

# Estimation of Ultimate and Outstanding Losses

## State of Tennessee Captive

SEPTEMBER 6, 2023

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## *Estimation of Ultimate and Outstanding Losses*

### **State of Tennessee Captive**

**Report Date:** September 6, 2023

#### **Report Notes**

Based on data as of June 30, 2023

#### **Prepared by:**

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# Table of Contents

<b>Section 1</b>	Executive Summary
<b>Section 2</b>	Considerations
<b>Section 3</b>	Description of Exhibits
<b>Section 4</b>	Exhibits
<b>Section 5</b>	Appendices

## Section 1

### Executive Summary

The purpose of this report is to provide the representatives of the State of Tennessee Captive (“the Captive”) with an evaluation of liabilities arising from its insurance policies as of June 30, 2023. The Captive has written property and cyber liability policies.

The specific objectives of this analysis are to (A) estimate ultimate and outstanding losses for the exposures arising from the policy periods through June 30, 2023, as of June 30, 2023, (B) forecast ultimate losses and allocated adjustment expenses for the property policy period October 15, 2023, through October 14, 2024, and (C) analyze the variability inherent in the loss experience by deriving loss estimates at various confidence levels or risk margins. Throughout this report the term losses refers to both losses and allocated loss adjustment expenses.

The table below summarizes the outstanding losses for the Captive as of June 30, 2023. Tables at the end of this section also provide an additional summary of the results.

The cyber liability policy was first issued on July 1, 2022, and the State of Tennessee has two open claims remaining for the 7/1/22-23 policy year. Neither claim is expected to exceed the \$1.5 million per occurrence retained by the State of Tennessee before the Captive begins paying claims. We estimate outstanding losses of \$0 for this coverage as of June 30, 2023.

Undiscounted Actuarial Central Estimate of Outstanding Losses as of June 30, 2023	
Property	\$21,498,000
Cyber Liability	\$0
<b>Total</b>	<b>\$21,498,000</b>

### Discussion of Results

#### Property

Total outstanding losses evaluated through June 30, 2023, are \$21,498,000. This is all case reserves.

The captive is responsible for losses in excess of the State’s retention of \$2.5 million per occurrence, excluding maintenance deductibles, up to aggregate losses of \$25 million. During the past eight months, the State has had two claims that have exceeded the State’s retention and the Captive is responsible for \$21,498,000 in case reserves on these claims. Because of the State’s large per occurrence retention, we do not expect any additional claims to enter the Captive layer for accident periods through June 30, 2023. We are relying on the case reserves as the best estimate of the losses

associated with these two claims and have not included any additional IBNR, or incurred but not reported, reserves.

Forecast losses in excess of the State's retention of \$2.5 million per occurrence, excluding maintenance deductibles, up to aggregate losses of \$25 million are estimated at \$4,208,000 for 2023-24. This estimate is based on a loss rate of \$0.12 per thousand dollars of TIV.

### **Cyber Liability**

The State of Tennessee has two open claims remaining for the 7/1/22-23 policy year. Neither claim is expected to exceed the \$1.5 million per occurrence retained by the State of Tennessee before the Captive begins paying claims. We have judgmentally estimated outstanding losses of \$0 for the Captive as of June 30, 2023.

## **Tables**

Table 1 displays the estimated ultimate property losses by year. Also displayed are the limited reported and paid losses, case reserves, incurred but not reported losses (IBNR) and required reserves (outstanding losses).

Table 2 shows the forecast property losses at various retentions for the 2023-24 accident period. In addition, these estimates are shown at various confidence levels. These confidence levels give an indication of the variability associated with the estimates. For example, there is a 10% probability that property losses in excess of the State's retention of \$2.5 million per occurrence, excluding maintenance deductibles, up to aggregate losses of \$25 million will exceed \$15,716,000 in the 2023-24 accident period.

**Calculation of Captive Outstanding Losses  
As of June 30, 2023  
Property**

(A)	(B)	(C)	(D)	(E)	(F)	(G)
<i>Accident Period</i>	<i>Selected Ultimate Losses</i>	<i>Limited Reported Losses</i>	<i>Limited Paid Losses</i>	<i>Case Reserves</i>	<i>IBNR Reserves</i>	<i>Total Outstanding Losses</i>
10/15/22-6/30/23	\$21,497,562	\$21,497,562	\$0	\$21,497,562	\$0	\$21,498,000
<i>Total</i>	\$21,497,562	\$21,497,562	\$0	\$21,497,562	\$0	\$21,498,000

*Column (B): Limited Reported Losses*

*Columns (C), (D): Exhibit 5*

*Column (E) = (C) - (D)*

*Column (F) = (B) - (C)*

*Column (G) = (B) - (D)*

**Estimation of Forecast Ultimate Losses for Captive  
For 10/15/23-24  
Property**

Confidence Level	10/15/23-24 Aggregate Losses Limited to \$25M vs \$1M Deductible	10/15/23-24 Aggregate Losses Limited to \$25M vs \$2.5M Deductible	10/15/23-24 Aggregate Losses Limited to \$25M vs \$5M Deductible	10/15/23-24 Aggregate Losses Limited to \$25M vs \$7.5M Deductible	10/15/23-24 Unlimited Losses
40th	\$1,845,000	\$0	\$0	\$0	\$9,057,000
45th	\$2,373,000	\$154,000	\$0	\$0	\$9,793,000
50th	\$2,941,000	\$564,000	\$0	\$0	\$10,626,000
55th	\$3,598,000	\$1,057,000	\$0	\$0	\$11,529,000
60th	\$4,421,000	\$1,685,000	\$0	\$0	\$12,543,000
65th	\$5,387,000	\$2,487,000	\$0	\$0	\$13,786,000
70th	\$6,535,000	\$3,479,000	\$559,000	\$0	\$15,160,000
75th	\$8,149,000	\$4,792,000	\$1,761,000	\$0	\$16,886,000
80th	\$10,236,000	\$6,838,000	\$3,466,000	\$792,000	\$19,328,000
85th	\$13,623,000	\$9,930,000	\$6,523,000	\$3,688,000	\$22,923,000
90th	\$19,349,000	\$15,716,000	\$11,886,000	\$8,885,000	\$28,573,000
95th	\$25,000,000	\$25,000,000	\$25,000,000	\$23,241,000	\$43,025,000
<i>Expected Losses</i>	\$6,011,000	\$4,208,000	\$3,005,000	\$2,378,000	\$22,354,000

Accident Period	TIV	Expected Loss Rates Per Thousand TIV				
10/15/23-24	\$33,700,000	\$0.18	\$0.12	\$0.09	\$0.07	\$0.66
10/15/24-25	\$35,385,000	\$0.18	\$0.12	\$0.09	\$0.07	\$0.66
10/15/25-26	\$37,154,250	\$0.18	\$0.12	\$0.09	\$0.07	\$0.66
10/15/26-27	\$39,011,963	\$0.18	\$0.12	\$0.09	\$0.07	\$0.66
10/15/27-28	\$40,962,561	\$0.18	\$0.12	\$0.09	\$0.07	\$0.66
10/15/28-29	\$43,010,689	\$0.18	\$0.12	\$0.09	\$0.07	\$0.66
10/15/29-30	\$45,161,223	\$0.18	\$0.12	\$0.09	\$0.07	\$0.66
10/15/30-31	\$47,419,284	\$0.18	\$0.12	\$0.09	\$0.07	\$0.66
10/15/31-32	\$49,790,248	\$0.18	\$0.12	\$0.09	\$0.07	\$0.66
10/15/32-33	\$52,279,761	\$0.18	\$0.12	\$0.09	\$0.07	\$0.66

Accident Period	TIV	Expected Losses				
10/15/23-24	\$33,700,000	\$6,011,000	\$4,208,000	\$3,005,000	\$2,378,000	\$22,354,000
10/15/24-25	\$35,385,000	\$6,312,000	\$4,418,000	\$3,155,000	\$2,497,000	\$23,472,000
10/15/25-26	\$37,154,250	\$6,627,000	\$4,639,000	\$3,313,000	\$2,622,000	\$24,645,000
10/15/26-27	\$39,011,963	\$6,958,000	\$4,871,000	\$3,479,000	\$2,753,000	\$25,878,000
10/15/27-28	\$40,962,561	\$7,306,000	\$5,115,000	\$3,653,000	\$2,890,000	\$27,171,000
10/15/28-29	\$43,010,689	\$7,672,000	\$5,371,000	\$3,835,000	\$3,035,000	\$28,530,000
10/15/29-30	\$45,161,223	\$8,055,000	\$5,639,000	\$4,027,000	\$3,187,000	\$29,956,000
10/15/30-31	\$47,419,284	\$8,458,000	\$5,921,000	\$4,228,000	\$3,346,000	\$31,454,000
10/15/31-32	\$49,790,248	\$8,881,000	\$6,217,000	\$4,440,000	\$3,513,000	\$33,027,000
10/15/32-33	\$52,279,761	\$9,325,000	\$6,528,000	\$4,662,000	\$3,689,000	\$34,678,000

TIV Estimated Based on 5% Increase Each Year

## Section 2

# Considerations

## Background

The State of Tennessee Captive is licensed as a captive insurance company in the State of Tennessee and issues policies covering risks of the State. Select Actuarial Services has worked with the Captive since 2022.

## Scope

Select Actuarial Services has prepared this report for the Captive at the request of its management. The specific objectives of this analysis are to (A) estimate ultimate and outstanding losses for the exposures arising from the policy periods through June 30, 2023, as of June 30, 2023, (B) forecast ultimate losses and allocated adjustment expenses for the property policy period October 15, 2023, through October 14, 2024, and (C) analyze the variability inherent in the loss experience by deriving loss estimates at various confidence levels or risk margins.

This report is an actuarial analysis of data, conditions, and practices communicated as of August 8, 2023, to Select Actuarial Services as described in this report. While Select Actuarial Services believes these communications to be reliable, it has not attempted to audit the information and cannot guarantee the accuracy of any information supplied.

Data have been reviewed for reasonableness and internal consistency through a comparison with data from the prior analysis. Details of any data concerns are described under the heading entitled “Available Data” in this section of our report.

It must be understood that the evaluation of ultimate levels of past liabilities requires estimation of future transactions. In projecting future loss emergence, we have assumed that historical patterns, with specific adjustments as noted, are predictive of future loss emergence. We have not anticipated any extraordinary changes to the social, legal and economic environment that may affect the frequency, cost or future reporting and settlement patterns of claims. In addition, our estimates do not include any provision for future claims arising out of causes not represented in the current data. Actual results may differ significantly from the estimates provided in this analysis.

## Use and Distribution

The actuarial estimates in this report are based upon appropriate actuarial assumptions and procedures described in the section of this report entitled “Description of Exhibits.” Select Actuarial Services assumes no responsibility for any loss or damage that might arise from the use of or reliance upon this report other than for the purposes set forth herein.



This report was prepared for the use of and is only to be relied upon by the management of the Captive. This report also may be provided to the Captive's auditors, insurance brokers, captive managers and domicile regulators. No portion of the report may be provided to any other party without Select Actuarial Services' prior written consent. In the event such consent is provided, the report must be provided in its entirety. We recommend that any such party have its own actuary review this report to ensure that the party understands the assumptions and uncertainties inherent in our estimates.

## Qualifications and Standards of Practice

Cheryl White is an independent consultant to the Captive. She is a Fellow of the Casualty Actuarial Society and a Member of the American Academy of Actuaries. She meets the Qualification Standards of the American Academy of Actuaries for property/casualty actuarial opinions. This report is prepared in accordance with Actuarial Standards of Practice No. 23, *Data Quality*, No. 41, *Actuarial Communications*, No. 43, *Property/Casualty Unpaid Claim Estimates*, and No. 53, *Estimating Future Costs for Prospective Property/Casualty Risk Transfer and Risk Retention*.

## Coverage

The following table details the policies written by the Captive.

Line of Business	Aggregate Limit	Per Occurrence Retention*	Date of Policy	Policy Type
Property	\$25,000,000	\$2,500,000	10/15/22-23	Occurrence
Cyber Liability	\$10,000,000	\$1,500,000	7/1/22-23	Claims-Made

\* - Property has additional Departmental Maintenance Deductibles.

## Available Data

Loss and exposure information was provided by AON Commercial Risk Solutions and the State of Tennessee. Loss information included reported and paid losses and allocated adjustment expenses at the current evaluation date. TIV information was provided for the experience period and for the forecast period.

## Trends and External Influences

Trends are defined as changes over time in underlying costs. Trend factors are used to adjust losses and exposure costs from past years to the level at which they would have been, had they occurred during a future period. This is vital since historical losses and exposure costs may have occurred in a different environment in terms of monetary inflation and/or benefit levels.

This analysis explicitly recognizes the effect of external influences upon expected claims costs. Economic inflation is measured by changes in the U.S. Claims Cost Indices as compiled by Willis Towers Watson. For exposure trend we have relied on the Consumer Price Index to measure inflation in Total Insured

Value (TIV). The current inflationary environment has been considered when selecting trend factors for the forecast periods.

## Actuarial Central Estimate

The estimates of ultimate losses at the “expected” level in this analysis are actuarial central estimates - estimates that represent an expected value over the range of reasonably possible outcomes. Such a range of reasonably possible outcomes may not include all conceivable outcomes. For example, it would not include conceivable extreme events where the contribution of such events to an expected value estimate is not reliably measurable.

## Loss Models

Statistical distributions are often used by the insurance industry to model the loss generating process. Property loss severity has been modelled using a pareto distribution and frequency has been modeled assuming a negative binomial distribution.

## Subrogation and Recoveries

We have used data net of recoveries other than excess recoveries throughout this analysis. The effect of such recoveries is therefore implicit in our calculations and no other reductions for collateral sources other than excess insurance have been incorporated into the estimates.

## Definitions

**Accident Period:** All of the events with occurrence dates during a period specified make up the corresponding accident period. The dollars associated with those events total the accident period's losses, although they may be paid long after the end of the accident period. Losses are grouped by accident period throughout our analyses.

**Ultimate Losses:** The total amount that will eventually be paid on all losses for a particular accident period. Our estimate of the ultimate losses for an accident period is the sum of the paid losses, the case reserves, and the IBNR reserve.

**Paid Losses:** Dollars paid as of the latest available evaluation on losses incurred through the latest available evaluation.

**Case Reserves:** Reserves established on individual claims by the claims adjusters, as of the latest available evaluation. The case reserve plus the amount paid to date represents the adjuster's best estimate of the ultimate value of a particular claim.

**Reported Losses:** Paid losses plus case reserves as of the latest available evaluation.

**IBNR Reserve:** ("Incurred But Not Reported") This is the dollar amount which we estimate will be added to the reported losses between the date when the losses were compiled and final settlement of all claims for the accident period. Some of these additional dollars will be added to claims which are already

known and currently open but which will finally cost more than they are currently reserved for. Other of these dollars are associated with claims which are known and closed but will be reopened before final closure. The balance of the IBNR reserve is for late-reported events.

**Outstanding Losses:** The losses not yet paid. Outstanding losses equal the difference between the ultimate losses and the paid losses. They are also the sum of the case reserves and the IBNR reserve.

**Loss Development:** The change in the paid losses or the reported losses over time. As more information is provided, individual claim estimates get closer and closer to the ultimate value of the claims. The increase in the total reported losses through time is the reported loss development. Similarly, as losses are paid out over time, the increase in total paid losses is the paid loss development.

## Section 3

### Description of Exhibits and Appendices

#### Exhibit 1: Summary of Data

Exhibit 1 summarizes the number of reported claims, incurred losses, and total insured value for each accident period, evaluated as of June 30, 2023. These losses are net of the departmental maintenance deductibles.

#### Exhibit 2: Severity Distribution

In Exhibit 2, the fitted severity distribution is compared to the trended observed distribution.

#### Exhibit 3: Projected Claim Counts

Exhibit 3 shows the calculation of the expected number of claims for 2023-24. This calculation is based on the historical claims experience for the State of Tennessee.

#### Exhibit 4: Forecast Ultimate Losses and Aggregate Distribution

Exhibit 4-A displays the results of the property forecast of losses for the 2023-24 accident period at the expected level as well as at various percentiles. This is shown for various potential captive coverage amounts as well as on an unlimited basis. The forecast loss rate, or projected cost per \$1,000 of insured value, is calculated by dividing the projected losses by the projected 2023-24 total insured value. The 2023-24 loss rate is trended to the cost levels of the next nine accident periods and multiplied by estimated total insured values to estimate costs for those accident periods.

Monte Carlo simulation was used to combine the various possible outcomes to produce an estimate of the distribution of overall costs. This simulation technique starts by generating a random number between 0 and 1 to determine the number of claims (based on the negative binomial distribution fitted to the selected number of claims from Exhibit 3) for one simulated outcome. For each claim, another random number is generated to determine the size of the claim based on a pareto severity distribution. The claims are added together to determine the total cost for one simulated outcome.

The process is repeated 10,000 times, generating 10,000 different possible outcomes. Because the various possible numbers of claims and claim sizes are assigned probabilities, the random-number selection process selects the more likely values more often than the unexpected values. The various outcomes are averaged to determine the expected cost and sorted to estimate the distribution of potential outcomes.

Exhibit 4-B details similar information as that shown in Exhibit 4-A for the portion of the losses retained by the State of Tennessee’s Risk Management Fund.

## Exhibit 5: Summary of Captive Data

Exhibit 5 summarizes the number of reported claims, paid losses and incurred losses for the Captive evaluated as of June 30, 2023. These losses are net of both the departmental maintenance deductibles and the State of Tennessee’s retention.

## Exhibit 6: Outstanding Captive Losses

Estimated outstanding losses for the Captive as of June 30, 2023, are calculated on Exhibit 6. Total outstanding losses are the difference between estimated ultimate losses and losses paid to date for each period. Losses paid to date are limited to the period’s aggregate retention. Similarly, unreported (“IBNR”) losses are the difference between estimated ultimate losses and limited losses reported to date.

## Appendices

Appendices A and B provide the trend factors for the study.

## Section 4

### Exhibits

<b>Exhibit 1</b>	Summary of Data
<b>Exhibit 2</b>	Severity Distribution
<b>Exhibit 3</b>	Projected Claim Counts
<b>Exhibit 4</b>	Forecast Ultimate Losses and Aggregate Distribution
<b>Exhibit 5</b>	Summary of Captive Data
<b>Exhibit 6</b>	Outstanding Captive Losses

**Summary of Experience\***  
**Property**

(A)		(B)	(C)	(D)	(E)	(F)
Period Begin	End	Evaluation Date	Maturity (months)	Reported Claims	Reported Losses	Exposure+
7/1/10	6/30/11	6/30/23	156	21	\$38,028,324	\$17,642,240
7/1/11	6/30/12	6/30/23	144	12	\$1,415,575	\$18,381,844
7/1/12	6/30/13	6/30/23	132	28	\$2,028,001	\$19,216,119
7/1/13	6/30/14	6/30/23	120	24	\$2,753,141	\$19,362,348
7/1/14	6/30/15	6/30/23	108	31	\$3,385,152	\$20,447,754
7/1/15	6/30/16	6/30/23	96	30	\$4,657,673	\$21,509,087
7/1/16	6/30/17	6/30/23	84	36	\$6,965,385	\$22,777,903
7/1/17	6/30/18	6/30/23	72	38	\$4,991,076	\$25,002,001
7/1/18	6/30/19	6/30/23	60	37	\$9,436,305	\$27,130,616
7/1/19	6/30/20	6/30/23	48	21	\$147,201,112	\$26,484,928
7/1/20	6/30/21	6/30/23	36	20	\$7,815,977	\$26,938,080
7/1/21	6/30/22	6/30/23	24	31	\$11,794,649	\$27,667,925
7/1/22	6/30/23	6/30/23	12	35	\$32,387,790	\$32,009,184
10/15/23	10/14/24					\$33,700,000
Total				364	\$272,860,159	\$338,270,029

\* Provided by the State of Tennessee, Net of Department Deductibles

+ Based on total insured value in thousands

**Results of Severity Distribution  
Property**

(A)	(B)	(C)
<i>Percentile</i>	<i>Fitted Claims</i>	<i>Observed Claims</i>
10%	\$10,530	\$9,703
25%	\$31,147	\$34,538
30%	\$39,824	\$43,121
35%	\$49,731	\$49,543
40%	\$61,160	\$59,549
45%	\$74,502	\$71,239
50%	\$90,300	\$87,334
55%	\$109,326	\$104,549
60%	\$132,722	\$128,917
65%	\$162,253	\$166,962
70%	\$200,802	\$215,131
75%	\$253,451	\$264,779
80%	\$330,098	\$367,777
85%	\$453,103	\$476,625
90%	\$686,711	\$574,946
95%	\$1,331,028	\$1,117,863

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*Fitted values based on Pareto Distribution fit to claims  
Observed values from trended claims, sorted by size*



**Estimated Ultimate Non-Zero Claim Counts  
Property**

(A) Accident Period	(B) Number of Claims*	(C) Claim Development Factor	(D) Estimated Ultimate Claims	(E) Exposures	(F) Trend Factor to 2023-24	(G) Trended Exposures	(H) Claim Frequency
7/1/10-11	21	1.000	21.0	\$17,642,240	1.407	\$24,817,372	0.0008
7/1/11-12	12	1.000	12.0	\$18,381,844	1.371	\$25,201,843	0.0005
7/1/12-13	28	1.000	28.0	\$19,216,119	1.347	\$25,888,851	0.0011
7/1/13-14	24	1.000	24.0	\$19,362,348	1.327	\$25,688,766	0.0009
7/1/14-15	31	1.000	31.0	\$20,447,754	1.315	\$26,896,328	0.0012
7/1/15-16	30	1.000	30.0	\$21,509,087	1.306	\$28,098,430	0.0011
7/1/16-17	36	1.000	36.0	\$22,777,903	1.285	\$29,259,129	0.0012
7/1/17-18	38	1.000	38.0	\$25,002,001	1.256	\$31,397,677	0.0012
7/1/18-19	37	1.000	37.0	\$27,130,616	1.230	\$33,362,188	0.0011
7/1/19-20	21	1.000	21.0	\$26,484,928	1.211	\$32,080,751	0.0007
7/1/20-21	20	1.000	20.0	\$26,938,080	1.176	\$31,686,689	0.0006
7/1/21-22	31	1.000	31.0	\$27,667,925	1.106	\$30,591,162	0.0010
7/1/22-23	35	1.083	37.9	\$32,009,184	1.044	\$33,411,940	0.0011
Total	364		367	\$304,570,029		\$378,381,126	0.0010

10/15/23-24

- (1) Selected Claim Frequency  
{ Average of 14/15 - 22/23 } 0.0010
- (2) Projected Exposure:  
{Exhibit 1} \$33,700,000
- (3) Forecast Ultimate Non-Zero Claims:  
{(Line (1) x Line (2)) / 1000} 34.5

\* Excludes claims with \$0 incurred

Column (B): Exhibit 1  
 Column (C): No additional claims expected except for one month report lag for 2022-23  
 Column (D) = (B) \* (C)  
 Column (E): Exhibit 1  
 Column (F) : Appendix B  
 Column (G) = (E) \* (F)  
 Column (H) = (D) / (G) \* 1000

**Estimation of Forecast Ultimate Losses for Captive  
For 10/15/23-24  
Property**

Confidence Level	10/15/23-24 Aggregate Losses Limited to \$25M xs \$1M Deductible	10/15/23-24 Aggregate Losses Limited to \$25M xs \$2.5M Deductible	10/15/23-24 Aggregate Losses Limited to \$25M xs \$5M Deductible	10/15/23-24 Aggregate Losses Limited to \$25M xs \$7.5M Deductible	10/15/23-24 Unlimited Losses
40th	\$1,845,000	\$0	\$0	\$0	\$9,057,000
45th	\$2,373,000	\$154,000	\$0	\$0	\$9,793,000
50th	\$2,941,000	\$564,000	\$0	\$0	\$10,626,000
55th	\$3,598,000	\$1,057,000	\$0	\$0	\$11,529,000
60th	\$4,421,000	\$1,685,000	\$0	\$0	\$12,543,000
65th	\$5,387,000	\$2,487,000	\$0	\$0	\$13,786,000
70th	\$6,535,000	\$3,479,000	\$559,000	\$0	\$15,160,000
75th	\$8,149,000	\$4,792,000	\$1,761,000	\$0	\$16,886,000
80th	\$10,236,000	\$6,838,000	\$3,466,000	\$792,000	\$19,328,000
85th	\$13,623,000	\$9,930,000	\$6,523,000	\$3,688,000	\$22,923,000
90th	\$19,349,000	\$15,716,000	\$11,886,000	\$8,885,000	\$28,573,000
95th	\$25,000,000	\$25,000,000	\$25,000,000	\$23,241,000	\$43,025,000
<i>Expected Losses</i>	\$6,011,000	\$4,208,000	\$3,005,000	\$2,378,000	\$22,354,000

Accident Period	TIV	Expected Loss Rates Per Thousand TIV				
10/15/23-24	\$33,700,000	\$0.18	\$0.12	\$0.09	\$0.07	\$0.66
10/15/24-25	\$35,385,000	\$0.18	\$0.12	\$0.09	\$0.07	\$0.66
10/15/25-26	\$37,154,250	\$0.18	\$0.12	\$0.09	\$0.07	\$0.66
10/15/26-27	\$39,011,963	\$0.18	\$0.12	\$0.09	\$0.07	\$0.66
10/15/27-28	\$40,962,561	\$0.18	\$0.12	\$0.09	\$0.07	\$0.66
10/15/28-29	\$43,010,689	\$0.18	\$0.12	\$0.09	\$0.07	\$0.66
10/15/29-30	\$45,161,223	\$0.18	\$0.12	\$0.09	\$0.07	\$0.66
10/15/30-31	\$47,419,284	\$0.18	\$0.12	\$0.09	\$0.07	\$0.66
10/15/31-32	\$49,790,248	\$0.18	\$0.12	\$0.09	\$0.07	\$0.66
10/15/32-33	\$52,279,761	\$0.18	\$0.12	\$0.09	\$0.07	\$0.66

Accident Period	TIV	Expected Losses				
10/15/23-24	\$33,700,000	\$6,011,000	\$4,208,000	\$3,005,000	\$2,378,000	\$22,354,000
10/15/24-25	\$35,385,000	\$6,312,000	\$4,418,000	\$3,155,000	\$2,497,000	\$23,472,000
10/15/25-26	\$37,154,250	\$6,627,000	\$4,639,000	\$3,313,000	\$2,622,000	\$24,645,000
10/15/26-27	\$39,011,963	\$6,958,000	\$4,871,000	\$3,479,000	\$2,753,000	\$25,878,000
10/15/27-28	\$40,962,561	\$7,306,000	\$5,115,000	\$3,653,000	\$2,890,000	\$27,171,000
10/15/28-29	\$43,010,689	\$7,672,000	\$5,371,000	\$3,835,000	\$3,035,000	\$28,530,000
10/15/29-30	\$45,161,223	\$8,055,000	\$5,639,000	\$4,027,000	\$3,187,000	\$29,956,000
10/15/30-31	\$47,419,284	\$8,458,000	\$5,921,000	\$4,228,000	\$3,346,000	\$31,454,000
10/15/31-32	\$49,790,248	\$8,881,000	\$6,217,000	\$4,440,000	\$3,513,000	\$33,027,000
10/15/32-33	\$52,279,761	\$9,325,000	\$6,528,000	\$4,662,000	\$3,689,000	\$34,678,000

TIV Estimated Based on 5% Increase Each Year

**Estimation of Forecast Ultimate Losses for Risk Management Fund  
For 10/15/23-24  
Property**

<i>Confidence Level</i>	<i>10/15/23-24 Risk Management Fund Assuming Captive Coverage of \$25M xs \$1M Deductible</i>	<i>10/15/23-24 Risk Management Fund Assuming Captive Coverage of \$25M xs \$2.5M Deductible</i>	<i>10/15/23-24 Risk Management Fund Assuming Captive Coverage of \$25M xs \$5M Deductible</i>	<i>10/15/23-24 Risk Management Fund Assuming Captive Coverage of \$25M xs \$7.5M Deductible</i>
<i>40th</i>	\$6,437,000	\$8,030,000	\$8,869,000	\$9,053,000
<i>45th</i>	\$6,757,000	\$8,465,000	\$9,489,000	\$9,783,000
<i>50th</i>	\$7,102,000	\$8,930,000	\$10,076,000	\$10,556,000
<i>55th</i>	\$7,426,000	\$9,412,000	\$10,722,000	\$11,354,000
<i>60th</i>	\$7,785,000	\$9,943,000	\$11,390,000	\$12,217,000
<i>65th</i>	\$8,132,000	\$10,531,000	\$12,209,000	\$13,085,000
<i>70th</i>	\$8,477,000	\$11,118,000	\$13,067,000	\$14,086,000
<i>75th</i>	\$8,892,000	\$11,743,000	\$13,910,000	\$15,203,000
<i>80th</i>	\$9,359,000	\$12,476,000	\$14,928,000	\$16,349,000
<i>85th</i>	\$9,923,000	\$13,297,000	\$16,116,000	\$17,869,000
<i>90th</i>	\$10,632,000	\$14,482,000	\$17,667,000	\$19,829,000
<i>95th</i>	\$11,781,000	\$16,276,000	\$20,038,000	\$22,790,000
<i>Expected Losses</i>	\$7,303,000	\$9,369,000	\$10,804,000	\$11,595,000

**Summary of Captive Experience\***  
**Property**

(A)		(B)	(C)	(D)	(E)	(F)
<i>Period</i>	<i>End</i>	<i>Evaluation</i>	<i>Maturity</i>	<i>Reported</i>	<i>Paid</i>	<i>Reported</i>
<i>Begin</i>		<i>Date</i>	<i>(months)</i>	<i>Claims</i>	<i>Losses</i>	<i>Losses</i>
10/15/22	10/14/23	6/30/23	8	2	\$0	\$21,497,562
Total				2	\$0	\$21,497,562

\* Provided by the State of Tennessee, Net of department and RMF Deductibles

**Calculation of Captive Outstanding Losses  
As of June 30, 2023  
Property**

(A)	(B)	(C)	(D)	(E)	(F)	(G)
<i>Accident Period</i>	<i>Selected Ultimate Losses</i>	<i>Limited Reported Losses</i>	<i>Limited Paid Losses</i>	<i>Case Reserves</i>	<i>IBNR Reserves</i>	<i>Total Outstanding Losses</i>
10/15/22-6/30/23	\$21,497,562	\$21,497,562	\$0	\$21,497,562	\$0	\$21,498,000
<i>Total</i>	\$21,497,562	\$21,497,562	\$0	\$21,497,562	\$0	\$21,498,000

*Column (B): Limited Reported Losses*

*Columns (C), (D): Exhibit 5*

*Column (E) = (C) - (D)*

*Column (F) = (B) - (C)*

*Column (G) = (B) - (D)*

# Section 5

## Appendices

<b>Appendix A</b>	Claim Cost Trend Factors
<b>Appendix B</b>	Exposure Trend Factors

**U.S. Claims Cost Index  
Commercial Property**

(A) Year	(B) Composite Economic Index	(C) Accident Period	(D) Interpolated Index	(E) Trend Factor to 2023-24
2010	126.2	7/1/10-11	126.0	1.442
2011	125.8	7/1/11-12	125.3	1.450
2012	124.8	7/1/12-13	126.0	1.442
2013	127.1	7/1/13-14	129.9	1.399
2014	132.6	7/1/14-15	133.4	1.362
2015	134.1	7/1/15-16	137.2	1.324
2016	140.3	7/1/16-17	141.0	1.288
2017	141.8	7/1/17-18	141.2	1.286
2018	140.7	7/1/18-19	141.5	1.283
2019	142.3	7/1/19-20	145.5	1.248
2020	148.7	7/1/20-21	156.4	1.161
2021	164.1	7/1/21-22	167.3	1.086
2022*	170.6	7/1/22-23	174.0	1.044
2023*	177.4	10/15/23-24	181.7	1.000
2024*	182.8			

\* - Estimate

(B) - Willis Towers Watson Claim Cost Index

(D) - Linear interpolation of column (B)

(E) - [(D), forecast period] / [(D), current period]

**Derivation of Consumer Price Index  
Exposure Trend Factors**

(A)	(B)	(C)	(D)	(E)
Year	CPI Index	Accident Period	Interpolated Index	Trend Factor to 2023-24
2010	218.1	7/1/10-11	221.5	1.407
2011	224.9	7/1/11-12	227.3	1.371
2012	229.6	7/1/12-13	231.3	1.347
2013	233.0	7/1/13-14	234.9	1.327
2014	236.7	7/1/14-15	236.9	1.315
2015	237.0	7/1/15-16	238.5	1.306
2016	240.0	7/1/16-17	242.6	1.285
2017	245.1	7/1/17-18	248.1	1.256
2018	251.1	7/1/18-19	253.4	1.230
2019	255.7	7/1/19-20	257.2	1.211
2020	258.8	7/1/20-21	264.9	1.176
2021	271.0	7/1/21-22	281.8	1.106
2022	292.7	7/1/22-23	298.5	1.044
2023*	304.4	10/15/23-24	311.6	1.000
2024*	313.5			

\* - Estimate

(B) - based on data from the U. S. Department of Labor, Bureau of Statistics

(D) - Values interpolated from index in (B)

(E) = (D, Forecast period) / (D)