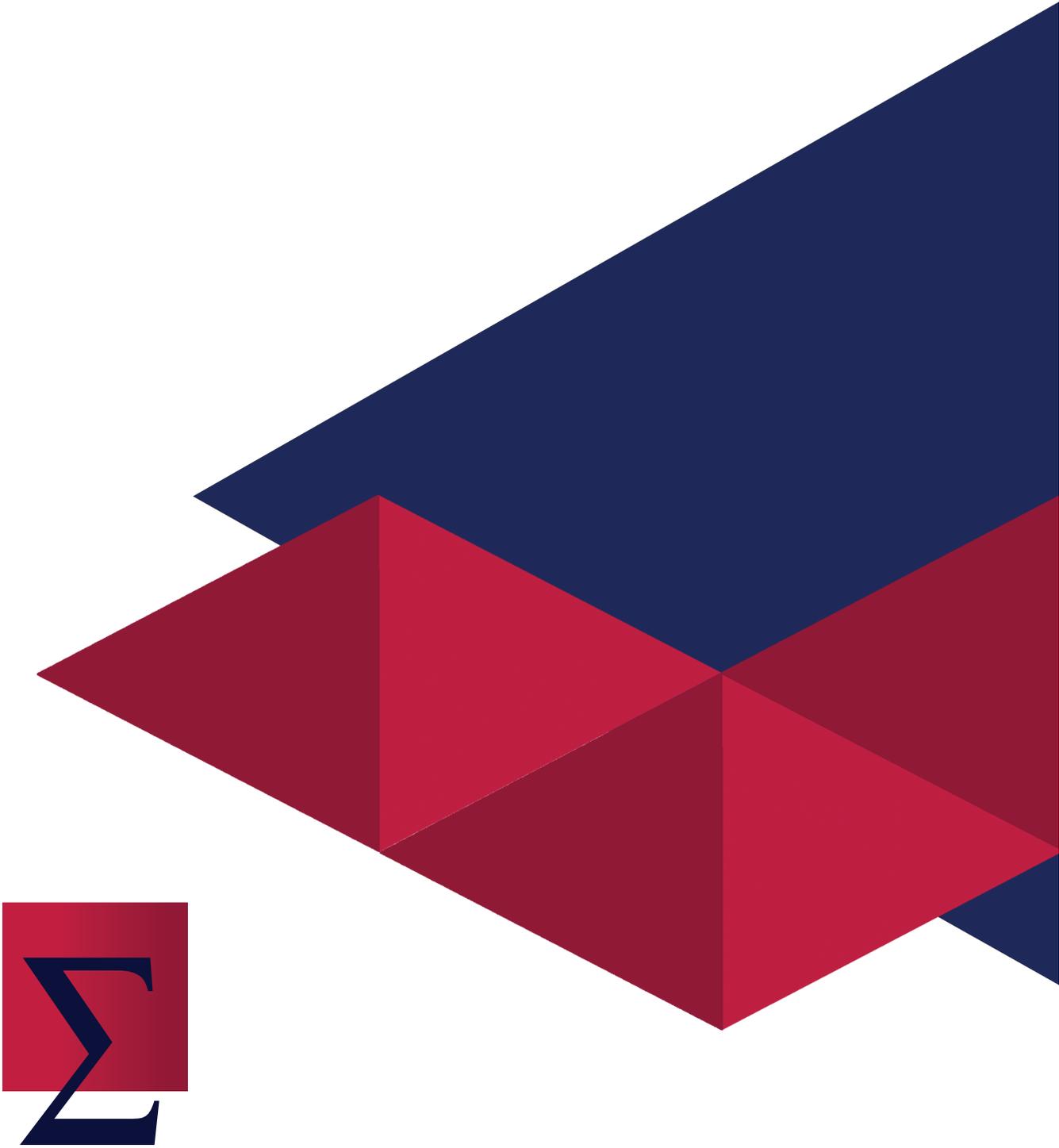An Actuarial Analysis prepared by

SIGMA Actuarial Consulting Group, Inc.

January 21, 2021

Samuel Jackson
Director of Risk Management
XYZ, Inc.
123 Lafayette Avenue, Suite 456
Atlanta, GA 30303

Re: *Actuarial Analysis*

Mr. Jackson:

Enclosed are the results of an actuarial analysis prepared by SIGMA Actuarial Consulting Group, Inc. Your comments and questions are welcome.

It has been a pleasure working on this assignment and we look forward to future opportunities to work together.

Regards,

AL J. Rhodes, ACAS, MAAA
President & Senior Actuary
SIGMA Actuarial Consulting Group, Inc.

Qualification Statement: I, Al J. Rhodes, am associated with the firm of SIGMA Actuarial Consulting Group, Inc. I am a member of the American Academy of Actuaries and meet its qualification standards, and I am an Associate of the Casualty Actuarial Society.

Table of Contents

Executive Summary

Introduction

This actuarial analysis is prepared by SIGMA Actuarial Consulting Group, Inc. (SIGMA) for XYZ, Inc. (XYZ). The conclusions represent a professional analysis and opinion of XYZ's workers compensation loss experience. The scope of this analysis is:

1. *Evaluate net (retained) estimated required reserves including loss and ALAE for periods 2015 through 2020 as of 12/31/20.*
2. *Provide a range of reasonable estimates around the estimated required reserves.*
3. *Project losses for the 2021 period.*
4. *Provide a confidence level analysis for the 2021 period.*

Immediately following this introduction is a **loss summary** of the results of this analysis. The **outline of basic methodology** section summarizes the actuarial techniques utilized. The **data** section discusses the sources of all data utilized for this analysis. The **qualifying statements** add important comments concerning the data and assumptions used to complete the analysis. The **analysis and methodology** section presents the step by step approach used to analyze XYZ's loss experience. Additional sections provide supporting detail.

Included within this report is an estimate of required reserves, also referred to as an unpaid claim estimate. For the purposes of this report, three important dates are noted:

* The valuation date (12/31/20) is the date through which transactions are included in the data used in the unpaid claim estimate analysis.
* The accounting or required reserve date (12/31/20) is the date used to separate paid versus unpaid claim amounts.
* The review date (1/15/21) is the cutoff date for including information known to the actuary in the unpaid claim estimate analysis.

This report is intended for the use of XYZ. If released to any third party it should be released only in its entirety. Please advise the authors at SIGMA of the release of this report to any other parties. SIGMA reserves the right to supplement this report with additional explanations and qualifications as it deems appropriate for the particular user.

Executive Summary

Loss Summary

The evaluation of ultimate losses requires the estimation of future contingent events. In estimating these losses, we have assumed historical patterns, with adjustments as noted, are indicative of future patterns. We have not anticipated any extraordinary changes in the legal, social or economic environment which might affect the frequency or claim costs. To the extent future development is different than the historical patterns assumed in this analysis, the conclusions contained in this report will change. For these reasons, we can provide no guarantee that estimates will prove adequate or not excessive.

Estimated ultimate incurred loss is defined as the amount needed to provide for the cost of claims relating to events that occurred during each period included in the reserve analysis. This includes the **estimated required reserve** which is the amount that will be required for future payments on (1) claims that have been reported and (2) claims that have occurred but have not been reported as of the evaluation date.

Estimated Required Reserve as of 12/31/20
Claims Incurred 1/1/15 to 12/31/20

Selected Estimated Ultimate Incurred Loss	$9,040,000
Reported Paid Loss	5,236,586
Estimated Required Reserve	$3,803,414
Case Reserve	$1,765,312
Development on Known Claims and IBNR	2,038,102

The estimated required reserve includes **case reserve** (calculated as reported losses minus paid losses) and **IBNR** (development on known claims and incurred but not reported losses).

These amounts are calculated on a **net basis** and reflect the per occurrence limits in effect for each period. **Allocated loss adjustment expense (ALAE)** is included and is defined as expense assignable to specific claims, such as legal costs. We have not analyzed unallocated loss adjustment expense which we define as expense not assigned to individual claims.

The liability for losses (defined to include ALAE) represents the estimated ultimate net cost of all reported and unreported losses incurred through 12/31/20. The liability for losses is estimated based on certain actuarial and other assumptions including individual case-basis valuations, past experience, and statistical analysis. Those estimates are subject to the effects of trends in loss severity and frequency. Because of the inherent uncertainties in estimating the liability for losses, it is reasonable that the estimates will change within the near term and could be material to the financial statements as a whole.

A range is selected around the expected loss (sometimes referred to as the actuarial central estimate). This range is not intended to provide an absolute minimum or maximum of required reserve but is intended to show a range of reasonable estimates around the expected required reserve. The range was determined based on professional judgment, with consideration to the IBNR by year, the range of results from various methods, and the number of open claims by year.

Range of Required Reserve as of 12/31/20

Favorable	Expected	Adverse
$3,400,000	$3,803,414	$4,210,000

Projected losses are defined as the amount needed to provide for the cost of claims relating to events expected to occur during 2021.

2021 Aggregate Loss Probability Distribution
(Losses are Limited to $500,000 per Occurrence)

Aggregate Loss Probability	Aggregate Loss Distribution	Risk Margin
Expected	$1,870,000	100%
40%	$1,770,000	95%
45%	1,810,000	97%
50%	1,850,000	99%
55%	1,880,000	101%
60%	1,920,000	103%
65%	1,960,000	105%
70%	2,010,000	107%
75%	2,060,000	110%
80%	2,120,000	113%

Estimating losses expected to occur in a future period is difficult due to the unpredictability of internal and external influences. Therefore, a range is calculated which is intended to show a reasonable variance for the establishment of the projected funding level. Choosing a funding level greater than the expected loss amount increases the ability of the program to withstand loss costs greater than anticipated.

The loss distribution is not intended to establish a maximum or minimum funding level and does not include all possible outcomes. Rather, the distribution is an estimate of the range of losses expected to be generated by the program during the projected period. Since claim costs will vary from year to year, prudent funding recognizes the potential for higher loss costs in a given year.

Executive Summary

Outline of Basic Methodology

- Estimated ultimate losses are calculated using different methods, including standard development methods and a loss projection method. The Bornhuetter-Ferguson methods are also considered, where appropriate. Results from these methods are compared, and a selection of ultimate loss is made.

- Historical ultimate loss estimates are adjusted to reflect the projected period's retention level, then trend factors are applied to contemplate changes in the level of claim costs. Inflation-sensitive exposures are also trended. Adjusted losses are divided by adjusted exposures to calculate historical pure loss rates. These rates are used to select a projected pure loss rate. Projected losses are calculated by multiplying the selected pure loss rate by projected exposures. An aggregate loss distribution is generated to show confidence intervals around the projected losses.

- Ultimate claim counts are projected using a similar process. Average loss severities are calculated to test the reasonableness of the expected loss projection.

- Paid losses are subtracted from the estimated ultimate incurred losses to calculate estimated required reserves.

- Net present value for estimated required reserves are calculated based on historical average payments.

Executive Summary

Data Reliance and Review

The company-specific loss, exposure, and financial data used in this report are supplied by XYZ or ABC. It is our understanding we have been provided with all information which would materially affect this analysis. The historical data is assumed to be accurate and complete and should be reconciled with internal records. We have used XYZ's own loss and exposure data to the extent this data is credible and available. All supplementary industry data reflects the characteristics of XYZ's type of business, to the extent possible.

Our consulting engagement does not include an audit of the loss data, financial records, or accounting records provided to us. An audit of the data is defined in an actuarial standard of practice as "a formal and systematic examination of data for the purpose of testing its accuracy and completeness." SIGMA does not provide accounting or auditing services, and these services are normally completed by independent accounting firms.

We have reviewed the data for overall reasonableness. We have also reviewed the data for consistency to the prior actuarial report completed about a year ago by SIGMA. This review involved the comparison of incurred losses, paid losses, and claim counts, as well as other tests we considered necessary. As part of this review, we did not find any material issues in the data. However, such issues could be revealed by an audit.

Additional sources of industry data include National Council on Compensation Insurance (NCCI), Best's Aggregates & Averages, United States Department of Commerce, and insurance company information.

Executive Summary

Qualifying Statements

1. We have relied without audit or verification on historical data and qualitative information supplied by XYZ. It is our understanding we have been provided with all information which would materially affect the loss estimates, and that all information furnished to us has been accurate and complete.

2. We have assumed that historical operations (distribution of exposures by geographic area and nature of operations) are representative of current and future operations.

3. We have assumed there are no factors which would cause patterns in the underlying data to be unrepresentative of the current or future situation.

4. We have assumed the alternative data sources used to develop losses and used to trend losses and exposures reflects the characteristics of XYZ's type of business, to the extent possible.

5. The range of required reserves in this report is not intended to provide an absolute maximum or minimum of the required reserves. It is intended to provide a range of reasonable estimates. The range contained in this report was determined based on professional judgment, with consideration to the IBNR by year, the range of results from various methods and the number of open claims by year.

6. SIGMA understands that this report will be used for internal budgeting purposes for retained liabilities for XYZ. It is our understanding that XYZ has provided us with accurate retentions for historical periods. This report does not contain an analysis of the gross unlimited losses related to XYZ's risk exposure.

7. Changes in any of the information or assumptions upon which SIGMA's estimates of ultimate losses are based will require a reevaluation of the results of this report and possibly a revision of these projections.

This report should be released only in its entirety. SIGMA actuaries will be available for consultation should any individual reviewing this report have questions or require further analysis.

Analysis and Methodology

Analysis of Loss Experience

This section presents the detailed methodology used in analyzing XYZ's workers compensation loss experience. The tables referenced in this narrative are located in Section 3. Tables 1 through 10 limit losses to historical retention levels for the loss reserve analysis. Subsequent tables adjust losses to current retention levels for the loss projection analysis.

A purely mechanical method of loss reserving is not possible due to several decisions that require judgment based on the available data, changes in operations, external changes and the credibility of various reserving methods. The impact of external influences such as inflation, the judicial environment and regulatory changes have been considered.

Table 1 – Historical Losses Adjusted to Retentions

This table summarizes reported losses, paid losses, and case outstanding reserve by policy period as of the current evaluation date. Losses limited to historical per occurrence retentions are also shown on this table.

For all data disclosures, please refer to the *Data Reliance and Review* section.

Table 2 - Incurred Loss Development Factor Calculation

The ultimate cost of claims incurred for a policy period is usually not known until several years after the close of the period. Therefore, loss development factors are used to project the additional cost expected on claims for each period. Loss development factors quantify the late developing aspects of certain losses, such as claims involving medical complications not recognized in the early stages of treatment or verdict values for litigated claims which are different than the amount which was reserved to pay the claims. They also account for losses that occurred during the period but are not reported until a later date, commonly referred to as incurred but not reported claims, or IBNR claims.

The database for XYZ is large enough to calculate unique loss development factors. Unique factors <u>may</u> produce a more accurate projection of ultimate incurred losses versus using a benchmark.

The calculation of development factors is shown in Table 2, beginning with incurred losses as of different evaluation dates for each policy period. For example, the table shows losses incurred during the 2018 period evaluated as of 12 through 36 months after the beginning of that period. In general, the value of incurred losses increases from one evaluation to the next as a result of development of reported claims and IBNR losses becoming known. This format allows us to select development factors unique to XYZ.

The middle section shows how losses develop from month to month (age-to-age factors). Age-to-age factors look at the growth (development) between each age. For example, the 12 to 24 age-to-age factor for 2018 is calculated:

24 Month Evaluation for 2018 =	$1,297,037
12 Month Evaluation for 2018 =	$908,943
Development =	1.427

A loss development factor less than 1.000 indicates that the value of reported losses declined, possibly due to a claim being settled for an amount less than was previously reserved.

Various age-to-age averages are calculated and the factors selected as most representative of expected loss development are shown in the line labeled "Selected." Computation of loss development factors is based on the selected age-to-age factors. The 24 month to ultimate loss development factor, for instance, is found by multiplying the 24 to 36 month age-to-age factor by the 36 month to ultimate loss development factor.

Table 3 - Estimated Ultimate Incurred Losses - Incurred Method

The development factors applied to reported losses are selected based on the time that has passed between the beginning of the loss period and the date of the most recent evaluation. In most cases, the closer the evaluation date is to the period effective date, the larger the loss development factor needed. Conversely, as the period matures, the loss development factor approaches 1.000. The expected ultimate losses including development and IBNR for each period are estimated by multiplying the development factors by recently valued reported losses for each period.

For example, the formula to develop <u>incurred</u> losses to <u>ultimate</u> losses for 2018 is:

$1,487,922 x loss development factor (1.241) = $1,846,511

Table 4 - Paid Loss Development Factor Calculation
Table 5 - Estimated Ultimate Incurred Losses - Paid Method

A paid loss approach attempts to eliminate distortions that can occur in the incurred loss development method as a result of changes in claims handling procedures or reserving adequacy. The paid loss development method assumes the timing of payments has been consistent.

Table 6 - Estimated Ultimate Incurred Losses - Case Method

A third method of calculating ultimate losses for each period uses the case reserves. The case reserve development factor is calculated from the selected incurred and paid loss development factors. The sum of paid losses, case reserves and the expected development on case reserves is the indicated ultimate loss amount.

Table 7 - Selected Estimated Ultimate Incurred Losses

Multiple methods are used to a calculate a range of estimates that represent the expected ultimate incurred losses. The ultimate losses from each method are compared, and as might be expected produce different results. A weighted average yields the selected estimated ultimate incurred losses for each period.

Table 8 - Estimated Required Reserves as of 12/31/20

This table contains a summary of estimated required reserves. Estimated required reserves are calculated by subtracting paid losses from the estimated ultimate incurred losses. These outstanding liabilities represent case reserves plus IBNR.

A range is provided to show a favorable and adverse estimate of the required reserves. The favorable and adverse estimates are not intended to provide an absolute minimum and maximum of required reserves but are rather intended to show a range of reasonable estimates around the expected required reserves.

Table 9 – Net Present Value

The estimated required reserves are discounted to reflect the timing of future loss payments. The discounted estimated required reserves are based on average monthly paid losses since 1/1/15 and a discount rate of 3% provided by XYZ. SIGMA is not opining on the appropriateness of the discount rate for XYZ.

The future yield on the underlying assets is susceptible to significant changes in economic conditions. Therefore, while the recognition given future investment earnings is important, discounting does add an additional uncertainty to an already projected amount. Due to this uncertainty, we cannot provide assurance that the amount of actual claim payments will not deviate materially from our projections.

Table 10 – Actual versus Expected Reserves

This table compares actual required reserves versus expected required reserves as of the current evaluation. Expected required reserves as of the current evaluation are calculated by adding the annual loss projection (adjusted for payroll change) to the estimated ultimate losses from the prior evaluation, less actual payments as of the current evaluation. The results show that loss experience has been favorable.

Analysis and Methodology

Loss Projection

Losses in prior tables were limited to historical per occurrence retentions. For the loss projection, historical losses are adjusted to projected retention levels to reflect experience expected to arise in the projected loss period.

Table 11 - Trend Adjustments to 2021

While development factors account for changes in loss experience as policy periods mature, trend factors account for claim cost changes related to inflation that occur over time.

Inflation trend factors are applied to historical incurred losses to more accurately reflect the expected cost level for the period being projected. In this set of factors, the factor of 1.090 for 2018 indicates an increased average loss cost of 9.0 percent. These factors include changes in workers compensation benefit levels, indemnity trends and medical cost trends.

The next step is to trend historical exposures to expected levels for the projected period. The exposure base selected for workers compensation losses is payroll. The exposure inflation trend factors are based on the average hourly wages as measured by the United States Department of Commerce.

Table 12 - Calculation of Projected Losses

The next step is to calculate pure loss rates based on the historical experience. This calculation uses past experience to determine a rate which, when applied to payroll, produces an estimate of ultimate incurred losses. The pure loss rate can be defined as the expected dollar loss cost per $100 of payroll. Adjusted losses are divided by adjusted exposures to yield pure loss rates based on the unique experience of each historical period. Each of the calculated pure loss rates is an estimate of the pure loss rate which could be charged for the projected period. A pure loss rate of $1.70 per $100 of payroll has been selected for the projected period.

The selected pure loss rate of $1.70 per $100 of payroll is multiplied by the projected payroll to forecast losses of $1,870,000. Note, actual losses for the projected period will differ from projected losses based on actual payrolls and loss experience.

Table 13 - Claim Count Development Factor Calculation
Table 14 - Claim Count Projection

Estimated ultimate claim counts are calculated by multiplying claim count development factors by reported claim counts. The claim count development factors are used to project the additional claim counts expected for each period. Since claim frequency is not inflation sensitive but the exposure base is, it is necessary to adjust the historical payroll to reflect projected wage levels before calculating frequencies. This adjustment was made in an earlier exhibit.

Estimated ultimate claim counts are divided by exposures adjusted to the projected level to calculate estimates of the projected frequency. Based on the calculated values, a projected frequency is selected.

The indicated frequency is multiplied by estimated exposures to yield an estimate of the total number of claims for the projected period.

Table 15 - Average Loss Severities

The calculation of trended estimated ultimate average severities provides an important check on the appropriateness of the projected losses, by verifying that the projected average severity is in the range indicated by trended severities for recent periods.

Analysis and Methodology

Aggregate Loss Probability Distribution

In this section, confidence intervals around the projected losses are discussed.

Table 16 - 2021 Aggregate Loss Probability Distribution

A statistical model can be used to estimate amounts for confidence levels around the projected losses. Confidence levels are useful for determining funding requirements within a self-insured retention, defining an adequate amount to achieve a desired level of confidence that a particular liability is adequately funded, negotiation of proper collateralization for a program requiring security, determination of a cost effective aggregate stop-loss and determination of an appropriate maximum for a retrospectively rated insurance program.

The model used to calculate the distribution is based on the historical loss experience and a lognormal statistical distribution. A useful feature of this distribution is that it is positively skewed. For this reason it is widely used within the insurance industry.

The aggregate loss distribution column indicates the aggregate losses at various confidence levels. For example, an aggregate loss amount of $1,880,000 should be adequate to pay all losses that occur during the projected period 55% of the time. This means that 55 out of 100 times, losses will be less than or equal to $1,880,000. Larger dollar amounts relate to higher probability levels. For example, there is a 75% chance that losses will not exceed $2,060,000.

A limitation of the statistical model is that a concept known as parameter risk is not included in the calculation of the aggregate distribution. Parameter risk is the risk associated with the possible incorrect estimate of the projected losses. There is always the possibility that the estimate of projected loss is wrong. However, we have made our best estimate of the assumptions regarding the exposure to loss.

Table 16 – Trend Factor Compilations

Loss inflation trend factors are calculated to adjust historical incurred losses to more accurately reflect the expected cost level for the period being projected. For workers compensation, this

adjustment has two parts.

1.   The **benefit level change factor** for workers compensation quantifies increases in benefit levels attributable to changes in state workers compensation laws and is developed from individual state data.

2.   The **severity trend factor** for workers compensation consists of two elements: medical costs and average wages on which indemnity benefits are based.

Analysis and Methodology

Preface to Additional Sections

Section 3 contains all backup calculations used in analyzing XYZ's workers compensation loss experience. All tables discussed in the narrative are included in Section 3.

Section 3, Table 1

XYZ, Inc.

Workers Compensation
Historical Losses Adjusted to Retentions
(Losses are Limited to Historical per Occurrence Retentions)

Period Start	Period End	Evaluation Date	Retention	Reported Incurred Losses	Excess Incurred Losses	Limited Incurred Losses	Reported Paid Losses	Excess Paid Losses	Limited Paid Losses	Reported Case Reserves	Excess Case Reserves	Limited Case Reserves
01/01/15	12/31/15	12/31/20	$500,000	$1,215,388	$0	$1,215,388	$1,115,094	$0	$1,115,094	$100,294	$0	$100,294
01/01/16	12/31/16	12/31/20	500,000	1,001,856	0	1,001,856	881,856	0	881,856	120,000	0	120,000
01/01/17	12/31/17	12/31/20	500,000	1,416,780	0	1,416,780	1,050,780	0	1,050,780	366,000	0	366,000
01/01/18	12/31/18	12/31/20	500,000	1,487,922	0	1,487,922	1,218,360	0	1,218,360	269,562	0	269,562
01/01/19	12/31/19	12/31/20	500,000	1,157,848	0	1,157,848	684,510	0	684,510	473,338	0	473,338
01/01/20	12/31/20	12/31/20	500,000	722,104	0	722,104	285,986	0	285,986	436,118	0	436,118
Total				$7,001,898	$0	$7,001,898	$5,236,586	$0	$5,236,586	$1,765,312	$0	$1,765,312

Section 3, Table 2

XYZ, Inc.

Workers Compensation
Incurred Loss Development Factor Calculation
(Losses are Unlimited)

Period Start	Months After Inception Date - Reported Incurred Losses									
	12 Months	24 Months	36 Months	48 Months	60 Months	72 Months	84 Months	96 Months	108 Months	120 Months
01/01/11	$945,548	$1,261,652	$1,381,954	$1,448,093	$1,486,792	$1,514,205	$1,535,778	$1,552,366	$1,565,044	$1,576,489
01/01/12	1,017,197	1,210,713	1,265,384	1,295,580	1,325,227	1,355,205	1,377,774	1,401,107	1,419,422	
01/01/13	652,215	922,998	1,038,293	1,110,750	1,152,681	1,192,176	1,229,400	1,246,817		
01/01/14	961,782	1,327,203	1,470,364	1,561,550	1,598,729	1,637,723	1,677,113			
01/01/15	697,904	934,482	1,035,535	1,111,445	1,172,317	1,215,388				
01/01/16	611,053	846,881	940,979	987,257	1,001,856					
01/01/17	1,032,478	1,286,577	1,373,205	1,416,780						
01/01/18	908,943	1,297,037	1,487,922							
01/01/19	656,580	1,157,848								
01/01/20	722,104									
01/01/11	1.334	1.095	1.048	1.027	1.018	1.014	1.011	1.008	1.007	
01/01/12	1.190	1.045	1.024	1.023	1.023	1.017	1.017	1.013		
01/01/13	1.415	1.125	1.070	1.038	1.034	1.031	1.014			
01/01/14	1.380	1.108	1.062	1.024	1.024	1.024				
01/01/15	1.339	1.108	1.073	1.055	1.037					
01/01/16	1.386	1.111	1.049	1.015						
01/01/17	1.246	1.067	1.032							
01/01/18	1.427	1.147								
01/01/19	1.763									
Wtd Avg	1.369	1.100	1.050	1.030	1.027	1.021	1.014	1.010	1.007	
4 Year Avg	1.456	1.108	1.054	1.033	1.030	1.022				
4 Year Median	1.406	1.110	1.056	1.031	1.029	1.020				
Benchmark	1.375	1.117	1.060	1.033	1.023	1.015	1.012	1.010	1.009	1.068
Selected	1.400	1.110	1.050	1.030	1.030	1.025	1.015	1.010	1.010	1.050
Cumulative	1.929	1.378	1.241	1.182	1.148	1.115	1.088	1.072	1.061	1.050

Section 3, Table 3

XYZ, Inc.

Workers Compensation
Estimated Ultimate Incurred Losses - Incurred Method
(Losses are Limited to Historical per Occurrence Retentions)

Period Start	Period End	Evaluation Date	Limited Incurred Losses	Months of Loss Development	Loss Development Factor	Ultimate Incurred Losses
01/01/15	12/31/15	12/31/20	$1,215,388	72	1.115	$1,355,158
01/01/16	12/31/16	12/31/20	1,001,856	60	1.148	1,150,131
01/01/17	12/31/17	12/31/20	1,416,780	48	1.182	1,674,634
01/01/18	12/31/18	12/31/20	1,487,922	36	1.241	1,846,511
01/01/19	12/31/19	12/31/20	1,157,848	24	1.378	1,595,515
01/01/20	12/31/20	12/31/20	722,104	12	1.929	1,392,939
Total			$7,001,898			$9,014,888

Notes:

1. **Loss Development Factor** is from Table 2.

Section 3, Table 4

XYZ, Inc.

Workers Compensation
Paid Loss Development Factor Calculation
(Losses are Unlimited)

Period Start	Months After Inception Date - Reported Paid Losses									
	12 Months	24 Months	36 Months	48 Months	60 Months	72 Months	84 Months	96 Months	108 Months	120 Months
01/01/11	$399,902	$882,590	$1,129,894	$1,273,244	$1,362,595	$1,421,131	$1,459,446	$1,487,395	$1,510,027	$1,528,111
01/01/12	250,200	525,843	815,823	1,019,160	1,155,049	1,251,374	1,323,304	1,377,537	1,419,422	
01/01/13	216,804	516,393	726,562	887,071	996,876	1,062,644	1,120,803	1,152,337		
01/01/14	383,660	890,832	1,159,656	1,320,123	1,412,146	1,467,722	1,498,551			
01/01/15	299,089	644,000	868,614	997,969	1,071,179	1,115,094				
01/01/16	173,113	416,157	608,843	754,410	881,856					
01/01/17	477,914	854,041	982,068	1,050,780						
01/01/18	347,650	903,812	1,218,360							
01/01/19	310,849	684,510								
01/01/20	285,986									
01/01/11	2.207	1.280	1.127	1.070	1.043	1.027	1.019	1.015	1.012	
01/01/12	2.102	1.551	1.249	1.133	1.083	1.057	1.041	1.030		
01/01/13	2.382	1.407	1.221	1.124	1.066	1.055	1.028			
01/01/14	2.322	1.302	1.138	1.070	1.039	1.021				
01/01/15	2.153	1.349	1.149	1.073	1.041					
01/01/16	2.404	1.463	1.239	1.169						
01/01/17	1.787	1.150	1.070							
01/01/18	2.600	1.348								
01/01/19	2.202									
Wtd Avg	2.210	1.333	1.161	1.100	1.053	1.038	1.029	1.023	1.012	
4 Year Avg	2.248	1.327	1.149	1.109	1.057	1.040				
4 Year Median	2.303	1.348	1.144	1.099	1.053	1.041				
Benchmark	2.187	1.304	1.140	1.080	1.049	1.034	1.025	1.020	1.017	1.176
Selected	2.200	1.330	1.150	1.100	1.050	1.040	1.030	1.020	1.015	1.150
Cumulative	4.957	2.253	1.694	1.473	1.339	1.275	1.226	1.190	1.167	1.150

Section 3, Table 5

XYZ, Inc.

Workers Compensation
Estimated Ultimate Incurred Losses - Paid Method
(Losses are Limited to Historical per Occurrence Retentions)

Period Start	Period End	Evaluation Date	Limited Paid Losses	Months of Loss Development	Loss Development Factor	Ultimate Paid Losses
01/01/15	12/31/15	12/31/20	$1,115,094	72	1.275	$1,421,745
01/01/16	12/31/16	12/31/20	881,856	60	1.339	1,180,805
01/01/17	12/31/17	12/31/20	1,050,780	48	1.473	1,547,799
01/01/18	12/31/18	12/31/20	1,218,360	36	1.694	2,063,902
01/01/19	12/31/19	12/31/20	684,510	24	2.253	1,542,201
01/01/20	12/31/20	12/31/20	285,986	12	4.957	1,417,633
Total			$5,236,586			$9,174,085

Notes:

1. **Loss Development Factor** is from Table 4.

Section 3, Table 6

XYZ, Inc.

Workers Compensation
Estimated Ultimate Incurred Losses - Case Method
(Losses are Limited to Historical per Occurrence Retentions)

	(1)	(2)	(3)	(4)	(5)	(6)
						(3) + (4) x (5)
					Case	
	Incurred	Paid			Reserve	Estimated
	Loss	Loss	Limited	Limited	Loss	Ultimate
Period	Development	Development	Paid	Case	Development	Incurred
Start	Factor	Factor	Losses	Reserves	Factor	Losses
01/01/15	1.115	1.275	$1,115,094	$100,294	1.916	$1,307,257
01/01/16	1.148	1.339	881,856	120,000	2.038	1,126,416
01/01/17	1.182	1.473	1,050,780	366,000	1.921	1,753,866
01/01/18	1.241	1.694	1,218,360	269,562	1.901	1,730,797
01/01/19	1.378	2.253	684,510	473,338	1.973	1,618,406
01/01/20	1.929	4.957	285,986	436,118	2.521	1,385,439
Total			$5,236,586	$1,765,312		$8,922,181

Notes:

1. **Case Reserve Development Factor =** (1.00-1.00/(1))/(1.00/(1)-1.00/(2))+1.00

Section 3, Table 7

XYZ, Inc.

Workers Compensation
Selected Estimated Ultimate Incurred Losses
(Losses are Limited to Historical per Occurrence Retentions)

Period Start	Estimated Ultimate Incurred Losses				
	Incurred Method	Paid Method	Case Method	Prior Evaluation	Selected
01/01/15	$1,355,158	$1,421,745	$1,307,257	$1,370,000	$1,360,000
01/01/16	1,150,131	1,180,805	1,126,416	1,130,000	1,150,000
01/01/17	1,674,634	1,547,799	1,753,866	1,700,000	1,660,000
01/01/18	1,846,511	2,063,902	1,730,797	1,840,000	1,880,000
01/01/19	1,595,515	1,542,201	1,618,406	1,610,000	1,590,000
01/01/20	1,392,939	1,417,633	1,385,439	1,300,000	1,400,000
Total	$9,014,888	$9,174,085	$8,922,181	$8,950,000	$9,040,000

Section 3, Table 8

XYZ, Inc.

Workers Compensation
Estimated Required Reserves as of 12/31/20
(Losses are Limited to Historical per Occurrence Retentions)

Period	Retention	Selected Estimated Ultimate Incurred Losses	Reported Paid Losses	Estimated Required Reserves	Case Reserves	Development on Known Claims and IBNR
01/01/15	$500,000	$1,360,000	$1,115,094	$244,906	$100,294	$144,612
01/01/16	500,000	1,150,000	881,856	268,144	120,000	148,144
01/01/17	500,000	1,660,000	1,050,780	609,220	366,000	243,220
01/01/18	500,000	1,880,000	1,218,360	661,640	269,562	392,078
01/01/19	500,000	1,590,000	684,510	905,490	473,338	432,152
01/01/20	500,000	1,400,000	285,986	1,114,014	436,118	677,896
Total		$9,040,000	$5,236,586	$3,803,414	$1,765,312	$2,038,102

Range of Required Reserves as of 12/31/20

Favorable		$8,636,586	$5,236,586	$3,400,000	$1,765,312	$1,634,688
Expected		9,040,000	5,236,586	3,803,414	1,765,312	2,038,102
Adverse		9,446,586	5,236,586	4,210,000	1,765,312	2,444,688

Notes:

1. The range does not indicate a maximum or minimum.

SIGMA ACTUARIAL CONSULTING GROUP, INC.

Section 3, Table 9

XYZ, Inc.

Workers Compensation
Net Present Value
(Losses are Limited to Historical per Occurrence Retentions)

	Estimated Required Reserves	Discounted Estimated Required Reserves
Level		
Favorable	$3,400,000	$3,240,000
Expected	3,803,414	3,620,000
Adverse	4,210,000	4,010,000

Notes:

1. **Discounted Estimated Required Reserves** are based on
average monthly paid losses since 1/1/15 and a discount rate of 3%.

Section 3, Table 10

XYZ, Inc.

Workers Compensation
Actual versus Expected Reserves
(Losses are Limited to $500,000 per Occurrence)

			Notes:
(1)	$7,650,000	Selected Ultimates	Prior Evaluation
(2)	1,500,000	Projection	Prior Evaluation
(3)	5,236,586	Payments	Current Evaluation
(4)	$3,913,414	Expected Reserves	(1) + (2) - (3)
(5)	3,803,414	Actual Reserves	Current Evaluation
(6)	($110,000)	Difference	(5) - (4)

Note: The projection from the prior evaluation was adjusted for changes in payroll.

Section 3, Table 11

XYZ, Inc.

Workers Compensation
Trend Adjustments to 2021
(Losses are Limited to $500,000 per Occurrence)

	Loss Trend Adjustments			Exposure Trend Adjustments		
	Selected					
	Ultimate	Loss			Exposure	
Period	Incurred	Trend	Trended		Trend	Trended
Start	Losses	Factor	Losses	Payroll	Factor	Payroll
01/01/15	$1,360,000	1.210	$1,650,000	$79,187,885	1.176	$93,120,000
01/01/16	1,150,000	1.160	1,330,000	83,939,158	1.155	96,950,000
01/01/17	1,660,000	1.112	1,850,000	88,975,507	1.112	98,940,000
01/01/18	1,880,000	1.090	2,050,000	94,314,037	1.076	101,480,000
01/01/19	1,590,000	1.061	1,690,000	99,972,879	1.060	105,970,000
01/01/20	1,400,000	1.029	1,440,000	105,971,252	1.029	109,040,000
Total	$9,040,000		$10,010,000	$552,360,718		$605,500,000

Notes:

1. Trend factors are calculated on Table 17.

SIGMA ACTUARIAL CONSULTING GROUP, INC.

Section 3, Table 12

XYZ, Inc.

Workers Compensation
Calculation of Projected Losses
(Losses are Limited to $500,000 per Occurrence)

| | Pure Loss Rates Projected From Historical Data | | |
| | | | Pure Loss Rate (Per $100 |
Period Start	Trended Losses	Trended Payroll	Trended Payroll)
01/01/15	$1,650,000	$93,120,000	$1.77
01/01/16	1,330,000	96,950,000	1.37
01/01/17	1,850,000	98,940,000	1.87
01/01/18	2,050,000	101,480,000	2.02
01/01/19	1,690,000	105,970,000	1.59
01/01/20	1,440,000	109,040,000	1.32
Total	$10,010,000	$605,500,000	$1.65

Selected Pure Loss Rate =		$1.70
2021 Projected Payroll =		$110,000,000
2021 Projected Losses =		$1,870,000

Section 3, Table 13

XYZ, Inc.

Workers Compensation
Claim Count Development Factor Calculation

Period Start	Months After Inception Date - Reported Claim Counts									
	12 Months	24 Months	36 Months	48 Months	60 Months	72 Months	84 Months	96 Months	108 Months	120 Months
01/01/11	285	302	320	320	320	320	320	320	320	320
01/01/12	353	371	387	389	389	389	389	389	389	
01/01/13	242	258	276	276	276	276	276	276		
01/01/14	378	395	410	410	410	411	411			
01/01/15	385	405	423	423	423	423				
01/01/16	440	464	489	489	489					
01/01/17	588	603	621	621						
01/01/18	539	582	605							
01/01/19	495	522								
01/01/20	461									
01/01/11	1.060	1.060	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
01/01/12	1.051	1.043	1.005	1.000	1.000	1.000	1.000	1.000		
01/01/13	1.066	1.070	1.000	1.000	1.000	1.000	1.000			
01/01/14	1.045	1.038	1.000	1.000	1.002	1.000				
01/01/15	1.052	1.044	1.000	1.000	1.000					
01/01/16	1.055	1.054	1.000	1.000						
01/01/17	1.026	1.030	1.000							
01/01/18	1.080	1.040								
01/01/19	1.055									
Average	1.054	1.047	1.001	1.000	1.000	1.000	1.000	1.000	1.000	
Selected	1.055	1.050	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Cumulative	1.109	1.051	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Section 3, Table 14

XYZ, Inc.

Workers Compensation
Claim Count Projection

Period Start	Reported Claims	Claim Count Development Factor	Estimated Ultimate Claim Count	Adjusted Payroll	Frequency (Per $100,000 Adjusted Payroll)
01/01/15	423	1.000	423	$93,120,000	0.45
01/01/16	489	1.000	489	96,950,000	0.50
01/01/17	621	1.000	621	98,940,000	0.63
01/01/18	605	1.001	606	101,480,000	0.60
01/01/19	522	1.051	549	105,970,000	0.52
01/01/20	461	1.109	511	109,040,000	0.47
Total	3,121		3,199	$605,500,000	0.53

Selected Frequency =	0.50
2021 Projected Payroll =	$110,000,000
2021 Projected Claim Counts =	550

Notes:

1. **Claim Count Development Factor** is from Table 13.

Section 3, Table 15

XYZ, Inc.

Workers Compensation
Average Loss Severities
(Losses are Limited to $500,000 per Occurrence)

Period Start	Trended Estimated Ultimate Incurred Losses	Estimated Ultimate Claim Count	Trended Estimated Ultimate Average Severity
01/01/15	$1,650,000	423	$3,901
01/01/16	1,330,000	489	2,720
01/01/17	1,850,000	621	2,979
01/01/18	2,050,000	606	3,383
01/01/19	1,690,000	549	3,078
01/01/20	1,440,000	511	2,818
01/01/21	1,870,000	550	3,400

Section 3, Table 16

XYZ, Inc.

Workers Compensation
2021 Aggregate Loss Probability Distribution
(Losses are Limited to $500,000 per Occurrence)

Aggregate Loss Probability	Aggregate Loss Distribution	Risk Margin
Expected	$1,870,000	100%
40%	$1,770,000	95%
45%	1,810,000	97%
50%	1,850,000	99%
55%	1,880,000	101%
60%	1,920,000	103%
65%	1,960,000	105%
70%	2,010,000	107%
75%	2,060,000	110%
80%	2,120,000	113%

Section 3, Table 17

XYZ, Inc.

Workers Compensation
Trend Factor Compilations

	(1)	(2)	(3)	(4)	(5)	(6)
	Payroll Trend		Medical Care Trend		Loss Cost Trend	
Period	Index	Factor	Index	Factor	BLCF Index	Factor
01/01/15	$19.01	1.176	26,200	1.206	1.016	1.210
01/01/16	19.36	1.155	27,500	1.149	1.007	1.160
01/01/17	20.10	1.112	28,700	1.101	1.005	1.112
01/01/18	20.78	1.076	28,900	1.093	1.005	1.090
01/01/19	21.10	1.060	29,800	1.060	1.001	1.061
01/01/20	21.72	1.029	30,700	1.029	1.000	1.029
01/01/21	22.36	1.000	31,600	1.000	1.000	1.000

Notes:

1. Payroll Trend Index - Source: U.S. Department of Commerce - Services.

2. Benefit Level Change Factor (BLCF) Index - Countrywide benchmark.

3. Loss Cost Trend Factor - (5)x(50%x(2)+50%x(4))

About SIGMA

Founded in 1995, SIGMA Actuarial Consulting Group, Inc. is an independent property and casualty actuarial firm located in Brentwood Tennessee. SIGMA provides casualty actuarial consulting services to captive managers, risk managers, brokers, risk management consultants, TPAs, and CPAs. Our credentials cover a broad spectrum from actuarial credentials and advanced academic degrees to risk management and captive insurance specialty credentials. SIGMA is dedicated to offering professional services to its clients and prides itself in the method used to communicate the results of the analysis. We are known for providing an easy to read and understandable analysis free of actuarial jargon. The findings are presented in such a way that individuals not necessarily familiar with actuarial principles and procedures can follow and reasonably understand how the calculations are made and the implications of the results. The analyses of loss data are objective and reference the most recently available insurance industry statistics when necessary and appropriate. SIGMA has won numerous industry awards that highlight our commitment to excellence and education.

CAPTIVE INTERNATIONAL US Awards WINNER	CAPTIVE INTERNATIONAL US Awards HIGHLY COMMENDED	CAPTIVE INTERNATIONAL US Awards HIGHLY COMMENDED	CAPTIVE INTERNATIONAL US Awards HIGHLY COMMENDED
Actuarial Firm SIGMA	Actuary Al Rhodes	Feasibility Study SIGMA	Feasibility Specialist Al Rhodes