Montana State Fund

Review of Rates Effective July 1, 2015
&
Review of Claim Liability as of June 30, 2015

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Date: November 19, 2015

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November 19, 2015

Ms. Tori Hunthausen, CPA
Legislative Auditor
Legislative Audit Division
State Capitol Building, Room 160
1301 E. 6th Avenue
Helena, Montana 59620

Dear Ms. Hunthausen:

We are pleased to submit to you twenty-five (25) bound copies of our final report on the Review of Rates Effectively July 1, 2015 and the Review of Claim Liability as of June 30, 2015 for the Montana State Fund.

We greatly appreciate the cooperation and courtesy extended to us during the course of this engagement. Please do not hesitate to contact us at (305) 273-1589 if you have any question about the report.

Thank you very much for the opportunity to work with you.

Sincerely,

Aguedo M. Ingco, FCAS, MAAA, CPCU, ARM
President

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I. EXECUTIVE SUMMARY

Review of Rates Effective July 1, 2015
Review of Claim Liability as of June 30, 2015

PURPOSE

The Legislative Audit Division ("LAD") has engaged the services of AMI Risk Consultants, Inc. ("AMI") to perform the following:

- Determine if the rates established by the Montana State Fund ("MSF") for workers' compensation insurance are excessive, inadequate, or unfairly discriminatory;
- Evaluate the adequacy of amounts reserved by MSF at June 30, 2015 and the reasonableness of procedures used in the claim reservation process; and
- Recommend areas where MSF should modify its procedures for estimating claims liability and its rate making procedures to ensure rates are not excessive, inadequate, or unfairly discriminatory.

SCOPE

AMI's contract with the LAD requires that this report address the following:

A. For MSF rates effective July 1, 2015

1. Include appropriate analysis of the data used in the rate setting process.
2. Include appropriate analysis of the methods for setting the overall rate level and the rates by class.
3. Comment and conclude on the reasonableness of the rate setting methodology, formulas and procedures
4. Conclude as to whether the rates effective July 1, 2015 are excessive, inadequate or unfairly discriminatory.

B. For MSF loss and loss adjustment expense ("LAE") reserves as of June 30, 2015

1. Evaluate and comment on the data, formulas and methodology used by MSF's contract actuary in their estimates of MSF's loss and LAE liabilities.
2. Assess, comment and conclude on the reasonableness of the loss and LAE reserves established by MSF.

C. Information provided by MSF to their contract actuary

1. Review the procedures used by MSF's contract actuary to assess the consistency and reasonableness of the information obtained from MSF.
2. Determine the reliance placed on the information.
3. Comment and conclude on the adequacy of the procedures used by MSF's contract actuary to assess the consistency and reasonableness of information obtained from MSF.

D. Ranking of data elements

1. Review the data elements used by MSF's contract actuary in the rate setting process and the estimation of claims liability respective to each fiscal year reviewed.
2. Rank the data elements used by the actuary in terms of risk that erroneous data could materially affect the rates and estimated claims liability.

MSF COMMENTS AND RESPONSE	MSF and their contract actuary, Towers Watson ("TW"), had an opportunity to comment and respond to the conclusions presented in this report. Their response is attached to the final version of this report.

SUMMARY OF CONCLUSIONS

MSF Rates Effective July 1, 2015

In our opinion, the rates effective July 1, 2015 are not excessive, inadequate, or unfairly discriminatory. See Section A1 to A4.

MSF Loss and LAE Reserves as of June 30, 2015

Our opinion is that MSF's recorded loss and LAE reserves for the New Fund at June 30, 2015 are reasonable. However, our estimated loss and LAE reserves at June 30, 2015 for the Old Fund are above TW's high range of estimate. See Sections B1 to B2.

Data Testing Procedures

Our opinion is that the procedures used by TW to test the data used in both ratemaking and reserving are adequate. We do not have any further testing to suggest.

See Sections C1 to C3.

Ranking of Data Elements

It is our opinion that the rates and estimated reserves are most sensitive to errors in historical paid and reported loss triangles together with information on MSF internal operations.

See Sections D1 to D2.

SOURCES OF INFORMATION

AMI received the following documents from MSF:

Rates

- TW's Rate Level Analysis for the July 1, 2015 to June 30, 2016 Exposure Period (including Appendices)
- TW's Loss Cost Multiplier Analysis for the July 1, 2015 to June 30, 2016 Underwriting Year
- TW's Multivariate Model and Tier Structure Validation Update 2014
- Tiered Rating Plan Board Packet
- Loss Cost Exceptions Board Packet
- MSF Actual and Expected Results by Rate Tier as of March 31, 2015
- TW Certification of Loss Cost Exceptions
- TW Certification of Tier Rating
- MSF Top 20 Class Codes by Premium Volume as of December 31, 2014
- Internal Notes on MSF Special Classifications
- Internal Notes on Selected Deviations
- Terrorism Load from NCCI Filing
- Historical MSF equity-to-premium and investment yields

Reserves

- TW's Indicated Unpaid Loss and LAE Amounts as of June 30, 2015 - New Fund and Old Fund (including Appendices).
- MSF FY 2015 Statutory Balance Sheet (draft)
- Reconciliation of TW Indicated Reserves at June 30, 2015 to MSF Carried Reserves
- TW's September 2, 2015 letter to Mr. Laurence Hubbard addressing Anticipated Reinsurance Recoveries as of June 30, 2015.

In addition we communicated with Dan Gengler, MSF's Internal Actuary, and he provided background information and perspective for our consideration.

ACKNOWLEDGMENT OF QUALIFICATIONS

Aguedo M. (Bob) Ingco is a consulting actuary and President of AMI Risk Consultants, Inc. He is a Fellow of the Casualty Actuarial Society and a Member of the American Academy of Actuaries. Mr. Ingco meets the qualification standards of the American Academy of Actuaries to provide the opinions contained in this report.

II. ACTUARIAL REPORT

BACKGROUND **Rates**

Effective July 1, 2015 MSF implemented a 5**.0% decrease** to the Fund's overall rate level.

Depending on the investment yield MSF earns over the lifetime of the FY 2016 policy liabilities, TW estimates that the policies, at this rate level, will make the following contribution to equity:

TW Estimated Contribution to Equity Selected Rate Change of -5% % of FY 2016 Manual Premium	
Investment Yield	Contribution to Equity
0.00%	-10.5%
2.25%	-0.9%
2.50%	0.0%
2.75%	0.8%
3.00%	1.6%

Historical Investment Yield

MSF's investment yield in recent years has been as follows:

MSF Investment Yield By Fiscal Year*						
2009	2010	2011	2012	2013	2014	2015
4.68%	4.21%	3.80%	3.70%	3.45%	2.83%	2.68

*Recent bond purchases yielding considerably less. Effective duration as of 5/31/13 was 3.7 years for the bond portfolio. Yields for 2014 and subsequent computed from Draft Annual Statements.

Target Equity

MSF's target equity is a **reserve to equity ratio between 2.0 and 2.5**. In recent years the ratio realized has been:

MSF Reserves to Equity Ratio By Fiscal Year						
2009	2010	2011	2012	2013	2014	2015
4.05	3.47	2.95	2.80	2.43	2.08	1.73

*Yield for 2015 computed from Draft FY2015 Annual Statement.

BACKGROUND (CONTINUED)

Reserves

At June 30, 2015 MSF recorded a loss and LAE liability of **$895.5 million** which was **$44.3 million** higher than TW's central estimate for the New Fund. Of the **$44.3 million** difference, **$3.0 million** are for liabilities not explicitly contemplated in TW's estimates (Other States Coverage and Employers Liability).

MSF Recorded Reserves – New Fund Compared to TW Central Estimate Medical and Indemnity At June 30, 2015 ($millions)		
TW Central Estimate	MSF Recorded	Difference
$851.2	$895.5	44.3

TW estimated a loss and LAE liability of $41.6 million for the Old Fund. MSF does not record reserves for the Old Fund. The Old Fund reserve estimate was provided to assist the Old Fund's controlling authority.

State of Montana Recorded Reserves – Old Fund Compared to TW Central Estimate Medical and Indemnity At June 30, 2015 ($millions)		
TW Central Estimate	State of Montana Recorded	Difference
$41.6	**$41.6**	**$0**

BACKGROUND (CONTINUED)

Reserves (continued)

Adverse Development – TW Central Estimates - New Fund

The history of TW Central Estimates showed a pattern of chronic adverse development, as estimates of "ultimate loss" are repeatedly restated at higher and higher levels in the 2000's. This is more evident in the older accident years than the recent ones, as seen in the table below. However, the adverse development only represents a small percentage of the corresponding ultimate losses and that the pattern of adverse development seems to have stabilized over the recent years.

As explained in the TW report, the adverse deviation in the past year is attributed to faster than expected claim payouts.

TW Central Estimates of Ultimate Loss -New Fund
Annual Loss Reserve Reviews
Adverse (Favorable) Development Over the Past Seven Years
(2008 – 2015)
($000's)

Development Period	Older Accident Years 90/91 – 02/03	Newer Accident Years 03/04 – 12/14	Total
2008 to 2009	$13,323	$5,624	$18,947
2009 to 2010	7,482	6,323	13,805
2010 to 2011	4,345	(2,085)	2,260
2011 to 2012	4,150	(2,180)	1,970
2012 to 2013	7,170	(4,150)	3,020
2013 to 2014	335	(4,475)	(4,140)
2014 to 2015	4,130	1,690	5,820
7-Yr Total	**$40,935**	**$747**	**$41,682**

REVIEW OF RATES EFFECTIVE JULY 1, 2015

A1: Analysis of Data Used in Rate Setting

Data Used for the Overall Rate Level Analysis

TW used a combination of loss, expense, premium, exposure and economic data in their estimation of MSF's projected contribution to equity for different rate level change scenarios. Most of the data was supplied by MSF including the economic data such as medical CPI, unemployment and employment rates, and average weekly wages. Data was tested for consistency in order to validate the assumptions of the different actuarial methodologies used. (Those tests will be detailed in section C1 of this report).

Data Used for the Tier Rating

To update MSF's tier structure in response to the latest experience data from the more mature NCCI rating plan and stakeholder concerns, TW performed a multivariate analysis in predicting loss ratios using individual policyholder claims and exposure data with account size, experience modification factor, hazard grade, historical frequency, and claim-free tenure as independent variables. Before running the model, TW performed several diagnostic and data reasonableness checks, as described in section C1. For the 2014 update, TW decided to drop the hazard grade and experience modification factor from the scorecard structure.

Data Used for the NCCI Class Deviations and Special Classifications

MSF uses average manual premiums and pure premium indications for each class together with a credibility model to flag NCCI classes that merit further review and to derive rates for special classes not included in the NCCI class plan.

REVIEW OF RATES EFFECTIVE JULY 1, 2015 (continued)

A2: Analysis of Methods for Setting Overall Rate Level and Rates by Class

Overall Rate Level

The projected contribution to equity is determined using premium and loss data for accident years 1999/2000 to 2013/2014. Manual premiums are developed to ultimate and adjusted to the 2015/2016 manual rate level. Losses are likewise developed to ultimate and adjusted to current mix of business and 2015/2016 benefit level. Ultimate on-level losses are further adjusted for loss ratio trend and are loaded for Employers' Liability and reduced by a ceded percentage. A set of low, central, and high indications is derived separately for medical and indemnity and are then summed to a combined indication for each accident year.

The ALAE and Other Expense (General Underwriting and Production Expense) loadings are calculated using historical paid-to-paid ratios by fiscal year. The ULAE loading is computed using the Johnson method. Both loss adjustment expense loadings are partially adjusted to reflect the effects of HB 334.

Losses and LAE are then discounted using a selected payment pattern and discount rates 0.00%, 2.25%, 2.50%, 2.75%, and 3.00%.

The following loadings provided by MSF are also incorporated into the analysis:

- 5.0% adverse deviation (% of loss)
- 0.7% terrorism load (% of loss)
- 0.7% terrorism load (% of earned premium)
- 6.4% commissions (% of earned premium)
- 2.4% expense constant revenues (% of standard premium)
- 2.2% variable reinsurance costs (% of standard premium)
- 0.3% fixed reinsurance costs (% of earned premium)
- 5.6% pricing programs off-balance (% of manual premium).

An outline of our analysis regarding the different methods used in projecting the ultimate losses by accident year is in Appendix A.

TW uses generally accepted actuarial methods throughout the rate setting practice. In addition, they used regression analysis to determine the trend factors for claim count, severity, and loss ratio trends based on economic variables.

REVIEW OF RATES EFFECTIVE JULY 1, 2015 (continued)

A2: Analysis of Methods for Setting Overall Rate Level and Rates by Class (continued)

Tier Rating

TW utilized a multivariate model to estimate loss ratios using account size, historical frequency, and claim-free tenure as independent variables. This is a standard method used for classification ratemaking. A review is performed regularly to monitor the reasonableness of the TW rate tier relativities when compared to actual experience.

NCCI Class Deviations and Special Classifications

Every year MSF undergoes an underwriting review of the classes with MSF experience significantly different from NCCI indications.

Expected combined ratios are computed using the policy premium database, limited losses, 2015/2016 rate tier parameters and applicable net underwriting debits/credits, expenses, and other provisions. These expected combined ratios are examined to determine if the expected profitability for each tier is roughly equivalent. If material differences exist, further review will be done with regards to the tier assignment criteria or the tier relativities in addition to possible underwriting reviews.

MSF also has special classifications that are not recognized by NCCI but are implemented to meet the needs of the MSF's book of business. Indicated rates for these special classes are determined as part of the classification review process.

A3: Reasonableness of Rate Setting Approach

In this section we will comment upon TW's indications, including the approach applied and the actuarial selections made. In addition we show the results of our own calculations.

Comments on Overall Rate Level Approach

The TW approach to determining the projected equity contribution recognizes the appropriate, standard ratemaking elements. Our opinion of the various selections and calculations made by TW are discussed below.

Selection of Ultimate Losses

Our opinion is that TW's selections of ultimate losses are somewhat on the low side of the indications. Please see section B2 of this report for detailed discussion. In their overall rate level calculations, TW includes a load for adverse deviation of ultimate losses, at the request of MSF management based on a Montana statute requiring that MSF rates be set at a level that is more rather than less likely to cover costs. However, in our calculations we elected to remove the adverse deviation load and instead select ultimate losses nearer the midpoint of the Tower Watson indications which are higher than their selected ultimates.

Provision for Adverse Deviation

In evaluating the reasonableness of the 5% provision for adverse deviation in the rates, a comparison of the rate level indications and the current ultimate loss estimates is shown below:

AY	Expected Loss Ratio	Current Estimated Loss Ratio	Variance
2000	0.954	0.984	0.030
2001	0.810	1.197	0.387
2002	0.791	0.999	0.208
2003	0.777	1.004	0.226
2004	0.796	0.816	0.020
2005	0.754	0.722	-0.032
2006	0.733	0.696	-0.037
2007	0.733	0.649	-0.084
2008	0.715	0.661	-0.054
2009	0.696	0.643	-0.053
2010	0.700	0.625	-0.075
2011	0.646	0.678	0.032
2012	0.597	0.671	0.074
2013	0.630	0.653	0.023
2014	0.638	0.680	0.042
2015	0.665	0.636	-0.029

REVIEW OF RATES EFFECTIVE JULY 1, 2015 (continued)

A3: Reasonableness of Rate Setting Approach (continued)

We believe that the provision is reasonable given the historical variance between the expected and current loss ratio estimates. To assess the impact of the provision in the projected equity contributions, we have prepared the following comparison as well as Exhibit I to calculate the equity contributions assuming a 0% loading for adverse deviation.

Calculation of Rates on a Direct Basis

Our own rate level calculations below are performed on a direct basis. We did not reduce the indicated loss ratio by the ceded portion, and we excluded any reinsurance costs. In our opinion, this is an appropriate approach to determining the cost of risk transfer between the MSF and the insured.

Comparison of Assumptions and Projected Equity Contribution (as % of Premium)

Component	TW	AMI
Ultimate Loss Ratio	65.3%	66.3%
Ceded Losses	0.50%	0.00%
Adverse Deviation	5.0%	0.0%
Variable Reinsurance Costs	2.2%	0.0%
Fixed Reinsurance Costs	0.3%	0.0%
Rate Change	-5.0%	-5.0%
Investment Yield	Projected Equity Contribution	
0.00%	-10.5%	-5.6%
2.25%	-0.9%	3.6%
2.50%	0.0%	4.3%
2.75%	0.8%	5.1%
3.00%	1.6%	5.9%

Our projected equity contributions are slightly higher for each investment yield scenario.

REVIEW OF RATES EFFECTIVE JULY 1, 2015 (continued)

A3: Reasonableness of Rate Setting Approach (continued)

Comments on Tier Rating Approach, Class Deviations, and Special Classifications

The methods used by TW in determining the indicated rates by class recognize the appropriate, standard ratemaking elements. In our opinion, their approach appropriately takes into account the changing claims conditions but still allows for rate stability.

In the 2014 update of the tier rating, the experience modification factor and hazard grade variables were removed in the final scorecard model due to weak predictive power. However, we do recommend, for future updates, that dropped variables be still included in the documentation of exposure distribution and loss ratio graphs to be able to assess any trend or predictive power.

The relativities were also adjusted for the claim-free tenure variable so that there will be more incentives for the insured to control risks. Relativities were selected by management for each category up to 10+ years of claim-free experience even though statistically, the estimated loss ratios do not significantly vary after having 2 years of claims-free experience. We believe that the selected relativities are reasonable given management's objective of providing a path for insureds to achieve lower rates that is not too aggressive and rewards workplace safety.

A4: Conclusion Regarding Rates Effective July 1, 2015

In our opinion, the rates effective July 1, 2015 are not excessive, inadequate, or unfairly discriminatory.

Overall Rate Level

Since the MSF's reserve-to-equity ratio in the 2015 fiscal year is lower than the target reserve-to-equity ratio, a rate decrease is appropriate. Our calculated projected equity contribution shows a break-even point at an investment yield between 0.00% and 2.25%, which is a reasonable estimate of the investment yield that could be expected for new policy money in the current investment environment.

REVIEW OF RATES EFFECTIVE JULY 1, 2015 (continued)

A4: Conclusion Regarding Rates Effective July 1, 2015 (continued)

Tier Rating Approach, Class Deviations, and Special Classifications

We believe the procedures and methodology used by TW and MSF in class ratemaking and tiering are reasonable. Their methods highlight both statistical considerations and expert opinion in determining the appropriateness of class rates and tier definitions.

REVIEW OF LOSS AND LAE RESERVES AS OF JUNE 30, 2015

B1: Data and Methods Used by MSF's Contract Actuary

An outline of the data and methods used by TW in estimating loss and LAE reserves is attached to this report as **Appendix A**. An overview and discussion follow below.

Data Used by MSF's Contract Actuary

Similar to the overall rate level analysis, TW used a combination of loss, premium, exposure and economic data, mostly supplied by MSF, in their estimation of MSF's estimated loss and LAE reserves. The same consistency tests are done as described in section C1.

For the Old Fund, open claims data for Fatal, Permanent Total, and Permanent Partial injuries was used for the Sherman-Diss approach together with assumed medical inflation rates, claimant birth dates, and SSA life tables.

Methods Used by MSF's Contract Actuary

TW applied a variety of methods to estimate MSF's loss reserves. Some are methods frequently used in practice, such as:

- Loss Development Approach – projects cumulative paid losses by accident year to ultimate using selected factors based on historical payment patterns.
- Bornhuetter-Ferguson Approach – estimates ultimate losses by accident year using actual paid and expected unpaid losses.
- Berquist-Sherman Approach – projects adjusted cumulative reported losses by accident year to ultimate using selected factors.

Others are more unusual:

- Frequency-Severity Index Approach – estimates ultimate losses by accident year using a base 2015/2016 level ultimate losses and estimated trend factors.

REVIEW OF LOSS AND LAE RESERVES AS OF JUNE 30, 2015 (continued)

B1: Data and Methods Used by MSF's Contract Actuary (continued)

- Adjusted Case Reserve Approach – estimates ultimate losses by accident year using case reserves augmented by estimates of unreported claims, future reopenings, change in disability type, medical inflation/cost of living adjustments and future development potential (Old Fund only).
- Sherman-Diss Method (Old Fund only) – projects medical and indemnity payments for open claims using a heuristic trended mortality model.

To estimate the ALAE loading, TW used a single paid-to-paid method. To estimate ULAE loading, TW used the Johnson Method which is based on relative ULAE costs per claim activity.

Adjustments and Accommodations for Changing Conditions

The MSF data underlying the loss reserve estimates have been impacted by changes in benefit structures, faster closure rates, reduced temporary total disability durations, increased lump sum payments, inconsistent case reserving, shifts in the business mix, and varying loss ratio trends.

TW made a number of adjustments and accommodations for these changing conditions impacting the data. These include the following:

- Selecting loss development factors for groups of accident periods, grouping the accident periods with common statutory benefits;
- Accelerating selected development patterns to reflect faster closure rates and improvements in claims processing;
- Computing indicated ultimates after adjusting for lump sum settlements and excess medical payments;
- Using Berquist-Sherman approach to adjust for the varying case reserve levels in the reported loss triangles; and
- Using the Frequency-Severity Index method to reflect changes in the business mix and loss ratio trends.

REVIEW OF LOSS AND LAE RESERVES AS OF JUNE 30, 2015 (continued)

B1: Data and Methods Used by MSF's Contract Actuary (continued)

Key Selections

There are a number of points in the loss reserve calculations where selections are made based on actuarial judgment. One of the key assumptions that impacts the majority of the methods applied is the selection of paid loss development factors. We have reviewed the methodology used by TW in selecting the paid loss development factors and we have concluded that they are reasonable.

B2: Reasonableness of MSF's Loss and LAE Reserves

Opinion on TW's Loss and LAE Estimates

In our opinion the data and methods applied by TW are reasonable. TW made every effort to account for changing conditions, both internal and external to MSF, in their choice and application of data. Furthermore their selection of loss development factors and other selected values required by the various methods appear reasonable.

However, we do disagree with TW's final ***selection of ultimate losses*** based on the range of indications produced by the array of methods applied appears low.

No two actuaries will make exactly the same selections of factors or estimates when faced with similar indications. However, ***it is our opinion*** that in light of the persistent adverse development of past estimates, a selection of ultimate losses closer to the midpoint of the various indications would be prudent.

REVIEW OF LOSS AND LAE RESERVES AS OF JUNE 30, 2015 (continued)

B2: Reasonableness of MSF's Loss and LAE Reserves (continued)

Comparison of TW and AMI Selections – New Fund Ultimate Losses - Medical

The range of indicated New Fund ultimate Medical losses produced by TW's using the various methods are shown below, ranked from low to high:

TW Ultimate Loss Indications -New Fund Ranked from Low to High ($millions)	
Method	Medical
Paid Development – Low Factors	$1,522
Paid Dev. – Adjusted for Excess Settlements	1,770
Bornhuetter-Ferguson – Prior Ultimates	1,799
Bornhuetter-Ferguson – Freq-Sev Index	1,816
Frequency-Severity Index	1,830
Paid Development – Low/Hi Mixed Factors	1,895
Adjusted Case Reserves*	1,899
Paid Development – High Factors	2,203
Berquist-Sherman*	2,722
Selected Central Estimate	
TW	**1,792**
AMI	**1,841**

*Berquist-Sherman for latest two years and adjusted case reserve indication assumed to be the average of all other methods.

As shown above our selected ultimate loss for New Fund Medical is ***$49 million above TW***, and nearer to the middle of the range of Medical indications.

B2: Reasonableness of MSF's Loss and LAE Reserves (continued)

Comparison of TW and AMI Selections – New Fund Ultimate Losses - Indemnity

The range of indicated New Fund ultimate Indemnity losses produced by TW's using the various methods are shown below, ranked from low to high:

TW
Ultimate Loss Indications (New Fund)
Ranked from Low to High
($millions)

Method	Indemnity
Paid Development – Low Factors	$1,055
Reported Development	1,077
Adjusted Case Reserves*	1,116
Born.-Ferg.– Freq-Sev Index – Excl. Lump Sum	1,117
Paid Dev. – Adj. for Excess Lump Sum	1,121
Bornhuetter-Ferguson – Prior Ultimates	1,124
Bornhuetter-Ferguson – Freq-Sev Index	1,128
Frequency-Severity Index	1,129
Paid Development – Low/Hi Mixed Factors	1,178
Paid Development – High Factors	1,217
Selected Central Estimate	
TW	**1,120**
AMI	**1,130**

*Adjusted case reserve indication for latest year assumed to be the average of all other methods.

As shown above our selected ultimate loss for New Fund Indemnity is ***$10 million above TW***, and nearer to the average of the Indemnity indications.

REVIEW OF LOSS AND LAE RESERVES AS OF JUNE 30, 2015 (continued)

B2: Reasonableness of MSF's Loss and LAE Reserves (continued)

Opinion on MSF's Recorded Loss and LAE Reserves – New Fund

Based on our selections of ultimate losses and LAE factors as described above, our estimate of MSF's net loss and LAE reserves at June 30, 2015 is ***$923 million*** as derived below:

AMI Estimated Loss and LAE Reserves (New Fund) Central Estimate @6/30/15	
Component	$Millions
(1) AMI Selected Ultimate Loss	$2,971
(2) Paid Losses	2,131
(3) Gross Loss Reserve (1) – (2)	840
(4) ALAE Reserve at 3.2%	27
(5) ULAE Reserve at 11.0%	92
(6) MSF Estimated Ceded Reserve	36
(7) Net Loss and LAE Reserve*	**$923**

*(7) = (3) + (4) + (5) – (6).

At June 30, 2015 MSF recorded net loss and LAE reserves of ***$895.5 Million, or 3.0% below AMI's central estimate.***

We note that TW's range of reasonable loss estimates extends from 2.7% below to 3.7% above their central estimate.

Our opinion, therefore, is that MSF's recorded reserves fall within a reasonable range of our central estimate, and ***we conclude that recorded reserves are reasonable.***

REVIEW OF LOSS AND LAE RESERVES AS OF JUNE 30, 2015 (continued)

B2: Reasonableness of MSF's Loss and LAE Reserves (continued)

Comparison of TW and AMI Selections – Old Fund Ultimate Losses - Medical

The range of indicated Old Fund ultimate Medical losses produced by TW's using the various methods are shown below, ranked from low to high:

TW Ultimate Loss Indications (Old Fund) Ranked from Low to High ($millions)	
Method	Medical
Paid Development – Low Factors	$437
Adjusted Case Reserves	478
Paid Development – High Factors	480
Sherman-Diss*	552
Berquist-Sherman**	610
Selected Central Estimate	
TW	**455**
AMI	**512**

*Sherman-Diss for 1977/1978 & prior assumed to be the average of all other methods.
**Berquist-Sherman for 1973/1974 & prior assumed to be the average of all other methods.

As shown above our selected ultimate loss for Old Fund Medical is ***$57 million above TW***, and nearer to the average of the Medical indications.

REVIEW OF LOSS AND LAE RESERVES AS OF JUNE 30, 2015 (continued)

B2: Reasonableness of MSF's Loss and LAE Reserves (continued)

Comparison of TW and AMI Selections – Old Fund Ultimate Losses - Indemnity

The range of indicated Old Fund ultimate Indemnity losses produced by TW's using the various methods are shown below, ranked from low to high:

TW Ultimate Loss Indications (Old Fund) Ranked from Low to High ($millions)	
Method	Indemnity
Paid Development – Low Factors	$782
Sherman-Diss*	793
Reported Development	795
Adjusted Case Reserves*	798
Paid Development – High Factors	800
Selected Central Estimate	
TW	**786**
AMI	**794**

*Sherman-Diss for 1977/1978 & prior assumed to be the average of all other methods.

As shown above our selected ultimate loss for Old Fund Indemnity is ***$7 million above TW***, and nearer to the average of the Indemnity indications.

REVIEW OF LOSS AND LAE RESERVES AS OF JUNE 30, 2015 (continued)

B2: Reasonableness of MSF's Loss and LAE Reserves (continued)

Opinion on TW's Selected Loss and LAE Reserves – Old Fund

Based on our selections of ultimate losses as described above, our estimate of the Old Fund's net loss and LAE reserves at June 30, 2015 is ***115 million*** as derived below:

AMI Estimated Loss and LAE Reserves (Old Fund) Central Estimate @6/30/15	
Component	$Millions
(1) AMI Selected Ultimate Loss	$1,306
(2) Paid Losses	1,207
(3) Gross Loss Reserve (1) – (2)	99
(4) ALAE Reserve at 3.2%	3
(5) ULAE Reserve at 10.0%	10
(6) DLI Assessments at 3.0%	3
(7) Net Loss and LAE Reserve*	**115**

*(7) = (3) + (4) + (5) + (6).

At June 30, 2015 TW's estimated Old Fund net loss and LAE reserves are ***$41.6 Million, or 63.8% below AMI's central estimate. Consequently, our estimated central estimate is above TW's range.***

REVIEW OF INFORMATION PROVIDED BY MSF TO CONTRACT ACTUARY

C1: Procedures Used by Contract Actuary to Test Data

The methodology used by TW in their rate level and reserve reviews rely on certain assumptions. For the conclusions to be reliable, these assumptions need to be validated for the data at hand.

Overall Rate Level and Reserve Analysis

TW prepared several diagnostic exhibits in section C of their Appendix separately for Medical and Indemnity. A list of these exhibits is shown below:

1. Ratio Incremental Paid to Open (Lag 1) – displays the changes in closure rates
2. Average Case Outstanding – shows the changing case reserve adequacy over time
3. Paid to Reported Ratio – used to identify changes in payment rates and/or case reserve adequacy
4. Ratio Closed Count to Ultimate Count – shows changes in the settlement rate of claims
5. Estimated IBNR Count
6. Open and Estimated IBNR Count
7. Paid Loss Incremental – identifies changes in payment rates, specifically trends in lump sum and excess payments
8. Reported Loss Incremental – shows the changing case reserve adequacy over time
9. Outstanding Losses
10. Closed Claim Count
11. Open Claim Count
12. Paid Losses / Ultimate Losses – shows payment rates across time
13. Average Outstanding Loss including IBNR – shows changes in reserve adequacy
14. IBNR Counts / Ultimate Counts – shows changes in claim settlement rates
15. Ratio of Paid Loss to Adjusted Reported Loss - identifies changes in payment rates and/or case reserve adequacy

REVIEW OF INFORMATION PROVIDED BY MSF TO CONTRACT ACTUARY (continued)

C1: Procedures Used by Contract Actuary to Test Data (continued)

Class Ratemaking

TW used individual policyholder exposure and claims database for accident years 2008 through 2013 in their multivariate models. Several data checks and verification were done to minimize the distortion in the results as well as to identify certain data elements that warranted further review, such as negative or blank cell entries. Other measures undertaken are listed below:

- Reconciling control totals with other databases;
- Performing univariate distribution analysis for each variable and by policy or claims year; and
- Matching premium and loss records by policy.

C2: Reliance Placed on Various Data Items

Aside from historical loss triangles, premiums, and exposure data, considerable reliance is placed by TW on certain data items that were provided directly by MSF which include most economic data and loss/expense loadings.

C3: Adequacy of Procedures Used by Contract Actuary to Test Data

Our opinion is that the procedures used by TW to test the data used in both ratemaking and reserving are adequate. We do not have any further testing to suggest.

RANKING OF DATA ELEMENTS

D1: Review of Data Elements

The following data elements were used by TW in their rate level and reserve analysis, as provided by MSF:

1. Historical paid and reported losses – used as a base to project losses to ultimate value by accident year. Used also in calculating the appropriate payment pattern for discounting purposes.
2. Historical closed, reported, and open claim counts – used in several diagnostic exhibits, Berquist-Sherman method, and Frequency-Severity Index method.
3. Historical premium, payroll, and expense data – used in computing the selected loss ratio and projected equity contributions
4. Rate change history – adjusts historical premiums to current rate level
5. Statutory benefit changes – adjusts historical loss data to current benefit level
6. Historical exposure, premium, and loss data for new and departed business – adjusts historical data to current mix of business
7. Internal MSF analyses on several court cases – used to identify its effect on Old Fund' claim payout patterns
8. Information on MSF operations – gives insights on any adjustments or considerations that should be taken throughout the analysis, as what TW did:
    a. Selecting different loss development factors for accident year groups to reflect changes in statutory benefit changes
    b. Acceleration of development patterns due to faster closure rates and improved claim operations
    c. Adjustment of estimates to reflect the impact of excess lump sum and settlements
    d. Use of more sophisticated methods to reflect the implementation of Claim Center in 2006
9. Economic statistics and forecasts – used regression analysis to predict trends
10. Individual policyholder exposure and claims database for accident years 2008 through 2013 – used for multivariate modeling of tier rate relativities
11. Impact on MSF's book of business of: July 1, 2015 NCCI loss costs, MSF proposed deviations and MSF special classes; current MSF rates; and proposed MSF rating programs – used to calculate the LCM multipliers

RANKING OF DATA ELEMENTS (continued)

D2: Ranking of Data Elements

In this section we will rank the data elements used for each analysis in terms of risk that erroneous data could materially affect the results.

Ranking of Data Elements Used in Ratemaking

It is our opinion that the following items greatly affects the rate level sensitivities to errors and thus are given high ranking:

1. Historical paid and reported losses – historical loss information is the starting point for any ratemaking analysis since the rates are mostly composed of the loss provision. TW relied more on the paid development triangles due to the inconsistent case reserving present in the reported triangles. If the historical losses are distorted and not accounted for, loss projections would also be greatly distorted. It's not just the current year's data that is at issue but the whole history itself. This potential distortion would be further compounded since the payment patterns used in determining the discount factors are also calculated from the historical paid triangles.
2. Information on MSF operations – changes in the claims environment can invalidate the assumptions of most actuarial methods. However, TW took every effort to take into account these changes by making several selections and actuarial methods as described in the previous section. If these were not done, material distortions could result in the projections.

A vital step in any ratemaking analysis is the ability to combine historical experience in determining projected indications. However, adjustments need to be done in order to combine data that are on-level with the projection period. The following data items were used by TW to calculate these on-level factors and are given slightly lesser rankings than the first two items.

3. Historical closed, reported, and open claim counts
4. Historical premium, payroll, and expense data
5. Rate change history
6. Statutory benefit changes
7. Historical exposure, premium, and loss data for new and departed business
8. Economic statistics and forecasts

RANKING OF DATA ELEMENTS (continued)

D2: Ranking of Data Elements (continued)

After the overall rate level has been determined, the class rates have to be brought on-level as well. TW calculated rate relativities using a multivariate model to accomplish this. However, these rate relativities rely on the assumption that the overall rate level is accurate, thus are given lesser rankings than the previous items.

9. Individual policyholder exposure and claims database for accident years 2008 through 2013
10. Impact on MSF's book of business of: July 1, 2015 NCCI loss costs, MSF proposed deviations and MSF special classes; current MSF rates; and proposed MSF rating programs

Ranking of Data Elements Used in Reserving

It is our opinion that the following items greatly affects the reserve estimate sensitivities to errors and thus are given high ranking:

1. Historical paid and reported losses – as in the case for ratemaking, the reserving process starts off with the projection of loss amounts to ultimate. Thus, the same distortions and inconsistencies could affect the results if not properly accounted for.
2. Information on MSF operations – as also the case in ratemaking, changes in the claims environment can invalidate the assumptions of most actuarial methods. Similarly, TW accounted for these changes in their analyses.
3. Internal MSF analyses on several court cases – large claims tend to develop differently than the other claims and could materially affect the development in future periods. TW took this into consideration by reviewing these cases with MSF.

RANKING OF DATA ELEMENTS (continued)

D2: Ranking of Data Elements (continued)

A common approach in reserving is to estimate ultimate losses by accident year. In some cases, it is also desirable to have single estimate based on the combined experience for a more credible estimate. However, adjustments need to be done in order to combine data that are on-level with a common projection period. The following data items were used by TW to calculate these on-level factors and are given slightly lesser rankings than the first three items.

4. Historical closed, reported, and open claim counts
5. Historical premium, payroll, and expense data
6. Rate change and statutory benefit change history
7. Historical exposure, premium, and loss data for new and departed business
8. Economic statistics and forecast

ATTACHED EXHIBITS

The following exhibits are attached to this report:

- Summary Exhibit
  - Page 1 shows our projected equity contribution at an effective rate change of -5.0% as compared to TW
  - Page 2 shows our estimated reserves as compared to TW
- Exhibit I – AMI Projected Contribution to Equity
- Exhibit II – AMI Selected Ultimate Losses
  - Page 1 shows our selected ultimate losses by accident year for the New Fund
  - Page 2 shows our selected ultimate losses by accident year for the Old Fund

Attached as Appendix A is an outline of our analysis regarding the different methods used by TW in projecting the ultimate losses by accident year.

III. ACTUARIAL EXHIBITS

MONTANA STATE FUND

RATE LEVEL ACTUARIAL REVIEW

FOR THE EXPOSURE PERIOD JULY 1, 2015 TO JUNE 30, 2016

COMPARISON OF ASSUMPTIONS AND PROJECTED EQUITY CONTRIBUTIONS

WORKERS' COMPENSATION

	TOWERS WATSON	AMI	Difference
1. SELECTED ULTIMATE LOSS RATIO	**65.3%**	**66.3%**	**-1.01%**
2. EMPLOYERS' LIABILITY	**0.25%**	**0.25%**	**-**
3. CEDED LOSSES	**0.50%**	**0.00%**	**0.50%**
4. LOSS LOADINGS	**5.7%**	**0.7%**	**5.00%**
4a. Adverse Deviation	5.0%	0.0%	**5.00%**
4b. Terrorism	0.7%	0.7%	-
5. EXPENSE PROVISIONS			
5a. Loss Adjustment Expenses	18.1%	18.1%	-
5b. Commissions	6.4%	6.4%	-
5c. Other Expenses	12.9%	12.9%	-
5d. Revenue Generated by Expense Constant	2.4%	2.4%	-
5e. Variable Reinsurance Costs	2.2%	0.0%	**2.20%**
5f. Fixed Reinsurance Costs	0.3%	0.0%	**0.30%**
6. RATE CHANGE	**-5.0%**	**-5.0%**	-
7. PRICING PROGRAMS	**5.6%**	**5.6%**	-
8. TERRORISM LOAD	**0.7%**	**0.7%**	-

10. INVESTMENT YIELD	11a. INDICATED CONTRIBUTION TO EQUITY	12a. DISCOUNT FACTOR	11b. INDICATED CONTRIBUTION TO EQUITY	12b. DISCOUNT FACTOR	
0.00%	**-10.5%**	1.000	**-5.6%**	1.000	**-4.94%**
2.25%	**-0.9%**	0.893	**3.6%**	0.893	**-4.46%**
2.50%	**0.0%**	0.884	**4.3%**	0.884	**-4.33%**
2.75%	**0.8%**	0.875	**5.1%**	0.875	**-4.29%**
3.00%	**1.6%**	0.866	**5.9%**	0.866	**-4.26%**

Notes:
Towers Watson column per Towers Watson 7/1/2014 Rate Level Analysis report.
AMI column per Exhibit I.
Difference = Towers Watson - AMI.

MONTANA STATE FUND

LOSS AND LOSS ADJUSTMENT EXPENSE RESERVES REVIEW

AS OF JUNE 30, 2015

COMPARISON OF ESTIMATED LOSS & LAE RESERVES

WORKERS' COMPENSATION

($Amounts in Millions)

LOSSES EXCLUDING LAE

COVERAGE	TOWERS WATSON			AMI
	LOW	CENTRAL	HIGH	CENTRAL
	(1)	(2)	(3)	(4)
OLD FUND	**$32.5**	**$35.8**	**$78.6**	**$99.3**
MEDICAL	$25.1	$27.6	$68.4	$83.5
INDEMNITY	$7.4	$8.2	$10.1	$15.8
NEW FUND	**$703.3**	**$780.5**	**$888.3**	**$839.6**
MEDICAL	$550.6	$611.8	$703.5	$660.7
INDEMNITY	$152.7	$168.8	$184.8	$178.9
TOTAL	**$735.9**	**$816.3**	**$966.9**	**$938.9**

LOSSES & LAE (NET OF CEDED)

COVERAGE	TOWERS WATSON			AMI
	LOW	CENTRAL	HIGH	CENTRAL
	(5)	(6)	(7)	(8)
OLD FUND	**$37.8**	**$41.6**	**$91.3**	**$115.4**
NEW FUND	**$763.0**	**$851.2**	**$974.3**	**$923.2**
TOTAL	**$800.8**	**$892.8**	**$1,065.6**	**$1,038.6**

LOSSES & LAE (NET OF CEDED)

	NEW FUND		
	LOW	CENTRAL	HIGH
	(9)	(10)	(11)
RECORDED		$895.5	
TOWERS WATSON	763.0	851.2	974.3
DIFFERENCE	132.5	44.3	(78.8)
AMI		923.2	
DIFFERENCE		(27.7)	

Notes:
(1), (2), (3), (5), (6), & (7) - Per Towers Watson 6/30/2015 Reserve Review report.
(4) - Per Exhibit II, Page 1, Columns (4) & (8) less the cumulative paid losses @6/30/2015.
For Old Fund, (8) = (4) × (1 + ALAE loading of 3.2%, ULAE loading of 10.0%, and DLI assessments of 3.0%).
For New Fund, (8) = (4) × (1 + ALAE loading of 3.2%, ULAE loading of 11.0%).
(9), (10), & (11) - per (5), (6), (7), & (8) for New Fund. Recorded per MONTANA STATE FUND.

MONTANA STATE FUND
RATE LEVEL ACTUARIAL REVIEW
FOR THE EXPOSURE PERIOD JULY 1, 2015 TO JUNE 30, 2016
CALCULATION OF PROJECTED EQUITY CONTRIBUTION
WORKERS' COMPENSATION

ACCIDENT YEAR*	ULTIMATE LOSS RATIO (1)
2007	0.626
2008	0.666
2009	0.643
2010	0.687
2011	0.659
2012	0.674
2013	0.660
2014	0.637

2. SELECTED ULTIMATE LOSS RATIO	**66.3%**
3. EMPLOYERS' LIABILITY	**0.25%**
4. CEDED LOSSES	**0.00%**
5. LOSS LOADINGS	**0.7%**
5a. Adverse Deviation	0.0%
5b. Terrorism	0.7%
6. EXPENSE PROVISIONS	
6a. Loss Adjustment Expenses	18.1%
6b. Commissions	6.4%
6c. Other Expenses	12.9%
6d. Revenue Generated by Expense Constant	2.4%
6e. Variable Reinsurance Costs	0.0%
6f. Fixed Reinsurance Costs	0.0%
7. RATE INCREASE	**-5.0%**
8. PRICING PROGRAMS	**5.6%**
9. TERRORISM LOAD	**0.7%**

10. INVESTMENT YIELD	11. INDICATED CONTRIBUTION TO EQUITY	12. DISCOUNT FACTOR
0.00%	**-5.6%**	1.000
2.25%	**3.6%**	0.893
2.50%	**4.3%**	0.884
2.75%	**5.1%**	0.875
3.00%	**5.9%**	0.866

Notes:
(1) - Towers Watson's current mix on-level loss ratio trended to 2014/2015 multiplied by the ratio AMI's selected ultimates per Exhibit II, Page 1, Columns (4) + (8) and Towers Watson's selected ultimates.
(2) - Per AMI selection, based on (1).
(3), (5b), (6a) (6b), (6c), (6d), (7), (8), (9), & (10) - Per MONTANA STATE FUND.
(4) = 0.0%; (5a) = 0.0%; (6e) = 0.0%; & (6f) = 0.0%.
(11) - 1.0 - (6b) - {[(2) + (3) - (4)] × [1 + (5)] × [1 + (6a)] × (12) + (6c)} / {[[1 + (7)] × [1 - (8)] + (6d)] × [1 - (6e)] - (6f) + (9)}.
(12) - Per Towers Watson 7/1/2014 Rate Level Analysis report.

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RATE LEVEL ACTUARIAL REVIEW

FOR THE EXPOSURE PERIOD JULY 1, 2014 TO JUNE 30, 2015
COMPARISON OF ULTIMATE LOSSES
FOR THE PERIOD JULY 1, 2014 TO JUNE 30, 2015
WORKERS' COMPENSATION
NEW FUND
(AMTS IN $000's)

MEDICALBENEFITS

ACCIDENT YEAR*	TOWERS WATSON AVERAGE INDICATIONS			AMI SELECTED CENTRAL
	ALL METHODS	EXCLUDING BERQUIST-SHERMAN	EXCLUDING HIGH & LOW	
	(1)	(2)	(3)	(4)
1991	$61,576	$58,363	$59,680	$58,363
1992	59,689	56,947	57,742	56,947
1993	63,492	60,378	61,196	60,378
1994	60,104	56,961	57,895	56,961
1995	52,850	50,660	51,475	50,660
1996	47,343	45,457	46,158	45,457
1997	44,761	42,876	43,565	42,876
1998	49,919	47,009	48,014	47,009
1999	57,682	53,884	55,043	53,884
2000	53,276	50,492	51,576	50,492
2001	68,942	65,001	66,275	65,001
2002	69,462	65,628	67,011	65,628
2003	87,454	82,632	84,349	82,632
2004	85,479	81,163	83,076	81,163
2005	98,295	92,582	94,740	92,582
2006	109,405	103,607	105,960	103,607
2007	113,677	107,631	110,228	107,631
2008	123,009	116,050	118,975	116,050
2009	101,031	95,224	97,887	95,224
2010	93,921	89,218	91,600	89,218
2011	98,854	93,649	96,380	93,649
2012	90,876	83,986	86,598	83,986
2013	82,291	76,261	78,834	76,261
2014	84,803	84,803	83,662	84,803
2015	80,657	80,657	81,326	80,657
TOTAL	**$1,938,846**	**$1,841,117**	**$1,879,245**	**$1,841,117**

INDEMNITY BENEFITS

ACCIDENT YEAR*	TOWERS WATSON AVERAGE INDICATIONS			AMI SELECTED CENTRAL
	ALL METHODS	EXCLUDING BERQUIST-SHERMAN	EXCLUDING HIGH & LOW	
	(5)	(6)	(7)	(8)
1991	$66,955	N/A	$66,833	$66,955
1992	67,130	N/A	67,185	67,130
1993	61,909	N/A	61,949	61,909
1994	55,955	N/A	55,590	55,955
1995	48,109	N/A	47,781	48,109
1996	36,886	N/A	36,800	36,886
1997	29,915	N/A	29,814	29,915
1998	30,493	N/A	30,353	30,493
1999	33,414	N/A	33,262	33,414
2000	32,686	N/A	32,546	32,686
2001	38,503	N/A	38,531	38,503
2002	39,000	N/A	38,821	39,000
2003	48,226	N/A	47,951	48,226
2004	45,368	N/A	45,106	45,368
2005	47,869	N/A	47,552	47,869
2006	55,083	N/A	54,655	55,083
2007	55,883	N/A	55,509	55,883
2008	54,324	N/A	53,852	54,324
2009	47,975	N/A	47,423	47,975
2010	39,054	N/A	38,454	39,054
2011	41,046	N/A	40,264	41,046
2012	39,981	N/A	39,123	39,981
2013	36,081	N/A	35,177	36,081
2014	39,618	N/A	38,418	39,618
2015	38,226	N/A	36,552	38,226
TOTAL	**$1,129,690**	**N/A**	**$1,119,500**	**$1,129,690**

Notes:
(1), (2), (3), (5), (6), & (7) - Per Towers Watson 6/30/2015 Reserve Review report.
(4) - selected based on (1), (2) & (3); (8) - selected based on (5), (6), & (7).
* All Accident Years are 12-month periods ending 6/30 of the stated year.

RATE LEVEL ACTUARIAL REVIEW
FOR THE EXPOSURE PERIOD JULY 1, 2014 TO JUNE 30, 2015
COMPARISON OF ULTIMATE LOSSES
FOR THE PERIOD JULY 1, 2014 TO JUNE 30, 2015
WORKERS' COMPENSATION
OLD FUND
(AMTS IN $000's)

MEDICALBENEFITS

ACCIDENT YEAR*	TOWERS WATSON AVERAGE INDICATIONS: ALL METHODS	EXCLUDING BERQUIST-SHERMAN	EXCLUDING BERQUIST-SHERMAN & SHERMAN-DISS	AMI SELECTED CENTRAL
	(1)	(2)	(3)	(4)
1964 & Prior	$971	$971	$971	$971
1965	961	961	961	961
1966	1,318	1,318	1,318	1,318
1967	1,245	1,245	1,245	1,245
1968	1,385	1,385	1,385	1,385
1969	1,424	1,424	1,424	1,424
1970	1,644	1,644	1,644	1,644
1971	2,594	2,594	2,594	2,594
1972	1,909	1,909	1,909	1,909
1973	2,054	2,054	2,054	2,054
1974	5,900	5,900	5,900	5,900
1975	5,635	5,517	5,478	5,635
1976	6,064	5,987	5,961	6,064
1977	13,831	13,337	13,172	13,831
1978	9,124	8,987	8,941	9,124
1979	11,486	11,195	11,149	11,486
1980	16,033	15,438	15,299	16,033
1981	20,398	19,765	19,201	20,398
1982	22,204	21,527	20,954	22,204
1983	31,946	30,412	27,312	31,946
1984	41,529	39,062	36,385	41,529
1985	36,589	35,053	34,661	36,589
1986	44,986	43,019	42,193	44,986
1987	55,493	52,211	47,651	55,493
1988	58,111	54,629	51,320	58,111
1989	51,048	48,412	44,797	51,048
1990	66,301	61,489	59,864	66,301
TOTAL	**$512,183**	**$487,442**	**$465,742**	**$512,183**

INDEMNITY BENEFITS

ACCIDENT YEAR*	TOWERS WATSON AVERAGE INDICATIONS: ALL METHODS	EXCLUDING SHERMAN-DISS	PLDA-LOW & SHERMAN-DISS	AMI SELECTED CENTRAL
	(5)	(6)	(7)	(8)
1964 & Prior	$112	$112	$112	$112
1965	2,289	2,289	2,286	2,289
1966	3,157	3,157	3,154	3,157
1967	3,094	3,094	3,090	3,094
1968	3,593	3,593	3,589	3,593
1969	3,869	3,869	3,864	3,869
1970	4,262	4,262	4,257	4,262
1971	4,382	4,382	4,377	4,382
1972	4,660	4,660	4,647	4,660
1973	4,708	4,708	4,703	4,708
1974	8,747	8,747	8,677	8,747
1975	9,965	9,965	9,895	9,965
1976	9,284	9,284	9,261	9,284
1977	13,233	13,233	13,046	13,233
1978	18,387	18,387	18,292	18,387
1979	21,567	21,540	21,472	21,567
1980	31,288	31,202	31,076	31,288
1981	35,969	35,941	35,618	35,969
1982	45,063	44,964	44,674	45,063
1983	52,320	52,201	51,870	52,320
1984	72,622	72,533	71,980	72,622
1985	79,566	79,547	78,942	79,566
1986	84,883	84,916	84,157	84,883
1987	86,769	86,845	86,040	86,769
1988	62,654	62,766	62,317	62,654
1989	61,104	61,254	60,641	61,104
1990	66,082	66,271	65,592	66,082
TOTAL	**$793,627**	**$793,720**	**$787,627**	**$793,627**

Notes:
(1), (2), (3), (5), (6), & (7) - Per Towers Watson 6/30/2015 Reserve Review report.
(4) - selected based on (1), (2) & (3); (8) - selected based on (5), (6), & (7).
* All Accident Years are 12-month periods ending 6/30 of the stated year.

IV. APPENDIX

OUTLINE OF RESERVING METHODS APPLIED BY MSF' CONTRACT ACTUARY

Reserving Method	Method Description	Data Used	Data Adjustments or Special Considerations	Comments
Paid Loss Development	Project cumulative paid losses by accident year to ultimate based on selected factors. Factors are selected based on payment pattern history of older accident years	1. Cumulative paid losses by accident year and development age, separately for Medical and Indemnity 2. Lump sum payments - Indemnity 3. Excess settlements - Medical	1. Selected loss development factors for groups of accident years to reflect benefit changes impacting claim closure rates 2. Adjusted selected loss development factors for 1990/91 forward by .5% for Medical to accelerate assumed payout due to internal operational changes at MSF 3. Adjusted selected loss development factors for Indemnity by .5 month to reflect shorter TTD claims and more lump sum payments 4. Selected four levels of development factors for each group of accident years: low, high, high thru age 26 years/low after, average of high and low 5. One Medical indication is adjusted by removing excess medical settlements. One Indemnity indication is adjusted by removing lump sum payments.	This is a standard method. There are 4 indications for Medical and 4 for Indemnity using this method and various factor selections. Tail factors at age 51 years are judgmental.
Berquist-Sherman	Project adjusted cumulative reported losses by accident year to ultimate based on selected factors. Reported losses were first adjusted on a consistent average case reserve per open claim basis. Factors are selected based on payment pattern history of older accident years	1. Cumulative reported losses by accident year and development age for Medical. 2. Cumulative medical claim counts by accident year and development age , separately for reported, closed, and open counts. 3. Long-term inflationary trend of 5.0% for Medical.	1. Omitted indications for 2013/2014 and 2014/2015 due to inconsistency in zero-loss claims recording.	This method produced very high indications and appears to be given little weight in the final selection of ultimate. This method applied for Medical. AMI excluded this method in selecting ultimate Medical losses.
Frequency-Severity Index	Selects 2015/2016 level ultimate losses based on trended ultimate loss picks from the Development and Berquist-Sherman methods. Trend indices are estimated separately for claim counts, claim severity, business mix, and benefit level by regressing them to independent variables listed in the next column. Selected 2015/2016 level ultimate losses are then detrended using the same indices to get the indicated ultimate losses for each accident year.	1. Ultimate losses by accident year and development age 2. Historical reported claim counts by accident year and development age. 3. Ultimate payroll by year 4. Projected Ultimate Manual Premium by year 5. Mix of business relativities to current level by accident year for loss ratios and severity separately for Medical and Indemnity. 6. Rate level history 7. Benefit level history 8. CPI - Medical 9. Unemployment rate history 10. Change in employment rate history 11. Average weekly wage history 12. Method requires losses, payroll and premium to segment between policies currently active vs. departed business.	Same as Paid Loss Development 1-4	Not a common method. Adjusts a preliminary estimate of ultimate loss for each accident year to 2015/2016 level based on histories of claim counts, claim severity, mix of business and benefit level. For Medical, selects a projected ultimate loss at 2015/2016 level. For Indemnity, different selections were made for 1996/1997 & Prior, 1997/1998 to 2002/2003, and 2003/2004 & Subsequent. Divides that one selection by the index for each accident year.

OUTLINE OF RESERVING METHODS APPLIED BY MSF' CONTRACT ACTUARY

Reserving Method	Method Description	Data Used	Data Adjustments or Special Considerations	Comments
Bornhuetter-Ferguson	Estimates ultimate losses by accident year using actual paid and expected unpaid losses. Estimated expected unpaid losses as a percentage of ultimate losses are selected based on payment pattern history of older accident years.	1. Paid losses by accident year and development age	Same as Paid Loss Development 1-4	This is a standard method. One estimate relies on prior selected ultimate for the initial ultimate. One Medical estimate relies on the Frequency/Severity Index ultimate for the initial ultimate. There are three initial ultimate assumptions for Indemnity. Loss development factors are the average of the low and high selections by accident year group, accelerated as described above in the Paid Loss Development section.
Adjusted Case Reserve	Estimates ultimate losses by accident year based on adjusted case reserves.	1. Case reserves and open claim counts, separately for TTD/Medical Only and All Other. 2. Reported claim counts by accident year and development age, separately for Medical and Indemnity. 3. Reported claim counts for TTD and Medical Only.	For the Old Fund, adjustments were made regarding the potential for future development, which was based on a July 21, 1998 Towers Watson report.	Assumes case reserves are reasonable except for unreported claims, future reopenings, change in disability type, medical inflation/cost of living adjustments and future development potential (Old Fund only). Assumes 6% medical inflation, 2% COLA. Inflation adjustment to Medical reserves significant: 25%-50% by accident year. Development of TTD and Medical Only claim counts judgmental based on MSF data provided to TW. Not sure what payment pattern used for inflation adjustment - average of high/low ?
Incurred Loss Development (Indemnity only)	Same as Paid Loss Development, but uses reported losses instead.	1. Cumulative reported losses by accident year and development age.	1. Selected loss development factors for groups of accident years to reflect benefit changes impacting claim closure rates	Not used for Medical because of inconsistent case reserving and volatility in losses.
Sherman-Diss Method (Old Fund only)	Projects medical and indemnity payments for open claims using a heuristic trended mortality model.	1. Paid losses and case reserves for open claims separately for Medical & Indemnity Fatal, Permanent Total, and Permanent Partial injuries. 2. Medical inflation rate. 3. Claimants' birth dates. 4. SSA Life Tables. 5. Fatal benefits and birth dates.	1. Paid loss development factors using the model were converted to a reported basis using ratios of reported-to-paid losses for open claims.	Sometimes used in WC reserving for old accident years. Medical indications use three medical inflation rates: 4%, 5%, and 6%.
ALAE - Paid to Paid	Selected ALAE ratio based on historical paid ALAE-to-paid loss ratios.	1. History of fiscal year paid ALAE and paid loss		More typical to develop ALAE, but not a major issue for WC.
ULAE - Johnson Method	Estimates ULAE based on relative ULAE costs per claim activity, i.e. reporting, maintenance, and closure.	1. Paid ULAE by fiscal year 2. History of open claims counts at beginning of each year 3. History of number of new claims opened during each fiscal year		Requires a trend factor assumption for ULAE per weighted open claim 4.0% was based on fitted ULAE per weighted open claim Select an amount for ULAE per wtd open claim and detrend to earlier accident years

V. COMMENTS FROM MSF AND TOWERS WATSON

MONTANA STATE FUND

P.O. Box 4759 • Helena, MT 59604-4759
Customer Service 1-800-332-6102
Fraud Hotline 1-888-682-7463 (888-MT-CRIME)

November 12, 2015

Tori Hunthausen
Legislative Audit Division
Post Office Box 201705
Helena, Montana 59620-1705

Dear Ms. Hunthausen:

Thank you for the opportunity to review and respond to the report presented by AMI Risk Consultants Inc. (AMI) on the adequacy and fairness of Montana State Fund (MSF) rates effective July 1, 2015 and the adequacy of MSF loss and loss adjustment reserves as of June 30, 2015.

We appreciate AMI's finding that MSF rates and reserves are reasonable and that MSF is likely to have adequate funding to meet its financial obligations to injured Montana employees for claims incurred on or after July 1, 1990. The AMI report also concludes that our consulting actuary's (Towers Watson or TW) analysis of rates and reserves is consistent with generally accepted actuarial principles.

The volatility in global financial markets, historically unprecedented low interest rates, and rising medical costs create challenging risks for the insurance industry, particularly in the workers compensation line. Prudently managing these risks requires a strong balance sheet, a conservatively invested, well diversified asset portfolio, and adequate rates. In addition to these challenges, Montana has recently enacted sweeping benefit reforms which have led to significant rate reductions. It will take up to a decade before we will be able to determine whether benefit costs will be reduced as much as estimated and whether the rate decrease implemented July 1, 2011 will prove in hindsight to be too high or too low. A substantial variance between these estimates and actual results could have significant consequences for MSF and Montana employers.

There is an inherent uncertainty in projecting the cost of incurred workers compensation claims which will not be ultimately resolved in full for several decades in the future. The development of new medical technologies and changing patterns of medical utilization are but two examples of factors which will significantly affect the eventual cost of these claims though these factors cannot be predicted with certainty. Actuarial analysis is an inexact science which relies on judgment informed by data.

An example of the uncertainty inherent in estimating claim costs is the adverse development in Towers Watson central estimates for prior accident years, particularly from 2003 to 2010.

Fortunately, MSF's strong financial position allowed us to absorb these fluctuations in prior year loss estimates without creating undue rate volatility for our customers. We are pleased to see our reserve estimates have largely stabilized over the past five years. In this time, prior accident year reserve estimates increased by a net of $8.9 million, an average fluctuation in loss reserves of 0.2%. By comparison, we note $65.8 million in downward development in the central estimates of the LAD's consulting actuaries over this same time period.

There are risks in both underestimating as well as overestimating claim costs. If we significantly underestimate claim costs, we jeopardize the financial viability of MSF. If we overestimate claim costs, Montana's employers would pay unnecessarily excessive premiums, which are already very high relative to prevailing rate levels in other states. Our challenge is to find a reasonable balance between these two risks while maintaining a degree of stability in workers compensation rates for Montana employers. The key question is whether MSF rates and reserves are reasonable given the best available information and application of sound actuarial methodologies.

AMI's central estimate for MSF reserve liabilities differs from Towers Watson's central estimate. The difference of $59.1 million in estimated ultimate losses (2.0%) is largely due to Towers Watson's fine-tuning the actuarial techniques in response to changes in statutory benefit structure, MSF operations, and Towers Watson's judgments in weighting the various actuarial indications based on their knowledge of the Montana workers compensation system and MSF operations. We believe that the range selected by Towers Watson and the movement in their loss reserve estimates over time are reasonable and prudent given the need to balance the risks of inadequacy versus redundancy of loss reserves. We have asked Towers Watson to address the technical issues explaining the differences in the analyses. A copy of the Towers Watson response is attached and should be considered part of our formal response to the AMI report. AMI's analysis is a constructive comparison to Towers Watson's, quantifying the effect of the judgments made by Towers Watson in their analysis of reserve indications. We believe that Towers Watson's judgments are reasonable, appropriate, and backed by observable evidence. Nonetheless, the range of results in Towers Watson's and AMI's estimates underscores the variability inherent in workers compensation insurance reserving and the associated financial risks.

MSF proactively manages that risk by booking reserves slightly higher than Towers Watson's actuarial central estimate by $32.1 million (about 4%), at least partly in consideration of the findings of third party actuarial reviews of MSF such as AMI's. By actuarial standards, the central estimate is merely the "50:50" estimate of the ultimate value of unpaid claims – just as likely to be insufficient as it is likely to be enough to cover outstanding claim liabilities. In addition, MSF seeks to maintain equity levels within a range as advised by our independent consulting actuary through careful, long term planning. As you know, MSF does not participate in the Montana Insurance Guaranty Association. This is why MSF endeavors to maintain a strong balance sheet coupled with proactive risk management, so that the claim liabilities of MSF never again become a burden to the general taxpayers of the state, as happened with the Old Fund.

With regard to MSF rates effective July 1, 2015, AMI concludes that MSF rates are not inadequate, excessive, or unfairly discriminatory. AMI notes the inclusion of a contingency provision in MSF rates and opined that this provision is reasonable. Section 39-71-2311, MCA requires that, when uncertain, MSF shall use assumptions which result in predictions more likely rather than less likely to cover the cost of future claims. This contingency provision is in direct response to this statutory requirement and in our judgment is prudent and appropriate. MSF has the ability to return any amount of the contingency not needed to cover the cost of losses and expenses to Montana employers in the form of a dividend. However, MSF does not have the ability to retroactively charge customers additional amounts if rates prove to be inadequate. MSF's goal is to ensure a stable market for Montana employers.

AMI also comments on the adequacy of loss and loss adjustment reserves for claims incurred prior to July 1, 1990 (the "Old Fund"). AMI finds that Towers Watson's central estimate for the Old Fund as of 6/30/2015 falls below the range estimated by AMI. MSF acknowledges the risk that Old Fund claim liabilities may exceed the Towers Watson central estimate. The variance in actuarial estimates highlights the extreme difficulty in estimating the outstanding liabilities for the Old Fund given the nature of the underlying claims, many of which involve lifetime medical treatment for continually evolving medical conditions. The case reserves on only twelve Old Fund claims account for 80% of the total estimated unpaid losses. Variances in expected mortality on just these twelve individuals alone can significantly swing the results. AMI's analysis underscores the relatively wide variance in expected results for a runoff portfolio of workers compensation claims with no supporting assets nor margin for worse than expected results.

Overall, we believe that AMI's analysis constructively adds to our understanding of the uncertainties inherent in setting workers compensation premium rates and reserves and of the relative merits of alternate actuarial assumptions and methods. We at the Montana State Fund work diligently to ensure a stable rate environment for Montana employers and that our financial obligations to injured Montana employees will be met.

Sincerely,

Laurence A. Hubbard
President/CEO

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November 10, 2015

Mr. Laurence Hubbard
President
Montana State Fund
855 Front Street
Helena, MT 59601

Dear Mr. Hubbard:

AMI Risk Consultants, Inc. Review of Montana State Fund's Loss Reserves and Rates

As you requested, we have reviewed the November 9, 2015 report (the AMI Report) prepared by Aguedo M. (Bob) Ingco of AMI Risk Consultants, Inc. (AMI) on the adequacy of Montana State Fund's (MSF's) rates effective July 1, 2015 and the adequacy of MSF's loss and loss adjustment expense (LAE) reserves as of June 30, 2015. This letter provides several comments, all of which presume that the reader has access to, and has read and understood, the AMI Report.

Much of the AMI analysis as documented in the AMI Report is based on AMI's review of various analyses and reports that have been prepared by Towers Watson (Towers Watson or we or our) for the management of MSF in the course of our ongoing engagement as consulting actuaries to management and the Board of MSF. In many cases, AMI derived its numerical results by judgmentally modifying a selected set of methodologies or parameters or judgments that had been made in the Towers Watson analyses, specifically Towers Watson's analysis of unpaid loss and loss adjustment expense as of June 30, 2015; and Towers Watson's analysis of rate level indications effective July 1, 2015 based on data as of December 31, 2014 (the Towers Watson Reports). Therefore, in this letter, we will also make reference to some of the Towers Watson Reports. We presume that the reader also has access to, and has read and understood, the Towers Watson Reports.

This letter, however, is based on our review of the written AMI Report.

Commentary – Overall Conclusions

Some of the specific numerical findings and conclusions in the AMI Report differ from the numerical findings and conclusions in the Towers Watson Reports. We will discuss some of those differences later in this letter.

We appreciate AMI's discussion of key issues relating to loss reserves and rates. This type of discussion can be useful to the understanding of what types of issues can affect the adequacy of loss reserves and of rates.

We concur with the conclusions in the AMI Report that:

- "Our opinion is that MSF's recorded loss and LAE reserves for the New Fund at June 30, 2015 are reasonable." (page 4 of the AMI Report).

We concur with AMI that MSF's provision for New Fund unpaid loss and loss adjustment expense as of June 30, 2015 is reasonable.

- "Our opinion is that the procedures used by TW to test the data used in both ratemaking and reserving are adequate. We do not have any further testing to suggest". (page 4 of the AMI Report)

  We concur with AMI that our data testing procedures are adequate.

- "In our opinion the data and methods applied by TW are reasonable. TW made every effort to account for changing conditions, both internal and external to MSF, in their choice and application of data. Furthermore, their selection of loss development factors and other selected values required by the various methods appear reasonable." (page 19 of the AMI Report).

  We further note that customizing the actuarial techniques and parameters to MSF's changing operating environment is an important element of the analysis due to the very significant changes – particularly in the statutory benefit structure, but also in MSF's operations – that have occurred over the years.

- "In our opinion, the rates effective July 1, 2015 are not excessive, inadequate, or unfairly discriminatory." (page 4 of the AMI Report)

- "We believe the procedures and methodology used by TW and MSF in class ratemaking and tiering are reasonable." (page 16 of the AMI Report)

  We concur with AMI that MSF's rates effective July 1, 2015 are not excessive, inadequate or unfairly discriminatory.

Commentary – Numerical Results

The AMI Report produces numerical indications for unpaid MSF losses at June 30, 2015 that are higher than the range suggested by the array of Towers Watson methodologies. After having had an opportunity to review the AMI Report, we have revisited our specific analyses and results for both the New Fund and Old Fund. Based on our subsequent review, we have concluded that our original analyses, findings, and conclusions, as documented in the Towers Watson Reports, remain appropriate and reasonable. We would not alter our methodologies, assumptions, or selections based on our review of the AMI Report.

We would like to specifically address several important issues that relate to numerical differences between the results presented in the Towers Watson Reports and the results in the AMI Report.

Estimate of Unpaid Loss

In our analysis and projection of ultimate losses for each historical accident year, we reflect the changes in payment patterns that were and are expected, and that we have observed to result from several significant changes in the statutorily-defined structure of injured worker benefits. These restructurings had substantial effects on the Montana claims environment. Given the magnitude of these changes, we believe that historical data from periods prior to each of these significant benefit restructurings requires adjustment prior to using that historical data as a basis for anticipating the likely pattern with which recent years' claims will pay out. Towers Watson made explicit recognition of these environmental changes in our selection and projection of payout patterns for the more recent years. We continue to believe our resulting selection of development patterns, different for each set of years during which different benefit structures and benefit levels prevailed in Montana, is prudent and appropriate.

AMI notes (page 9 of the AMI Report) that the TW history of actuarial central estimate of ultimate losses showed a chronic pattern of adverse development, the adverse development is a small percentage of the

ultimate losses and that ultimate losses have stabilized over the recent years. The actuarial process is dynamic and cyclical. MSF has also had periods of significant favorable development and stable prior years ultimate loss development. As the loss experience emerges, the actuarial models and results move in the direction of the new data. Therefore, changes in actuarial estimates are expected and will continue until all claims are closed and settled at final ultimate value.

AMI raises concerns (pages 13 and 19 of the AMI Report) that our judgmental selection of ultimate losses is low relative to the indications. AMI's concern implicitly assumes that all the projections should get equal weight in the selection process. We disagree with that assumption, as the various actuarial methods have different strengths and weaknesses and thus suit different situations differently, and we are comfortable with our selection of ultimate losses.

AMI notes on page 14 that they feel it is appropriate to calculate rates on a direct (gross of reinsurance) basis. We disagree with AMI. The Casualty Actuarial Society's Statement of Principles Regarding Property and Casualty Insurance Ratemaking and the American Academy of Actuaries Actuarial Standard of Practice #29, Expense Provisions in Property/Casualty Insurance Ratemaking both state that it is up to the actuary to reflect a provision for reinsurance. Further, if reinsurance costs increase, but that increase is not reflected in the rates, then the rates are inadequate. Conversely, if the reinsurance costs decrease, but the decrease is not reflected, then the rates are excessive.

When two actuaries use similar assumptions within each of the various actuarial methods, and thus arrive at similar results for each of the individual methods, the two actuaries may still arrive at different actuarial central estimates because of placing different judgmental weights on the results of those various different actuarial methods.

We recognize and respect AMI's exercise of independent actuarial judgment in its review, and we concur with AMI that two actuaries looking at the same methodologies and results may make different selections of their actuarial central estimates. We have no comment on AMI's selection of an actuarial central estimate from within a range of methodologies. However, we do believe that the methodologies themselves should reflect loss development parameters and selections appropriate to the Montana environment and MSF operations in which the claims will be handled and paid.

Sources of Uncertainty

The ultimate liability for claims is subject to the outcome of events yet to occur, e.g., the likelihood of claimants filing, inflation in medical costs, statutory changes, and the attitudes of claimants towards settlements of their claims. The three primary risks defined in Actuarial Standard of Practice No. 43 – Property/Casualty Unpaid Claim Estimates are:

- Model Risk – The risk that the methods are not appropriate to the circumstances or the models are not representative of the specified phenomenon.
- Parameter Risk – The risk that parameters used in the methods or models are not representative of future outcomes.
- Process Risk – The risk associated with the projection of future contingencies that are inherently variable, even when the parameters are known with certainty.

All of these risks are inherent in the loss reserving and rate setting process for MSF and as a result, there is a limitation upon the accuracy of loss projections for prior periods and rate indications for prospective periods. In our judgment, we have employed techniques and assumptions that are appropriate, and the conclusions presented in our reports are reasonable, given the information currently available. However, it should be recognized that future loss emergence will likely deviate, perhaps materially, from our estimates.

The table on page 9 of the AMI report shows Towers Watson's change in ultimate loss selections. The table illustrates the variability in conducting actuarial analyses of workers' compensation exposures.

* * * * *

Reliances and Limitations; Distribution

In preparing this letter, we relied on data and information supplied by the MSF and AMI, without audit or verification. The information from MSF is the same information used in our reports, which contain a more extensive discussion of Reliances and Limitations that is equally applicable to this analysis.

This letter is intended for internal use by the MSF and its Board of Directors. Anyone receiving a copy of this letter should be made aware that Towers Watson is available to answer any questions that may arise with respect to these comments.

I, Russell Greig, am a member of the American Academy of Actuaries and meet its qualification standards to render the actuarial opinion contained herein.

We are available to continue the dialogue regarding MSF's loss reserves and rate indications.

Sincerely,

Russell Greig, FCAS, MAAA, CFA
Direct Dial: 404.365.1707

RG:mj