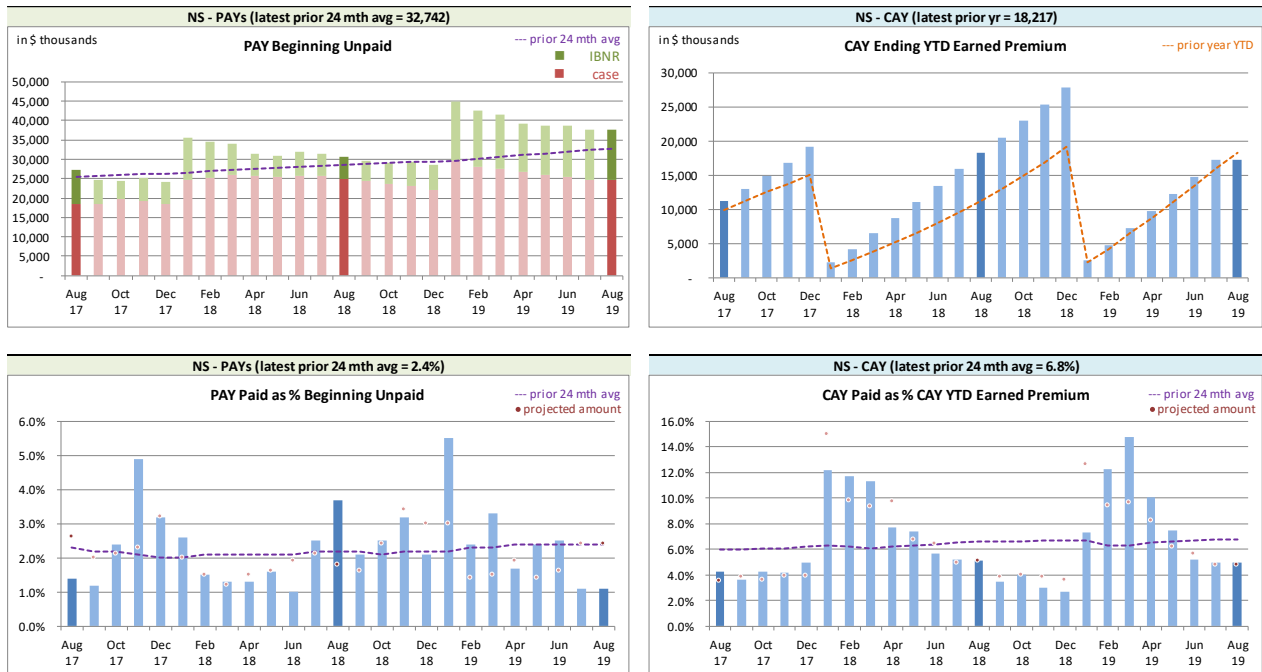
The PAY **paid** variance (left chart above) was outside of one standard deviation this month. The activity was reviewed and confirmed, with the variance attributed to process variance.

The current accident year (CAY) **paid** variances fell outside of one standard deviation 20% of the time over the last 25 calendar months (see table above), suggesting that the projection process has performed better than simply projecting the prior 24-month average amount. Bias has not been

indicated at a 95% confidence level on a rolling 25-month basis (16 of 25 variances are positive).

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

Nova Scotia RSP Levels that influence⁹ 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

⁹Our 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.

IBNR¹⁰, and factors were applied to the nominal unpaid claims liability (case plus IBNR) to determine the discount amount (shown as a negative value to indicate its impact of reducing the liability) and the Provisions for Adverse Deviations. The loss ratios and the factors used to determine the current month's provisions and projections were based on the applicable valuation. The table immediately below summarizes variances in provisions included in this month's Operational Report and the associated one-month projections from last month's Report.

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

Table 02

Accident Year	actuarial present value adjustments							
	IBNR		Discount Amount		Provisions for Adverse Deviations		IBNR + actuarial present value adjustments	
	Actual	Actual less Projected	Actual	Actual less Projected	Actual	Actual less Projected	Actual	Actual less Projected
Prior	802	177	(309)	(10)	1,448	(17)	1,941	150
2017	2,532	(523)	(265)	27	1,019	(76)	3,286	(572)
2018	7,959	(373)	(540)	47	1,819	(64)	9,238	(390)
2019	8,742	(621)	(562)	16	1,581	(5)	9,761	(610)
TOTAL	20,035	(1,340)	(1,676)	80	5,867	(162)	24,226	(1,422)

The IBNR provision is \$1.3 million lower than projected from last month, counterbalancing the recorded claims activity and adjusting for the earned premium variance impacts indicated in section 2.1 and due to the valuation implementation.

Exhibit G shows the accident year IBNR amount change from last month to this month broken down into:

- (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.

¹⁰For 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: 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:	(142)	(144)	1,106	11	964	(133)
balance as % unearned premium:	(0.9%)	(0.9%)	6.8%	0.1%	5.9%	(0.8%)
actual unearned premium:	16,350					
less projected:	44					

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 loss¹¹ 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 expenses¹², 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 98.1% rather than 96.8% (the valuation ultimate ratio for accident year 2019), 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.)

¹¹“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).

¹²Allowed 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	(402)	(2.1%)	429	2.2%	27	0.1%	(669)	(4.0%)
CAY	19,220	98.1%	1,019	5.2%	20,239	103.3%	2,494	(1.1%)
TOTAL	18,818	96.0%	1,448	7.4%	20,266	103.4%	1,825	(5.1%)

(" % EP" based on 2019 calendar year-to-date earned premium; ratios may not total due to rounding)

In general, prior accident years (PAYs) changes from last month are due to the release of the actuarial present value adjustments with claims payments, except when valuations are implemented. The loss ratio change year-to-date in Table 04 reflects not only changes in the prior accident year levels, but also the increase in the calendar year-to-date earned premium with an additional month's earned premium and due to the valuation implementation.

For the current accident year (CAY), changes in the year-to-date total reflects the additional month's exposure and regular changes to actuarial present value adjustments as the year ages.

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
 1.41%

 interest rate margin
 25 basis pts

Amounts in \$000s					
Accident Year	Actual Jul. 2019	Actual Aug. 2019	Projected Sep. 2019	Projected Oct. 2019	Projected Dec. 2019
2007	(1)	(1)	(1)	(1)	(1)
2008	2	2	2	2	2
2009	10	10	10	10	10
2010	4	4	4	4	4
2011	(23)	15	14	14	15
2012	98	55	54	53	52
2013	293	317	314	309	302
2014	81	214	211	207	202
2015	203	394	382	374	342
2016	1,168	931	916	903	862
2017	4,037	3,286	3,220	3,180	2,993
2018	9,913	9,238	9,131	9,027	8,605
2019	8,966	9,761	10,995	12,267	14,707
TOTAL	24,751	24,226	25,252	26,349	28,095
Change		(525)	1,026	1,097	

Please see Exhibit G, page 1 for Components of Change during Current Month

EXHIBIT B
IBNR
TABLE EXHIBIT B

TABLE EXHIBIT B		Amounts in \$000s					
IBNR	Ultimate Loss Ratio	Accident Year	Actual Jul. 2019	Actual Aug. 2019	Projected Sep. 2019	Projected Oct. 2019	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	5
	73.4%	2010	4	4	4	4	4
	90.2%	2011	(32)	5	5	5	5
	102.5%	2012	33	(7)	(7)	(7)	(7)
	90.8%	2013	120	140	139	136	134
	85.8%	2014	(41)	83	82	80	78
	85.3%	2015	(132)	110	103	101	92
	90.8%	2016	692	461	456	451	433
	91.5%	2017	3,216	2,532	2,481	2,456	2,311
	94.3%	2018	8,590	7,959	7,879	7,800	7,415
	96.8%	2019	8,085	8,742	9,850	10,991	13,179
		TOTAL	20,541	20,035	20,998	22,023	23,650
		Change		(506)	963	1,025	

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

EXHIBIT C
Premium Liabilities
TABLE EXHIBIT C

	Amounts in \$000s				
	Actual Jul. 2019	Actual Aug. 2019	Projected Sep. 2019	Projected Oct. 2019	Projected Dec. 2019
Premium Liabilities					
(1) unearned premium (UP)	15,922	16,350	17,026	17,296	16,996
FOR MEMBER SHARING					
(2) expected future costs ratio {% of (1)}	106.6%	105.9%	106.2%	106.5%	107.0%
(3) expected future costs {(1) x (2)}	16,965	17,314	18,088	18,420	18,193
(4) premium deficiency / (deferred policy acquisition cost)	1,043	964	1,062	1,124	1,197
Excluding Actuarial Present Value Adjustments					
(5) expected future costs ratio {% of (1)}	99.9%	99.1%	99.5%	99.7%	100.2%
(6) expected future costs {(1) x (5)}	15,898	16,208	16,934	17,244	17,031
(7) premium deficiency / (deferred policy acquisition cost)	(24)	(142)	(92)	(52)	35

EXHIBIT D

Projected Year-end Policy Liabilities

The table below presents the projected policy liabilities as at December 31, 2019, broken down by component.

Nova Scotia ending 2019		Projected Balances as at Dec. 31, 2019 (\$000s)							
Acc Yr	nominal values			actuarial present value adjustments (apvs)					
	Case	IBNR	Total Unpaid	discount	investment PfAD	nominal development PfAD	development PfAD discount	development PfAD	Total apvs
2007	-	(1)	(1)	-	-	-	-	-	-
2008	-	2	2	-	-	-	-	-	-
2009	64	5	69	(2)	-	7	-	7	5
2010	-	4	4	-	-	-	-	-	-
2011	143	5	148	(5)	1	15	(1)	14	10
2012	770	(7)	763	(18)	3	76	(2)	74	59
2013	1,951	134	2,085	(44)	8	208	(4)	204	168
2014	1,434	78	1,512	(29)	5	151	(3)	148	124
2015	3,038	92	3,130	(69)	13	313	(7)	306	250
2016	3,872	433	4,305	(116)	22	538	(15)	523	429
2017	5,173	2,311	7,484	(239)	37	913	(29)	884	682
2018	6,196	7,415	13,611	(504)	82	1,674	(62)	1,612	1,190
PAYs (sub-total):	22,641	10,471	33,112	(1,026)	171	3,895	(123)	3,772	2,917
CAY (2019)	6,443	13,179	19,622	(844)	137	2,335	(100)	2,235	1,528
claims liabilities:	29,084	23,650	52,734	(1,870)	308	6,230	(223)	6,007	4,445
	Unearned Premium	Premium Deficiency / (DPAC)	Total Provision	discount	investment PfAD	nominal development PfAD	development PfAD discount	development PfAD	Total apvs
premium liabilities:	16,996	35	17,031	(603)	101	1,726	(62)	1,664	1,162
*Total may not be sum of parts, as apvs apply to future costs within UPR									
policy liabilities:			69,765	(2,473)	409	7,956	(285)	7,671	5,607

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, 2019 from the valuation), followed by the selected discount rate and the associated margin for investment income.

**Selected Claims Development MfADs (Jun. 30,
 2019)**

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	10.0%	10.0%	9.3%	10.0%
2016	12.5%	10.0%	12.5%	12.5%
2017	12.5%	10.0%	11.2%	12.2%
2018	12.5%	10.0%	11.8%	12.3%
2019	12.4%	10.0%	5.6%	11.9%
2020	12.0%	10.0%	5.1%	10.3%
prem liab	12.0%	10.0%	5.1%	10.3%

discount rate: 1.41%
 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, 2019 from the latest valuation date (projections in exhibits A to D are to Dec. 31, 2019, and are based on more up-to-date information). We have included the most recent valuation selection (1.43%), the prior valuation assumption (1.93%) and the prior fiscal year end valuation assumption (2.28%) 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, 2019 projected Unpaid								
AY	0.41%	0.91%	1.41%	1.91%	2.41%	2.91%	1.43%	2.28%
2007	-	-	-	-	-	-	-	-
2008	-	-	-	-	-	-	-	-
2009	66	65	65	64	64	63	65	64
2010	-	-	-	-	-	-	-	-
2011	153	151	149	147	145	143	149	146
2012	752	746	739	733	727	721	739	729
2013	1,855	1,841	1,827	1,814	1,801	1,788	1,827	1,804
2014	1,123	1,115	1,108	1,100	1,093	1,086	1,107	1,095
2015	3,314	3,287	3,261	3,236	3,211	3,187	3,260	3,217
2016	4,692	4,647	4,603	4,560	4,518	4,477	4,601	4,529
2017	8,587	8,487	8,390	8,296	8,202	8,113	8,387	8,226
2018	15,538	15,329	15,124	14,926	14,731	14,542	15,116	14,781
2019	21,115	20,784	20,463	20,150	19,844	19,548	20,449	19,923
Total	57,195	56,452	55,729	55,026	54,336	53,668	55,700	54,514
	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	0.41%	0.91%	1.41%	1.91%	2.41%	2.91%	1.43%	2.28%
Total	1,466	723	-	(703)	(1,393)	(2,061)	(29)	(1,215)
	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	0.41%	0.91%	1.41%	1.91%	2.41%	2.91%	1.43%	2.28%
2007	-	-	-	-	-	-	-	-
2008	-	-	-	-	-	-	-	-
2009	1.5%	-	-	(1.5%)	(1.5%)	(3.1%)	-	(1.5%)
2010	-	-	-	-	-	-	-	-
2011	2.7%	1.3%	-	(1.3%)	(2.7%)	(4.0%)	-	(2.0%)
2012	1.8%	0.9%	-	(0.8%)	(1.6%)	(2.4%)	-	(1.4%)
2013	1.5%	0.8%	-	(0.7%)	(1.4%)	(2.1%)	-	(1.3%)
2014	1.4%	0.6%	-	(0.7%)	(1.4%)	(2.0%)	(0.1%)	(1.2%)
2015	1.6%	0.8%	-	(0.8%)	(1.5%)	(2.3%)	(0.0%)	(1.3%)
2016	1.9%	1.0%	-	(0.9%)	(1.8%)	(2.7%)	(0.0%)	(1.6%)
2017	2.3%	1.2%	-	(1.1%)	(2.2%)	(3.3%)	(0.0%)	(2.0%)
2018	2.7%	1.4%	-	(1.3%)	(2.6%)	(3.8%)	(0.1%)	(2.3%)
2019	3.2%	1.6%	-	(1.5%)	(3.0%)	(4.5%)	(0.1%)	(2.6%)
Total	2.6%	1.3%	-	(1.3%)	(2.5%)	(3.7%)	(0.1%)	(2.2%)
	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 - Discounted

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	-	-	-	-	-	2
2009	10	-	-	-	-	-	10
2010	4	-	-	-	-	-	4
2011	(23)	-	-	38	38	(165.2%)	15
2012	98	-	-	(43)	(43)	(43.9%)	55
2013	293	(3)	(8)	35	24	8.2%	317
2014	81	(1)	18	116	133	164.2%	214
2015	203	5	(17)	203	191	94.1%	394
2016	1,168	(45)	(130)	(62)	(237)	(20.3%)	931
2017	4,037	(179)	(263)	(309)	(751)	(18.6%)	3,286
2018	9,913	(285)	188	(578)	(675)	(6.8%)	9,238
2019	8,966	1,405	(431)	(179)	795	8.9%	9,761
Grand Total	24,751	897	(643)	(779)	(525)	(2.1%)	24,226

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	-	-	-	-	-	2
2009	5	-	-	-	-	-	5
2010	4	-	-	-	-	-	4
2011	(32)	-	-	37	37	(115.6%)	5
2012	33	-	-	(40)	(40)	(121.2%)	(7)
2013	120	(1)	(7)	28	20	16.7%	140
2014	(41)	-	18	106	124	(302.4%)	83
2015	(132)	11	(21)	252	242	(183.3%)	110
2016	692	(35)	(136)	(60)	(231)	(33.4%)	461
2017	3,216	(161)	(239)	(284)	(684)	(21.3%)	2,532
2018	8,590	(258)	178	(551)	(631)	(7.3%)	7,959
2019	8,085	1,278	(442)	(179)	657	8.1%	8,742
Grand Total	20,541	834	(649)	(691)	(506)	(2.5%)	20,035