

**FEASIBILITY STUDY
TO
ESTABLISH A CAPTIVE INSURANCE COMPANY
TO PROVIDE CLEANING AND DISINFECTION (C&D) EXPENSE INSURANCE
ASSOCIATED WITH AN AVIAN INFLUENZA OUTBREAK**

Prepared for: British Columbia Poultry Association

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BACKGROUND AND PURPOSE OF THE REPORT

In 2013, the Investment Agriculture Foundation of British Columbia engaged J. S. Cheng & Partners Inc. (“JSCP”) to conduct a feasibility study to establish a captive insurance company (“Captive”) to provide avian influenza (“AI”) insurance for the British Columbia poultry industry. Our report covered three components:

1. A market loss [gap between what the Canadian Food Inspection Agency (“CFIA”) would pay and the calculated market value];
2. A cleaning and disinfection (fixed dollar per bird) cost; and
3. A limited business interruption.

Since the issuance of the report on April 1, 2014, British Columbia (“BC”) legislation has granted marketing boards the authority to require producers to hold insurance for disease losses. As part of the process to secure this authority, the marketing boards must establish a sound policy rationale for the mandatory insurance requirement. A robust review narrowed down the loss that could be the basis of compulsory insurance to the cleaning and disinfection (“C&D”) cost of infected premises. The marketing board has agreed that it is in the interest of the BC poultry industry for all producers to share in those C&D costs to ensure a prompt return to a system of orderly marketing; this would lead to pooling of the funds as well as maintaining and replenishing a fund.

JSCP has been retained by the BC Poultry Association to prepare a feasibility study for a Captive to provide C&D coverage to all BC poultry producers.

DISTRIBUTION AND USE

This report has been prepared for the British Columbia Poultry Association (“BCPA”). The sole purpose of this report is to determine the feasibility of using a captive insurance company to insure C&D cost arising from an Avian Influenza outbreak for the members of BCPA.

This report in its entirety may be distributed to BCPA.

This report is neither intended nor necessarily suitable for any other use. Distribution beyond the above list is permitted provided that it is authorized by BCPA and the recipient is made aware that he/she is a third party and the author will be available for further questions on this report.

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SCOPE OF THE REPORT

BCPA is considering using a Captive to insure the financial risk of C&D. The scope of this report is to:

1. Assess the risk and premium of the Captive.
2. Estimate the annual (C&D) frequency and average claim size of the Captive.
3. Estimate the annual claims amount and cost of reinsurance of the Captive in 2018, 2019 and 2020.
4. Estimate the funding requirement of the Captive for 2018-2020.
5. Allocate the annual funding into four sectors: broiler, breeder, layer and turkey.
6. Prepare pro-forma financial statements of the Captive from 2018 to 2020.
7. Recommend a loss limit per occurrence and an annual aggregate loss limit for the Captive.
8. Estimate the cost of stop-loss and excess-of-loss reinsurance for the Captive.
9. Stress test the ability of the Captive to withstand adverse events.
10. Recommend an initial capital and surplus for the Captive.
11. Provide an opinion on the feasibility of the Captive to insure C&D.

DATA AND RELIANCE

The compensation provided after a flock has tested positive will depend on the type of bird, size of the infected flocks, and the type and size of each flock within a one- to three-kilometer radius of the infected flocks. The producers will be compensated for C&D costs as a result of a CFIA destroy order. Mr. Sasaki, our main contact with BCPA, provided us with updated C&D costs by type, using the experience of a 2014 AI outbreak.

Mr. Sasaki provided us with the quota units, paid weight produced, number of birds marketed, production cycle length, and the weight category of each member's farm as well as the simulated spreading rates from the North American Animal Disease Spread Model ("NAADSM"). NAADSM is a computer program designed to simulate the spread and control of foreign animal diseases in a population of susceptible livestock herds. The spreading rates are shown in the Assumptions section. We were given detailed data for 2010 and summarized data for 2016. A summary of the data is shown in Appendix F.

Mr. Sasaki also provided further guidance on January 15, 2018 and we agreed to use six new assumptions for this report. The email correspondences are included in Appendix G.

We did not perform an independent verification of any of the source data. Such verification is beyond the scope of our assignment. In this report, we have relied on data provided by Mr. Sasaki, and assumed that such data is accurate and complete. To the extent that problems with the data are discovered, our analysis may need to be revised and our estimates may need to be revised.

VARIABILITY OF ACTUARIAL ESTIMATES

There is a limitation upon the accuracy of future claims projection as there is an inherent uncertainty in any projection of future claims. There is uncertainty in any future claims projection because future events could affect the ultimate claim payments. Some examples of future events are:

- 1) Higher inflation rate than the past,
- 2) Unusually large number of AI incidences,
- 3) High cost of reinsurance, and
- 4) The AI virus becoming commutable by humans.

There have been four notifiable avian influenza (“NAI”) outbreaks in the past 13 years: two of them were highly pathogenic AI (“HPAI”) and the other two were low pathogenic AI. Due to the low number of historical events, it is difficult to estimate the likelihood of NAI claims accurately in the future.

Therefore, one must acknowledge that the actual future claim amount may differ materially from the simulated result. However, we have employed standard actuarial techniques and assumptions which are appropriate and in our judgment, the conclusions presented in this report are reasonable given the information currently available.

The cost of reinsurance is difficult to forecast because reinsurers are not accustomed to quantifying AI risk. We expect the reinsurance cost will be fairly high and we believe the annual aggregate stop-loss cover may be difficult to place. For the purposes of this report, we have made reasonable assumptions with respect to the pricing of the excess and stop-loss covers in the reinsurance market. We expect that the cost of reinsurance will be known in due course. We recommend the funding (premium) amount be revised to reflect the actual cost of reinsurance.

DEFINITIONS AND ABBREVIATIONS

Accident year is the year in which the event (accident/incident) occurs.

Actuarial present value provision is the discounted value of all future payments using an appropriate discount rate with a provision for adverse deviations on a specific valuation date.

Attachment point is the amount of claim where the reinsurance coverage comes into effect.

Catastrophic AI (“CAT-AI”) event is a highly pathogenic avian influenza that happens to spread quickly and affect many farms. In the case of a CAT-AI event, all farms within a 3 km radius must be tested for AI.

Colony is made up of farms within 1.0 km of an infected premise in a HPAI event and within 3.0 km of an infected premise in a CAT-AI event.

Cull is to destroy or discard.

Event is the occurrence of AI infection and the possible spread of the disease to neighbouring farms resulting in flock destruction at the infected farms.

Farm crews are external parties coming into a farm to provide services; they are not employees of the farm. Farm crews in this report are equivalent to those considered high risk contacts in the NAADSM.

Incurred loss (claims amount) is the sum of paid losses, expenses and outstanding claims amount.

Index farm is the farm where a flock in British Columbia is first infected with AI in an outbreak.

Infected premise (“IP”) is the farm that is infected through direct contact or indirect contact. Infected farm and infected premise are used interchangeably.

Internal loss adjustment expenses (“ILAE”) are the expenses required to manage all claims from notice to settlement. These expenses are required even when the Captive uses external adjusters.

Loss ratio is the ratio of incurred losses to premiums earned in a policy year. For example, if premiums are \$100 and incurred losses are \$50, then the loss ratio is 50%.

MCT is the Minimum Capital Test.

Notifiable avian influenza (“NAI”) is defined by CFIA; it includes highly pathogenic AI and low pathogenic H5/H7 type AI.

Policy year is the year in which the policies become effective. All premiums and claims attributable to the policies effective in a policy year are combined for analysis.

Probability of infection is abbreviated as PI in this report.

Reinstatement premium is the cost to restore the full coverage limit after a reinsured event has occurred. Otherwise, a second event may leave the Captive inadequately protected. Reinstatement premium (if applicable) is usually calculated as: (replacement coverage required/total limit purchased) times the original reinsurance premium.

Reinsured losses are losses above the retention. For example, if the Captive's retention is \$100,000, a \$700,000 claim will result in \$600,000 reinsured losses and \$100,000 retained losses.

Retention is the amount of claim that the Captive retains for each and every occurrence.

Stop-loss reinsurance protects the Captive so that its annual retained losses cannot exceed a pre-determined limit (known as annual aggregate stop-loss limit).

Valuation date is the date on which actuarial liabilities are estimated.

ASSUMPTIONS

1. The frequency of an NAI event is once every three years for low pathogenic virus, once every ten years for highly pathogenic virus and once every 50 years for a catastrophic AI event. These frequency rates are taken from the parameterization of the North American Animal Disease Spread Model for the British Columbia poultry industry. In the 2014 highly pathogenic notifiable event, 2 breeder and 2 turkey premises were classified as independent primary introductions of HPAI. Based on the HPAI experience in 2014, the number of producers in each sector as well as the idle time by type of birds, we estimate the incidence relativity of an index farm by sector as follows:

Broilers	15%
Breeders	30%
Layers	21%
Turkeys	32%
Ducks	2%

2. All farm crews can work in two poultry farms on any day. However, the second farm has to be in the same region. The three regions in British Columbia are Fraser Valley, Vancouver Island and Interior.
3. A farm crew may infect a second farm in the afternoon only if they have worked on an infected farm in the morning of the same day. This is because AI can only survive outside of a living organism for several hours. For a HPAI event, we assumed a probability of 50% (100% for CAT-AI) for a farm crew that work in an infected farm in the morning to infect the next farm that they work in the afternoon.
4. It will take up to two days to recognize the clinical signs of highly pathogenic avian influenza and up to two more days to comply with the imposition of

zones and effect movement controls. From the initial infection to discovery and compliance to movement restriction, it will either be 3 days or 4 days with 50% probability each (See daily infection trees for HPAI in Appendix D). CAT-AI events are assumed to have a discovery and compliance to movement restrictions on the 4th day.

5. Low pathogenic (“LPAI”) avian influenza events are assumed to have immediate discovery and compliance with movement restrictions, and therefore be limited to the index farm. The probability of a LPAI event is 33.3% per year.
6. The total birds per cycle production by calendar year are as follows:

Sector	2010 Birds per Cycle	2016 Birds per Cycle	2016 Production
Broiler	14,320,077	16,194,285	105,262,850
Breeder	889,100	775,000	775,000
Layer	2,628,139	3,118,319	3,118,319
Turkey	1,201,756	836,748	2,510,243

The 2010 barn sizes are adjusted so that the total by sector agrees with the 2016 birds per cycle. The production cycle and idle period between two production cycles by sector are:

	Broilers	Breeders	Layers	Turkeys
Production cycle	39 days	59 wks	71 wks	16 wks
Idle period between cycles	17 days	7 wks	1 wk	1 wk
End-to-end cycles	56 days	66 wks	72 wks	17 wks

7. The probability of infection (“PI”) between types of birds is initially taken from the parameterization of NAADSM for British Columbia poultry industry. However, we supplemented the information using the 2014 AI event as well as

the no-broiler infection in the recent British Columbia AI outbreak. The PI for broiler is reduced to 5.0%.

The probability of infection table, from one bird type to another, is shown below:

From\To	Broilers	Breeders	Layers	Turkeys	Ducks
Broilers	5.0%	5.0%	5.0%	5.0%	5.0%
Breeders	5.0%	50.0%	30.0%	20.0%	20.0%
Layers	5.0%	30.0%	30.0%	20.0%	20.0%
Turkeys	5.0%	20.0%	20.0%	30.0%	20.0%
Ducks	5.0%	20.0%	20.0%	20.0%	40.0%

8. The policy will pay C&D costs per quota unit at the following rate:

Type	Cleaning & Disinfection Costs per Quota Unit**			
	2014	2018	2019	2020
Broilers	\$1.00	\$1.08	\$1.10	\$1.13
Breeders	\$2.00	\$2.16	\$2.21	\$2.25
Layers (a)	\$2.50	\$2.71	\$2.76	\$2.82
Layers (b)	\$0.75	\$0.81	\$0.83	\$0.84
Turkeys	\$2.65	\$2.87	\$2.93	\$2.98

**Adjusted by inflation at 2.0% per annum

In the alternate cost scenario (b), \$1.75 per bird would be compensated by the egg industry, not the Captive.

9. The Captive may purchase excess of loss and/or stop-loss reinsurance to limit its risk exposure. Excess-of-loss reinsurance provides coverage for every incident exceeding the per-occurrence retention up to a limit. However, our preliminary investigation concluded that multiple reinsured events in any calendar year are sufficiently remote that per-event excess-of-loss reinsurance

costs mimic stop-loss reinsurance costs. Therefore, we assumed stop-loss reinsurance would be the preferred reinsurance vehicle for the captive. We have evaluated various possible attachment points for the stop-loss reinsurance. The retention should be high enough such that a low pathogenic AI event should not trigger a reinsurance claim.

10. As claims are paid very promptly, the undiscounted amount is considered as the appropriate actuarial present value provision.
11. The cost of stop-loss reinsurance is based on simulated expected reinsured losses (see Appendix A) plus 150% loading for risk margin, expenses and profit. In other words, the expected loss ratio for the reinsurer is 40%. The reinsurance coverage is intended to protect up to a 99.9 percentile event. For this report, we used a \$5.0 million limit and a net retention of either \$100,000 or \$250,000.
12. An inflation of 2% per annum is applied to loss expenditures and operating expenses.
13. Assets available for investments are assumed to earn 1.0% per annum.
14. All policies are assumed to run from January 1st and expire on December 31st of each year. This assumption does not affect the estimated claims value. However, all policies should expire on the year-end date of the Captive so that no unearned premiums will be required on the filing date of the Captive.
15. We assumed a \$500 external adjuster cost for each farm given the simplicity of the claims process. Operating expenses are assumed to be \$63,500, \$65,000 and \$66,000 in 2018 to 2020, respectively.

ANALYSIS

The British Columbia poultry industry follows the CFIA policy regarding NAI. An integral part of the policy is a recovery process that compensates farmers for losses incurred due to the destruction of AI infected flocks. BCPA has a more prescriptive, mandatory biosecurity policy and is consistent with the CFIA policy's principles. The policy is audited and applicable to all licensed poultry producers in British Columbia. Members of BCPA are required to cull all infected birds tested with highly pathogenic AI within a one-kilometer radius of the infected farm to avoid the spread of the disease. Furthermore, in the event of an outbreak (CAT-AI), the CFIA will survey all farms within a three-kilometer radius and monitor farms within a ten-kilometer radius.

Currently, the CFIA provides some compensation to producers for birds culled as a result of a NAI outbreak, but it does not pay any compensation for birds that die prior to the destruction of the flock. Furthermore, the CFIA expects—but does not compensate for—a higher standard of cleaning and disinfection be applied to an infected premise that must be inspected prior to re-stocking.

In the proposed BCPA policy, culling only occurs if there is a positive test result for NAI within the surveillance zone (1 km for HPAI, or 3 km for CAT-AI).

As a quid-pro-quo to implement a Notifiable Avian Influenza Hazard Specific Plan, there has to be a compensation (insurance) scheme to minimize the financial shock to poultry producers. The poultry marketing boards of British Columbia have concluded that they could request the authority to mandate C&D expense insurance only, and are currently in the decision making process of whether to exercise the authority. This section outlines the methodology and funding requirement for such a C&D insurance program using a Captive as a vehicle to spread the risk among the members of BCPA. The Captive would indemnify producers' C&D costs in the event of an insured occurrence.

For each simulated event, we have to determine whether the event is a LPAI, HPAI or CAT-AI. Then we have to determine which sector will likely be an index farm. We estimated the probability of each sector being an index farm by credibility weighting the HPAI event in 2014 with the expected number of events based on exposure. Exposure takes into account the number of farms, percentage of idle time or extremely high temperature. The details are shown in Appendix C.

There are two probable ways to spread AI:

1. Direct contact through the tools, clothes, gloves and boots of the working crew; and
2. Indirect contact from an unknown source (e.g. wild birds).

For direct contact, we assumed the probability of infection from farm to farm to be 0% for a LPAI, 50% for a HPAI and 100% for a CAT-AI event.

For indirect contact, we used the PI table shown below to assess the potential infection of each farm within a colony based on the type of birds in the farm.

From\To	Broilers	Breeders	Layers	Turkeys	Ducks
Broilers	5.0%	5.0%	5.0%	5.0%	5.0%
Breeders	5.0%	50.0%	30.0%	20.0%	20.0%
Layers	5.0%	30.0%	30.0%	20.0%	20.0%
Turkeys	5.0%	20.0%	20.0%	30.0%	20.0%
Ducks	5.0%	20.0%	20.0%	20.0%	40.0%

Once a farm is infected by HPAI, all farms within 1 km of this infected premise (i.e. a colony) will be tested for potential AI. If it is a CAT-AI event, all farms within 3 km will be tested for AI. The PI table above recognizes that the transmission rate from farm A to farm B depends on the types of birds. Once a premise tests positive, all birds in that farm will be destroyed; C&D will be required before operation can be restored.

In our analysis, C&D costs for each event were estimated by sector and based on the number of birds in each infected farm. The number of birds in each farm were adjusted to the 2016 bird population level. The C&D costs of all simulated events (LPAI, HPAI, and CAT-AI, if applicable) were added to arrive at the yearly losses (Appendix A). We used a Monte Carlo technique to simulate 100,000 years and derive the expected (average) yearly losses. Finally, we added adjusting and operating expenses to the expected yearly losses to arrive at the premium level (without reinsurance).

The simulation process is as follows:

1. Each year, up to six events (three for LPAI and three for others) are simulated using a Poisson distribution with a mean frequency of 0.333 for LPAI, 0.100 for HPAI and 0.020 for CAT-AI.
2. For each event simulated, a region is drawn randomly based on the number of farms in each region.
3. Then the sector of the index farm is simulated. The probability of each sector being an index farm is calculated by credibility weighting the actual event in 2014 with the expected number of events based on exposure (Appendix C).
4. For every index farm, there would be 15 potential farms for AI propagation through direct contact. For a CAT-AI event, the AI propagation is allowed until the end of the 4th day. For a HPAI event, we performed a random draw using a binomial distribution based on a 50% probability that compliance starts on either the 3rd or 4th day.

These 15 potential farms are drawn randomly from the region where the index farm is. The probability that the selected farm belongs to a particular sector is as follows:

Region	Broilers	Breeders	Layers	Turkeys	Ducks
FV	49.8%	22.7%	13.9%	7.9%	5.7%
VI	73.7%	0.0%	20.7%	5.5%	0.0%
INT	46.3%	0.0%	37.2%	16.5%	0.0%

Normally, the probability should be proportional to the number of farms in that sector as a percent of all farms in the region. However, breeders and ducks tend to have more external contacts from farm crews; to reflect this, breeders and ducks have an increased probability. On the other hand, layers' probability is reduced to account for fewer contacts (See Appendix E).

For a LPAI event, we assumed there would not be any spreading beyond the index farm.

5. For every potential direct contact in Step 4, we used a random draw approach (again, a binomial distribution with a 50% probability) to determine whether the farm crew worked on the infected premise in the morning or afternoon. If the first random draw has the crew working on an infected premise in the afternoon, there would be no further propagation from the infected premise. However, should it be determined that a crew has worked on an infected premise in the morning, another random draw is used to determine whether the farm where the crew worked in the afternoon was subsequently infected. This second random draw would also be done using a binomial distribution with an infection probability of 50% for HPAI and 100% for CAT-event. An infection tree for a HPAI event is shown in Appendix D with PI for each of the 15 potential farms.
6. For potential indirect contacts due to proximity to each infected premise in Step 5, we calculated the probability weighted losses of each colony (within 1 km of the infected premise for HPAI, and 3 km for CAT-AI) based on the spreading probabilities by sector on page 20. In other words, only a percentage of the farms in the surveillance zone may test positive and require C&D.

Individual farm data (with respect to the population of birds per cycle) is based on 2010 data adjusted to 2016 using the sector’s growth rate since 2010. For example, bird counts in broiler farms increased by 13.1% while the bird counts in turkey farms decreased by 12.8% (See Appendix F).

7. If a farm in a colony is found to be infected, the colony will have to be investigated anew. This process will continue until AI propagation ends. As this is too complicated to simulate, we simplified this process by adding a loading to the indirect losses from the 15 potential farms to represent additional spreading. These loadings are determined based on the average indirect-to-direct losses for the 15 original colonies.

The indirect loss loadings by sector are:

	Broilers	Breeders	Layers	Turkeys
Direct Losses	7,696	3,492	7,744	6,803
Indirect Losses	3,326	2,025	8,626	1,894
Indicated Loading	43.2%	58.0%	111.4%	27.8%
Selected Loading	45.0%	60.0%	110.0%	30.0%

8. For each infected premise, the type and number of birds multiplied by the C&D cost per quota unit for each sector will generate the C&D cost. The C&D cost per quota unit by sector and by year are shown on page 17. The sum of all infected premises (direct and indirect contacts) is sub-totaled by sector in each event.

The C&D costs of each infected premise are adjusted by an inflation rate of 2.0% p.a. from 2014 to the year of the AI outbreak.

9. For each of the 100,000 simulated years, the model keeps track of the simulated losses to determine the expected reinsured losses at a net retention of either \$100,000 or \$250,000.

$$\text{Reinsured Losses} = \text{Max}(0, \text{Simulated Yearly Losses} - \text{Net Retention})$$

The results of the simulation in 2018 are:

Percentile	No Reins.	\$100,000 Aggr. Stop Loss		\$250,000 Aggr. Stop Loss	
	Total	Captive	Reinsurer	Captive	Reinsurer
	C&D	C&D	C&D	C&D	C&D
	Costs	Costs	Costs	Costs	Costs
	(\$)	(\$)	(\$)	(\$)	(\$)
Average	49,925	19,577	30,348	28,723	21,202
70.0	16,580	16,580	-	16,580	-
80.0	41,515	41,515	-	41,515	-
90.0	98,310	98,310	-	98,310	-
95.0	197,362	100,000	97,362	197,362	-
99.0	968,950	100,000	868,950	250,000	718,950
99.5	1,714,977	100,000	1,614,977	250,000	1,464,977
99.9	3,044,223	100,000	2,944,223	250,000	2,794,223

See Appendix A1, Year 2018

The simulation results indicate a \$100,000 aggregate stop-loss would transfer 61% (or \$49,925 - \$19,577 = \$30,348) of the expected losses to the reinsurer. However, reinsurers incur expenses as well as require a large risk premium to reinsure the potential of a catastrophic loss. In this analysis, we used a 40% reinsurer expected loss ratio to gross up expected reinsured losses to derive the cost of reinsurance.

The funding requirement for a Captive with no reinsurance, with \$100,000 aggregate stop-loss reinsurance and \$250,000 aggregate stop-loss reinsurance in 2018 are summarized below (details are in Appendix A):

	No Reinsurance	\$100,000 Agg. Stop Loss	\$250,000 Agg. Stop Loss
Expected losses (Captive)	49,925	19,577	28,723
External adjuster expenses	500	500	500
Cost of Stop loss	-	75,870	53,004
Operating expenses	63,500	63,500	63,500
Premium Tax (4%)	4,747	6,644	6,072
2018 Premium	118,671	166,090	151,799
Savings versus the next lower retention			14,291
Extra risk assumed versus next lower retention			150,000
Payback period for one full retention (in years)			10.5

While a Captive with no reinsurance requires far less premiums, the potential for catastrophic losses outweighs the reward to keep premiums at their lowest level. On the other hand, increasing the retention to \$250,000 per year yields only a \$14,300 savings. Therefore, we recommend the Captive have a net retention of \$100,000 to limit losses and provide financial stability.

Using a \$100,000 net retention, we recommend an annual premium of \$166,090 in 2018. The allocation of the annual premium by sector is as follows:

2018 Premiums	Broilers	Breeders	Layers	Turkeys	Total
\$100,000 Stop Loss	40,303	21,106	74,770	29,910	166,090
Rate Per 1,000 Birds	0.38	27.23	23.98	11.92	
2016 Production	105,262,850	775,000	3,118,319	2,510,243	111,666,412

The premium allocation for the alternate cost scenario where \$1.75 of layers' C&D cost per bird would be compensated by the egg industry is included in Appendix A2.

As the data we used is sparse and the CFIA-based biosecurity program is evolving, the future frequency might be much higher or lower than what we assumed. We recommend an initial capital of \$1.0 million to maintain the Captive's financial stability.

In the following pro-forma financial statements, we used the most likely incurred losses as opposed to an average amount. Therefore, low pathogenic AI incurred losses of \$43,500 are assumed to occur once in a three-year block (we put it in 2019, the middle of a 3-year period) in the base scenario. We added an adjusting expense of \$500 to derive incurred losses of \$44,000.

	Amount in \$ (rounded)		
	2018	2019	2020
Direct Written Premiums	166,000	170,000	173,000
Ceded Written Premiums	76,000	78,000	80,000
Net Written Premiums	90,000	92,000	93,000
Incurred Losses	-	44,000	-
General and Other Expenses	68,500	69,800	71,100
Underwriting Income	22,000	(22,000)	22,000
Investment Income	9,000	9,000	9,000
Assets	1,031,000	1,018,000	1,049,000
Liabilities	-	-	-
Equity	1,031,000	1,018,000	1,049,000
MCT	7931%	7831%	8069%

The income statement, balance sheet and solvency test are shown in Appendix 1.

A 150% MCT score is assumed to be the supervisory target. An average P&C company has a MCT score of 250%. With an initial capital of \$1.0 million, the proposed Captive has a MCT score in excess of 1000%; this is necessary due to the lack of historical data and the uncertain catastrophic exposure.

We stress tested the Captive using a 99th percentile AI event to show that the proposed funding requirement with a \$5.0 million reinsurance limit is actuarially sound. We assumed \$988,000 in insured losses in 2019 based on our simulated results. With a \$100,000 net retention, \$888,000 would be covered under the stop-loss reinsurance agreement. There would be a reinstatement premium of \$14,000 (\$0.89 million / \$5.0 million x reinsurance premiums of \$78,000). We also added \$15,000 external adjuster expenses using an adjusting expense of \$510 per claim (infected farm). In this scenario, the Captive would withstand a 99th percentile event—maintaining a positive surplus while meeting the supervisory MCT target of 150% (Appendix 2).

In addition, we also stress tested the Captive with a 99th percentile AI event together with a 12.5% impairment on reinsurance recoverable. In this scenario, the reinsurance recovery would be reduced by \$111,000 (12.5% of \$888,000); at the same time, the reinstatement premium would also decrease to \$12,000 (\$14,000 x 87.5%). The \$15,000 external adjuster expenses would remain unchanged, thus the net loss for the captive becomes \$226,000 (\$100,000+\$111,000+\$15,000). In this scenario, the Captive would withstand this 99th percentile integrated event; again, the Captive would maintain a positive surplus and meet the supervisory MCT target of 150% (Appendix 3).

The key results of the base and the two tested adverse scenarios are summarized below:

		2018	2019	2020
Equity (\$000)	Base	1,031	1,018	1,049
	99th% AI Event	1,031	933	964
	99th% AI Event & Reinsurer Default	1,031	822	852
MCT	Base	7931%	7831%	8069%
	99th% AI Event	7931%	7177%	7415%
	99th% AI Event & Reinsurer Default	7931%	6850%	7100%

The income statement, balance sheet and solvency test for the adverse scenarios are shown in Appendices 2 and 3.

While the indicated results suggest a lower initial capital could be feasible for the Captive, our model does not and cannot possibly account for all the risks faced by the Captive. Some examples are: higher probability of infection between sectors, higher frequency of AI events, higher cleaning and disinfecting costs, etc. Therefore, we recommend an initial capital of \$1.0 million to maintain the financial stability of the Captive.

The Captive might consider not purchasing reinsurance. This will likely be cheaper to operate but it also introduces instability in the operating results. Quite often when participants are not in the insurance business, a couple years of high losses—especially in the early years of a self-insurance scheme—can cause a complete loss of confidence and ultimately the demise of the entire insurance program. In comparison, a Captive with reinsurance delivers the benefits (with minimal risk) of a regulated structure and instills discipline among its participants to ride with any adverse operating results.

CONCLUSION

Based on our analysis, we concluded that establishing a captive insurance company to provide C&D insurance to members of BCPA is feasible provided that:

1. The proposed Captive has proper reinsurance (preferably at least \$5.0 million per occurrence);
2. The aforementioned reinsurance is purchased from a number of financially strong reinsurance firms;
3. The proposed Captive has at least \$1.0 million start-up capital; and
4. The initial net retention is no more than \$250,000 per year, and preferably \$100,000 per year.

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APPENDIX 1

Base Scenario

BC Poultry Captive Insurance Company

Appendix 1

ASSETS

(\$000)

BASE SCENARIO (\$100,000 Net Retention)

	Base 2018	2019	2020
Cash and Cash Equivalents	131	118	149
Investment Income due and accrued	-	-	-
Assets held for sale	-	-	-
<u>Investment</u>			
Short Term Investments	900	900	900
Bonds and Debentures	0	0	0
Mortgage Loans	-	-	-
Preferred Shares	-	-	-
Common Shares	-	-	-
Investment Properties	-	-	-
Other Loans and Invested Assets	-	-	-
Total Investments (lines 4 to 10)	900	900	900
<u>Receivables:</u>			
Unaffiliated Agents and Brokers	-	-	-
Policyholders	-	-	-
Instalment Premiums	-	-	-
Other Insurers	-	-	-
"Facility Association" and the "P.R.R."	-	-	-
Subsidiaries, Associates & Joint Ventures	-	-	-
Income Taxes	-	-	-
Other Receivables	-	-	-
<u>Recoverable from Reinsurers:</u>			
Unearned Premiums	-	-	-
Unpaid Claims and Adjustment Expenses	-	-	-
Other Recoverables on Unpaid Claims	-	-	-
Interests in Subsidiaries, Associates & Joint Ventures	-	-	-
Property and Equipment	-	-	-
Deferred Policy Acquisition Expenses	-	-	-
Current Tax Assets	-	-	-
Deferred Tax Assets	-	-	-
Goodwill	-	-	-
Intangible Assets	-	-	-
Defined Benefit Pension Plan Assets	-	-	-
Other Assets	-	-	-
TOTAL ASSETS	1,031	1,018	1,049

BC Poultry Captive Insurance Company

Appendix 1

LIABILITIES, CAPITAL, SURPLUS AND RESERVES

(\$000)

BASE SCENARIO (\$100,000 Net Retention)

	Base 2018	2019	2020
LIABILITIES			
Overdrafts	1	-	-
Borrowed Money and Accrued Interest	2	-	-
<u>Payables:</u>			
Unaffiliated Agents and Brokers	3	-	-
Policyholders	4	-	-
Other Insurers	5	-	-
Subsidiaries, Associates & Joint Ventures/Affiliates	6	-	-
Expenses due and accrued	7	-	-
Other Taxes due and accrued	9	-	-
Policyholder Dividends and Rating Adjustments	10	-	-
Encumbrances on Real Estate	11	-	-
Unearned Premiums	12	-	-
Unpaid Claims and Adjustment Expenses	13	0	0
Unearned Commissions	14	-	-
Ceded Deferred Premium Taxes	20	-	-
Premium Deficiency	15	-	-
Liabilities held for sale	17	-	-
Current Tax Liabilities	18	-	-
Deferred Tax Liabilities	21	-	-
Self-Insured Retention (SIR) portion of unpaid claims	22	-	-
Defined Benefit Pension Plan Obligation	23	-	-
Employment Benefits(not incl. amts on line 23 above)	24	-	-
Subordinated Debt	25	-	-
Preferred Shares - Debt	26	-	-
Provisions and Other Liabilities	28	-	-
Total Liabilities	29	0	0
EQUITY			
Shares issued and paid			
Common	41	1,000	1,000
Preferred	33	-	-
Contributed Surplus	42	-	-
(Specify)	43		
Retained Earnings	44	31	18
Reserves	45	-	-
Accumulated Other Comprehensive Income(Loss)	47	0	0
Total Policyholders/Shareholders' Equity	59	1,031	1,018
Non-controlling Interests	48		
Total Equity	49	1,031	1,049
TOTAL LIABILITIES AND EQUITY	89	1,031	1,049

BC Poultry Captive Insurance Company

UNDERWRITING OPERATIONS

(\$000)

BASE SCENARIO (\$100,000 Net Retention)

	Base 2018	2019	2020
Premiums Written			
Direct	166	170	173
Reinsurance Assumed	-	-	-
Reinsurance Ceded	76	78	80
Net Premiums Written	90	92	93
Decrease (Increase) in Net Unearned Premiums	-	-	-
Net Premiums Earned	90	92	93
Service Charges	-	-	-
Other	-	-	-
Total Underwriting Revenue	90	92	93
Gross Claims and Adjustment Expenses	-	44	-
Reinsurers' share of claims and adjustment expenses	-	-	-
Net Claims and Adjustment Expense	-	44	-
Acquisition Expenses :			
Gross Commissions	-	-	-
Ceded Commissions	-	-	-
Taxes	5	5	5
Other	-	-	-
General Expenses	64	65	66
Total Claims and Expenses	69	114	71
Premium Deficiency Adjustments	-	-	-
Underwriting Income (Loss)	22	(22)	22
<u>INVESTMENT OPERATIONS</u>			
Income	9	9	9
Recognized Gains (Losses)	-	-	-
Expenses	-	-	-
Net Investment Income	9	9	9
<u>OTHER REVENUE AND EXPENSES</u>			
(net of Expenses of \$000.....)	-	-	-
Share of Net Income (Loss) of Subsidiaries, Associates and Joint Ventures	-	-	-
Gains (Losses) from fluctuations in Foreign Exchange Rates	-	-	-
Other Revenues	-	-	-
Finance costs	-	-	-
Other Expenses	-	-	-
Income (Loss) before Income Taxes and Extraordinary Items	31	(13)	31
<u>INCOME TAXES</u>			
Current	-	-	-
Future	-	-	-
Total Income Taxes	-	-	-
NET INCOME (LOSS) FOR THE YEAR	31	(13)	31
ATTRIBUTABLE TO:			
Non-controlling interests	-	-	-
Equity Holders	31	(13)	31
Loss Ratio	0.0%	47.8%	0.0%
Expense Ratio	76.1%	75.8%	76.4%
Combined Ratio	76.1%	123.7%	76.4%
ROE	5.9%	-1.2%	3.0%

BC Poultry Captive Insurance Company

STATEMENT OF CHANGES IN RETAINED EARNINGS

(\$000)

BASE SCENARIO (\$100,000 Net Retention)

	Base 2018	2019	2020	
Balance at beginning of prior year	1	-	-	31
Net Income Portion of Total Comprehensive Income for the Year	9	-	31	(13)
Issue of Share Capital	2	-	-	-
Transfer from/to Retained Earnings	15	-	-	-
Decrease/increase in Reserves	13	-	-	-
Dividends				
Preferred	17	-	-	-
Common	18	-	-	-
Other	16	-	-	-
Balance at End of Prior Year	19	-	31	18
Changes in Equity for Current Year				
Net Income Portion of Total Comprehensive Income for the Year	29	31	(13)	31
Issue of Share Capital	22	-	-	-
Transfer from/to Retained Earnings	35	-	-	-
Decrease/increase in Reserves	33	-	-	-
Dividends				
Preferred	37	-	-	-
Common	38	-	-	-
Other	36	-	-	-
Balance at End of Current Year	39	31	18	49

BC Poultry Captive Insurance Company

**COMPREHENSIVE INCOME (LOSS) AND
ACCUMULATED OTHER COMPREHENSIVE INCOME (LOSS)**

(\$000)

BASE SCENARIO (\$100,000 Net Retention)

	Base 2018	2019	2020
Comprehensive Income (Loss), net of Income Taxes			
Net Income.....	1	31	(13)
Other Comprehensive Income (Loss):			
Items that may be reclassified subsequently to Net Income:			
Available for Sale:			
Change in Unrealized Gains and Losses:			
-Loans.....	2	-	-
-Bonds and Debentures.....	3	0	(0)
-Equities.....	4	-	-
Reclassification to Earnings of Gains/(Losses).....	5	-	-
Derivatives Designated as Cash Flow Hedges			
Change in Unrealized Gains and Losses.....	6	-	-
Reclassification to Earnings of Gains/(Losses).....	7	-	-
Foreign Currency Translation			
-Change in Unrealized Gains and Losses	8	-	-
-Impact of Hedging	9	-	-
Other	18	-	-
Subtotal of items that may be reclassified subsequently to Net Income	19	0	(0)
Items that will not be reclassified subsequently to Net Income:			
Revaluation Surplus	31	-	-
Share of Other Comprehensive Income of			
Subsidiaries, Associates & Joint Ventures	11	-	-
Remeasurements of Defined Benefit Plans	34	-	-
Other	12	-	-
Subtotal of items that will not be reclassified subsequently to Net Income	29	-	-
Total Other Comprehensive Income (Loss).....	21	0	(0)
Total Comprehensive Income (Loss)	39	31	(13)
ATTRIBUTABLE TO:			
Non-controlling Interests.....	60	-	-
Equity Holders.....	62	31	(13)

	Base 2018	2019	2020
Accumulated Other Comprehensive Income (Loss), net of Income Taxes			
Accumulated Gains/(Losses) on:			
Items that may be reclassified subsequently to Net Income:			
Available for Sale:			
-Loans.....	42	-	-
-Bonds and Debentures.....	43	0	0
-Equities.....	44	-	-
Derivatives Designated as Cash Flow Hedges.....	45	-	-
Foreign Currency (net of hedging activities)	46	-	-
Other	68	-	-
Subtotal of items that may be reclassified subsequently to Net Income	69	0	0
Items that will not be reclassified subsequently to Net Income:			
Revaluation Surplus	71	-	-
Share of Other Comprehensive Income of			
Subsidiaries, Associates & Joint Ventures.....	51	-	-
Remeasurements of Defined Benefit Plans	74	-	-
Other	49	-	-
Subtotal of items that will not be reclassified subsequently to Net Income	79	-	-
Balance at end of year	59	0	0

BC Poultry Captive Insurance Company

MINIMUM CAPITAL TEST - 2015 FORMULATION

(\$000)

BASE SCENARIO (\$100,000 Net Retention)

		Base 2018	2019	2020
Capital Available				
Qualifying category A common shares	01	1,000	1,000	1,000
Contributed Surplus	02	0	0	0
Retained Earnings	03	31	18	49
Less: Accumulated net after-tax fair value gains(losses) due to changes in the company's own credit risk	04	0	0	0
Unrealized net after-tax fair value gains(losses) on own use properties at conversion to IFRS-cost model	05	0	0	0
Add: Accumulated net after-tax revaluation losses in excess of gains on own use properties-revaluation model	06	0	0	0
Subtotal :Retained earnings net of adjustments	09	31	18	49
Earthquake reserves	10	0	0	0
Less: Earthquake EPR not used as part of financial resources to cover exposure	11	0	0	0
Nuclear reserves	12	0	0	0
General and contingency reserves	13	0	0	0
Accumulated other comprehensive income (loss)	14	0	0	0
Less: Accumulated net after-tax fair value gains(losses) on cash flow hedges that are not fair valued on the balance sheet	15	0	0	0
Accumulated net after-tax fair value gains(losses) due to changes in the company's own credit risk	16	0	0	0
Accumulated net after-tax unrealized gains on own-use properties-revaluation surplus	17	0	0	0
Accumulated net after-tax impact of shadow accounting	18	0	0	0
Subtotal :AOCI net of adjustments	19	0	0	0
Qualifying category B instruments -Non-cumulative perpetual preferred shares	20	0	0	0
Qualifying category B instruments -Other	21	0	0	0
Qualifying category C instruments-Preferred shares	22	0	0	0
Qualifying category C instruments-Subordinated debt	23	0	0	0
Less: Accumulated amortization of category C instruments for capital adequacy purposes	24	0	0	0
Net qualifying category C instruments	25	0	0	0
Non-controlling interests	26	0	0	0
(specify)	27	0	0	0
Subtotal :capital available gross of deductions	29	1,031	1,018	1,049
Deductions:				
interests in non-qualifying subsidiaries	30	0	0	0
Interests in associates	31	0	0	0
Interests in joint ventures with more than 10% ownership	32	0	0	0
Loans considered as capital to non-qualifying subsidiaries	33	0	0	0
Loans considered as capital to associates	34	0	0	0
Loans considered as capital to joint ventures with more than 10% ownership	35	0	0	0
Receivables and recoverables from unregistered insurers not covered by acceptable collateral	36	0	0	0
Self-insured retentions, where OSFI requires collateral and no collateral has been received	37	0	0	0
DPAE other for A&S business	38	0	0	0
Goodwill (net of eligible deferred tax liability)	40	0	0	0
Intangible assets including computer software (net of eligible deferred tax liability)	41	0	0	0
Deferred tax assets excluding those arising from temporary differences (net of eligible deferred tax liability)	42	0	0	0
Net defined benefit pension plan surplus asset, net of available refunds (net of eligible deferred tax liability)	43	0	0	0
Investments in own capital instruments not derecognized for accounting purposes	44	0	0	0
Reciprocal cross holdings in the capital of financial entities	45	0	0	0
Specify	46	0	0	0
Subtotal :total deductions from capital available	49	0	0	0
Total Capital Available	80	1,031	1,018	1,049

BC Poultry Captive Insurance Company

Appendix 1

MINIMUM CAPITAL TEST - 2015 FORMULATION (CONT'D)

(\$000)

BASE SCENARIO (\$100,000 Net Retention)

		Base 2018	2019	2019
Total Capital Available	80	1,031	1,018	1,049
Capital (Margin) Required at Target:				
Insurance Risk:				
Premium liabilities	22	5	6	6
Unpaid claims	23	0	0	0
Catastrophes	24	0	0	0
Margin required for reinsurance ceded to unregistered Insurers	26	0	0	0
Subtotal:Insurance risk margin	51	5	6	6
Market Risk:				
Interest rate risk	34	11	11	11
Foreign exchange risk	36	0	0	0
Equity risk	41	0	0	0
Real estate risk	42	0	0	0
Other market risk exposures	43	0	0	0
Subtotal:Market risk margin	52	11	11	11
Credit Risk:				
Counterparty default risk for balance sheet assets	20	0	0	0
Counterparty default risk for off-balance sheet exposures	28	0	0	0
Counterparty default risk for unregistered reinsurance collateral and SIR	27	0	0	0
Subtotal:Credit risk margin	53	0	0	0
Operational risk margin	32	5	5	5
Less Diversification credit	70	2	2	2
Total Margin Required at Target	59	19	20	20
Minimum Margin Required (line 59/1.5)	69	13	13	13
Total Minimum Margin Required	39	13	13	13
Excess Capital Available over Margin Required (line 80 minus line 39)	89	1,018	1,005	1,036
Line 80 as a % of line 39	90	7931%	7831%	8069%

BC Poultry Captive Insurance Company

CAPITAL REQUIRED FOR BALANCE SHEET ASSETS

(\$000)

BASE SCENARIO (\$100,000 Net Retention)

		Factor	Base 2017	2018	2019
Cash	01	0.00%	0	0	0
Investment Income due and accrued	02	2.50%	0	0	0
Investments:					
Long-Term Obligations including Term Deposits Bonds and Debentures	06		0	0	0
Loans (at amortized cost):					
Government Grade	13	0.00%	0	0	0
Loans rated A- and higher, and Residential Mortgages\	14	4.00%	0	0	0
Commercial Mortgages	15	10.00%	0	0	0
Other	18	10.00%	0	0	0
Subsidiaries, Associates & Joint Ventures(not considered capital)	23	45.00%	0	0	0
Adjustment to reflect difference between amortized cost and Balance Sheet value of loans	19				
Preferred Shares	25		0	0	0
Common Shares	27				
Investment Properties	30				
Interests in Subsidiaries, Associates & Joint Ventures	34	Note	0	0	0
Other Investments	35	10.00%	0	0	0
Receivables:					
Government Grade	50	0.00%	0	0	0
Facility Association" and the "P.R.R."	51	0.70%	0	0	0
Agents, Brokers, Policyholders, Associates, Joint Ventures, Non- qualifying Subsidiaries and Other Receivables:					
- Instalment Prem(not yet due)	54	0.00%	0	0	0
- Outstanding less than 60 days	55	5.00%	0	0	0
- Outstanding 60 days or more	56	10.00%	0	0	0
Insurers					
- Registered Associated	42	0.00%	0	0	0
- Registered Non-Associated	57	0.70%	0	0	0
- Unregistered	58				
Recoverable from Reinsurers:					
- Registered Associated					
- Unearned Premiums	45	0.00%	0	0	0
- Unpaid Claims	46	0.00%	0	0	0
- Registered Non-associated					
- Unearned Premiums	60	2.50%	0	0	0
- Unpaid Claims	61	2.50%	0	0	0
- Unregistered	63				
Other Recoverables on Unpaid Claim including SIRs not deducted from capital	65	20.00%	0	0	0
Own Use Properties (valued using cost model)	75	10.00%			
Adjustment to reflect difference between cost model and Balance Sheet value of Own Use Properties	70				
Deferred Policy Acquisition Expenses					
Premium Taxes	76	0.00%			
Commissions(A&S)	77	Note			
Other	78	0.00%			
Deferred Tax Assets:					
Eligible Deferred tax assets arising from temp diff realized through loss carrybacks from inc. tax paid last three yrs		10.00%	0	0	0
Other	81	Note			
Other Assets: Goodwill and Other Intangibles	85	Note			
Computer Software	84	Note			
Other Assets (net of lines 85 and 84) and Equipment	86	10.00%	0	0	0
	88	Note			
Total Credit Risk Margin for Balance Sheet Assets	89		0	0	0

BC Poultry Captive Insurance Company

Appendix 1

Insurance Risk

(\$'000)

BASE SCENARIO (\$100,000 Net Retention)

DISCOUNTED UNPAID CLAIMS

	Factor	Base 2018	2019	2020	Distr. Selected Forecast
Property - personal..... 03	15.00%	-	-	-	0.00%
- commercial..... 07	10.00%	-	-	-	0.00%
Property - total..... 09		-	-	-	0.00%
Aircraft..... 10	20.00%	-	-	-	0.00%
Automobile - liability..... 19	10.00%	-	-	-	0.00%
- personal accident..... 20	10.00%	-	-	-	0.00%
- other..... 21	15.00%	-	-	-	0.00%
Automobile - total..... 29		-	-	-	0.00%
Boiler and Machinery..... 32	15.00%	-	-	-	0.00%
Credit..... 34	20.00%	-	-	-	0.00%
Credit Protection..... 35	20.00%	-	-	-	0.00%
Fidelity..... 36	20.00%	-	-	-	0.00%
Hail..... 38	20.00%	-	-	-	0.00%
Legal Expense 40	25.00%	-	-	-	0.00%
Liability..... 59	25.00%	-	-	-	0.00%
Mortgage..... 62	20.00%	-	-	-	0.00%
Other Approved Products..... 63	20.00%	-	-	-	0.00%
Surety..... 64	20.00%	-	-	-	0.00%
Title..... 66	15.00%	-	-	-	0.00%
Marine..... 68	20.00%	-	-	-	0.00%
Accident and Sickness..... 70	Note	-	-	-	0.00%
TOTAL..... 89		-	-	-	0.00%

Capital Required Margin on Unpaid Claims

a) Net Unpaid Claims margin(excl.A&S)	0	0	0
b) Net Unpaid Claims margin(A&S)	0	0	0
c) Net Unpaid Claims margin(Total)	<u>0</u>	<u>0</u>	<u>0</u>

DISCOUNTED PREMIUM LIABILITIES

	Factor	Base 2018	2019	2020	Distr. Selected Forecast
Property - personal..... 03	20.00%	27	28	28	0.00%
- commercial..... 07	20.00%	-	-	-	0.00%
Property - total..... 09		27	28	28	0.00%
Aircraft..... 10	25.00%	-	-	-	0.00%
Automobile - liability..... 19	15.00%	-	-	-	0.00%
- personal accident..... 20	15.00%	-	-	-	0.00%
- other..... 21	20.00%	-	-	-	0.00%
Automobile - total..... 29		-	-	-	0.00%
Boiler and Machinery..... 32	20.00%	-	-	-	0.00%
Credit..... 34	25.00%	-	-	-	0.00%
Credit Protection..... 35	25.00%	-	-	-	0.00%
Fidelity..... 36	25.00%	-	-	-	0.00%
Hail..... 38	25.00%	-	-	-	0.00%
Legal Expense 40	30.00%	-	-	-	0.00%
Liability..... 59	30.00%	-	-	-	0.00%
Mortgage..... 62	25.00%	-	-	-	0.00%
Other Approved Products..... 63	25.00%	-	-	-	0.00%
Surety..... 64	25.00%	-	-	-	0.00%
Title..... 66	20.00%	-	-	-	0.00%
Marine..... 68	25.00%	-	-	-	0.00%
Accident and Sickness..... 70	Note	-	-	-	0.00%
TOTAL..... 89		27	28	28	0.00%

Capital Required Margin on Discounted Premium Liabilities

d) Net premium liability margin(excl. A&S)	5	6	6
e) Net premium liability margin(A&S)	0	0	0
f) Premium liabilities margin (Total)	<u>5</u>	<u>6</u>	<u>6</u>

BC Poultry Captive Insurance Company

**MCT (BAAT) MARKET RISK CAPITAL (MARGIN) REQUIREMENTS
(\$000)**

BASE SCENARIO (\$100,000 Net Retention)

	Base 2018	2019	2020
Total Interest Sensitive Assets	900	900	900
Modified or Effective Duration	1.00	1.00	1.00
Interest rate shock factor	1.25%	1.25%	1.25%
Dollar fair value change	11	11	11
Total Interest Sensitive Liabilities			
Net unpaid claims and adjustment expenses	-	-	-
Net premium liabilities	-	-	-
Modified or Effective Duration: Net unpaid claims	-	-	-
Modified or Effective Duration: Premium liabilities	-	-	-
Interest rate shock factor			
Dollar fair value change	-	-	-
Total interest rate risk margin	11	11	11

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APPENDIX 2

99th Percentile Scenario

BC Poultry Captive Insurance Company

Appendix 2

ASSETS

(\$000)

99TH PERCENTILE SCENARIO

		Base 2018	2019	2020
Cash and Cash Equivalents	1	131	33	64
Investment Income due and accrued	2	-	-	-
Assets held for sale	50	-	-	-
Investment				
Short Term Investments	4	900	900	900
Bonds and Debentures	5	0	0	0
Mortgage Loans	6	-	-	-
Preferred Shares	7	-	-	-
Common Shares	8	-	-	-
Investment Properties	9	-	-	-
Other Loans and Invested Assets	10	-	-	-
Total Investments (lines 4 to 10)	19	900	900	900
Receivables:				
Unaffiliated Agents and Brokers	20	-	-	-
Policyholders	21	-	-	-
Instalment Premiums	22	-	-	-
Other Insurers	23	-	-	-
"Facility Association" and the "P.R.R."	24	-	-	-
Subsidiaries, Associates & Joint Ventures	25	-	-	-
Income Taxes	26	-	-	-
Other Receivables	27	-	-	-
Recoverable from Reinsurers:				
Unearned Premiums	30	-	-	-
Unpaid Claims and Adjustment Expenses	31	-	-	-
Other Recoverables on Unpaid Claims	37	-	-	-
Interests in Subsidiaries, Associates & Joint Ventures	40	-	-	-
Property and Equipment	41	-	-	-
Deferred Policy Acquisition Expenses	43	-	-	-
Current Tax Assets	52	-	-	-
Deferred Tax Assets	44	-	-	-
Goodwill	54	-	-	-
Intangible Assets	56	-	-	-
Defined Benefit Pension Plan Assets	58	-	-	-
Other Assets	88	-	-	-
TOTAL ASSETS	89	1,031	933	964

BC Poultry Captive Insurance Company

Appendix 2

LIABILITIES, CAPITAL, SURPLUS AND RESERVES

(\$000)

99TH PERCENTILE SCENARIO

LIABILITIES

Overdrafts 1
Borrowed Money and Accrued Interest 2

Payables:

Unaffiliated Agents and Brokers 3
Policyholders 4
Other Insurers 5
Subsidiaries, Associates & Joint Ventures/Affiliates 6
Expenses due and accrued 7
Other Taxes due and accrued 9
Policyholder Dividends and Rating Adjustments 10
Encumbrances on Real Estate 11
Unearned Premiums 12
Unpaid Claims and Adjustment Expenses 13
Unearned Commissions 14
Ceded Deferred Premium Taxes 20
Premium Deficiency 15
Liabilities held for sale 17
Current Tax Liabilities 18
Deferred Tax Liabilities 21
Self-Insured Retention (SIR) portion of unpaid claims 22
Defined Benefit Pension Plan Obligation 23
Employment Benefits(not incl. amts on line 23 above) 24
Subordinated Debt 25
Preferred Shares - Debt 26
Provisions and Other Liabilities 28

Total Liabilities 29

EQUITY

Shares issued and paid
Common 41
Preferred 33
Contributed Surplus 42
(Specify) 43
Retained Earnings 44
Reserves 45
Accumulated Other Comprehensive Income(Loss) 47

Total Policyholders/Shareholders' Equity 59

Non-controlling Interests 48

Total Equity 49

TOTAL LIABILITIES AND EQUITY 89

	Base 2018	2019	2020
1	-	-	-
2	-	-	-
3	-	-	-
4	-	-	-
5	-	-	-
6	-	-	-
7	-	-	-
9	-	-	-
10	-	-	-
11	-	-	-
12	-	-	-
13	0	0	0
14	-	-	-
20	-	-	-
15	-	-	-
17	-	-	-
18	-	-	-
21	-	-	-
22	-	-	-
23	-	-	-
24	-	-	-
25	-	-	-
26	-	-	-
28	-	-	-
29	0	0	0
41	1,000	1,000	1,000
33	-	-	-
42	-	-	-
43	-	-	-
44	31	(67)	(36)
45	-	-	-
47	0	0	0
59	1,031	933	964
48	-	-	-
49	1,031	933	964
89	1,031	933	964

BC Poultry Captive Insurance Company

Appendix 2

UNDERWRITING OPERATIONS

(\$000)

99TH PERCENTILE SCENARIO

	Base 2018	2019	2020
Premiums Written			
Direct	166	170	173
Reinsurance Assumed	-	-	-
Reinsurance Ceded	76	78	80
Net Premiums Written	90	92	93
Decrease (Increase) in Net Unearned Premiums	-	-	-
Net Premiums Earned	90	92	93
Service Charges	-	-	-
Other	-	(14)	-
Total Underwriting Revenue	90	78	93
Gross Claims and Adjustment Expenses	-	1,003	-
Reinsurers' share of claims and adjustment expenses	-	888	-
Net Claims and Adjustment Expense	-	115	-
Acquisition Expenses :			
Gross Commissions	-	-	-
Ceded Commissions	-	-	-
Taxes	5	5	5
Other	-	-	-
General Expenses	64	65	66
Total Claims and Expenses	69	185	71
Premium Deficiency Adjustments	-	-	-
Underwriting Income (Loss)	22	(107)	22
<u>INVESTMENT OPERATIONS</u>			
Income	9	9	9
Recognized Gains (Losses)	-	-	-
Expenses	-	-	-
Net Investment Income	9	9	9
<u>OTHER REVENUE AND EXPENSES</u>			
(net of Expenses of \$000.....)	-	-	-
Share of Net Income (Loss) of Subsidiaries, Associates and Joint Ventures	-	-	-
Gains (Losses) from fluctuations in Foreign Exchange Rates	-	-	-
Other Revenues	-	-	-
Finance costs	-	-	-
Other Expenses	-	-	-
Income (Loss) before Income Taxes and Extraordinary Items	31	(98)	31
<u>INCOME TAXES</u>			
Current	-	-	-
Future	-	-	-
Total Income Taxes	-	-	-
NET INCOME (LOSS) FOR THE YEAR	31	(98)	31
ATTRIBUTABLE TO:			
Non-controlling interests	-	-	-
Equity Holders	31	(98)	31
Loss Ratio	0.0%	125.0%	0.0%
Expense Ratio	76.1%	75.8%	76.4%
Combined Ratio	76.1%	200.8%	76.4%
ROE	5.9%	-10.0%	3.3%

BC Poultry Captive Insurance Company

Appendix 2

STATEMENT OF CHANGES IN RETAINED EARNINGS

(\$000)

99TH PERCENTILE SCENARIO

	Base 2018	2019	2020
Balance at beginning of prior year	1	-	31
Net Income Portion of Total Comprehensive Income for the Year	9	-	(98)
Issue of Share Capital	2	-	-
Transfer from/to Retained Earnings	15	-	-
Decrease/increase in Reserves	13	-	-
Dividends			
Preferred	17	-	-
Common	18	-	-
Other	16	-	-
Balance at End of Prior Year	19	-	(67)
Changes in Equity for Current Year			
Net Income Portion of Total Comprehensive Income for the Year	29	31	(98)
Issue of Share Capital	22	-	-
Transfer from/to Retained Earnings	35	-	-
Decrease/increase in Reserves	33	-	-
Dividends			
Preferred	37	-	-
Common	38	-	-
Other	36	-	-
Balance at End of Current Year	39	31	(67)
			(36)

BC Poultry Captive Insurance Company

COMPREHENSIVE INCOME (LOSS) AND
ACCUMULATED OTHER COMPREHENSIVE INCOME (LOSS)
 (\$000)
 99TH PERCENTILE SCENARIO

	Base 2018	2019	2020
Comprehensive Income (Loss), net of Income Taxes			
Net Income.....	1	31	(98)
Other Comprehensive Income (Loss):			
Items that may be reclassified subsequently to Net Income:			
Available for Sale:			
Change in Unrealized Gains and Losses:			
-Loans.....	2	-	-
-Bonds and Debentures.....	3	0	(0)
-Equities.....	4	-	-
Reclassification to Earnings of Gains/(Losses).....	5	-	-
Derivatives Designated as Cash Flow Hedges			
Change in Unrealized Gains and Losses.....	6	-	-
Reclassification to Earnings of Gains/(Losses).....	7	-	-
Foreign Currency Translation			
-Change in Unrealized Gains and Losses	8	-	-
-Impact of Hedging	9	-	-
Other.....	18	-	-
Subtotal of items that may be reclassified subsequently to Net Income	19	0	(0)
Items that will not be reclassified subsequently to Net Income:			
Revaluation Surplus	31	-	-
Share of Other Comprehensive Income of			
Subsidiaries, Associates & Joint Ventures	11	-	-
Remeasurements of Defined Benefit Plans	34	-	-
Other	12	-	-
Subtotal of items that will not be reclassified subsequently to Net Income	29	-	-
Total Other Comprehensive Income (Loss).....	21	0	(0)
Total Comprehensive Income (Loss)	39	31	(98)
ATTRIBUTABLE TO:			
Non-controlling Interests.....	60	-	-
Equity Holders.....	62	31	(98)

	Base 2018	2019	2020
Accumulated Other Comprehensive Income (Loss),			
net of Income Taxes			
Accumulated Gains/(Losses) on:			
Items that may be reclassified subsequently to Net Income:			
Available for Sale:			
-Loans.....	42	-	-
-Bonds and Debentures.....	43	0	0
-Equities.....	44	-	-
Derivatives Designated as Cash Flow Hedges.....	45	-	-
Foreign Currency (net of hedging activities)	46	-	-
Other.....	68	-	-
Subtotal of items that may be reclassified subsequently to Net Income	69	0	0
Items that will not be reclassified subsequently to Net Income:			
Revaluation Surplus	71	-	-
Share of Other Comprehensive Income of			
Subsidiaries, Associates & Joint Ventures.....	51	-	-
Remeasurements of Defined Benefit Plans	74	-	-
Other.....	49	-	-
Subtotal of items that will not be reclassified subsequently to Net Income	79	-	-
Balance at end of year.....	59	0	0

BC Poultry Captive Insurance Company

MINIMUM CAPITAL TEST - 2015 FORMULATION

(\$000)

99TH PERCENTILE SCENARIO

		Base 2018	2019	2020
Capital Available				
Qualifying category A common shares	01	1,000	1,000	1,000
Contributed Surplus	02	0	0	0
Retained Earnings	03	31	(67)	(36)
Less: Accumulated net after-tax fair value gains(losses) due to changes in the company's own credit risk	04	0	0	0
Unrealized net after-tax fair value gains(losses) on own use properties at conversion to IFRS-cost model	05	0	0	0
Add: Accumulated net after-tax revaluation losses in excess of gains on own use properties-revaluation model	06	0	0	0
Subtotal :Retained earnings net of adjustments	09	31	(67)	(36)
Earthquake reserves	10	0	0	0
Less: Earthquake EPR not used as part of financial resources to cover exposure	11	0	0	0
Nuclear reserves	12	0	0	0
General and contingency reserves	13	0	0	0
Accumulated other comprehensive income (loss)	14	0	0	0
Less: Accumulated net after-tax fair value gains(losses) on cash flow hedges that are not fair valued on the balance sheet	15	0	0	0
Accumulated net after-tax fair value gains(losses) due to changes in the company's own credit risk	16	0	0	0
Accumulated net after-tax unrealized gains on own-use properties-revaluation surplus	17	0	0	0
Accumulated net after-tax impact of shadow accounting	18	0	0	0
Subtotal :AOCI net of adjustments	19	0	0	0
Qualifying category B instruments -Non-cumulative perpetual preferred shares	20	0	0	0
Qualifying category B instruments -Other	21	0	0	0
Qualifying category C instruments-Preferred shares	22	0	0	0
Qualifying category C instruments-Subordinated debt	23	0	0	0
Less: Accumulated amortization of category C instruments for capital adequacy purposes	24	0	0	0
Net qualifying category C instruments	25	0	0	0
Non-controlling interests	26	0	0	0
(specify)	27	0	0	0
Subtotal :capital available gross of deductions	29	1,031	933	964
Deductions:				
interests in non-qualifying subsidiaries	30	0	0	0
Interests in associates	31	0	0	0
Interests in joint ventures with more than 10% ownership	32	0	0	0
Loans considered as capital to non-qualifying subsidiaries	33	0	0	0
Loans considered as capital to associates	34	0	0	0
Loans considered as capital to joint ventures with more than 10% ownership	35	0	0	0
Receivables and recoverables from unregistered insurers not covered by acceptable collateral	36	0	0	0
Self-insured retentions, where OSFI requires collateral and no collateral has been received	37	0	0	0
DPAE other for A&S business	38	0	0	0
Goodwill (net of eligible deferred tax liability)	40	0	0	0
Intangible assets including computer software (net of eligible deferred tax liability)	41	0	0	0
Deferred tax assets excluding those arising from temporary differences (net of eligible deferred tax liability)	42	0	0	0
Net defined benefit pension plan surplus asset, net of available refunds (net of eligible deferred tax liability)	43	0	0	0
Investments in own capital instruments not derecognized for accounting purposes	44	0	0	0
Reciprocal cross holdings in the capital of financial entities	45	0	0	0
Specify	46	0	0	0
Subtotal :total deductions from capital available	49	0	0	0
Total Capital Available	80	1,031	933	964

BC Poultry Captive Insurance Company

MINIMUM CAPITAL TEST - 2015 FORMULATION (CONT'D)

(\$000)

99TH PERCENTILE SCENARIO

		Base 2018	2019	2019
Total Capital Available	80	1,031	933	964
Capital (Margin) Required at Target:				
Insurance Risk:				
Premium liabilities	22	5	6	6
Unpaid claims	23	0	0	0
Catastrophes	24	0	0	0
Margin required for reinsurance ceded to unregistered Insurers	26	0	0	0
Subtotal:Insurance risk margin	51	5	6	6
Market Risk:				
Interest rate risk	34	11	11	11
Foreign exchange risk	36	0	0	0
Equity risk	41	0	0	0
Real estate risk	42	0	0	0
Other market risk exposures	43	0	0	0
Subtotal:Market risk margin	52	11	11	11
Credit Risk:				
Counterparty default risk for balance sheet assets	20	0	0	0
Counterparty default risk for off-balance sheet exposures	28	0	0	0
Counterparty default risk for unregistered reinsurance collateral and SIR	27	0	0	0
Subtotal:Credit risk margin	53	0	0	0
Operational risk margin	32	5	5	5
Less Diversification credit	70	2	2	2
Total Margin Required at Target	59	19	20	20
Minimum Margin Required (line 59/1.5)	69	13	13	13
Total Minimum Margin Required	39	13	13	13
Excess Capital Available over Margin Required (line 80 minus line 39)	89	1,018	920	951
Line 80 as a % of line 39	90	7931%	7177%	7415%

BC Poultry Captive Insurance Company

CAPITAL REQUIRED FOR BALANCE SHEET ASSETS

(\$000)

99TH PERCENTILE SCENARIO

		Factor	Base 2018	2019	2020
Cash	01	0.00%	0	0	0
Investment Income due and accrued	02	2.50%	0	0	0
<u>Investments:</u>					
Long-Term Obligations including Term Deposits Bonds and Debentures	06		0	0	0
Loans (at amortized cost):					
Government Grade	13	0.00%	0	0	0
Loans rated A- and higher, and Residential Mortgages\	14	4.00%	0	0	0
Commercial Mortgages	15	10.00%	0	0	0
Other	18	10.00%	0	0	0
Subsidiaries, Associates & Joint Ventures(not considered capital)	23	45.00%	0	0	0
Adjustment to reflect difference between amortized cost and Balance Sheet value of loans	19				
Preferred Shares	25		0	0	0
Common Shares	27				
Investment Properties	30				
Interests in Subsidiaries, Associates & Joint Ventures	34	Note	0	0	0
Other Investments	35	10.00%	0	0	0
<u>Receivables:</u>					
Government Grade	50	0.00%	0	0	0
Facility Association" and the "P.R.R."	51	0.70%	0	0	0
Agents, Brokers, Policyholders, Associates, Joint Ventures, Non- qualifying Subsidiaries and Other Receivables					
- Instalment Prem(not yet due)	54	0.00%	0	0	0
- Outstanding less than 60 days	55	5.00%	0	0	0
- Outstanding 60 days or more	56	10.00%	0	0	0
Insurers					
- Registered Associated	42	0.00%	0	0	0
- Registered Non-Associated	57	0.70%	0	0	0
- Unregistered	58				
<u>Recoverable from Reinsurers:</u>					
- Registered Associated					
- Unearned Premiums	45	0.00%	0	0	0
- Unpaid Claims	46	0.00%	0	0	0
- Registered Non-associated					
- Unearned Premiums	60	2.50%	0	0	0
- Unpaid Claims	61	2.50%	0	0	0
- Unregistered	63				
Other Recoverables on Unpaid Claim including SIRs not deducted from capital	65	20.00%	0	0	0
Own Use Properties (valued using cost model)	75	10.00%			
Adjustment to reflect difference between cost model and Balance Sheet value of Own Use Properties	70				
Deferred Policy Acquisition Expenses					
Premium Taxes	76	0.00%			
Commissions(A&S)	77	Note			
Other	78	0.00%			
Deferred Tax Assets:					
Eligible Deferred tax assets arising from temp diff realized through loss carrybacks from inc. tax paid last three yrs		10.00%	0	0	0
Other	81	Note			
Other Assets: Goodwill and Other Intangibles	85	Note			
Computer Software	84	Note			
Other Assets (net of lines 85 and 84) and Equipment	86	10.00%	0	0	0
	88	Note			
Total Credit Risk Margin for Balance Sheet Assets	89		0	0	0

BC Poultry Captive Insurance Company

Appendix 2

Insurance Risk

(\$000)

99TH PERCENTILE SCENARIO

DISCOUNTED UNPAID CLAIMS

	Factor	Base 2018	2019	2020	Distr. Selected Forecast
Property - personal..... 03	15.00%	-	-	-	0.00%
- commercial..... 07	10.00%	-	-	-	0.00%
Property - total..... 09		-	-	-	0.00%
Aircraft..... 10	20.00%	-	-	-	0.00%
Automobile - liability..... 19	10.00%	-	-	-	0.00%
- personal accident..... 20	10.00%	-	-	-	0.00%
- other..... 21	15.00%	-	-	-	0.00%
Automobile - total..... 29		-	-	-	0.00%
Boiler and Machinery..... 32	15.00%	-	-	-	0.00%
Credit..... 34	20.00%	-	-	-	0.00%
Credit Protection..... 35	20.00%	-	-	-	0.00%
Fidelity..... 36	20.00%	-	-	-	0.00%
Hail..... 38	20.00%	-	-	-	0.00%
Legal Expense 40	25.00%	-	-	-	0.00%
Liability..... 59	25.00%	-	-	-	0.00%
Mortgage..... 62	20.00%	-	-	-	0.00%
Other Approved Products..... 63	20.00%	-	-	-	0.00%
Surety..... 64	20.00%	-	-	-	0.00%
Title..... 66	15.00%	-	-	-	0.00%
Marine..... 68	20.00%	-	-	-	0.00%
Accident and Sickness..... 70	Note	-	-	-	0.00%
TOTAL..... 89		-	-	-	0.00%

Capital Required Margin on Unpaid Claims

a) Net Unpaid Claims margin(excl.A&S)	0	0	0
b) Net Unpaid Claims margin(A&S)	0	0	0
c) Net Unpaid Claims margin(Total)	0	0	0

DISCOUNTED PREMIUM LIABILITIES

	Factor	Base 2018	2019	2020	Distr. Selected Forecast
Property - personal..... 03	20.00%	27	28	28	0.00%
- commercial..... 07	20.00%	-	-	-	0.00%
Property - total..... 09		27	28	28	0.00%
Aircraft..... 10	25.00%	-	-	-	0.00%
Automobile - liability..... 19	15.00%	-	-	-	0.00%
- personal accident..... 20	15.00%	-	-	-	0.00%
- other..... 21	20.00%	-	-	-	0.00%
Automobile - total..... 29		-	-	-	0.00%
Boiler and Machinery..... 32	20.00%	-	-	-	0.00%
Credit..... 34	25.00%	-	-	-	0.00%
Credit Protection..... 35	25.00%	-	-	-	0.00%
Fidelity..... 36	25.00%	-	-	-	0.00%
Hail..... 38	25.00%	-	-	-	0.00%
Legal Expense 40	30.00%	-	-	-	0.00%
Liability..... 59	30.00%	-	-	-	0.00%
Mortgage..... 62	25.00%	-	-	-	0.00%
Other Approved Products..... 63	25.00%	-	-	-	0.00%
Surety..... 64	25.00%	-	-	-	0.00%
Title..... 66	20.00%	-	-	-	0.00%
Marine..... 68	25.00%	-	-	-	0.00%
Accident and Sickness..... 70	Note	-	-	-	0.00%
TOTAL..... 89		27	28	28	0.00%

Capital Required Margin on Discounted Premium Liabilities

d) Net premium liability margin(excl. A&S)	5	6	6
e) Net premium liability margin(A&S)	0	0	0
f) Premium liabilities margin (Total)	5	6	6

**MCT (BAAT) MARKET RISK CAPITAL (MARGIN) REQUIREMENTS
 (\$000)**

99TH PERCENTILE SCENARIO

Total Interest Sensitive Assets

Modified or Effective Duration

Interest rate shock factor

Dollar fair value change

Total Interest Sensitive Liabilities

Net unpaid claims and adjustment expenses

Net premium liabilities

Modified or Effective Duration: Net unpaid claims

Modified or Effective Duration: Premium liabilities

Interest rate shock factor

Dollar fair value change

Total interest rate risk margin

	Base 2018	2019	2020
1	900	900	900
2	1.00	1.00	1.00
3	1.25%	1.25%	1.25%
4	11	11	11
5	-	-	-
6	-	-	-
7	-	-	-
7	-	-	-
8			
9	-	-	-
10	11	11	11

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APPENDIX 3

99th Percentile Adverse Scenario with 12.5% Defaults on Recovery

BC Poultry Captive Insurance Company

Appendix 3

ASSETS

(\$000)

99th PERCENTILE SCENARIO WITH 12.5% DEFAULTS ON RECOVERY

		Base 2018	2019	2020
Cash and Cash Equivalents	1	131	72	102
Investment Income due and accrued	2	-	-	-
Assets held for sale	50	-	-	-
Investment				
Short Term Investments	4	900	750	750
Bonds and Debentures	5	0	0	0
Mortgage Loans	6	-	-	-
Preferred Shares	7	-	-	-
Common Shares	8	-	-	-
Investment Properties	9	-	-	-
Other Loans and Invested Assets	10	-	-	-
Total Investments (lines 4 to 10)	19	900	750	750
Receivables:				
Unaffiliated Agents and Brokers	20	-	-	-
Policyholders	21	-	-	-
Instalment Premiums	22	-	-	-
Other Insurers	23	-	-	-
"Facility Association" and the "P.R.R."	24	-	-	-
Subsidiaries, Associates & Joint Ventures	25	-	-	-
Income Taxes	26	-	-	-
Other Receivables	27	-	-	-
Recoverable from Reinsurers:				
Unearned Premiums	30	-	-	-
Unpaid Claims and Adjustment Expenses	31	-	-	-
Other Recoverables on Unpaid Claims	37	-	-	-
Interests in Subsidiaries, Associates & Joint Ventures	40	-	-	-
Property and Equipment	41	-	-	-
Deferred Policy Acquisition Expenses	43	-	-	-
Current Tax Assets	52	-	-	-
Deferred Tax Assets	44	-	-	-
Goodwill	54	-	-	-
Intangible Assets	56	-	-	-
Defined Benefit Pension Plan Assets	58	-	-	-
Other Assets	88	-	-	-
TOTAL ASSETS	89	1,031	822	852

BC Poultry Captive Insurance Company

Appendix 3

LIABILITIES, CAPITAL, SURPLUS AND RESERVES

(\$000)

99th PERCENTILE SCENARIO WITH 12.5% DEFAULTS ON RECOVERY

		Base 2018	2019	2020
LIABILITIES				
Overdrafts	1	-	-	-
Borrowed Money and Accrued Interest	2	-	-	-
<u>Payables:</u>				
Unaffiliated Agents and Brokers	3	-	-	-
Policyholders	4	-	-	-
Other Insurers	5	-	-	-
Subsidiaries, Associates & Joint Ventures/Affiliates	6	-	-	-
Expenses due and accrued	7	-	-	-
Other Taxes due and accrued	9	-	-	-
Policyholder Dividends and Rating Adjustments	10	-	-	-
Encumbrances on Real Estate	11	-	-	-
Unearned Premiums	12	-	-	-
Unpaid Claims and Adjustment Expenses	13	0	0	0
Unearned Commissions	14	-	-	-
Ceded Deferred Premium Taxes	20	-	-	-
Premium Deficiency	15	-	-	-
Liabilities held for sale	17	-	-	-
Current Tax Liabilities	18	-	-	-
Deferred Tax Liabilities	21	-	-	-
Self-Insured Retention (SIR) portion of unpaid claims	22	-	-	-
Defined Benefit Pension Plan Obligation	23	-	-	-
Employment Benefits(not incl. amts on line 23 above)	24	-	-	-
Subordinated Debt	25	-	-	-
Preferred Shares - Debt	26	-	-	-
Provisions and Other Liabilities	28	-	-	-
Total Liabilities	29	0	0	0
EQUITY				
Shares issued and paid				
Common	41	1,000	1,000	1,000
Preferred	33	-	-	-
Contributed Surplus	42	-	-	-
(Specify)	43			
Retained Earnings	44	31	(178)	(148)
Reserves	45	-	-	-
Accumulated Other Comprehensive Income(Loss)	47	0	0	0
Total Policyholders/Shareholders' Equity	59	1,031	822	852
Non-controlling Interests	48			
Total Equity	49	1,031	822	852
TOTAL LIABILITIES AND EQUITY	89	1,031	822	852

BC Poultry Captive Insurance Company

Appendix 3

UNDERWRITING OPERATIONS

(\$000)

99th PERCENTILE SCENARIO WITH 12.5% DEFAULTS ON RECOVERY

	Base 2018	2019	2020
Premiums Written			
Direct	166	170	173
Reinsurance Assumed	-	-	-
Reinsurance Ceded	76	78	80
Net Premiums Written	90	92	93
Decrease (Increase) in Net Unearned Premiums	-	-	-
Net Premiums Earned	90	92	93
Service Charges	-	-	-
Other	-	(12)	-
Total Underwriting Revenue	90	80	93
Gross Claims and Adjustment Expenses	-	1,003	-
Reinsurers' share of claims and adjustment expenses	-	777	-
Net Claims and Adjustment Expense	-	226	-
Acquisition Expenses :			
Gross Commissions	-	-	-
Ceded Commissions	-	-	-
Taxes	5	5	5
Other	-	-	-
General Expenses	64	65	66
Total Claims and Expenses	69	296	71
Premium Deficiency Adjustments	-	-	-
Underwriting Income (Loss)	22	(216)	22
<u>INVESTMENT OPERATIONS</u>			
Income	9	8	8
Recognized Gains (Losses)	-	-	-
Expenses	-	-	-
Net Investment Income	9	8	8
<u>OTHER REVENUE AND EXPENSES</u>			
(net of Expenses of \$000.....)	-	-	-
Share of Net Income (Loss) of Subsidiaries, Associates and Joint Ventures	-	-	-
Gains (Losses) from fluctuations in Foreign Exchange Rates	-	-	-
Other Revenues	-	-	-
Finance costs	-	-	-
Other Expenses	-	-	-
Income (Loss) before Income Taxes and Extraordinary Items	31	(208)	30
<u>INCOME TAXES</u>			
Current	-	-	-
Future	-	-	-
Total Income Taxes	-	-	-
NET INCOME (LOSS) FOR THE YEAR	31	(208)	30
ATTRIBUTABLE TO:			
Non-controlling interests	-	-	-
Equity Holders	31	(208)	30
Loss Ratio	0.0%	246.0%	0.0%
Expense Ratio	76.1%	75.8%	76.4%
Combined Ratio	76.1%	321.9%	76.4%
ROE	5.9%	-22.5%	3.6%

BC Poultry Captive Insurance Company

Appendix 3

STATEMENT OF CHANGES IN RETAINED EARNINGS

(\$000)

99th PERCENTILE SCENARIO WITH 12.5% DEFAULTS ON RECOVERY

	Base 2018	2019	2020
Balance at beginning of prior year	1	-	31
Net Income Portion of Total Comprehensive Income for the Year	9	-	(208)
Issue of Share Capital	2	-	-
Transfer from/to Retained Earnings	15	-	-
Decrease/increase in Reserves	13	-	-
Dividends			
Preferred	17	-	-
Common	18	-	-
Other	16	-	-
Balance at End of Prior Year	19	-	(178)
Changes in Equity for Current Year			
Net Income Portion of Total Comprehensive Income for the Year	29	31	(208)
Issue of Share Capital	22	-	-
Transfer from/to Retained Earnings	35	-	-
Decrease/increase in Reserves	33	-	-
Dividends			
Preferred	37	-	-
Common	38	-	-
Other	36	-	-
Balance at End of Current Year	39	31	(148)

BC Poultry Captive Insurance Company

Appendix 3

**COMPREHENSIVE INCOME (LOSS) AND
 ACCUMULATED OTHER COMPREHENSIVE INCOME (LOSS)**

(\$000)

99th PERCENTILE SCENARIO WITH 12.5% DEFAULTS ON RECOVERY

	Base 2018	2019	2020
Comprehensive Income (Loss), net of Income Taxes			
Net Income.....	1	31	(208)
Other Comprehensive Income (Loss):			
Items that may be reclassified subsequently to Net Income:			
Available for Sale:			
Change in Unrealized Gains and Losses:			
-Loans.....	2	-	-
-Bonds and Debentures.....	3	0	(0)
-Equities.....	4	-	-
Reclassification to Earnings of Gains/(Losses).....	5	-	-
Derivatives Designated as Cash Flow Hedges			
Change in Unrealized Gains and Losses.....	6	-	-
Reclassification to Earnings of Gains/(Losses).....	7	-	-
Foreign Currency Translation			
-Change in Unrealized Gains and Losses	8	-	-
-Impact of Hedging	9	-	-
Other.....	18	-	-
Subtotal of items that may be reclassified subsequently to Net Income	19	0	(0)
Items that will not be reclassified subsequently to Net Income:			
Revaluation Surplus	31	-	-
Share of Other Comprehensive Income of			
Subsidiaries, Associates & Joint Ventures	11	-	-
Remeasurements of Defined Benefit Plans	34	-	-
Other	12	-	-
Subtotal of items that will not be reclassified subsequently to Net Income	29	-	-
Total Other Comprehensive Income (Loss).....	21	0	(0)
Total Comprehensive Income (Loss)	39	31	(208)
ATTRIBUTABLE TO:			
Non-controlling Interests.....	60	-	-
Equity Holders.....	62	31	(208)

	Base 2018	2019	2020
Accumulated Other Comprehensive Income (Loss),			
net of Income Taxes			
Accumulated Gains/(Losses) on:			
Items that may be reclassified subsequently to Net Income:			
Available for Sale:			
-Loans.....	42	-	-
-Bonds and Debentures.....	43	0	0
-Equities.....	44	-	-
Derivatives Designated as Cash Flow Hedges.....	45	-	-
Foreign Currency (net of hedging activities)	46	-	-
Other.....	68	-	-
Subtotal of items that may be reclassified subsequently to Net Income	69	0	0
Items that will not be reclassified subsequently to Net Income:			
Revaluation Surplus	71	-	-
Share of Other Comprehensive Income of			
Subsidiaries, Associates & Joint Ventures.....	51	-	-
Remeasurements of Defined Benefit Plans	74	-	-
Other.....	49	-	-
Subtotal of items that will not be reclassified subsequently to Net Income	79	-	-
Balance at end of year.....	59	0	0

BC Poultry Captive Insurance Company

Appendix 3

MINIMUM CAPITAL TEST - 2015 FORMULATION

(\$000)

99th PERCENTILE SCENARIO WITH 12.5% DEFAULTS ON RECOVERY

		Base 2018	2019	2020
Capital Available				
Qualifying category A common shares	01	1,000	1,000	1,000
Contributed Surplus	02	0	0	0
Retained Earnings	03	31	(178)	(148)
Less: Accumulated net after-tax fair value gains(losses) due to changes in the company's own credit risk	04	0	0	0
Unrealized net after-tax fair value gains(losses) on own use properties at conversion to IFRS-cost model	05	0	0	0
Add: Accumulated net after-tax revaluation losses in excess of gains on own use properties-revaluation model	06	0	0	0
Subtotal :Retained earnings net of adjustments	09	31	(178)	(148)
Earthquake reserves	10	0	0	0
Less: Earthquake EPR not used as part of financial resources to cover exposure	11	0	0	0
Nuclear reserves	12	0	0	0
General and contingency reserves	13	0	0	0
Accumulated other comprehensive income (loss)	14	0	0	0
Less: Accumulated net after-tax fair value gains(losses) on cash flow hedges that are not fair valued on the balance sheet	15	0	0	0
Accumulated net after-tax fair value gains(losses) due to changes in the company's own credit risk	16	0	0	0
Accumulated net after-tax unrealized gains on own-use properties-revaluation surplus	17	0	0	0
Accumulated net after-tax impact of shadow accounting	18	0	0	0
Subtotal :AOCI net of adjustments	19	0	0	0
Qualifying category B instruments -Non-cumulative perpetual preferred shares	20	0	0	0
Qualifying category B instruments -Other	21	0	0	0
Qualifying category C instruments-Preferred shares	22	0	0	0
Qualifying category C instruments-Subordinated debt	23	0	0	0
Less: Accumulated amortization of category C instruments for capital adequacy purposes	24	0	0	0
Net qualifying category C instruments	25	0	0	0
Non-controlling interests	26	0	0	0
(specify)	27	0	0	0
Subtotal :capital available gross of deductions	29	1,031	822	852
Deductions:				
interests in non-qualifying subsidiaries	30	0	0	0
Interests in associates	31	0	0	0
Interests in joint ventures with more than 10% ownership	32	0	0	0
Loans considered as capital to non-qualifying subsidiaries	33	0	0	0
Loans considered as capital to associates	34	0	0	0
Loans considered as capital to joint ventures with more than 10% ownership	35	0	0	0
Receivables and recoverables from unregistered insurers not covered by acceptable collateral	36	0	0	0
Self-insured retentions, where OSFI requires collateral and no collateral has been received	37	0	0	0
DPAE other for A&S business	38	0	0	0
Goodwill (net of eligible deferred tax liability)	40	0	0	0
Intangible assets including computer software (net of eligible deferred tax liability)	41	0	0	0
Deferred tax assets excluding those arising from temporary differences (net of eligible deferred tax liability)	42	0	0	0
Net defined benefit pension plan surplus asset, net of available refunds (net of eligible deferred tax liability)	43	0	0	0
Investments in own capital instruments not derecognized for accounting purposes	44	0	0	0
Reciprocal cross holdings in the capital of financial entities	45	0	0	0
Specify	46	0	0	0
Subtotal :total deductions from capital available	49	0	0	0
Total Capital Available	80	1,031	822	852

BC Poultry Captive Insurance Company

Appendix 3

MINIMUM CAPITAL TEST - 2015 FORMULATION (CONT'D)

(\$000)

99th PERCENTILE SCENARIO WITH 12.5% DEFAULTS ON RECOVERY

		Base 2018	2019	2019
Total Capital Available	80	1,031	822	852
Capital (Margin) Required at Target:				
Insurance Risk:				
Premium liabilities	22	5	6	6
Unpaid claims	23	0	0	0
Catastrophes	24	0	0	0
Margin required for reinsurance ceded to unregistered Insurers	26	0	0	0
Subtotal:Insurance risk margin	51	5	6	6
Market Risk:				
Interest rate risk	34	11	9	9
Foreign exchange risk	36	0	0	0
Equity risk	41	0	0	0
Real estate risk	42	0	0	0
Other market risk exposures	43	0	0	0
Subtotal:Market risk margin	52	11	9	9
Credit Risk:				
Counterparty default risk for balance sheet assets	20	0	0	0
Counterparty default risk for off-balance sheet exposures	28	0	0	0
Counterparty default risk for unregistered reinsurance collateral and SIR	27	0	0	0
Subtotal:Credit risk margin	53	0	0	0
Operational risk margin	32	5	5	5
Less Diversification credit	70	2	2	2
Total Margin Required at Target	59	19	18	18
Minimum Margin Required (line 59/1.5)	69	13	12	12
Total Minimum Margin Required	39	13	12	12
Excess Capital Available over Margin Required (line 80 minus line 39)	89	1,018	810	840
Line 80 as a % of line 39	90	7931%	6850%	7100%

BC Poultry Captive Insurance Company

CAPITAL REQUIRED FOR BALANCE SHEET ASSETS

(\$000)

99th PERCENTILE SCENARIO WITH 12.5% DEFAULTS ON RECOVERY

		Factor	Base 2017	2018	2019
Cash	01	0.00%	0	0	0
Investment Income due and accrued	02	2.50%	0	0	0
<u>Investments:</u>					
Long-Term Obligations including Term Deposits Bonds and Debentures	06		0	0	0
Loans (at amortized cost):					
Government Grade	13	0.00%	0	0	0
Loans rated A- and higher, and Residential Mortgages\	14	4.00%	0	0	0
Commercial Mortgages	15	10.00%	0	0	0
Other	18	10.00%	0	0	0
Subsidiaries, Associates & Joint Ventures(not considered capital)	23	45.00%	0	0	0
Adjustment to reflect difference between amortized cost and Balance Sheet value of loans	19				
Preferred Shares	25		0	0	0
Common Shares	27				
Investment Properties	30				
Interests in Subsidiaries, Associates & Joint Ventures	34	Note	0	0	0
Other Investments	35	10.00%	0	0	0
<u>Receivables:</u>					
Government Grade	50	0.00%	0	0	0
Facility Association" and the "P.R.R."	51	0.70%	0	0	0
Agents, Brokers, Policyholders, Associates, Joint Ventures, Non- qualifying Subsidiaries and Other Receivables:					
- Instalment Prem(not yet due)	54	0.00%	0	0	0
- Outstanding less than 60 days	55	5.00%	0	0	0
- Outstanding 60 days or more	56	10.00%	0	0	0
Insurers					
- Registered Associated	42	0.00%	0	0	0
- Registered Non-Associated	57	0.70%	0	0	0
- Unregistered	58				
<u>Recoverable from Reinsurers:</u>					
- Registered Associated					
- Unearned Premiums	45	0.00%	0	0	0
- Unpaid Claims	46	0.00%	0	0	0
- Registered Non-associated					
- Unearned Premiums	60	2.50%	0	0	0
- Unpaid Claims	61	2.50%	0	0	0
- Unregistered	63				
Other Recoverables on Unpaid Claim including SIRs not deducted from capital	65	20.00%	0	0	0
Own Use Properties (valued using cost model)	75	10.00%			
Adjustment to reflect difference between cost model and Balance Sheet value of Own Use Properties	70				
Deferred Policy Acquisition Expenses					
Premium Taxes	76	0.00%			
Commissions(A&S)	77	Note			
Other	78	0.00%			
Deferred Tax Assets:					
Eligible Deferred tax assets arising from temp diff realized through loss carrybacks from inc. tax paid last three yrs		10.00%	0	0	0
Other	81	Note			
Other Assets: Goodwill and Other Intangibles	85	Note			
Computer Software	84	Note			
Other Assets (net of lines 85 and 84) and Equipment	86	10.00%	0	0	0
	88	Note			
Total Credit Risk Margin for Balance Sheet Assets	89		0	0	0

BC Poultry Captive Insurance Company

Appendix 3

Insurance Risk

(\$000)

99th PERCENTILE SCENARIO WITH 12.5% DEFAULTS ON RECOVERY

DISCOUNTED UNPAID CLAIMS

	Factor	Base 2017	2018	2019	Distr. Selected Forecast
Property - personal..... 03	15.00%	-	-	-	0.00%
- commercial..... 07	10.00%	-	-	-	0.00%
Property - total..... 09		-	-	-	0.00%
Aircraft..... 10	20.00%	-	-	-	0.00%
Automobile - liability..... 19	10.00%	-	-	-	0.00%
- personal accident..... 20	10.00%	-	-	-	0.00%
- other..... 21	15.00%	-	-	-	0.00%
Automobile - total..... 29		-	-	-	0.00%
Boiler and Machinery..... 32	15.00%	-	-	-	0.00%
Credit..... 34	20.00%	-	-	-	0.00%
Credit Protection..... 35	20.00%	-	-	-	0.00%
Fidelity..... 36	20.00%	-	-	-	0.00%
Hail..... 38	20.00%	-	-	-	0.00%
Legal Expense 40	25.00%	-	-	-	0.00%
Liability..... 59	25.00%	-	-	-	0.00%
Mortgage..... 62	20.00%	-	-	-	0.00%
Other Approved Products..... 63	20.00%	-	-	-	0.00%
Surety..... 64	20.00%	-	-	-	0.00%
Title..... 66	15.00%	-	-	-	0.00%
Marine..... 68	20.00%	-	-	-	0.00%
Accident and Sickness..... 70	Note	-	-	-	0.00%
TOTAL..... 89		-	-	-	0.00%

Capital Required Margin on Unpaid Claims

a) Net Unpaid Claims margin(excl.A&S)	0	0	0
b) Net Unpaid Claims margin(A&S)	0	0	0
c) Net Unpaid Claims margin(Total)	0	0	0

DISCOUNTED PREMIUM LIABILITIES

	Factor	Base 2017	2018	2019	Distr. Selected Forecast
Property - personal..... 03	20.00%	27	28	28	0.00%
- commercial..... 07	20.00%	-	-	-	0.00%
Property - total..... 09		27	28	28	0.00%
Aircraft..... 10	25.00%	-	-	-	0.00%
Automobile - liability..... 19	15.00%	-	-	-	0.00%
- personal accident..... 20	15.00%	-	-	-	0.00%
- other..... 21	20.00%	-	-	-	0.00%
Automobile - total..... 29		-	-	-	0.00%
Boiler and Machinery..... 32	20.00%	-	-	-	0.00%
Credit..... 34	25.00%	-	-	-	0.00%
Credit Protection..... 35	25.00%	-	-	-	0.00%
Fidelity..... 36	25.00%	-	-	-	0.00%
Hail..... 38	25.00%	-	-	-	0.00%
Legal Expense 40	30.00%	-	-	-	0.00%
Liability..... 59	30.00%	-	-	-	0.00%
Mortgage..... 62	25.00%	-	-	-	0.00%
Other Approved Products..... 63	25.00%	-	-	-	0.00%
Surety..... 64	25.00%	-	-	-	0.00%
Title..... 66	20.00%	-	-	-	0.00%
Marine..... 68	25.00%	-	-	-	0.00%
Accident and Sickness..... 70	Note	-	-	-	0.00%
TOTAL..... 89		27	28	28	0.00%

Capital Required Margin on Discounted Premium Liabilities

d) Net premium liability margin(excl. A&S)	5	6	6
e) Net premium liability margin(A&S)	0	0	0
f) Premium liabilities margin (Total)	5	6	6

BC Poultry Captive Insurance Company

**MCT (BAAT) MARKET RISK CAPITAL (MARGIN) REQUIREMENTS
(\$000)**

99th PERCENTILE SCENARIO WITH 12.5% DEFAULTS ON RECOVERY

Total Interest Sensitive Assets

Modified or Effective Duration

Interest rate shock factor

Dollar fair value change

Total Interest Sensitive Liabilities

Net unpaid claims and adjustment expenses

Net premium liabilities

Modified or Effective Duration: Net unpaid claims

Modified or Effective Duration: Premium liabilities

Interest rate shock factor

Dollar fair value change

Total interest rate risk margin

	Base 2018	2019	2020
1	900	750	750
2	1.00	1.00	1.00
3	1.25%	1.25%	1.25%
4	11	9	9
5	-	-	-
6	-	-	-
7	-	-	-
7	-	-	-
8			
9	-	-	-
10	11	9	9

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APPENDICES A & A1 & A2

- A. Premiums Requirement for 2018, 2019 and 2020 by Sector
- A1. C&D Cost Simulation Results for 2018, 2019 and 2020
- A2. C&D Cost Simulation Results for 2018: Reduced Layers C&D Cost to \$0.81 per Bird

	2018	2018	2018
	No Reinsurance	\$100,000 Agg. Stop Loss	\$250,000 Agg. Stop Loss
Expected losses (Captive)	49,925	19,577	28,723
External adjuster expenses	500	500	500
Cost of Stop loss	-	75,870	53,004
Operating expenses	63,500	63,500	63,500
Premium Tax (4%)	4,747	6,644	6,072
2018 Premium	118,671	166,090	151,799
Savings versus the next lower retention			14,291
Extra risk assumed versus next lower retention			150,000
Payback period for one full retention (in years)			10.5

	Broilers	Breeders	Layers	Turkeys	Total
Average Losses (\$)	12,115	6,344	22,475	8,991	49,925
% of Average Losses	24.3%	12.7%	45.0%	18.0%	100.0%

2018 Premiums	Broilers	Breeders	Layers	Turkeys	Total
No Insurance	28,877	15,122	53,571	21,430	119,000
\$100,000 Stop Loss	40,303	21,106	74,770	29,910	166,090
\$250,000 Stop Loss	36,884	19,316	68,427	27,372	152,000

2018 Premiums	Broilers	Breeders	Layers	Turkeys	Total
\$100,000 Stop Loss	40,303	21,106	74,770	29,910	166,090
Rate Per 1,000 Birds	0.38	27.23	23.98	11.92	
2016 Production	105,262,850	775,000	3,118,319	2,510,243	111,666,412

	2019	2019	2019
	No Reinsurance	\$100,000 Agg. Stop Loss	\$250,000 Agg. Stop Loss
Expected losses (Captive)	50,923	19,769	29,117
External adjuster expenses	510	510	510
Cost of Stop loss	-	77,885	54,515
Operating expenses	64,770	64,770	64,770
Premium Tax (4%)	4,842	6,789	6,205
2018 Premium	121,045	169,723	155,117
Savings versus the next lower retention			14,606
Extra risk assumed versus next lower retention			150,000
Payback period for one full retention (in years)			10.3

	Broilers	Breeders	Layers	Turkeys	Total
Average Losses (\$)	12,357	6,471	22,925	9,170	50,923
% of Average Losses	24.3%	12.7%	45.0%	18.0%	100.0%

2019 Premiums	Broilers	Breeders	Layers	Turkeys	Total
No Insurance	29,605	15,503	54,922	21,970	122,000
\$100,000 Stop Loss	41,187	21,569	76,409	30,565	169,730
\$250,000 Stop Loss	37,855	19,824	70,228	28,093	156,000

2019 Premiums	Broilers	Breeders	Layers	Turkeys	Total
\$100,000 Stop Loss	41,187	21,569	76,409	30,565	169,730

	2020	2020	2020
	No Reinsurance	\$100,000 Agg. Stop Loss	\$250,000 Agg. Stop Loss
Expected losses (Captive)	51,941	19,961	29,513
External adjuster expenses	520	520	520
Cost of Stop loss	-	79,952	56,070
Operating expenses	66,065	66,065	66,065
Premium Tax (4%)	4,939	6,937	6,340
2018 Premium	123,466	173,436	158,510
Savings versus the next lower retention			14,926
Extra risk assumed versus next lower retention			150,000
Payback period for one full retention (in years)			10.0

	Broilers	Breeders	Layers	Turkeys	Total
Average Losses (\$)	12,604	6,601	23,383	9,354	51,941
% of Average Losses	24.3%	12.7%	45.0%	18.0%	100.0%

2020 Premiums	Broilers	Breeders	Layers	Turkeys	Total
No Insurance	30,090	15,758	55,822	22,330	124,000
\$100,000 Stop Loss	42,087	22,040	78,079	31,233	173,440
\$250,000 Stop Loss	38,583	20,205	71,579	28,633	159,000

2020 Premiums	Broilers	Breeders	Layers	Turkeys	Total
\$100,000 Stop Loss	42,087	22,040	78,079	31,233	173,440

British Columbia Poultry Association
Analysis for Cleaning & Disinfection Expense Insurance
2018 Simulation Results - Direct and Indirect Losses by Sector

Annual Losses by Percentile:

Percentile	Insured Amount (\$)	\$100K Aggr. Stop Loss (R. Layer) (\$)		\$250K Aggr. Stop Loss (R. Layer) (\$)		Direct C&D Cost ⁽¹⁾			Indirect C&D Cost ⁽²⁾			Total (Direct + Indirect)						
		Broilers (\$)	Breeders (\$)	Layers (\$)	Turkeys (\$)	Broilers (\$)	Breeders (\$)	Layers (\$)	Turkeys (\$)	Broilers (\$)	Breeders (\$)	Layers (\$)	Turkeys (\$)	Broilers (\$)	Breeders (\$)	Layers (\$)	Turkeys (\$)	
Mean	49,925	30,348	21,202	7,696	3,492	7,744	6,803	4,419	2,852	14,731	2,187	12,115	6,344	22,475	8,991			
50.0th	0	0	0															
70.0th	16,580	0	0															
80.0th	41,515	0	0															
90.0th	98,310	0	0															
95.0th	197,362	97,362	0															
99.0th	968,950	868,950	718,950															
99.5th	1,714,977	1,614,977	1,464,977															
99.9th	3,044,223	2,944,223	2,794,223															
*Reinsurer losses (not BCPA)							Losses % by Sector											
							24.3%			12.7%			45.0%			18.0%		

Type	Broilers	Breeders	Layers	Turkeys
C&D Cost per Quota Unit	\$1.08	\$2.16	\$2.71	\$2.87

Note:

- (1) Direct C&D cost includes the index farm and spreading from external crews (same-day visit)
- (2) Indirect C&D cost includes any other contact others than direct contact from external crews
- (3) Based on the simulated results, the average cost of one LPAI event in 2018 is approximately \$43,500.

British Columbia Poultry Association
Analysis for Cleaning & Disinfection Expense Insurance
2019 Simulation Results - Direct and Indirect Losses by Sector

Annual Losses by Percentile:

Percentile	Insured Amount (\$)	\$100K Aggr. Stop Loss (R. Layer) (\$)		\$250K Aggr. Stop Loss (R. Layer) (\$)		Direct C&D Cost			Indirect C&D Cost			Total (Direct + Indirect)												
		(\$)	(\$)	(\$)	(\$)	Broilers (\$)	Breeders (\$)	Layers (\$)	Turkeys (\$)	Broilers (\$)	Breeders (\$)	Layers (\$)	Turkeys (\$)	Broilers (\$)	Breeders (\$)	Layers (\$)	Turkeys (\$)							
Mean	50,923	31,154	21,806	7,849	3,562	7,899	6,939	4,508	2,909	15,026	2,231	12,357	6,471	22,925	9,170									
50.0th	0	0	0																					
70.0th	16,911	0	0																					
80.0th	42,345	0	0																					
90.0th	100,276	276	0																					
95.0th	201,309	101,309	0																					
99.0th	988,329	888,329	738,329																					
99.5th	1,749,277	1,649,277	1,499,277																					
99.9th	3,105,107	3,005,107	2,855,107																					
*Reinsurer losses (not BCPA)													Losses % by Sector											
													24.3%			12.7%			45.0%			18.0%		

Type	Broilers	Breeders	Layers	Turkeys
C&D Cost per Quota Unit	\$1.10	\$2.21	\$2.76	\$2.93

Note:

Direct C&D cost includes the index farm and spreading from external crews (same-day visit)
Indirect C&D cost includes any other contact others than direct contact from external crews

British Columbia Poultry Association
Analysis for Cleaning & Disinfection Expense Insurance
2020 Simulation Results - Direct and Indirect Losses by Sector

Annual Losses by Percentile:

Percentile	Insured Amount (\$)	\$100K Aggr. Stop Loss (R. Layer) (\$)		\$250K Aggr. Stop Loss (R. Layer) (\$)		Direct C&D Cost			Indirect C&D Cost			Total (Direct + Indirect)					
		(\$)	(\$)	(\$)	(\$)	Broilers (\$)	Breeders (\$)	Layers (\$)	Turkeys (\$)	Broilers (\$)	Breeders (\$)	Layers (\$)	Turkeys (\$)	Broilers (\$)	Breeders (\$)	Layers (\$)	Turkeys (\$)
Mean	51,941	31,981	22,428	8,006	3,633	8,056	7,078	4,598	2,967	15,327	2,276	12,604	6,601	23,383	9,354		
50.0th	0	0	0														
70.0th	17,250	0	0														
80.0th	43,192	0	0														
90.0th	102,282	2,282	0														
95.0th	205,335	105,335	0														
99.0th	1,008,095	908,095	758,095														
99.5th	1,784,262	1,684,262	1,534,262														
99.9th	3,167,209	3,067,209	2,917,209														
*Reinsurer losses (not BCPA)																	
Losses % by Sector																	
Broilers 24.3% Breeders 12.7% Layers 45.0% Turkeys 18.0%																	

Type	Broilers	Breeders	Layers	Turkeys
C&D Cost per Quota Unit	\$1.13	\$2.25	\$2.82	\$2.98

Note:

Direct C&D cost includes the index farm and spreading from external crews (same-day visit)
Indirect C&D cost includes any other contact others than direct contact from external crews

	2018	2018	2018
	No Reinsurance	\$100,000 Agg. Stop Loss	\$250,000 Agg. Stop Loss
Expected losses (Captive)	34,192	16,692	28,723
External adjuster expenses	500	500	500
Cost of Stop loss	-	43,750	27,102
Operating expenses	63,500	63,500	63,500
Premium Tax (4%)	4,091	5,185	4,993
2018 Premium	102,283	129,627	124,817
Savings versus the next lower retention			4,810
Extra risk assumed versus next lower retention			150,000
Payback period for one full retention (in years)			31.2

	Broilers	Breeders	Layers*	Turkeys	Total
Average Losses (\$)	12,115	6,344	6,743	8,991	34,192
% of Average Losses	35.4%	18.6%	19.7%	26.3%	100.0%

2018 Premiums	Broilers	Breeders	Layers	Turkeys	Total
No Insurance	36,494	19,112	20,311	27,083	103,000
\$100,000 Stop Loss	45,930	24,053	25,562	34,085	129,630
\$250,000 Stop Loss	44,289	23,194	24,649	32,868	125,000

2018 Premiums	Broilers	Breeders	Layers	Turkeys	Total
\$100,000 Stop Loss	45,930	24,053	25,562	34,085	129,630
Rate Per 1,000 Birds	0.44	31.04	8.20	13.58	
2016 Production	105,262,850	775,000	3,118,319	2,510,243	111,666,412

*\$1.75 per bird would be compensated by the egg industry, not the Captive

British Columbia Poultry Association
Analysis for Cleaning & Disinfection Expense Insurance
2018 Simulation Results - Direct and Indirect Losses by Sector (Reduced Layers C&D Cost)

Annual Losses by Percentile:

Percentile	Insured Amount (\$)	\$100K Aggr. Stop Loss (R. Layer) (\$)		\$250K Aggr. Stop Loss (R. Layer) (\$)		Direct C&D Cost ⁽¹⁾			Indirect C&D Cost ⁽²⁾			Total (Direct + Indirect)			
		(\$)	(\$)	(\$)	(\$)	Broilers (\$)	Breeders (\$)	Turkeys (\$)	Broilers (\$)	Breeders (\$)	Turkeys (\$)	Broilers (\$)	Breeders (\$)	Turkeys (\$)	
Mean	34,192	17,500	10,841	7,696	3,492	2,323	6,803	4,419	2,852	4,419	2,187	12,115	6,344	6,743	8,991
50.0th	0	0	0												
70.0th	11,322	0	0												
80.0th	30,513	0	0												
90.0th	69,384	0	0												
95.0th	152,330	52,330	0												
99.0th	642,171	542,171	392,171												
99.5th	1,056,959	956,959	806,959												
99.9th	1,722,577	1,622,577	1,472,577												
*Reinsurer losses (not BCPA)															
Losses % by Sector															
Broilers 35.4% Breeders 18.6% Layers 19.7% Turkeys 26.3%															

Type	Broilers	Breeders	Layers	Turkeys
C&D Cost per Quota Unit	\$1.08	\$2.16	\$0.81	\$2.87

Note:

- (1) Direct C&D cost includes the index farm and spreading from external crews (same-day visit)
- (2) Indirect C&D cost includes any other contact others than direct contact from external crews
- (3) Reduced Layer C&D Cost to $\$0.75 \times (1.02)^f = \0.81
- (4) Based on the simulation results, the average cost of one LPAI event in 2018 is approximately \$33,600

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APPENDIX B

Simulation Model

Year 2018

1 2 3 4 5

Step	Low	CAT	High	Total
1	0.0	0.0	0.0	0.0

max. of 3 for LPAI
 max. of 3 for HPAI & CATAI Events

Probability for Region Simulation:

	FV	VI	INT	Total
Farms	468	31	70	569
Probability	82.2%	5.4%	12.3%	100%

Probability for Sector being the Index Farm:

Region	B	H	L	T	D
FV	0.150	0.300	0.210	0.320	0.020
VI	0.221	0.000	0.309	0.471	0.000
INT	0.221	0.000	0.309	0.471	0.000

Step	Type	LPAI Event(s)			HPAI/ CATAI Event(s)			Total
		1	2	3	1	2	3	
2	Region Draw	NA	NA	NA	NA	NA	NA	
3	Sector	NA	NA	NA	NA	NA	NA	
4	Index Farm	0	0	0	0	0	0	
5	C&D Cost (direct)	NA	NA	NA	NA	NA	NA	
6	C&D Cost (indirect)	0	0	0	0	0	0	
7								
	B				0	0	0	0
	H				0	0	0	0
	L				0	0	0	0
	T				0	0	0	0
	D				0	0	0	0
Losses from Non-Index Farm:								
8	Direct Contacts				0	0	0	0
9	Indirect Contacts				0	0	0	0
Total C&D Cost		0	0	0	0	0	0	0

Aggregate Stop Loss \$100K - BC Poultry 0

Aggregate Stop Loss \$100K - Insurer 0

Aggregate Stop Loss \$250K - BC Poultry 0

Aggregate Stop Loss \$250K - Insurer 0

Sector	B	H	L	T	D	Total
C&D - Direct Cost	0	0	0	0	0	0
C&D - Indirect Cost	0	0	0	0	0	0
C&D - Total Cost	0	0	0	0	0	0

HPAI or CATAI Event 1:

Event Type (CAT/ High)	NA
Discovery for HPAI on Day 3 & 4	1.00
Probability of infection	0.00

(i) Factor for spreading from colony not taken into account				
45%	60%	110%	30%	0%

Day3 & Day4 ~ Binomial(1, 50%)
 100% for CATAI & 50 % for HPAI

Day	Path for infection	AM/PM	(a)	(b)	PI	(c)	(d)	(e)	(f)	(h)				
										Discovery	Infected	Farm ID	Sector	Direct Losses
2	A-C1	1.0	0.0	0.0	0.0	0.0	0.0	NA	0	0	0	0	0	0
3	A-C1-D3	1.0	0.0	0.0	0.0	0.0	0.0	NA	0	0	0	0	0	0
4	A-C1-D3-E7	1.0	0.0	0.0	0.0	0.0	0.0	NA	0	0	0	0	0	0
4	A-C1-E3	1.0	0.0	0.0	0.0	0.0	0.0	NA	0	0	0	0	0	0
3	A-D1	1.0	0.0	0.0	0.0	0.0	0.0	NA	0	0	0	0	0	0
4	A-D1-E5	1.0	0.0	0.0	0.0	0.0	0.0	NA	0	0	0	0	0	0
4	A-E1	1.0	0.0	0.0	0.0	0.0	0.0	NA	0	0	0	0	0	0
1	A-B	1.0	0.0	0.0	0.0	0.0	0.0	NA	0	0	0	0	0	0
2	A-B-C2	1.0	0.0	0.0	0.0	0.0	0.0	NA	0	0	0	0	0	0
3	A-B-C2-D4	1.0	0.0	0.0	0.0	0.0	0.0	NA	0	0	0	0	0	0
3	A-B-D2	1.0	0.0	0.0	0.0	0.0	0.0	NA	0	0	0	0	0	0
4	A-B-C2-D4-E8	1.0	0.0	0.0	0.0	0.0	0.0	NA	0	0	0	0	0	0
4	A-B-C2-E4	1.0	0.0	0.0	0.0	0.0	0.0	NA	0	0	0	0	0	0
4	A-B-D2-E6	1.0	0.0	0.0	0.0	0.0	0.0	NA	0	0	0	0	0	0
4	A-B-E2	1.0	0.0	0.0	0.0	0.0	0.0	NA	0	0	0	0	0	0
Total										0	0	0	0	0

Note:

- (a) 1 if crew has worked in the morning
- (b) 1 if infected (based on PI table)
- (c) if HPAI, 50% chance of discovery on day 3 and day 4. 0% chance if CAT-AI.
- (d) = (a) x (b) x (c); (c) = 1 if Yes
- (e) Random draw from simulated region
- (f) Depending on the farm ID simulated
- (g) Birds x unit price (adj. for inflation & growth)
- (h) Expected (average) value of colony (1KM for HPAI & 3KM for CATAI)
- (i) Selected using Indirect-to-Direct Losses ratio assuming no further spreading from colony

	Direct Losses	Indirect Losses	Indirect-to-Direct Ratio
Broilers	7,696	3,326	43.2%
Breeders	3,492	2,025	58.0%
Layers	7,744	8,626	111.4%
Turkeys	6,803	1,894	27.8%

HPAI or CATAI Event 2:

Event Type (CAT/ High)	NA
Discovery for HPAI on Day 3 & 4	1.00
Probability of Infection	0.00

(i) Factor for spreading from colony not taken into account				
45%	60%	110%	30%	0%

Day3 & Day4 ~ Binomial(1, 50%)
 100% for CATAI & 50 % for HPAI

Day	Path for infection	(a) AM/PM	(b) PI	(c) Discovery	(d) Infected	(e) Farm ID	(f) Sector	(g) Direct Losses				(h) Indirect Losses				
								B	H	L	T	D				
2	A-C1	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0	0	0	0
3	A-C1-D3	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0	0	0	0
4	A-C1-D3-E7	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0	0	0	0
4	A-C1-E3	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0	0	0	0
3	A-D1	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0	0	0	0
4	A-D1-E5	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0	0	0	0
4	A-E1	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0	0	0	0
1	A-B	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0	0	0	0
2	A-B-C2	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0	0	0	0
3	A-B-C2-D4	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0	0	0	0
3	A-B-D2	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0	0	0	0
4	A-B-C2-D4-E8	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0	0	0	0
4	A-B-C2-E4	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0	0	0	0
4	A-B-D2-E6	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0	0	0	0
4	A-B-E2	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0	0	0	0
Total								0	0	0	0	0	0			

Note:

- (a) 1 if crew has worked in the morning
- (b) 1 if infected (based on PI table)
- (c) if HPAI, 50% chance of discovery on day 3 and day 4. 0% chance if CAT-AI.
- (d) = (a) x (b) x (c); (c) = 1 if Yes
- (e) Random draw from simulated region
- (f) Depending on the farm ID simulated
- (g) Birds x unit price (adj. for inflation & growth)
- (h) Expected (average) value of colony (1KM for HPAI & 3KM for CATAI)
- (i) Selected using Indirect-to-Direct Losses ratio assuming no further spreading from colony

HPAI or CATAI Event 3:

Event Type (CAT/ High)	NA
Discovery for HPAI on Day 3 & 4	1.00
Probability of infection	0.00

(i) Factor for spreading from colony not taken into account				
0%	0%	0%	0%	0%

Day3 & Day4 ~ Binomial(1, 50%)
 100% for CATAI & 50 % for HPAI

Day	Path for infection	(a) AM/PM	(b) PI	(c) Discovery	(d) Infected	(e) Farm ID	(f) Sector	(g) Direct Losses	(h) Indirect Losses				
									B	H	L	T	D
2	A-C1	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0
3	A-C1-D3	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0
4	A-C1-D3-E7	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0
4	A-C1-E3	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0
3	A-D1	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0
4	A-D1-E5	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0
4	A-E1	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0
1	A-B	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0
2	A-B-C2	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0
3	A-B-C2-D4	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0
3	A-B-D2	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0
4	A-B-C2-D4-E8	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0
4	A-B-C2-E4	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0
4	A-B-D2-E6	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0
4	A-B-E2	1.0	0.0	No	0.0	NA	0	0	0	0	0	0	0
Total								0	0	0	0	0	

Note:

- (a) 1 if crew has worked in the morning
- (b) 1 if infected (based on PI table)
- (c) if HPAI, 50% chance of discovery on day 3 and day 4. 0% chance if CAT-AI.
- (d) = (a) x (b) x (c); (c) = 1 if Yes
- (e) Random draw from simulated region
- (f) Depending on the farm ID simulated
- (g) Birds x unit price (adj. for inflation & growth)
- (h) Expected (average) value of colony (1KM for HPAI & 3KM for CATAI)
- (i) Selected using Indirect-to-Direct Losses ratio assuming no further spreading from colony

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APPENDIX C

Probability of a Sector Being the Index Farm

Type	2016 Producers	2014 Number of IP	Exposure	Expected Number of Events	Normalized Number of Events	Occupied Time	Credibility	Credibility		Probability by Sector	Selected Probability
								Weighted Number of Events	Normalized Number of Events		
[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[J]	[K]	[L]
B	329	0	188	0.0536	0.0000	0.5714	0.7512	0.0133	0.0177	0.1476	0.1500
H	51	2	45	0.0128	0.0600	0.8788	0.2958	0.0267	0.0355	0.2960	0.3000
L	131	0	127	0.0363	0.0000	0.9722	0.4740	0.0191	0.0254	0.2115	0.2100
T	58	2	51	0.0146	0.0600	0.8824	0.3154	0.0289	0.0384	0.3200	0.3200
D	14	0	9	0.0027	0.0000	0.6667	0.1550	0.0022	0.0030	0.0249	0.0200
Total	583	4	421	0.1200	0.1200			0.0904	0.1200	1.0000	1.0000

Note:

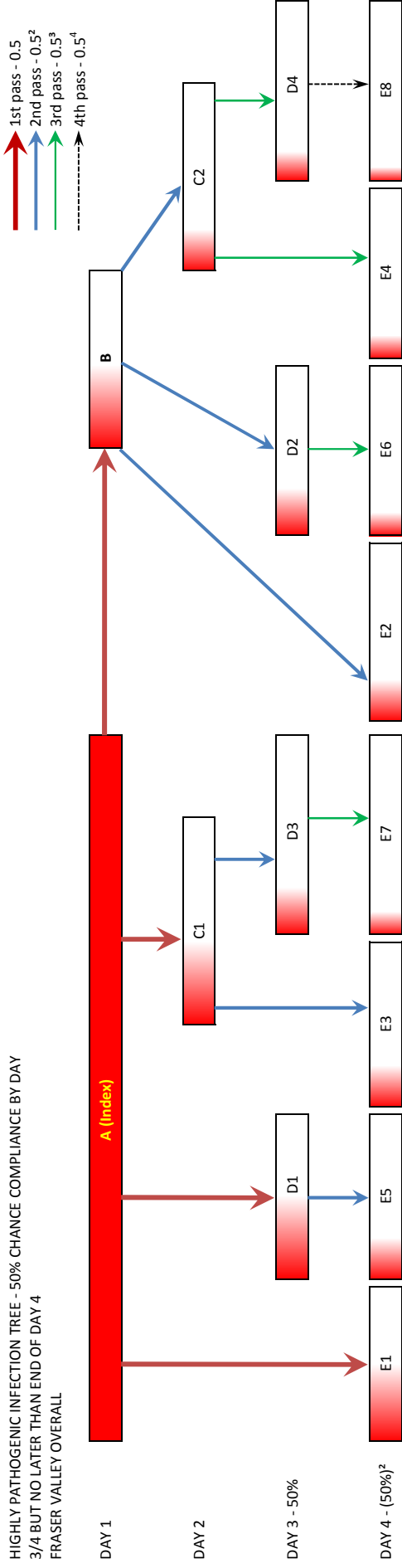
- [A] Sector name: B=Broiler, H=Breeder, L=layer, T=Turkey, D=Duck
- [B] Number of producers for each sector provided by BC Poultry
- [C] Number of infected farms in 2014 HPAI experience
- [D] $[B] \times [G]$
- [E] $[E]_{Total} \times [D]_{Sector} / [D]_{Total}$
- [F] $[C]_{Sector} / [C]_{Total} \times [G]_{Total}$
- [G] $1 - (\text{Idle time} + 7 \text{ days of high temperature period}) / \text{Total Production Time}$
- [H] $\text{SQRT}([B] / \text{Total}[B])$
- [I] $[H] \times [F] + (1-[H]) \times [E]$
- [J] $[I]_{Sector} / [I]_{Total} \times [F]_{Total}$
- [K] $[J]_{Sector} / [J]_{Total}$
- [L] Selected based on [K]

Sector	Production Cycle		
	Bird-in-barn	Idle	Total
Broiler	39 days	17 days	56 days
Breeder	59 weeks	7 weeks	66 weeks
Layer	71 weeks	1 week	72 weeks
Turkey	16 weeks	1 week	17 weeks
Duck	7 weeks	2 weeks	9 weeks

APPENDIX D

Highly Pathogenic Daily Infection Trees

HIGHLY PATHOGENIC INFECTION TREE - 50% CHANCE COMPLIANCE BY DAY
3/4 BUT NO LATER THAN END OF DAY 4
FRASER VALLEY OVERALL



From	To	Day	Pass	Chain of passes				Discovery	AM/PM	PI
				1	2	3	4			
A	B	1	1	.500				100% ¹	0.5 ¹	.250
A	C1	2	1	.500				100% ¹	0.5 ¹	.250
B	C2	2	2	.500	.500			100% ¹	0.5 ²	.063
A	D1	3	1	.500				50% ¹	0.5 ¹	.125
B	D2	3	2	.500	.500			50% ¹	0.5 ²	.031
C1	D3	3	2	.500	.500			50% ¹	0.5 ²	.031
C2	D4	3	3	.500	.500	.500		50% ¹	0.5 ³	.008
A	E1	4	1	.500				50% ²	0.5 ¹	.063
B	E2	4	2	.500	.500			50% ²	0.5 ²	.016
C1	E3	4	2	.500	.500			50% ²	0.5 ²	.016
C2	E4	4	3	.500	.500	.500		50% ²	0.5 ³	.004
D1	E5	4	2	.500	.500			50% ²	0.5 ²	.016
D2	E6	4	3	.500	.500	.500		50% ²	0.5 ⁴	.002
D3	E7	4	3	.500	.500	.500		50% ²	0.5 ³	.004
D4	E8	4	4	.500	.500	.500	.500	50% ²	0.5 ⁴	.001
Total										0.878

APPENDIX E

Distribution of Farms by Region and by Sector for Direct Contact

Selected Distribution of Farms by Region and by Sector for Direct Contact

	Average Daily Contact Rate ⁽¹⁾				
	Broilers	Breeders	Layers	Turkeys	Ducks
Catching Crews	0.0269	0.0087	0.0153	0.0379	0.1140
Vaccination Crews	0.0002	0.0066	0.0031	0.0009	0.0000
Feed Representatives	0.0092	0.0656	0.0111	0.0060	0.0022
Cleaning crews	0.0085	0.0038	0.0030	0.0018	0.0142
Manure hauler	0.0110	0.0063	0.0099	0.0135	0.0142
Employees	0.4577	0.5450	1.6207	0.3614	0.4000
Veterinarians	0.0020	0.0021	0.0003	0.0038	0.0014
Unsanctioned product movers	0.0012	0.0229	0.0025	0.0000	0.0142
Total Contacts	0.5167	0.6610	1.6659	0.4253	0.5602
Total Excluding Employees	0.0590	0.1160	0.0452	0.0639	0.1602
Contact Rate using Broiler as Base	100%	197%	77%	108%	272%
⁽²⁾ Selected Contact Rate using Broiler as Base	100%	200%	75%	100%	250%

Distribution of Farm by Region and by Sector:

% of Sector in Each Region	Broilers	Breeders	Layers	Turkeys	Ducks	Total
FV	55.4%	12.6%	20.7%	8.8%	2.6%	100.0%
VI	69.0%	0.0%	25.9%	5.2%	0.0%	100.0%
INT	41.2%	0.0%	44.1%	14.7%	0.0%	100.0%

Selected Distribution for Simulation:

% of Sector in Each Region	Broilers	Breeders	Layers	Turkeys	Ducks	Total
FV	49.8%	22.7%	13.9%	7.9%	5.7%	100.0%
VI	73.7%	0.0%	20.7%	5.5%	0.0%	100.0%
INT	46.3%	0.0%	37.2%	16.5%	0.0%	100.0%

Note:

- (1) Average daily contact rate for each sector (excluding pullets) from NAADSM
 Contact rate for duck is not used as there was no survey information available
- (2) Selected contact rate for each sector is used to determine the likelihood of infection by external contacts
- (3) Breeders distribution is determined as $2H / (B + 2H + 0.75L + T + 2.5D)$

APPENDIX F

BC Poultry Industry Data (2010, 2012, 2016)

**BC Poultry Industry - 2016
Annual Production by Region**

Board	Lower Mainland	Interior	Vancouver Island	Total	Column1
BCCMB (kgs live)	198,333,900	25,076,700	4,559,400	227,970,000	
- Percent of Production	87.00%	11.00%	2.00%		
BCTMB (kgs live)	24,077,646	585,237	744,828	25,407,711	
- Percent of Production	94.77%	2.30%	2.93%		
BCEMB (dozen eggs)	68,209,923	7,475,176	4,744,911	80,430,010	
- Percent of Production	84.81%	9.29%	5.90%		
BCBHEC (total eggs)	105,359,556	0	0	105,359,556	
- Percent of Production	100.00%	0.00%	0.00%		

**BC Poultry Industry
Registered Producers by Region**

Board	Lower Mainland	Interior	Vancouver Island	Total
BCCMB (# of producers)	266	49	14	329
- Percent of Producers	80.85%	14.89%	4.26%	
BCTMB (# of producers)	44	5	9	58
- Percent of Producers	75.86%	8.62%	15.52%	
BCEMB (# of producers)	107	16	8	131
- Percent of Producers	81.68%	12.21%	6.11%	
BCBHEC (# of producers)	51	0	0	51
- Percent of Production	100.00%	0.00%	0.00%	
	468			569

**BC Poultry Industry 2016
Number of Birds by Region**

Board	2016				2010
	Lower Mainland	Interior	Vancouver Island	Total	
BCCMB (# of birds)	94,084,707	10,299,482	878,661	105,262,850	14,320,077
- Percent of Production	89.38%	9.78%	0.83%	77%	78%
BCTMB (# of birds)	2,353,035	77,631	79,577	2,510,243	1,201,756
- Percent of Production	93.74%	3.09%	3.17%	4%	5%
BCEMB (# of birds)	2,606,327	346,520	165,472	3,118,319	2,621,139
- Percent of Production	83.58%	11.11%	5.31%	15%	13%
BCBHEC (# of birds)	775,000	0	0	775,000	889,100
- Percent of Production	100.00%	0.00%	0.00%	4%	4%
				20,924,351	19,195,724
					14,320,077

APPENDIX G

E-mail Correspondence

From: Harvey [<mailto:harveysasaki@gmail.com>]
Sent: Wednesday, January 17, 2018 6:01 PM
To: 'JSCP'
Subject: RE: BC Poultry

Joe:

This looks good and consistent with the directions and follow-up today. Please proceed as noted.

Thanks

Harvey

From: JSCP [<mailto:jscp@jscp.com>]
Sent: January 17, 2018 12:47 PM
To: 'Harvey Sasaki'
Subject: RE: BC Poultry

Harvey,

I want to catch your attention before you depart for vacation tomorrow. A more formal statement of work will follow in a few days.

After reading the directions you outlined on January 15, 2018, and your discussion with Benny Chan, we agree to make the following changes to our model:

- 1) 2014 IP
From 8 to 4 with 2 breeders and 2 turkeys. This is used to derive the probability of being an index farm.
- 2) Duration of production at more than 30°C
Change to 1st week for all sectors. This will affect the period of potential exposure in various calculations—in particular, the probability of being an index farm.
- 3) Definition of farm crew
Other than employees, most sectors have similar average daily contact except breeders which appear to be twice as high as other sectors. In our spreading model (page 86 of our November 21, 2017 report), we assumed equal probability of infection from one farm to the next. As breeders have twice as much external contact, we should double their probability of being one of the 15 farms.
- 4) Probability of Infection (PI) table
The PI from layer to layer will change from 50% to 30%.
The PI from breeder to layer will change from 50% to 30%.
The PI from layer to breeder will change from 50% to 30%.
- 5) Dollar value for C and D
We would run the model using: a) \$2.50/bird for layers, and b) \$0.75/bird for layers.
- 6) Number of farms
We would use the following table provided by you:

	Lower Mainland	Interior	Vancouver Island	Total
Broiler	266	49	14	329
Breeder	51	0	0	51
Layer	107	16	8	131
Turkey	44	5	9	58
Total	468	70	31	569

The deliverables will include: an expanded assumption section that explains the 6 revised assumptions in more detail; and an executive summary that shows i) expected losses by sector, ii) expected premium by sector, and iii) annual losses by percentile. The target completion date of this project is January 31, 2018.

Please approve the above work plan.

Best regards,
Joe

J. S. CHENG & PARTNERS INC.

JSCP

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6 key issues on the November 21, 2017 JSCP Feasibility Study to Provide Cleaning and Disinfection Expense Insurance arising from the January 2, 2018 Joint Board Chairs/MISC meeting:

1. 2014 IP Numbers
2. Duration of production >30° C
3. Definition of Farm Crew
4. Probability of Infection (PI) Table (pg 17 of report)
5. Dollar value for C&D
6. Number of farms

Based on input received from the poultry boards, the description of the issues and agreed upon approach for consideration by JSCP is outlined as follows.

1. 2014 IP Numbers:

Description: The number of IPs has a bearing on the PI, so we need to confirm what we view from 2014 to inform the actuarial analysis.

- There were 11 commercial IPs identified in the outbreak
 - 7 breeder farms
 - 3 turkey farms
 - 1 layer farm
- The CFIA has published their Outbreak Investigation Report on Avian Influenza in British Columbia 2014 which includes a Summary of Findings and Working Hypotheses on Source and Transmission of NAI. <http://www.inspection.gc.ca/animals/terrestrial-animals/diseases/reportable/ai/disease-incidents/avian-influenza-in-british-columbia-2014/eng/1475593889073/1506003977167?chap=8#s29c8>
 - The CFIA report at the BC Avian Influenza Poultry Industry Workshop in October 2016 also provides an analysis of field, molecular and air dispersion data.
 - Both reports identify at least four independent primary introductions of HPAI virus into commercial farms during the outbreak (IP1, IP2, IP5 and IP9).

Action Required: Modelling the Probabilities of a sector being an index farm (Appendix C):

- The Boards confirmed the following numbers to be used for the 2014 HPAI experience:
 - 11 IPs in total
 - 4 independent primary introductions
 - 2 breeders
 - 2 turkeys
 - 7 indirect introductions
 - 5 breeders
 - 1 layer
 - 1 turkey

2. Duration of production at >30° C:

Description: The amount of idle time during the production cycle affects the risk of infection, particularly if there is a difference between sectors.

- All four sectors recognize that only during the first week of production (brooding) is barn temperature at or above 30° C.

Action Required: Modelling the Probabilities of a sector being an index farm (Appendix C):

- The Boards confirmed that only the first week of production would be used for all sectors.
- The average downtime for layers should be increased to 2 weeks due to the increase in specialty production.

3. Definition of Farm Crew:

Description: The industry had input and influenced the parameters used in the North American Animal Disease Spread Model (NAADSM) which included a list of high risk contacts.

- JSCP confirmed that their use of the term “farm crews” is the same as those considered high risk contacts in the NAADSM.
- JSCP indicated that their model attempted to simplify the farm crew contacts by using only 5 sectors (breeders, broilers, layers, turkeys and ducks) whereas the NAADSM used contact rates for 10 sectors.
- JSCP did not see a need to adjust their daily contact rate of 50% for all sectors.

Action Required: Model to calculate direct and indirect losses (Appendix B)

- The four boards reviewed the NAADSM parameters paper with particular focus on the list of high risk contacts on page 4 and the resulting tables of contact rates on pages 9 – 11 and confirm:
 - The list of high risk contacts (page 4) is appropriate without having to survey (insufficient time to conduct) each sector to reaffirm or revise the contact rates (a point to be considered for future assessments).
- The following comments are provided for JSCP consideration:
 - Vaccination for broiler farms is done in ovo at the hatchery or by the farmer via the watering system, as such it is there is no vaccination crews contact on broiler operations.
 - Based on this list and the contact rates in Table 1, this represents those contacts that actually enter the restricted area of the barn. This list appears appropriate.
 - For the egg sector - The annual visits by contact type by sector (Table 1) - Based on the NAADSM definition for contact rates, these are specifically contacts where an individual or crew would visit multiple contacts in one day (Page 87 of the NAADSM user manual attached).

Table 1 – Contact R

	Layer		
	Survey		Expert Opinion
	Annual	Avg daily	
Catching Crews	5.6026	0.0153	0.0052
Vaccination Crews	1.1282	0.0031	0.0000
Feed Representatives	4.0513	0.0111	0.0047
Cleaning crews	1.0897	0.0030	0.0026
Manure hauler	3.6282	0.0099	0.0052
Employees	591.5641	1.6207	0.9500
Veterinarians	0.1026	0.0003	0.0014
Unsanctioned product movers	0.9231	0.0025	0.0071
Total Contacts		1.6660	

- Catching Crews: For Layers, the catching crews used for pullet transfer and fowl removal are used only in the layer industry and visit only one farm per day for approximately 75% of our farms. The annual number of visits makes sense for our average, however when we factor in the % of these that would be considered high risk contact, that would then be reduced to 1.4 visits annually.
- Vaccination Crews: This is usually completed by the vaccination crew at pullet transfer or by the producer. There are some producers who still have a vaccination crew come in that may attend other farms that day but is likely to be less than 10% of the industry. If each farm has 2 flocks and 10% are vaccinated by a crew that could be considered a high risk contact, that number should be closer to 0.2 annually.
- Employees: Most employees on layer farms only work on one farm, even part time employees do not have contact with other layer farms. I am unsure what the actual average number of annual visits would be however considering this trend it should be reduced to a number more in-line with the breeder or broiler industry, around 190.

4. Probability of Infection Table

Description: Questions were raised regarding the characterization of the IPs for the 2014 outbreak as direct versus indirect.

Action Required: The PI table on page 17 will be reviewed by JSCP particularly in reference to the percentages attributed to breeders, layers and turkeys.

- Breeders, Broilers and Turkeys have no concerns with the table.
- Layers believe that the assessment should look at both the probability of infection from one poultry type to another but also the frequency of high risk contacts.
- Layers would like clarity on Point #5 on page 21 – for every potential direct contact, they use a random draw approach to determine whether the farm crew has worked on the infected premise in the morning or afternoon. The current wording infers that every farm has a crew on it every day that goes to a subsequent premise. This is simply not the case and this is clearly outlined in the Contract Rates table on pages 9-11 of the Parameterization document. As well, per point 3 above, the layer numbers are inflated due to an incorrect employees number (should be closer to 200). The actual number should be around 60% probability which reduces the spread by 40%.
- Layers also suggested that when looking at direct high risk contacts, there should be some consideration taken into the likelihood of the contact occurring between poultry sectors, for example, the crew that is used for Fowl Removal on a layer farm is not used for fowl removal for any other poultry types. Hatchery crews for the layer industry will not be used on broiler, turkey or breeder farms, etc.
- Layers expect that once the probability of infection from direct contact is updated, this will affect the indirect loss loadings in assumption 8.

5. Dollar value for C&D

Description: The 2014 outbreak AgriRecovery data was used to establish the values currently used in the actuarial analysis, with the exception that the layer value was reduced from the \$4.80 per bird value used for layers.

- The analysis currently uses:
 - \$1.00 per bird for broilers
 - \$2.00 per bird for breeders
 - \$2.50 per bird for layers
 - \$2.65 weighted average for turkeys (broilers, hens and toms)
- CEIRA is only using \$1.75 per bird for layers and \$1.50 per bird for layer pullets, however, CEIRA is providing lump sum payments for BHT removal which is included in the .

Action Required:

- Breeders, broilers and turkeys confirm the above dollar value for C&D.
- Layers would like to see the analysis done at both \$2.50 and \$0.75 for layers.

6. Number of Farms

Description: Appendix C of the JSCP actuarial assessment uses the 2016 number of producers as part of the Probability of a Sector being an Index Farm. The numbers used by JSCP were from the attached spreadsheet which was compiled with input from each board.

- It was identified that the number of turkey producers does not equal the number of independent farm sites, 65 versus 58 which represents a >10% decrease in potential infected premises.
- Using the BC Premise ID database, there are:
 - 667 poultry premises listed in total

	Active Premises
Broiler	393
Hatching Egg	58
Layer	155
Turkey	61
	667

- 41 have multiple production types
- The premises with more than one production type:

	Broiler	Hatching Egg	Layer	Turkey
Broiler		7	20	7
Hatching Egg	7		1	1
Layer	20	1		5
Turkey	7	1	5	

- Notwithstanding the above tables, the Turkey Marketing Board confirmed 58 site registered in the province broken down by region as follows:
 - 44 – Lower Mainland
 - 5 – Interior
 - 9 – Vancouver Island
- Notwithstanding the BC Chicken Marketing Board confirmed 325 broiler producers registered in BC (Source: Chicken Farmers of Canada Data Booklet 2017, page 3).

Action Required: It is important that the analysis uses the same numbers for each board. While of value, the number of farms in the Premises ID database exceeds the number of registered producers reported by the Boards in the 2017-04-26 spreadsheet on 2016 Registered Poultry Production (data supplied to me by each board). We need to be clear and agree upon the production numbers to be used in directing the revisions for the Actuarial Assessment.