



NOVA SCOTIA RISK SHARING POOL

AUGUST 2020 OPERATIONAL REPORT

ACTUARIAL HIGHLIGHTS

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ACTUARIAL HIGHLIGHTS
RSP NOVA SCOTIA
OPERATIONAL REPORT
AUGUST 2020

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1 Summary

Key Points

- (a) The 2020 Q2 valuation was completed and implemented into the results this month, with a \$8.7 million favourable impact, or 9.9% of beginning policy liabilities (policy liabilities ended at \$88 million) and 38.1 points of year-to-date earned premium; the updated valuation loss ratios include a further assessment of the incurred impacts associated with the COVID-19 pandemic;
- (b) August’s premium projections have been updated to reflect the most recent information provided by certain members. Updated claims assumptions are derived from the 2020 Q2 valuation.

1.1 Valuation Schedule (Fiscal Year 2020)

The August 2020 Operational Report incorporates the results of an updated valuation (as at June 30, 2020) – the impact of the implementation of the valuation is discussed in section **Error! Reference source not found.** The following table summarizes the valuation implementations scheduled for fiscal year 2020.

NOVA SCOTIA RISK SHARING POOL FISCAL YEAR 2020 – SCHEDULE OF VALUATIONS			
Valuation Date	Discount Rate (per annum)	Operational Report	Description of Changes
Sep. 30, 2019 (completed)	1.46% mfad 25 bp	Oct. 2019	updated valuation (roll forward) : accident year 2019 loss ratio <u>increased</u> 1.0 points to 97.8%; discount rate <u>increased</u> 5 basis points; no change to selected margins for adverse deviations
Dec. 31, 2019 (completed)	1.64% mfad 25 bp	Mar. 2020	update valuation: 2019 loss ratio <u>increased</u> 2.7 points to 100.5%; accident year 2020 loss ratio <u>increased</u> 4.5 points to 103.1%; discount rate <u>increased</u> 18 basis points; no change to selected margins for adverse deviations
Mar. 31, 2020 (completed)	0.62% mfad -25 bp	May. 2020	update valuation (partial roll-forward): accident year 2020 loss ratio <u>decreased</u> 3.5 points to 99.6%; discount rate <u>decreased</u> 102 basis points; no change to selected margins for adverse deviations
Jun. 30, 2020 (completed)	0.23% mfad 25 bp	Aug. 2020	update valuation: accident year 2020 loss ratio <u>decreased</u> 12.1 points to 87.5%; discount rate <u>decreased</u> by 39 basis points; selected margins for adverse deviations were updated
Sep 30, 2020	% mfad -- bp	Oct. 2020	update valuation (roll-forward)

Under the proposed schedule for fiscal year 2020, the off-half valuation quarters ending

March 31, 2020 and September 30, 2020 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, 2020 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.

The valuation implementation impact is summarized in the following two tables, where the abbreviations PAYs refers to prior accident years, CAY refers to the current accident year (2020), and Prem Def refers to premium deficiency / deferred acquisition costs impacts.

Summary of Impact (\$000s) of Implementing Result of Valuation as at Jun. 30, 2020¹

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	(3,661)	(416)	(4,077)	410	(96)	(3,763)
CAY	(2,811)	(307)	(3,118)	208	-	(2,910)
Prem Def	(2,083)	(209)	(2,292)	222	-	(2,070)
TOTAL	(8,555)	(932)	(9,487)	840	(96)	(8,743)

As indicated in the preceding table, the incorporation of the new valuation had an estimated **\$8.7 million favourable impact** on the month’s net result from operations, subtracting an estimated 38.1 points (see following table) from the **year-to-date Combined Operating Ratio** to end at **123.0%**.

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.

Summary of Impact (% YTD EP) of Implementing Result of Valuation as at Jun 30, 2020

NS	ytd EP 22,974 (actual)					
	IMPACT unfav / (fav) as % ytd EP from changes in:					
	ults & payout patterns			dsct rate	margins	TOTAL
	Nominal	apv adj.	sub-tot	apv adj.	apv adj.	
[1]	[2]	[3]	[4]	[5]	[6]	
PAYs	(15.9%)	(1.8%)	(17.7%)	1.8%	(0.4%)	(16.4%)
CAY	(12.2%)	(1.3%)	(13.6%)	0.9%	-	(12.7%)
Prem Def	(9.1%)	(0.9%)	(10.0%)	1.0%	-	(9.0%)
TOTAL	(37.2%)	(4.1%)	(41.3%)	3.7%	(0.4%)	(38.1%)

The impact of the **nominal changes** is shown in column [1] of the two preceding summary tables. The change in the selected nominal ultimates was **favourable by \$8.6 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 **\$3.7 million favourable** nominal variance or 7.8% of the PAYs nominal unpaid balance of \$47.7 million determined at the end of last month (July 2020), 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 apply to different periods), the valuation result by government line provides insight into the relative PAYs nominal changes. As per following table, the primary changes were in relation to TPL for the recent 3 PAYs.

Valuation as at Jun 30, 2020 – 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
2015 & Prior	237	2	-	239
2016	240	36	(1)	275
2017	(864)	(24)	(19)	(907)
2018	(1,503)	(593)	-	(2,096)
2019	(1,266)	1	27	(1,238)
TOTAL	(3,156)	(578)	7	(3,727)

The CAY and premium deficiency impacts are a result of the change in the selected loss ratios for accident year **2020** (decreased 12.1 points to 87.5%) reflecting accident year **2021** (decreased 7.1 points to 99.4%).

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 preceding 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 favourable change of \$0.9 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 June 2020. Column [4] accounts for the change in the **discount rate** selected (decreased 39 basis point to **0.23%**), indicating an unfavourable impact of \$0.8 million. The impact *related only to claims liabilities* (i.e. PAYs plus CAY) was \$0.6 million at August 2020 – this compares to the \$0.6 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**, 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 \$0.1 million, 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

Mr. Cosimo Pantaleo of Ernst & Young LLP (EY) was appointed as Actuary by the FA Board at its February 18, 2020 meeting.

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 (i.e. within the last five years) changes are provided below.

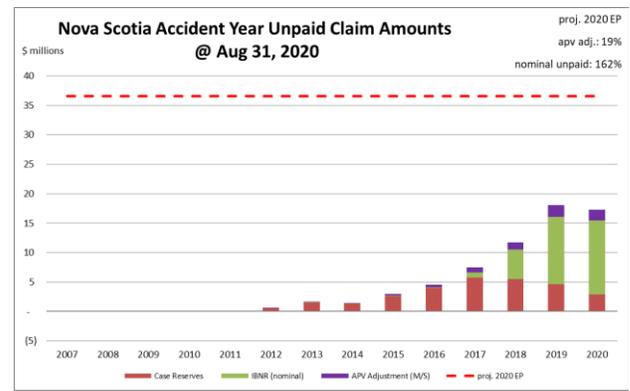
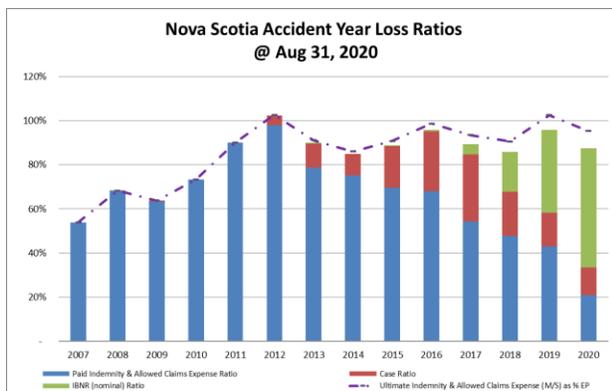
The **Nova Scotia Court of Appeal** confirmed, in a unanimous decision released on **January 18, 2019** in relation to **Sparks v Holland (2019 NSCA 3)**, that future Canada Pension Plan (CPP) disability benefits are deductible from future income loss awards in motor-vehicle accident claims in that province. Sparks sustained injuries as a result of a motor vehicle accident in Nova Scotia and sought

²This url to a pdf is to a helpful guide on how bills become laws: <https://www.ola.org/sites/default/files/common/how-bills-become-law-en.pdf>.

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 following charts 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 2020 full year earned premium (the red hash-mark line) to provide some perspective.



“M/S” refers to “Member Statement” values – that is, actuarial present value adjustments at the selected discount rate.

The current actuarial present value adjustments balance (\$6.9 million – see the following table) represents 19% of the earned premium projected for the full year 2020 (see the upper right corner of the right chart above). If our current estimates of the nominal unpaid amounts prove to match actual claims payments, the actuarial present value adjustments will be released into the net operating result over future periods.

claim liabilities (\$000s)	amt	%
case	28,936	43.9%
ibnr	30,124	45.7%
M/S apv adjust.	6,895	10.5%
M/S total	65,955	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 80% of the IBNR balance relates to accident years 2019 and 2020 (see Exhibit B). Approximately 90% of the M/S total claim

liabilities are related to accident years 2016-2020 inclusive (i.e. the most recent 5 accident years), and just over 0% is related to accident years 2010 and prior (i.e. prior to the most recent 10 accident years).

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.

The following tables summarize the premium liabilities and the total policy liabilities.

premium liabilities (\$000s)			policy liabilities (\$000s)		
	amt	%		amt	%
unearned prem	21,598	96.0%	claim	59,060	66.8%
prem def/(dpac)	(1,157)	(5.1%)	premium	20,441	23.1%
M/S apv adjust.	2,063	9.2%	M/S apv adjust.	8,958	10.1%
M/S total	22,504	100.0%	M/S total	88,459	100.0%

2 Activity During the Month of August 2020

2.1 Recorded Premium and Claims Activity

The following table summarizes the extent to which premiums and claims amounts recorded during the month differ from projections reflected in the prior month’s Operational Report⁴.

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

Accident Year	Earned Premium		Paid Indemnity & Allowed Claims Expense		Case increase / (decrease)		Recorded increase / (decrease)	
	Actual	Actual less Projected	Actual	Actual less Projected	Actual	Actual less Projected	Actual	Actual less Projected
Prior	(1)	(1)	93	(83)	168	313	261	230
2018	(1)	(1)	304	46	(671)	(614)	(367)	(568)
2019	(10)	(10)	21	(325)	(173)	(77)	(152)	(402)
2020	3,274	24	514	(488)	282	(670)	795	(1,158)
TOTAL	3,261	12	932	(850)	(395)	(1,049)	537	(1,898)

(Recorded transaction amounts exclude IBNR & other actuarial provisions)

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

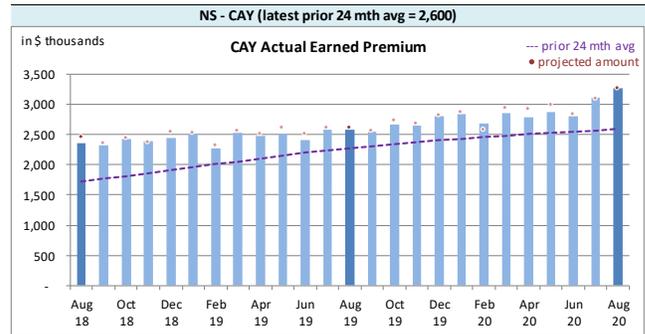
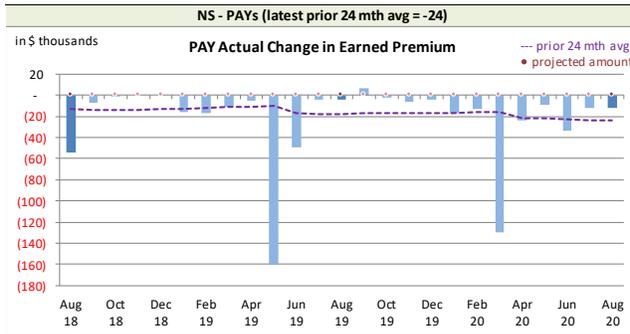
2.1.a Actual vs. Projected (AvsP): Earned Premium

The following charts 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.

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

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.

Nova Scotia RSP Actual Earned Premium by Calendar Month



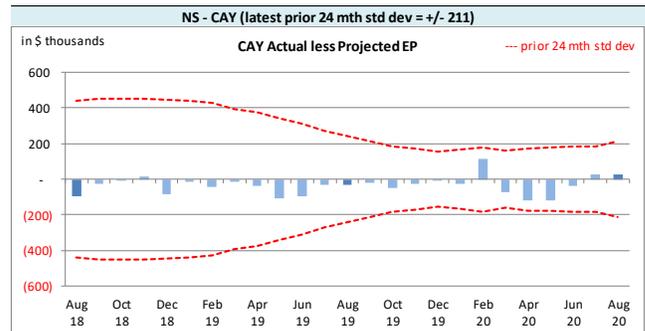
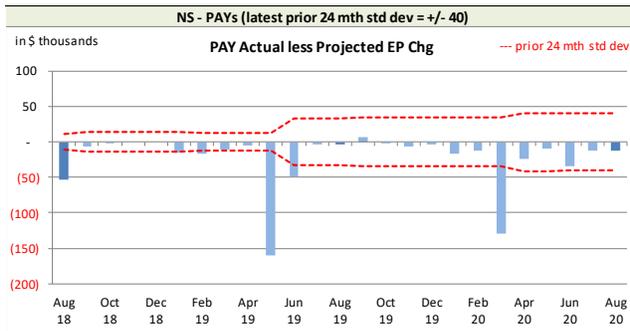
Earned premium changes during a given calendar month in relation to prior accident years tend to be at modest levels, although relatively high levels generally occur at the beginning of each year.

On Latest \$ thousands		
Earned Premium	PAYS	CAY
Mthly Avg EP Chg (prior 24 mths)	(24)	2,600
std dev	40	211
A-P <> std dev	6	-
% <> std dev	24.0%	0.0%
norm <> std dev	31.7%	31.7%
performance vs 24-mth avg:	better	better

The associated variance between the actual changes and the projections from the previous month are shown in the following charts. **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*



We project **earned premium** changes from known unearned premium balances 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 while we modified our projections processes in response, bias still exists. Over time, we may consider other projection approaches to

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

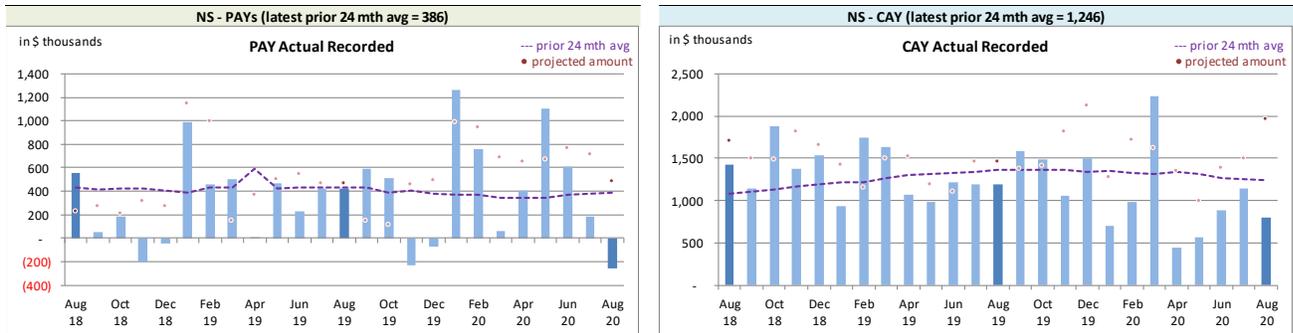
⁷We measure bias based on a 95% confidence range for a binominal distribution with trials based on the range being considered (25 in this case) and 50% probability of success. The rolling 25-month CAY variances at June 2020 has only 4 months where the actuals were higher than projected, and as the 95% confidence range is 8 to 17, bias continues to be indicated.

address the bias issue, but it is not currently deemed as priority.

2.1.b AvsP: Recorded Indemnity & Allowed Claims Expense

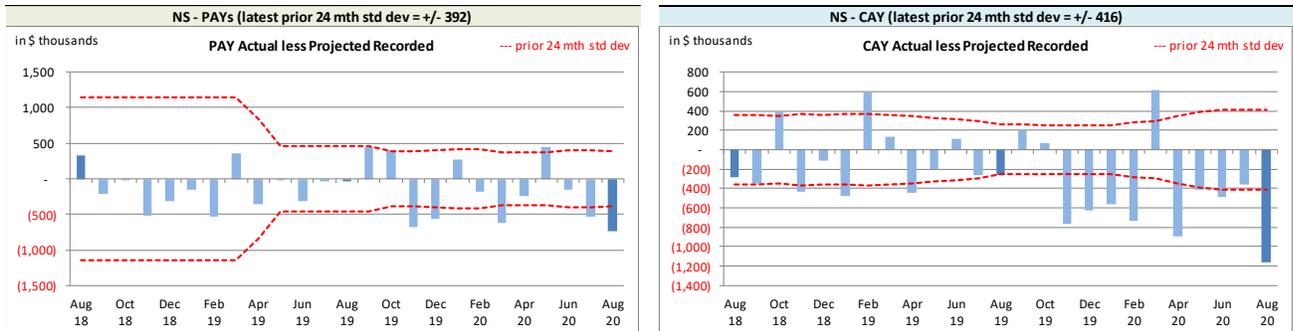
The following charts show actual **recorded** activity (**paid** and case reserve changes), in each of the most recent 25 calendar months, along with a “prior 24-month average” to show how each month’s actual compares with the average amount of the preceding 24 calendar months.

Nova Scotia RSP Actual Recorded by Calendar Month



Recorded activity variances from the previous month’s projections are shown in the following charts, 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)	386	1,246
std dev	392	416
A-P <> std dev	7	15
% <> std dev	28.0%	60.0%
norm <> std dev	31.7%	31.7%
performance vs 24-mth avg:	no better	worse

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, 28% 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 the preceding table), 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 been indicated at a 95% confidence level on a rolling 25-month basis (6 of 25 variances are positive).

The PAY **recorded** variance was outside of the one standard deviation band this month (see preceding chart on the left). The lower than projected recorded activity was reviewed, and attributed to process variance.

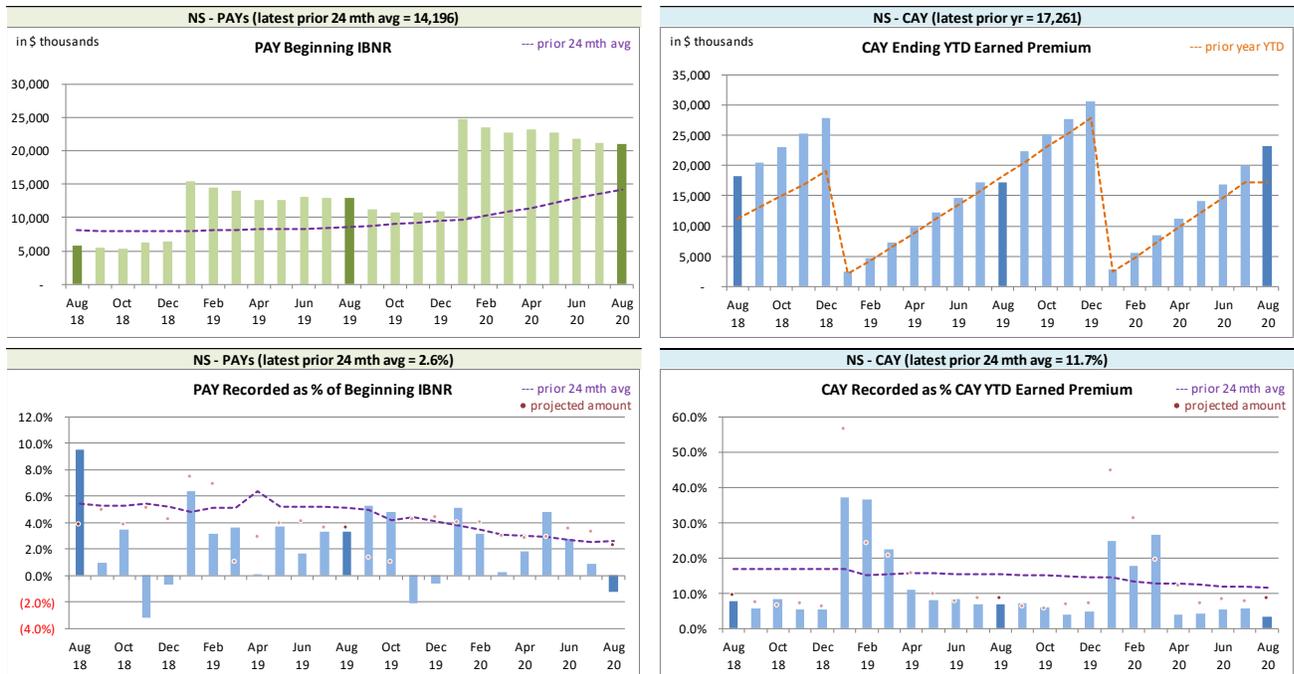
The current accident year (CAY) **recorded** variances fell outside of one standard deviation 60% of the time over the last 25 calendar months (see preceding table on the left), suggesting that the projection process has performed worse than simply projecting the prior 24-month average amount. We are considering ways to improve our projection process as a result, but efforts so far have fallen short. Bias has been indicated at a 95% confidence level on a rolling 25-month basis (7 of 25 variances are positive).

The CAY **recorded** variance was outside of the one standard deviation band this month (see preceding chart on the right). The lower than projected recorded activity was reviewed, and attributed to process variance.

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, the following charts related to levels influencing **recorded** activity. Note in particular the increase in the level of PAY 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



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

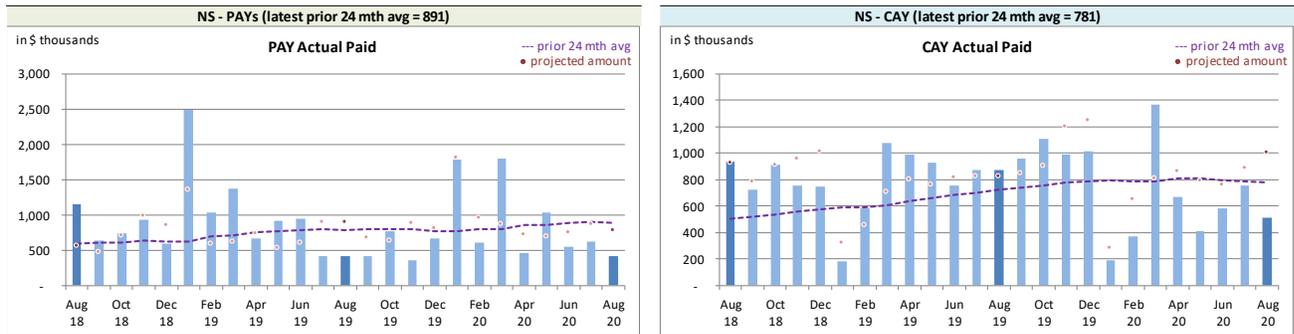
We track PAY beginning IBNR as **recorded** activity comes out of IBNR. Changes in the PAY beginning IBNR (see upper left of the preceding group of charts) occur for several possible reasons:

- to offset actual **recorded** activity (through loss ratio matching);
- the annual switchover as a CAY becomes a PAY (occurs in January); and
- when a new valuation is implemented, where the valuation resulted in changes to the selection of PAYs’ ultimates (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 following charts show actual **paid** activity in each of the most recent 25 calendar months, along with a “prior 24-month average” to show how each month’s actual compares with the average amount of the preceding 24 calendar months.

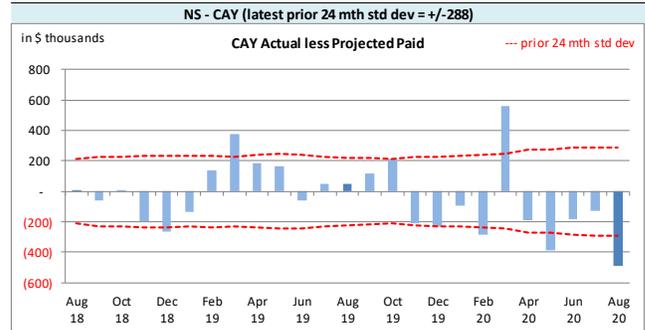
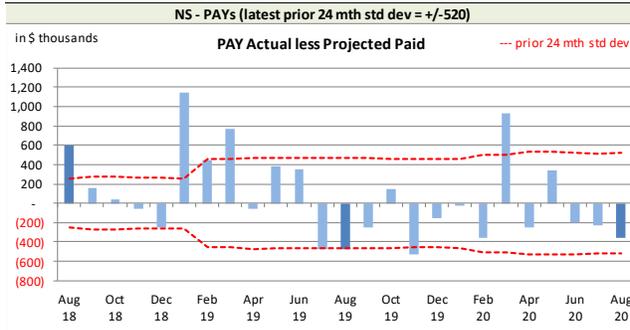
Nova Scotia RSP Actual Paid by activity Calendar Month



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

(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 vs Projected Summary: **Paid** Variances by Calendar Month*



On Latest \$ thousands		
Paid	PAYs	CAY
Mthly Avg Paid (prior 24 mths)	891	781
std dev	520	288
A-P <> std dev	7	8
% <> std dev	28.0%	32.0%
norm <> std dev	31.7%	31.7%
performance vs 24-mth avg:	no better	no better

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, 28% of the prior accident

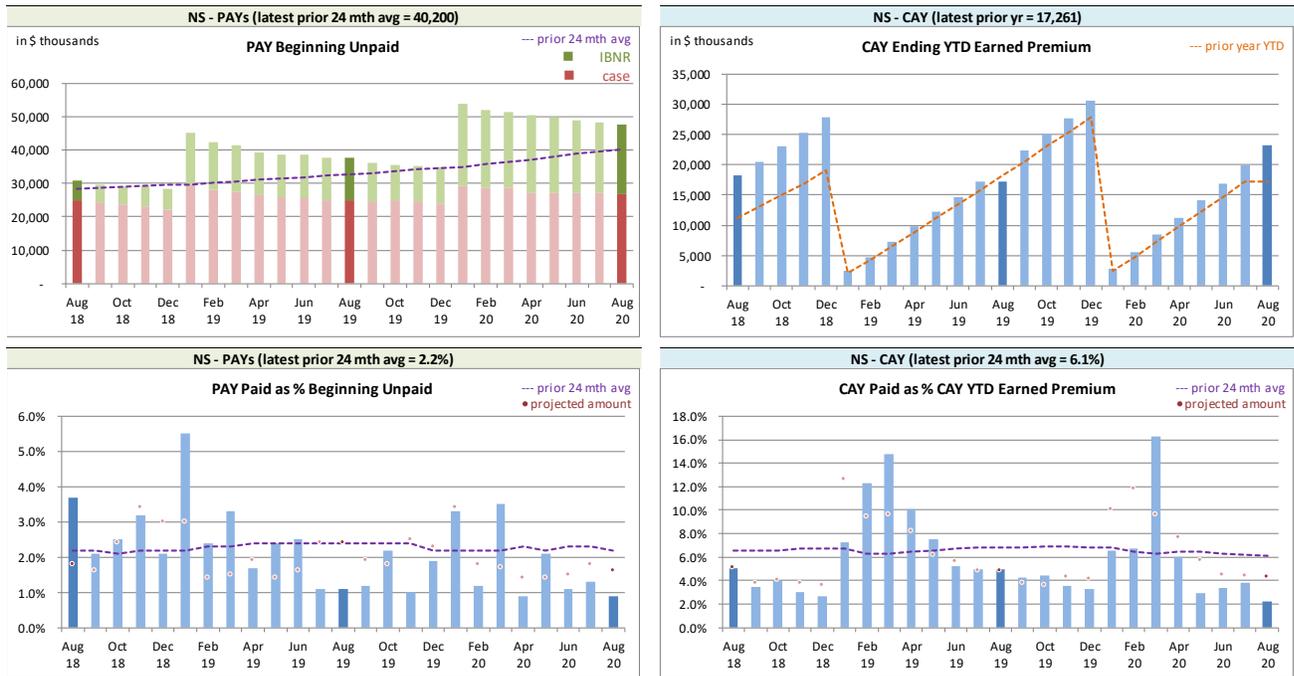
years' (PAYs) variances over the last 25 calendar months have fallen outside of one standard deviation of the actual **paid** amounts (see preceding table on the left), suggesting the projection process has performed no better than simply projecting the prior 24-month average amount (assuming it follows a normal distribution). Bias has not been indicated at a 95% confidence level on a rolling 25-month basis (11 of 25 variances are positive).

The current accident year (CAY) **paid** variances fell outside of one standard deviation 32% of the time over the last 25 calendar months (see the preceding table), suggesting that the projection process has performed no 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 (11 of 25 variances are positive).

The CAY **paid** was outside the one standard deviation band this month (see preceding chart on the right) the lower projected paid activated was reviewed, and attributed to process variance.

We have included, for reference, the following charts related to levels influencing **paid** activity. Both case and IBNR increases contribute to the increase of PAY 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 the PAY beginning unpaid balance (case and IBNR) as **paid** activity comes out of the unpaid balance. Changes in the PAY beginning unpaid balance (see upper left of the preceding group of charts) occur for several possible reasons:

- to offset actual **paid** activity (may reduce case or IBNR or both);
- the annual switchover as a CAY becomes a PAY (occurs in January); and
- when a new valuation is implemented, where the valuation resulted in changes to the selection of PAYS’ ultimates (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 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 following table summarizes variances in provisions included in this month’s Operational Report

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.

¹⁰For ease of discussion, “IBNR” is used in place of “provisions for incurred but not recorded (IBNR) and development”.

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

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

Table 02

Accident Year	IBNR		actuarial present value adjustments				IBNR + actuarial present value adjustments	
	Actual	Actual less Projected	Discount Amount		Provisions for Adverse Deviations		Actual	Actual less Projected
			Actual	Actual less Projected	Actual	Actual less Projected		
Prior	1,133	(617)	(71)	118	1,902	(134)	2,964	(633)
2018	4,976	(1,524)	(52)	137	1,336	(270)	6,260	(1,657)
2019	11,455	(792)	(97)	191	2,064	(105)	13,422	(706)
2020	12,560	(1,629)	(108)	247	1,921	(294)	14,373	(1,676)
TOTAL	30,124	(4,562)	(328)	693	7,223	(803)	37,019	(4,672)

The IBNR provision is \$4.6 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 following table 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 premium deficiency position (shown as a positive amount) prior to and 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:	(1,157)	(2,050)	2,063	83	906	(1,967)
balance as % unearned premium:	(5.4%)	(9.7%)	9.6%	0.1%	4.2%	(9.6%)
actual unearned premium:	21,598					
less projected:	758					

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 following table 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 88.5% rather than 87.5% (the valuation ultimate ratio for accident year 2020), 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	(3,064)	(13.3%)	585	2.5%	(2,479)	(10.8%)	(3,823)	(17.6%)
CAY	20,322	88.5%	1,813	7.9%	22,135	96.3%	637	(12.8%)
TOTAL	17,258	75.1%	2,398	10.4%	19,656	85.6%	(3,186)	(30.3%)

(*% EP" based on 2020 calendar year-to-date earned premium; ratios may not total due to rounding)

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

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

5 Current Operational Report – Additional Exhibits

Section 6 provides exhibits pertaining to the actuarial provisions reflected in the current month's Operational Report.

IBNR (including actuarial present value adjustments) presented in section 6, Exhibit A, were derived on a discounted basis, and therefore reflect the time value of money and include an explicit provision for adverse deviations in accordance with accepted actuarial practice in Canada.

IBNR presented in section 6, Exhibit B, does NOT include any actuarial present value adjustments. The "Total IBNR" from this exhibit is shown in the Operational Report as "Undiscounted IBNR".

The ultimate loss ratios detailed in section 6, Exhibit B, refer to the estimates derived on the basis of various actuarial methodologies applied to the experience of the Nova Scotia Risk Sharing Pool for the purposes of the most recent quarterly valuation. As discussed in section 3, IBNR reflected in the current month's Operational Report was derived as the difference between the estimated ultimate for the claims amount (i.e. earned premium x ultimate loss ratio) and the associated current recorded amounts (life-to-date payments plus current case reserves).

6 EXHIBITS

The exhibits listed below are provided on the pages that follow:

- EXHIBIT A IBNR for Member Sharing – includes Actuarial Present Value Adjustments
- EXHIBIT B IBNR
- EXHIBIT C Premium Liabilities
- EXHIBIT D Projected Year-end Policy Liabilities
- EXHIBIT E Discount Rate & Margins for Adverse Deviations
- EXHIBIT F Interest Rate Sensitivity
- EXHIBIT G Components of IBNR Change During Month

EXHIBIT A

IBNR for Member Sharing – includes Actuarial Present Value Adjustments

TABLE EXHIBIT A

		Amounts in \$000s				
IBNR + M/S actuarial present value adjustments	Accident Year	Actual Jul. 2020	Actual Aug. 2020	Projected Sep. 2020	Projected Oct. 2020	Projected Dec. 2020
	2007	(1)	(1)	(1)	(1)	(1)
	2008	9	9	9	9	9
	2009	11	12	12	12	12
	2010	4	4	4	4	4
	2011	4	4	4	4	4
	2012	46	31	30	30	31
	2013	227	228	226	222	215
	2014	110	131	129	127	125
discount rate 0.23%	2015	(1)	345	341	335	326
	2016	286	510	503	491	457
	2017	2,954	1,691	1,656	1,625	1,556
interest rate margin 25 basis pts	2018	8,146	6,260	6,088	6,021	5,608
	2019	14,416	13,422	13,267	13,012	12,307
	2020	14,531	14,373	15,468	16,593	15,564
	TOTAL	40,742	37,019	37,736	38,484	36,217
	Change		(3,723)	717	748	

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 Jul. 2020	Actual Aug. 2020	Projected Sep. 2020	Projected Oct. 2020	Projected Dec. 2020
	53.9%	2007	(1)	(1)	(1)	(1)	(1)
	68.3%	2008	8	8	8	8	8
	63.8%	2009	5	5	5	5	5
	73.4%	2010	4	4	4	4	4
	90.1%	2011	4	4	4	4	4
	102.2%	2012	(5)	(25)	(25)	(24)	(22)
	90.0%	2013	76	73	72	71	67
	85.0%	2014	(10)	1	1	1	1
	88.9%	2015	(230)	75	74	73	69
	95.9%	2016	(165)	99	96	94	90
	89.3%	2017	2,095	890	863	840	806
	85.8%	2018	6,701	4,976	4,827	4,779	4,423
	96.0%	2019	12,497	11,455	11,340	11,113	10,457
	87.5%	2020	12,906	12,560	13,432	14,344	12,884
		TOTAL	33,885	30,124	30,700	31,311	28,795
		Change		(3,761)	576	611	

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

EXHIBIT C

Premium Liabilities

TABLE EXHIBIT C

Amounts in \$000s

Premium Liabilities	Actual	Actual	Projected	Projected	Projected
	Jul. 2020	Aug. 2020	Sep. 2020	Oct. 2020	Dec. 2020
(1) unearned premium (UP)	19,823	21,598	22,603	23,750	24,028
FOR MEMBER SHARING					
(2) expected future costs ratio {% of (1)}	112.9%	104.2%	105.7%	107.4%	110.9%
(3) expected future costs {(1) x (2)}	22,384	22,504	23,890	25,502	26,648
(4) premium deficiency / (deferred policy acquisition cost)	2,561	906	1,287	1,752	2,620
Excluding Actuarial Present Value Adjustments					
(5) expected future costs ratio {% of (1)}	103.5%	94.6%	96.0%	97.5%	100.7%
(6) expected future costs {(1) x (5)}	20,516	20,441	21,699	23,163	24,203
(7) premium deficiency / (deferred policy acquisition cost)	693	(1,157)	(904)	(587)	175

EXHIBIT D

Projected Year-end Policy Liabilities

The table below presents the projected policy liabilities as at December 31, 2020, broken down by component.

Nova Scotia ending 2020		Projected Balances as at Dec. 31, 2020 (\$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	-	8	8	-	-	1	-	1	1	9	
2009	64	5	69	-	-	7	-	7	7	76	
2010	-	4	4	-	-	-	-	-	-	4	
2011	-	4	4	-	-	-	-	-	-	4	
2012	554	(22)	532	(2)	2	53	-	53	53	585	
2013	1,422	67	1,489	(6)	6	149	(1)	148	148	1,637	
2014	1,240	1	1,241	(5)	5	124	-	124	124	1,365	
2015	2,511	69	2,580	(8)	8	258	(1)	257	257	2,837	
2016	3,586	90	3,676	(15)	15	368	(1)	367	367	4,043	
2017	5,428	806	6,234	(31)	31	754	(4)	750	750	6,984	
2018	5,261	4,423	9,684	(48)	48	1,191	(6)	1,185	1,185	10,869	
2019	4,670	10,457	15,127	(91)	91	1,861	(11)	1,850	1,850	16,977	
PAYs (sub-total):	24,736	15,911	40,647	(206)	206	4,766	(24)	4,742	4,742	45,389	
CAY (2020)	9,986	12,884	22,870	(160)	160	2,699	(19)	2,680	2,680	25,550	
claims liabilities:	34,722	28,795	63,517	(366)	366	7,465	(43)	7,422	7,422	70,939	
	Unearned Premium	Premium Deficiency / (DPAC)	Total Provision	discount	investment PfAD	nominal development PfAD	development PfAD discount	development PfAD	Total apvs	TOTAL*	
premium liabilities:	24,028	175	24,203	(143)	143	2,460	(15)	2,445	2,445	26,648	
policy liabilities:			87,720	(509)	509	9,925	(58)	9,867	9,867	97,587	

*Total may not be sum of parts, as apvs apply to future costs within UPR

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, 2020 from the valuation), followed by the selected discount rate and the associated margin for investment income.

Selected Claims Development MfADs (Jun. 30,
2020)

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%	10.0%	10.0%
2016	10.0%	10.0%	10.0%	10.0%
2017	12.5%	10.0%	5.9%	12.1%
2018	12.5%	10.0%	9.9%	12.3%
2019	12.5%	10.0%	9.5%	12.3%
2020	12.4%	10.0%	5.4%	11.8%
2021	12.5%	10.0%	12.5%	12.5%
<u>prem liab</u>	<u>12.0%</u>	<u>10.0%</u>	<u>5.1%</u>	<u>10.3%</u>

discount rate: 0.23%
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, 2020 from the latest valuation date (projections in exhibits A to D are to Dec. 31, 2020, and are based on more up-to-date information). We have included the most recent valuation selection (0.23%), the prior valuation assumption (0.62%) and the prior fiscal year end valuation assumption (1.46%) for comparative purposes. A 25 basis point margin for investment return adverse deviation is used in all scenarios presented.

\$ Format: \$000s

AY	Actuarial Present Value of Provisions at Various Discount Rates - Dec. 31, 2020 projected Unpaid							
	0.00%	0.00%	0.23%	0.73%	1.23%	1.73%	0.62%	1.46%
2007	-	-	-	-	-	-	-	-
2008	-	-	-	-	-	-	-	-
2009	63	63	63	63	63	62	63	62
2010	-	-	-	-	-	-	-	-
2011	-	-	-	-	-	-	-	-
2012	469	469	469	465	462	458	466	460
2013	1,486	1,486	1,485	1,473	1,460	1,448	1,476	1,454
2014	742	742	742	736	731	725	738	728
2015	2,353	2,353	2,353	2,336	2,318	2,301	2,340	2,310
2016	4,194	4,194	4,193	4,158	4,123	4,088	4,166	4,107
2017	6,423	6,423	6,420	6,357	6,294	6,232	6,371	6,265
2018	10,786	10,786	10,780	10,656	10,529	10,407	10,684	10,473
2019	16,899	16,899	16,888	16,661	16,432	16,209	16,713	16,329
2020	23,334	23,334	23,317	22,962	22,607	22,259	23,045	22,446
Total	66,749	66,749	66,710	65,867	65,019	64,189	66,062	64,634
	curr - 100 bp	curr - 50 bp	curr val assumption	curr + 50bp	curr + 100bp	curr + 150bp	prior val assumption	prior fyr end assumption

AY	Dollar Impact Relative to Valuation Assumption							
	0.00%	0.00%	0.23%	0.73%	1.23%	1.73%	0.62%	1.46%
Total	39	39	-	(843)	(1,691)	(2,521)	(648)	(2,076)
	curr - 100 bp	curr - 50 bp	curr val assumption	curr + 50bp	curr + 100bp	curr + 150bp	prior val assumption	prior fyr end assumption

AY	Percentage Impact Relative to Valuation Assumption							
	0.00%	0.00%	0.23%	0.73%	1.23%	1.73%	0.62%	1.46%
2007	-	-	-	-	-	-	-	-
2008	-	-	-	-	-	-	-	-
2009	-	-	-	-	-	(1.6%)	-	(1.6%)
2010	-	-	-	-	-	-	-	-
2011	-	-	-	-	-	-	-	-
2012	-	-	-	(0.9%)	(1.5%)	(2.3%)	(0.6%)	(1.9%)
2013	0.1%	0.1%	-	(0.8%)	(1.7%)	(2.5%)	(0.6%)	(2.1%)
2014	-	-	-	(0.8%)	(1.5%)	(2.3%)	(0.5%)	(1.9%)
2015	-	-	-	(0.7%)	(1.5%)	(2.2%)	(0.6%)	(1.8%)
2016	0.0%	0.0%	-	(0.8%)	(1.7%)	(2.5%)	(0.6%)	(2.1%)
2017	0.0%	0.0%	-	(1.0%)	(2.0%)	(2.9%)	(0.8%)	(2.4%)
2018	0.1%	0.1%	-	(1.2%)	(2.3%)	(3.5%)	(0.9%)	(2.8%)
2019	0.1%	0.1%	-	(1.3%)	(2.7%)	(4.0%)	(1.0%)	(3.3%)
2020	0.1%	0.1%	-	(1.5%)	(3.0%)	(4.5%)	(1.2%)	(3.7%)
Total	0.1%	0.1%	-	(1.3%)	(2.5%)	(3.8%)	(1.0%)	(3.1%)
	curr - 100 bp	curr - 50 bp	curr val assumption	curr + 50bp	curr + 100bp	curr + 150bp	prior val assumption	prior fyr end assumption

EXHIBIT G

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	9	-	-	-	-	-	9
2009	11	-	-	1	1	9.1%	12
2010	4	-	-	-	-	-	4
2011	4	-	-	-	-	-	4
2012	46	(1)	(19)	5	(15)	(32.6%)	31
2013	227	(3)	24	(20)	1	0.4%	228
2014	110	(1)	(1)	23	21	19.1%	131
2015	(1)	-	52	294	346	(34,600.0%)	345
2016	286	4	(11)	231	224	78.3%	510
2017	2,954	(51)	(266)	(946)	(1,263)	(42.8%)	1,691
2018	8,146	(229)	562	(2,219)	(1,886)	(23.2%)	6,260
2019	14,416	(288)	426	(1,132)	(994)	(6.9%)	13,422
2020	14,531	1,518	1,234	(2,910)	(158)	(1.1%)	14,373
Grand Total	40,742	949	2,001	(6,673)	(3,723)	(9.1%)	37,019

EXHIBIT G

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

RSP		Nova Scotia						IBNR - in \$000s
AccountCode Desc		IBNR - Undiscounted						
AccYear	Values							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	Sum of Total Change	Sum of % Total Change		
2007	(1)	-	-	-	-	-	(1)	
2008	8	-	-	-	-	-	8	
2009	5	-	-	-	-	-	5	
2010	4	-	-	-	-	-	4	
2011	4	-	-	-	-	-	4	
2012	(5)	-	(20)	-	(20)	400.0%	(25)	
2013	76	(1)	26	(28)	(3)	(3.9%)	73	
2014	(10)	-	(2)	13	11	(110.0%)	1	
2015	(230)	2	50	253	305	(132.6%)	75	
2016	(165)	10	(13)	267	264	(160.0%)	99	
2017	2,095	(42)	(273)	(890)	(1,205)	(57.5%)	890	
2018	6,701	(201)	568	(2,092)	(1,725)	(25.7%)	4,976	
2019	12,497	(250)	392	(1,184)	(1,042)	(8.3%)	11,455	
2020	12,906	1,283	1,182	(2,811)	(346)	(2.7%)	12,560	
Grand Total	33,885	801	1,910	(6,472)	(3,761)	(11.1%)	30,124	