Commonwealth of Massachusetts

Actuarial Estimate of Outstanding Liability

As of June 30, 2018

FINAL REPORT

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Commonwealth of Massachusetts

Workers Compensation

Reserve Analysis at June 30, 2018

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I. Introduction

Purpose

Aon Global Risk Consulting ("AGRC") has conducted an actuarial review of the GAAP outstanding loss reserves of the Commonwealth of Massachusetts' ("Commonwealth") self-insured Workers Compensation program.

Scope

The specific scope of this study is to prepare an independent estimate of the required workers compensation reserves as of June 30, 2018 separately for seven clusters of agencies:

a) The Department of Developmental Services ("DDS") [1]
b) The Department of Mental Health ("DMH")
c) The Department of Corrections ("DOC")
d) UMass – Amherst
e) UMass – Medical School
f) All Other Colleges and Universities
g) All Other Departments

For the "All Other Colleges and Universities" cluster, we have provided estimates of each educational institution's obligations.

In addition, we have provided estimates of the outstanding liability contained within the "All Other Departments" cluster that is associated with agencies that during fiscal year 2010 ceased to be the liability of the Commonwealth and instead became the liability of the Massachusetts Department of Transportation (MassDOT).

We have provided a range of reserves that can be used to test the reasonableness of the carried reserves established by the Commonwealth. Estimates have been prepared on both a discounted and undiscounted basis, utilizing rates of discount equal to 4% and 6%.

Our estimates do not include any provision for allocated loss adjustment expenses (ALAE) that may be incurred in the processing and settlement of claims, other than rehabilitation/investigation payments included with medical losses as described in the Data section (Section V) of this report.

* * * * * *

[1] Formerly known as The Department of Mental Retardation ("DMR")

Vahan A. Mahdasian ACAS, MAAA and Kanika Vats, FCAS, MAAA, MBA are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial report contained herein.

We performed this analysis using generally accepted actuarial principles and in accordance with all relevant Actuarial Standards of Practice.

Please contact us if you have any questions regarding this report.

Respectfully submitted,

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II. Conditions and Limitations

Inherent Uncertainty

Actuarial calculations produce estimates of inherently uncertain future contingent events. We believe that the estimates provided represent reasonable provisions based on the appropriate application of actuarial techniques to the available data. However, there is no guarantee that actual future payments will not differ from estimates included herein.

Extraordinary Future Emergence

Our projections make no provision for the extraordinary future emergence of losses or types of losses not sufficiently represented in the historical data or which are not yet quantifiable.

Data Reliance

In conducting this analysis, we relied upon the provided data without audit or independent verification; however, we reviewed it for reasonableness and consistency. Any inaccuracies in quantitative data or qualitative representations could have a significant effect on the results of our review and analysis.

Discounting

The uncertainty inherent in the discounted unpaid loss estimates is greater than that of the undiscounted unpaid loss estimates. This is because undiscounted liabilities normally contemplate an implicit risk margin for the uncertainty in the loss estimation process (e.g., under-estimating). Discounting takes away this implicit risk margin and would subject the unpaid loss estimates to additional risks such as yields on the investment portfolio and the timing risk. Future loss payments could occur more or less rapidly than expected due to random variation and the timing of claim payments. We made no adjustment to account for these risks. The interest rate used to discount the unpaid losses was provided by the Commonwealth of Massachusetts. We express no opinion and have not independently evaluated the appropriateness of the interest rate.

Use and Distribution

Use of this report is limited to the Commonwealth of Massachusetts for the specific purpose described in the Introduction section. Other uses are prohibited without an executed release with Aon.

Distribution by the Commonwealth of Massachusetts is unrestricted. We recognize that this report may be distributed to others and we request that Aon be notified of further distribution of this report. The report should only be distributed in its entirety including all supporting exhibits.

III. Executive Summary

Summary of Results

As stated in the "Introduction" and detailed in the "Program Description" section of this report, this analysis considers those liabilities within the "All Other Departments" cluster that are attributed to the agencies of the newly created MassDOT; excluding the former Massachusetts Turnpike Authority (MTA).

Consistent with the methodology and presentation in the prior report issued in 2017, the liability amounts in the summary tables below are provided both **Gross** (including) and **Net** (excluding) of those liabilities associated with the MassDOT (excluding MTA).

A summary table of the composition of the "All Other Departments" cluster with respect to the MassDOT (excluding MTA) and Non-MassDOT agencies is also provided.

Total Gross Reserves

Based on our review, which utilized loss and exposure data valued as of June 30, 2018, we estimate that the range of reasonable undiscounted **gross** (inclusive of MassDOT liability, excluding MTA) loss reserves for the Commonwealth's aggregate workers compensation program to be: **$300.3M to $367.6M**.

We also calculated reasonable ranges on a present value basis, using interest rates of 4% and 6% and the Commonwealth's historical payment patterns. We estimate the range of reasonable **gross** reserves to be as follows:

Discounted at 4%: **$222.0 to $273.7M** | Discounted at 6%: **$197.4M to $243.8M**

The following table shows **gross** reserves for each cluster identified in the Scope section:

Cluster	Cluster	Report Section	Undiscounted	Discounted at 4%	Discounted at 6%
DDS	1	2	$21.9 - 27.4M	$17.3 - 21.7M	$15.7 - 19.8M
DMH	2	3	$24.0 - 30.4M	$17.9 - 22.7M	$16.1 - 20.4M
DOC	3	4	$38.2 - 50.8M	$29.2 - 38.7M	$26.3 - 34.7M
UMass - Amherst	4	5	$6.7 - 8.9M	$5.4 - 7.1M	$4.9 - 6.5M
UMass - Medical	4	6	$2.3 - 3.7M	$1.9 - 3.1M	$1.7 - 2.8M
Other Colleges & Universities	4	7	$18.3 - 23.3M	$14.7 - 18.8M	$13.4 - 17.1M
All Other Dept's (incl. MassDOT, excl. MTA)	5	8	$189.0 - 223.2M	$135.7 - 161.6M	$119.2 - 142.4M
Total			$300.3 - 367.6M	$222.0 - 273.7M	$197.4 - 243.8M

Total Net Reserves

Based on our review, which utilized loss and exposure data valued as of June 30, 2018 we estimate that the range of reasonable undiscounted **net** (excluding MassDOT and MTA liability) loss reserves for the Commonwealth's aggregate workers compensation program to be: **$288.1M to $353.2M**.

We also calculated reasonable ranges on a present value basis, using interest rates of 4% and 6% and the Commonwealth's historical payment patterns. We estimate the range of reasonable **net** reserves to be as follows:

Discounted at 4%: **$213.3 - 263.2M** | Discounted at 6%: **$189.7 - 234.6M**

The following shows **net** reserves for each cluster identified in the Scope section:

Cluster	Cluster	Report Section	Undiscounted	Discounted at 4%	Discounted at 6%
DDS	1	2	$21.9 - 27.4M	$17.3 - 21.7M	$15.7 - 19.8M
DMH	2	3	$24.0 - 30.4M	$17.9 - 22.7M	$16.1 - 20.4M
DOC	3	4	$38.2 - 50.8M	$29.2 - 38.7M	$26.3 - 34.7M
UMass - Amherst	4	5	$6.7 - 8.9M	$5.4 - 7.1M	$4.9 - 6.5M
UMass - Medical	4	6	$2.3 - 3.7M	$1.9 - 3.1M	$1.7 - 2.8M
Other Colleges & Universities	4	7	$18.3 - 23.3M	$14.7 - 18.8M	$13.4 - 17.1M
All Other Dept's (excl. MassDOT & MTA)	5	8	$176.8 - 208.7M	$127.0 - 151.2M	$111.5 - 133.2M
Total			$288.1 - 353.2M	$213.3 - 263.2M	$189.7 - 234.6M

All Other Departments – Decomposition of Departmental Liability

The total gross reserve of the All Other Departments cluster contains both MassDOT (excluding MTA) and Non-MassDOT liabilities. As shown in the table below, approximately 6.5% of the gross reserve for All Other Departments is attributed to MassDOT (excluding MTA) agencies.

The following shows the range of reasonable reserves at various discount rates for the cluster segments.

All Other Departments	Cluster	% of Cluster	Undiscounted	Discounted at 4%	Discounted at 6%
MassDOT Agencies (excl. MTA)	5	6.5%	$12.2 - 14.4M	$8.7 - 10.5M	$7.7 - 9.2M
Non-MassDOT Agencies	5	93.5%	$176.8 - 208.7M	$127.0 - 151.2M	$111.5 - 133.2M
Total			$189.0 - 223.2M	$135.7 - 161.6M	$119.2 - 142.4M

Fiscal Year 2018 Loss Rates

The cost of the workers compensation program as measured by the estimated FY2018 loss rates (losses per $100 payroll) varied significantly by cluster.

As shown in the table below, overall rates decreased by 1.6% when compared to the prior year

Cluster	Payroll (000)	Average Ult Loss	Average FY18 Loss Rate	Prior Loss Rate	% Change
DDS	292,956	4,380,000	1.495	1.713	-12.7%
DMH	203,925	6,173,000	3.027	3.293	-8.1%
DOC	347,621	8,771,050	2.523	2.975	-15.2%
UMass - Amherst	607,484	2,172,325	0.358	0.387	-7.5%
UMass - Medical	398,722	770,650	0.193	0.197	-1.8%
Other Colleges & Univ's	1,457,740	6,017,500	0.413	0.324	27.5%
All Other Dept's (excl. MTA)	3,401,479	41,039,540	1.207	1.124	7.4%
Total	6,709,926	69,324,065	1.033	1.017	1.6%

All Other Departments – Fiscal Year 2018 Loss Rates

In the table below, we have estimated, the composition of the All Other Departments FY2018 loss rate as a function of both the MassDOT (excluding MTA) and Non-MassDOT departments experience and exposure:

All Other Dept's (excl. MTA)	Payroll (000)	Average Ult Loss	Average FY18 Loss Rate	Prior Loss Rate	% Change
MassDOT (excl. MTA)	204,258	2,472,849	1.211	1.195	1.3%
Non-MassDOT	3,197,222	38,566,691	1.206	1.119	7.8%
Total	3,401,479	41,039,540	1.207	1.124	7.4%

It is important to note that the loss rates estimated via the decomposition methodology are inherently volatile due to their derivation being reliant on a variety of assumptions and estimations which are themselves also volatile.

UMass Reserves

To facilitate the use of this report by the University of Massachusetts (“UMass”), we present an aggregate estimate of the liabilities for each UMass segment. These include UMass Amherst and UMass Medical School (shown separately in table above) as well as UMass Lowell, Boston, and Dartmouth (included as part of the “Other Colleges and & Universities” cluster above).

A reasonable range of reserves for the aggregate UMass program is estimated at **$15.6M to $21.0M**.

Discounted at 4%: **$12.6M to $17.0M** | Discounted at 6%: **$11.5M to $15.5M**

The following shows the range of reasonable reserves at various discount rates for each UMass segment.

Cluster	Undiscounted	Discounted at 4%	Discounted at 6%
UMass - Amherst	$6.7 - 8.9M	$5.4 - 7.1M	$4.9 - 6.5M
UMass - Medical	$2.3 - 3.7M	$1.9 - 3.1M	$1.7 - 2.8M
UMass - Dartmouth	$2.0 - 2.6M	$1.6 - 2.1M	$1.5 - 1.9M
University of Lowell	$2.6 - 3.3M	$2.1 - 2.7M	$1.9 - 2.4M
UMass - Boston	$2.0 - 2.5M	$1.6 - 2.0M	$1.5 - 1.9M
Total UMass	$15.6 - 21.0M	$12.6 - 17.0M	$11.5 - 15.5M

Other Colleges and Universities Reserve

We have allocated the aggregate reserve estimate for All Other Colleges and Universities to the individual institutions within the cluster. Estimates for each institution are shown on Summary Exhibit 7.

Short Term Reserve Percentages

We have determined the percentage of the reserve estimates that can be considered short-term, meaning the percentage of projected payments of the total reserves expected to be made over the next twelve month period. The calculation of these percentages is shown on Exhibit 1 Page 16 of Sections 1-8.

IV. Program Description

The Commonwealth has provided workers compensation coverage to its employees on a self-insured basis since the early 1920's ("the Program"). The Program covers all workers, except those employed by the Commonwealth's various public authorities and the State Police.

The Commonwealth retains responsibility for all claims and does not purchase per claim or aggregate reinsurance.

Pursuant to legislation effective July 1, 1997, the Program is administered by the Commonwealth's Human Resources Division ("HRD"); prior to that date, certain workers compensation administration responsibilities had been under the supervision of the Public Employee Retirement Administration Commission ("PERAC"). HRD is responsible for making fair and timely payments of indemnity and medical benefits to injured employees, maintaining the claim and financial records of the Program and for negotiating appropriate settlements for all Program claims.

Effective November 1, 2009 a new entity, the Massachusetts Department of Transportation (MassDOT) was created. As part of the creation, various agencies ceased to be considered part of the Commonwealth and became part of the MassDOT. The agencies, previously part of the Commonwealth, that now comprise the MassDOT are the Old Mass Highway Department (MHD), Registry of Motor Vehicle (RMV), The Office of Transportation (TRP); The Mass Aeronautics Commission (MAC); Tobin Bridge (TOBIN) and a small operation of the Department of Conservation and Recreation (DCR).

Per discussions with the Commonwealth, it is our understanding that the MassDOT would assume the total historical liability of each of those departments; MHD, RMV, TRP, MAC, TOBIN and DCR.

V. Data

Loss

Claim payments for the 12 month period ending June 30, 2018 were provided by the Commonwealth. Payments were provided by department and agency and were split into four categories: compensation, medical, lump sum, and rehabilitation/investigations. For our review, we analyzed compensation (Indemnity) and lump sum payments separately. Medical and rehabilitation/ investigation payments were combined and analyzed as "Medical" losses.

Our estimates do not include any provision for allocated loss adjustment expenses (ALAE) that may be incurred in the processing and settlement of claims, other than rehabilitation/investigation payments included with medical losses noted above. Also, the estimates do not consider unallocated loss adjustment expenses (ULAE), such as fees of adjusters and settling agents, etc.

The 12 month incremental payments provided by the Commonwealth were added to the cumulative claim payments from the prior analysis (at June 30, 2017) to derive cumulative paid figures as of June 30, 2018 found in this report.

Exposure

Exposure information for FY2018, in the form of payroll was provided by the Commonwealth and fully consistent with the "object code" classification which was revised as part of the FY2010 study.

We relied on loss and exposure data provided by responsible officers or employees of the Commonwealth. We also relied on data found in the prior analysis and thereby also those sources described in it; utilizing last year's triangles and updating them with data provided by the HRD. We also relied on payroll data provided by the Office of the Comptroller. As mentioned previously, any inaccuracies in quantitative data or qualitative representations could have a significant effect on the results of our analysis.

Industry Data

Loss development factors were derived from the Commonwealth's own triangles and industry data provided by:

- The National Council on Compensation Insurance (NCCI)
- The Workers Compensation Rating and Inspection Bureau of Massachusetts (WCRIBMA)

Trend factors used to adjust for changes in historical wage and benefit levels are based on data from these sources as well.

VI. Actuarial Analysis

Overview

Performing an actuarial analysis involves developing a qualitative understanding of the risk and applying actuarial techniques and methods to available data. These methods attempt to project unpaid losses to ultimate settlement value. Each method requires certain underlying assumptions and varies in its responsiveness to loss data. As a result, not all methods are appropriate for use in all circumstances. For each unique situation, actuaries assess the strengths and weaknesses inherent in the results of each method in producing reasonable estimates of ultimate loss.

The following methods were employed in developing the recommendations contained in this report.

Methods/Models of Estimating Unpaid Loss Estimates

Paid Loss Development Method

This method is based on the assumption that losses from a group of claims are paid in a sufficiently consistent pattern such that past experience can be used to predict future development. The term loss development is used to describe changes that take place in the value of a group of claims over time. In order to reflect loss development arithmetically, incremental loss development factors are calculated by dividing losses at a given evaluation date by the immediately preceding evaluation date. A multiplicative process is then used to calculate a cumulative loss development factor that represents the development to ultimate for a given age of maturity.

This method can be applied using either cumulative paid losses or incurred losses (cumulative paid losses plus case reserves). For a given group of claims, cumulative losses are multiplied by the appropriate cumulative loss development factor to estimate ultimate losses. For the Commonwealth, we relied on the Paid Loss Development Method only, as the Commonwealth does not currently establish case reserves.

This method relies heavily on data as of the most recent evaluation date and assumes past patterns are predictive of future development. If the program has inadequate history to develop predictive loss development patterns, other sources of loss development information may be considered.

In addition to the cumulative loss development factors, we apply an additional factor to bring losses from their current paid status to a projected ultimate basis. This factor is called an “Additional Tail Consideration” factor.

The “Additional Tail Factor” consideration is based on our observation that for certain clusters, some of the older policy periods showed more open claims and higher development than other periods. We also evaluated the average age of the paid claimants for each cluster and year, and noticed that in certain years payments were being made to relatively young claimants. We judgmentally added a tail factor selection to account for these observations

Paid Bornhuetter-Ferguson (BF) Method

This method offers a blend of stability and responsiveness by estimating ultimate losses using a percentage of the expected loss results and current loss data. It calculates future loss development based on expected loss estimates and the cumulative loss development factors described in the Loss Development Method.

The B-F Method can be applied using either cumulative paid or incurred losses. Again, for the Commonwealth, we relied on the Paid B-F Method only as the Commonwealth does not currently establish case reserves.

In determining future loss development, the percent of expected losses remaining to be paid is based on the appropriate loss development factor. This percentage is multiplied by expected losses to determine expected future development. This estimate of future loss development is added to losses at the current evaluation date to project ultimate losses.

To determine the expected losses, we determine an initial expected pure premium (or an “a priori” loss rate) based upon (1) a review of the Commonwealth’s historic pure premiums (losses divided by payroll) as well as (2) consideration of the selected rate the trend and benefit level adjustments removed (“de-trended”). By considering both metrics, we attempt to balance stability and responsiveness in the selection of the initial expected pure premium.

Lump Sum Methodology

Lump sum indemnity payments are analyzed separately from all other indemnity payments. We relied on two methods to develop lump sum payments to ultimate levels. The first is a standard paid loss development method, where current lump sum payments are multiplied by a cumulative lump sum development factor to arrive at the estimate of ultimate lump sum losses.

The second method uses ultimate indemnity losses excluding lump sums as a base for estimating remaining outstanding lump sum payments. Outstanding lump sums payments are estimated by multiplying base ultimates by cumulative incremental lump sums as a percent of ultimate losses excluding lump sums ratio. The outstanding lump sum payments are added to payments to date to arrive at the estimate of ultimate lump sum losses. An estimate of ultimate lump sums is selected based on a review of both methods.

7/1/81-82 and Prior Periods Methodology

In order to estimate liabilities relating to periods 7/1/81-82 and prior, we again relied on two methods. The first uses an average payment trend to estimate the reserves needed for prior periods. This estimate is added to payments to date to arrive at the estimate of ultimate loss. The average payment trend is derived from the Commonwealth’s history of incremental payments and is credibility weighted with the total Commonwealth payment trend (derived from all Commonwealth data combined).

The second method multiplies average incremental payments over the last three fiscal years by a selected number of survival years in order to estimate the needed reserve. The needed reserve is added to payments to date to arrive at an estimate of the ultimate loss. An estimate of ultimate loss is selected based on a review of both methods

Selection of Ultimate Losses and Reasonable Reserve Estimates

Our estimates of ultimate losses by year were judgmentally selected based on the methods described above. Generally, we selected the lower and higher of the Paid Loss Development and Paid Bornhuetter-Ferguson methods as the "Low End" and "High End" selections by year. In certain cases, we judgmentally increased the high end of the range if we felt there was not enough "differential" in the two methodologies.

Similar to the prior analysis, we assume that any payment made during fiscal year 2018 implies an "open" claim and will remain open during fiscal year 2018. As a rule, if no payments were made for two years in a row, we project minimal reserves for that year, assuming the claims in that year are closed

Allocation Methodology for Massachusetts Colleges and Universities

The allocation of reserves to each college and university is based on a credibility weighting of expected loss experience based on exposure (payroll) and actual loss experience. The credibility weight is based on the formula P/ (P+K) where P is average payroll for the entity over the past five years and K is 20,000,000 for entities with a low coefficient of variation (CV) and 50,000,000 for entities with a high coefficient of variation (> 1.00).

The expected loss experience is the 5 year average payroll for each entity multiplied by the overall indemnity and medical loss rates for the entire Other Colleges and Universities group. The actual loss experience used in the allocation is a 5-year average ultimate loss for each entity. The ultimate loss for each entity is calculated by applying the paid loss development method to each entity's loss experience.

The outstanding losses estimated for Other Colleges and Universities is then allocated to each entity based on its percentage share of the ultimate credibility weighted losses.

Composition Analysis Methodology for Cluster 5 - All Other Departments

The decomposition of the All Other Departments cluster into the liability associated with MassDOT (excl. MTA) and Non-MassDOT agencies is based on a blended consideration of three different methods. Each method, estimates a percentage share of the total liability for each fiscal year that is associated with the agencies of the MassDOT (excl. MTA) agencies. Each of the three methods described below are applied to both the Medical and Indemnity analyses independently:

Method 1: The number of loss payments made to claimants of the MassDOT (excl. MTA) agencies during the fiscal year as a proportion of the total number of claim payments made during the fiscal year to the All Other Departments in Cluster 5

Method 2: The value of loss payments made to claimants of the MassDOT (excl. MTA) during the fiscal year as a proportion of the total value of claim payments made during the fiscal year to All Other Departments in Cluster 5.

Method 3: The payroll of the MassDOT (excl. MTA) agencies during each of the past fiscal years as a proportion of the total payroll paid to All Other Departments in Cluster 5 over the past fiscal years. Where this historical payroll split was not available, an assumption was made based upon available information.

Actuarial Assumptions

Incurred But Not Reported (IBNR)

Generally, losses will increase over time for the following reasons:

1. It is impossible to estimate precisely the ultimate losses and allocated loss adjustment expenses for claims when they are initially reported.
2. It takes a period of time for some claims to be discovered, reported, and recorded. Unreported claims are referred to as “pure” IBNR claims. Claims that are reported but not yet recorded are referred to as “pipeline” IBNR claims.
3. Closed claims are sometimes reopened.

These three conditions result in the need for IBNR reserves.

Loss Trend

Loss trend is the change in claim frequency and cost levels from one time period to the next. Factors that affect the frequency and severity of claims are constantly changing over time. Examples of causes of these changes include inflation, societal attitudes toward legal action, and changes in laws. Actuaries use trend factors to adjust historical loss experience to comparable cost levels. Using workers compensation as an example, three elements of cost are combined within this single factor:

Increases in defined benefits for Workers Compensation: Benefits are established by legislative authority and typically reviewed annually by state legislatures. Many times, benefits are expanded by legislatures through changes such as broadening the definition of injury, decreasing waiting periods, increasing benefit duration, or increasing maximum benefit limits.

Increases in medical costs: This causes inflationary trend in the medical component of workers compensation losses.

Increase in wage costs: Wage inflation, although relatively small in some economic sectors, has occurred over the past several years as well.

Specifically, for this analysis, trend factors were obtained from the most recent rate filing published by the WCRIB of Massachusetts.

Exposure

Actuaries select an exposure base expected to vary directly with the incidence and/or severity of claims. The actuary must consider both the historical loss level and the corresponding exposures in evaluating claim liabilities and expected future costs.

As previously discussed, payroll exposure for FY1985 through FY2018 were provided by the Commonwealth. For the FY2018 non-MTA element of the MassDOT payroll in Cluster 5, MTA-only payroll was subtracted from the total MassDOT payroll.

Time Value of Money

Due to the time lag between when claims are incurred, reported, and finally paid, a sound funding recommendation may consider the time value of money. Income will be earned on self-insurance fund assets until those assets are liquidated to pay losses. If this income is retained in the self-insurance fund, such investment income may be considered.

At the Commonwealth's direction, we used 4% and 6% rates to discount the estimated reserves. We have not formed any opinion regarding the reasonability of these rates. It is noted that discounting reserves introduces additional risk to the analysis since the timing of actual loss payments may differ from the estimated payment pattern, and since the realized investment yield may differ from that assumed.

Provision for Uncertainty

An actuarial projection may consider the degree of uncertainty inherent in its projection. An estimate stated at its ultimate value on a nominal basis may include an implicit provision for uncertainty due to the time value of money. If an estimate is stated at present value, it may be appropriate to include an explicit provision for uncertainty. Further, an explicit provision for uncertainty may be warranted when losses are subject to a high degree of variability.

For the Commonwealth, we have not explicitly used any provision for risk in our calculations. Instead, we have determined a "low" and "high" end range of reasonable reserves. It should be understood that the range does not represent all possible outcomes, but rather a range of reasonable estimates

VII. Arrangement of Exhibits

This report contains eight sections preceded by a set of summary exhibits.

The summary exhibits include the following:

Summary Exhibit	Description
1	Summary of Reserve Estimates - Undiscounted
2	Summary of Reserve Estimates - Discounted at 4%
3	Summary of Reserve Estimates - Discounted at 6%
4	Summary of Change in Ultimate Loss
5	Summary of Estimates for 2017-18 Fiscal Year
6	Summary of Reserve Estimates by Cluster
7	Summary of Reserve Estimates by College
8	Summary of Ultimate Losses by Cluster
9	Calculation of Implied Development Factors
10	MA Colleges and Universities Allocation

The eight sections and their exhibits are organized as follows:

Section	Exhibit	Cluster
1	1	All Clusters Combined - Indemnity
1	2	All Clusters Combined - Medical
2	1	DDS - Indemnity
2	2	DDS - Medical
3	1	DMH - Indemnity
3	2	DMH - Medical
4	1	DOC - Indemnity
4	2	DOC - Medical
5	1	UMass Amherst - Indemnity
5	2	UMass Amherst - Medical
6	1	UMass Medical School - Indemnity
6	2	UMass Medical School - Medical
7	1	Other College and Universities - Indemnity
7	2	Other College and Universities - Medical
8	1	All Other - Indemnity
8	2	All Other - Medical

Within Sections 1 through 8, the worksheets are organized as follows:

Page	Description
1	Summary of Ultimate Losses
2	Paid Loss Development Method
3	Paid Bornhuetter-Ferguson Method
4	Calculation of Initial Expected Loss Rates
5	Calculation of 1982 and Prior Reserves Page 1
6	Calculation of 1982 and Prior Reserves Page 2
7	Paid Loss Triangle
8	Comparison of Ultimate Losses
9-12	Calculation of Ultimate Lump Sum Payments
13-15	Discounting Exhibits
16	Calculation of FY 2019 Payments

For the purpose of the allocation of liability to MassDOT (excl. MTA), within Section 8 only, there are two additional worksheet pages:

Page	Description
MassDOT - FY2017	MassDOT (excl. MTA) Reserve Allocation as of 06/30/17
MassDOT - FY2018	MassDOT (excl. MTA) Reserve Allocation as of 06/30/18

VIII. Description of Exhibits

Summary Exhibits

Summary Exhibit 1 shows the undiscounted low and high reserve estimates by cluster for indemnity and medical separately.

Summary Exhibit 2 shows the low and high reserve estimates by cluster for indemnity and medical separately, discounted at 4%.

Summary Exhibit 3 shows the low and high reserve estimates by cluster for indemnity and medical separately, discounted at 6%.

Summary Exhibit 4 shows the change in ultimate loss from the prior report by cluster and for indemnity and medical separately. Changes in the ultimate loss for the current fiscal year are excluded.

Summary Exhibit 5 shows the low and high ultimate loss estimate for the current fiscal year. The estimates are shown by cluster and for indemnity and medical separately. The midpoint of the range of estimates is used to calculate the loss rate for each cluster.

Summary Exhibit 6 contains an additional summary of reserve estimates by cluster, showing both the discounted and undiscounted ranges of reserves.

Summary Exhibit 7 contains a summary of reserve estimates by college. High and low reserve estimates are shown undiscounted as well as at 4% and 6% discount rates.

Summary Exhibit 8 shows the selection of ultimate losses by accident year for all clusters. A calculation of the outstanding losses and loss rates is also shown by accident year.

Page 1 shows results for all clusters combined.

Pages 2 – 8 show results for each of the clusters specified in the Scope section.

Summary Exhibit 9 shows the calculation of the implied loss development factors underlying the results of our analysis by accident year. The selected ultimate loss for all clusters is divided by the paid losses to date for all clusters to derive the indicated LDF by accident year.

Summary Exhibit 10 Page 1 shows the results of the methodology used to allocate ultimate losses to each of the college and universities contained in the Other Colleges and Universities group. This methodology is discussed in the Overview section of this report.

Summary Exhibit 10 Page 2 shows the estimated loss costs for indemnity and medical combined for each college and university. The loss costs are calculated by dividing the sum of the estimated ultimate indemnity and medical losses on Page 4 by the payroll figures on Page 3.

Summary Exhibit 10 Page 3 shows the historical payrolls for each college and university.

Summary Exhibit 10 Page 4 shows the estimated ultimate indemnity and medical losses for each college and university. The estimated ultimate losses are calculated by multiplying the cumulative paid indemnity and medical losses on Page 5 by the Age-to-Ultimate LDF's shown on Page 4.

Summary Exhibit 10 Page 5 shows the historical cumulative indemnity and medical payments for each college and university.

Summary Exhibit 10 Page 6 shows the current fiscal year indemnity and medical payments for each college and university.

Pages in Exhibits 1 and 2 of Sections 1 through 8

Page 1 shows the selected ultimate losses by accident year. A high and low selection is made for each accident year based on a review of the actuarial methods presented. Outstanding losses based on the low and high estimates are also calculated. The outstanding loss estimate equals the selected ultimate loss minus paid losses to date.

Page 2 shows the application of the Paid Loss Development Method to the applicable data. The number of paid counts in the last 12 months, average outstanding claim amounts, and the average age for claimants that had an indemnity payment within the last calendar year are also shown.

Page 3 shows the application of the Paid Bornhuetter-Ferguson Method to the applicable data. The ultimate loss cost resulting from the method is also shown.

Page 4 calculates the initial expected loss rate, which is used as the a priori loss rate in the B-F method. Expected ultimate losses from the Paid Loss Development Method are divided by payroll for each accident year. The resulting loss rates are trended to the current cost and wage level and adjusted for historical changes in benefit levels. A current loss cost is then selected.

Page 5 shows the application of the methodology used to estimate ultimate losses for periods 7/1/1981-82 and prior. This methodology is described in the Actuarial Analysis section of this report.

Page 6 shows the derivation of the selected trend using the applicable data for each section. The selected trend is used in the methodology for estimating the 7/1/1981-82 and prior reserves.

Page 7 shows the paid loss development triangle and selected LDF's underlying the paid loss development and paid B-F methods.

Page 8 shows the comparison of the selected ultimate losses to the selection from the prior actuarial reserve review. The changes in ultimates are shown on an absolute and percentage change basis.

Page 9 calculates the estimated ultimate lump sum payments. Two methodologies are reviewed and an estimate of the ultimate lump sum payments by accident year is made. The two methods are described in the Actuarial Analysis section of this report. A comparison to the prior ultimate lump sum selection is also shown.

Pages 10 through 12 show various lump sum development triangles underlying the lump sum methodology on Page 9. Incremental lump sum payments (in 12 month intervals) are accumulated to derive a cumulative lump sum payment triangle (Page 10). Page 11 shows the incremental lump sum payments as a percent of ultimate indemnity loss excluding lump sum payments. Page 12 shows the selection of the LDF's for the cumulative lump sum payment triangle.

Page 13 calculates the discount factors based on the selected payout patterns from Page 7. Discount factors are calculated assuming 4% and 6% interest rates.

Pages 14 and 15 show the application of the discount factors from Page 13 to the outstanding losses from Page 1. Page 14 shows the discounted outstanding losses at 4%; Page 15 shows them at 6%.

Page 16 estimates the percentage of reserve estimates which can be considered short-term; i.e., projected payments associated with the reserves which will be made over the next calendar period

Additional MassDOT Pages in Exhibits 1 and 2 of Section 8 ONLY

Page MassDOT FY2017 shows the results of the methodology used to allocate outstanding reserve liability to the MassDOT (excl. MTA) and Non-MassDOT agencies. This methodology is discussed in the Overview section of this report. This page utilizes the results of the previous actuarial analysis performed in 2017 and based on loss data valued as of 6/30/17.

Page MassDOT FY2018 shows the results of the methodology used to allocate outstanding reserve liability to the MassDOT (excl. MTA) and Non-MassDOT agencies. This methodology is discussed in the Overview section of this report. This page utilizes the results of the current actuarial analysis, based on data valued as of 6/30/18.

IX. Exhibits

Commonwealth of Massachusetts
Workers Compensation
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- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

Section 3 *Department of Mental Health - Cluster 2*
- Exhibit 1 - Indemnity
- Exhibit 2 - Medical

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Section 8 *All Other - Clusters 5-17 & 95*
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- Exhibit 2 - Medical

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Summary of Reserve Estimates - Undiscounted

Cluster	Cluster #	Report Section	Loss Reserve Estimate Low End	Loss Reserve Estimate High End
Department of Developmental Services	1	Section 2		
Indemnity			19,060,179	22,099,062
Medical			2,803,657	5,263,832
Total			21,863,836	27,362,894
Department of Mental Health	2	Section 3		
Indemnity			20,889,995	26,283,850
Medical			3,128,261	4,155,395
Total			24,018,257	30,439,246
Department of Corrections	3	Section 4		
Indemnity			28,327,556	36,804,295
Medical			9,892,775	13,961,249
Total			38,220,331	50,765,544
UMass - Amherst	4	Section 5		
Indemnity			4,934,275	6,504,144
Medical			1,765,177	2,349,378
Total			6,699,452	8,853,523
UMass - Medical School	4	Section 6		
Indemnity			1,698,972	2,595,012
Medical			590,552	1,109,635
Total			2,289,524	3,704,648
Other Colleges & Universities	4	Section 7		
Indemnity			14,928,885	19,091,629
Medical			3,359,794	4,237,527
Total			18,288,679	23,329,156
All Others	5-17 & 95	Section 8		
Indemnity			159,707,977	186,465,994
Medical			29,256,243	36,709,116
Total			188,964,220	223,175,110
Grand Total		Section 1		
Indemnity			249,547,839	299,843,987
Medical			50,796,461	67,786,133
Total			300,344,299	367,630,120

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Summary of Reserve Estimates - Discounted at 4%

Cluster	Cluster #	Report Section	Loss Reserve Estimate Low End	Loss Reserve Estimate High End
Department of Developmental Services	1	Section 2		
Indemnity			14,968,847	17,438,672
Medical			2,311,038	4,295,121
Total			17,279,885	21,733,794
Department of Mental Health	2	Section 3		
Indemnity			15,428,357	19,449,510
Medical			2,476,367	3,287,878
Total			17,904,724	22,737,388
Department of Corrections	3	Section 4		
Indemnity			21,653,939	28,076,768
Medical			7,554,406	10,581,983
Total			29,208,345	38,658,751
UMass - Amherst	4	Section 5		
Indemnity			3,947,948	5,185,967
Medical			1,430,125	1,904,283
Total			5,378,073	7,090,250
UMass - Medical School	4	Section 6		
Indemnity			1,378,913	2,117,133
Medical			511,769	954,051
Total			1,890,682	3,071,185
Other Colleges & Universities	4	Section 7		
Indemnity			11,971,776	15,357,016
Medical			2,705,786	3,418,049
Total			14,677,562	18,775,066
All Others	5-17 & 95	Section 8		
Indemnity			113,545,892	133,775,785
Medical			22,156,038	27,851,314
Total			135,701,930	161,627,099
Grand Total		Section 1		
Indemnity			182,895,672	221,400,852
Medical			39,145,530	52,292,680
Total			222,041,202	273,693,532

Commonwealth of Massachusetts
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Summary of Reserve Estimates - Discounted at 6%

Cluster	Cluster #	Report Section	Loss Reserve Estimate Low End	Loss Reserve Estimate High End
Department of Developmental Services	1	Section 2		
Indemnity			13,608,091	15,876,270
Medical			2,137,092	3,954,912
Total			15,745,183	19,831,182
Department of Mental Health	2	Section 3		
Indemnity			13,807,717	17,410,761
Medical			2,255,482	2,993,595
Total			16,063,199	20,404,356
Department of Corrections	3	Section 4		
Indemnity			19,488,066	25,237,388
Medical			6,788,340	9,477,672
Total			26,276,406	34,715,060
UMass - Amherst	4	Section 5		
Indemnity			3,624,771	4,754,419
Medical			1,312,667	1,748,207
Total			4,937,437	6,502,625
UMass - Medical School	4	Section 6		
Indemnity			1,263,962	1,943,984
Medical			481,069	893,875
Total			1,745,031	2,837,859
Other Colleges & Universities	4	Section 7		
Indemnity			10,898,183	13,991,998
Medical			2,474,859	3,127,843
Total			13,373,042	17,119,842
All Others	5-17 & 95	Section 8		
Indemnity			99,388,620	117,450,054
Medical			19,822,650	24,937,792
Total			119,211,270	142,387,846
Grand Total		Section 1		
Indemnity			162,079,409	196,664,874
Medical			35,272,160	47,133,896
Total			197,351,569	243,798,770

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Summary of Change in Ultimate Loss (excluding current Fiscal Year)

Cluster	Cluster #	Report Section	Current Ult Loss Estimate less Previous Ult Loss Estimate	
			Low End	High End
Department of Developmental Services	1	Section 2		
Indemnity			(681,775)	(1,498,192)
Medical			224,683	(228,616)
Total			(457,092)	(1,726,808)
Department of Mental Health	2	Section 3		
Indemnity			1,264,294	141,788
Medical			52,647	(70,808)
Total			1,316,941	70,980
Department of Corrections	3	Section 4		
Indemnity			(3,917,698)	(6,969,022)
Medical			(821,664)	(1,346,077)
Total			(4,739,362)	(8,315,099)
UMass - Amherst	4	Section 5		
Indemnity			329,702	(710,954)
Medical			(207,969)	(191,830)
Total			121,733	(902,784)
UMass - Medical School	4	Section 6		
Indemnity			278,000	108,775
Medical			(80,854)	(157,013)
Total			197,146	(48,238)
Other Colleges & Universities	4	Section 7		
Indemnity			(549,752)	(1,381,164)
Medical			114,252	265
Total			(435,500)	(1,380,899)
All Others	5-17 & 95	Section 8		
Indemnity			(6,215,312)	(10,453,138)
Medical			(675,142)	(1,468,850)
Total			(6,890,454)	(11,921,988)
Grand Total		Section 1		
Indemnity			(9,492,542)	(20,761,908)
Medical			(1,394,047)	(3,462,928)
Total			(10,886,589)	(24,224,837)

Commonwealth of Massachusetts
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Summary of Estimates for 2017-18 Fiscal Year

Cluster	Cluster #	Report Section	Ultimate Loss Estimate Low End	Ultimate Loss Estimate High End	Average	Payroll (000)	Loss Rate
Department of Developmental Services	1	Section 2					
Indemnity			3,108,000	3,341,000			
Medical			1,005,000	1,306,000			
Total			4,113,000	4,647,000	4,380,000	292,956	1.495
Department of Mental Health	2	Section 3					
Indemnity			4,653,000	5,368,000			
Medical			1,081,000	1,244,000			
Total			5,734,000	6,612,000	6,173,000	203,925	3.027
Department of Corrections	3	Section 4					
Indemnity			6,324,000	6,931,000			
Medical			1,954,000	2,333,100			
Total			8,278,000	9,264,100	8,771,050	347,621	2.523
UMass - Amherst	4	Section 5					
Indemnity			1,456,000	1,597,000			
Medical			564,000	727,650			
Total			2,020,000	2,324,650	2,172,325	607,484	0.358
UMass - Medical School	4	Section 6					
Indemnity			366,000	561,000			
Medical			251,000	363,300			
Total			617,000	924,300	770,650	398,722	0.193
Other Colleges & Universities	4	Section 7					
Indemnity			4,088,000	4,790,000			
Medical			1,432,000	1,725,000			
Total			5,520,000	6,515,000	6,017,500	1,457,740	0.413
All Others	5-17 & 95	Section 8					
Indemnity			32,238,080	33,291,000			
Medical			7,500,000	9,050,000			
Total			39,738,080	42,341,000	41,039,540	3,401,479	1.207
Grand Total		Section 1					
Indemnity			52,233,080	55,879,000			
Medical			13,787,000	16,749,050			
Total			66,020,080	72,628,050	69,324,065	6,709,926	1.033

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Summary of Reserve Estimates by Cluster

Cluster	Cluster / Report Section	Undiscounted		Discounted at 4%		Discounted at 6%	
		Low End	High End	Low End	High End	Low End	High End
DDS	1 / 2	21,863,836	27,362,894	17,279,885	21,733,794	15,745,183	19,831,182
DMH	2 / 3	24,018,257	30,439,246	17,904,724	22,737,388	16,063,199	20,404,356
DOC	3 / 4	38,220,331	50,765,544	29,208,345	38,658,751	26,276,406	34,715,060
UMass - Amherst	4 / 5	6,699,452	8,853,523	5,378,073	7,090,250	4,937,437	6,502,625
UMass - Medical	4 / 6	2,289,524	3,704,648	1,890,682	3,071,185	1,745,031	2,837,859
Other Colleges & Universities	4 / 7	18,288,679	23,329,156	14,677,562	18,775,066	13,373,042	17,119,842
All Other Dept's (incl. MassDOT, excl. MTA)	5 / 8	188,964,220	223,175,110	135,701,930	161,627,099	119,211,270	142,387,846
Total		300,344,299	367,630,120	222,041,202	273,693,532	197,351,569	243,798,770

All Other Departments	Cluster / Report Section	Undiscounted		Discounted at 4%		Discounted at 6%	
		Low End	High End	Low End	High End	Low End	High End
MassDOT Agencies (excl. MTA)	5 / 8	12,162,896	14,429,687	8,741,382	10,456,731	7,681,241	9,214,083
Non-MassDOT Agencies	5 / 8	176,801,324	208,745,423	126,960,548	151,170,368	111,530,030	133,173,763

Commonwealth of Massachusetts
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Summary of Reserve Estimates by College

	Undiscounted		Discounted at 4%		Discounted at 6%	
Cluster	Low End	High End	Low End	High End	Low End	High End
Berkshire Community College	151,093	192,735	121,259	155,111	110,482	141,436
Bridgewater State College	1,425,859	1,818,835	1,144,322	1,463,780	1,042,616	1,334,732
Bristol Community College	215,011	274,270	172,557	220,729	157,220	201,270
Bunker Hill Community College	488,212	622,766	391,814	501,196	356,990	457,010
Cape Cod Community College	329,921	420,849	264,778	338,695	241,245	308,835
Fitchburg State College	648,771	827,576	520,670	666,025	474,394	607,307
Framingham State College	448,709	572,376	360,111	460,642	328,105	420,032
Greenfield Community College	184,136	234,885	147,778	189,033	134,644	172,368
Holyoke Community College	365,763	466,569	293,542	375,490	267,453	342,387
Mass Bay Community College	261,739	333,876	210,058	268,700	191,388	245,011
Mass College of Art	581,978	742,375	467,066	597,455	425,554	544,783
Mass Maritime Academy	334,458	426,637	268,419	343,353	244,562	313,083
Massachusetts College of Liberal Arts	289,903	369,802	232,661	297,613	211,983	271,375
Massasoit Community College	390,028	497,523	313,017	400,401	285,197	365,102
Middlesex Community College	301,592	384,713	242,043	309,613	220,530	282,318
Mt Wachusett Community College	238,557	304,305	191,454	244,902	174,438	223,311
North Essex Community College	284,344	362,711	228,200	291,906	207,918	266,172
North Shore Community College	365,461	466,185	293,301	375,181	267,233	342,105
Quinsigamond Community College	766,459	977,700	615,121	786,843	560,450	717,474
Roxbury Community College	176,947	225,715	142,009	181,653	129,387	165,639
Salem State College	948,550	1,209,977	761,258	973,777	693,599	887,928
Springfield Tech Community College	602,538	768,601	483,566	618,562	440,587	564,029
UMass (Boston)	1,990,521	2,539,122	1,597,491	2,043,459	1,455,508	1,863,306
UMass (Dartmouth)	2,027,325	2,586,069	1,627,028	2,081,242	1,482,420	1,897,758
University of Lowell	2,601,251	3,318,172	2,087,631	2,670,431	1,902,086	2,435,004
Westfield State College	934,472	1,192,018	749,959	959,324	683,304	874,749
Worcester State College	935,081	1,192,796	750,449	959,950	683,750	875,320
Total	18,288,679	23,329,156	14,677,562	18,775,066	13,373,042	17,119,842

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Clusters Combined

Total Indemnity (Including Lump Sums) + Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		105,774,973			115,983,495	122,061,256	10,208,522	16,286,284		
6/30/82-83		18,369,674	18,581,866		18,466,332	18,588,305	96,659	218,632		
6/30/83-84		26,657,928	27,616,194		27,308,255	28,024,699	650,328	1,366,772		
6/30/84-85	1,823,085	39,843,599	40,623,816	40,418,329	40,276,416	40,715,498	432,817	871,899	2.209	2.233
6/30/85-86	1,952,445	52,615,802	53,676,120	53,466,173	53,176,482	53,538,940	560,679	923,137	2.724	2.742
6/30/86-87	2,220,820	59,533,390	61,003,106	60,678,697	60,175,031	60,642,158	641,642	1,108,769	2.710	2.731
6/30/87-88	2,885,583	86,404,993	88,749,879	88,508,274	88,418,722	89,394,732	2,013,729	2,989,739	3.064	3.098
6/30/88-89	3,098,180	85,028,619	87,677,281	87,321,625	87,342,665	88,372,410	2,314,046	3,343,791	2.819	2.852
6/30/89-90	3,079,763	82,014,340	84,862,429	84,716,428	84,461,827	85,309,717	2,447,486	3,295,376	2.742	2.770
6/30/90-91	2,914,364	67,947,968	70,750,116	70,632,679	69,946,405	70,879,943	1,998,437	2,931,975	2.400	2.432
6/30/91-92	2,880,434	46,218,909	48,280,872	48,192,196	47,872,552	48,989,338	1,653,643	2,770,429	1.662	1.701
6/30/92-93	2,887,238	31,263,047	32,929,646	32,854,097	32,672,869	32,957,522	1,409,822	1,694,474	1.132	1.141
6/30/93-94	3,056,850	34,522,326	36,571,745	36,423,610	36,338,027	36,955,595	1,815,701	2,433,269	1.189	1.209
6/30/94-95	3,158,808	30,922,139	32,951,704	32,893,978	32,613,524	33,438,174	1,691,385	2,516,035	1.032	1.059
6/30/95-96	3,301,791	29,704,713	31,943,007	31,871,446	31,690,111	32,535,677	1,985,398	2,830,964	0.960	0.985
6/30/96-97	3,902,868	29,810,693	32,295,595	32,224,465	31,962,696	32,832,564	2,152,003	3,021,871	0.819	0.841
6/30/97-98	3,776,138	33,021,882	35,914,655	35,815,471	35,083,170	36,047,347	2,061,288	3,025,465	0.929	0.955
6/30/98-99	4,017,530	30,914,319	34,105,916	34,003,731	33,531,133	34,413,233	2,616,815	3,498,914	0.835	0.857
6/30/99-00	4,221,786	34,731,404	38,839,252	38,674,648	38,039,192	39,097,725	3,307,788	4,366,321	0.901	0.926
6/30/00-01	4,310,725	40,938,368	45,974,499	45,755,655	45,001,530	46,115,553	4,063,162	5,177,184	1.044	1.070
6/30/01-02	4,438,755	35,600,744	40,417,900	40,267,830	39,437,883	40,873,423	3,837,138	5,272,678	0.888	0.921
6/30/02-03	4,423,888	35,525,718	40,740,308	40,588,869	40,100,698	41,552,560	4,574,980	6,026,842	0.906	0.939
6/30/03-04	4,482,207	35,319,176	40,942,954	40,799,415	40,153,323	41,234,320	4,834,147	5,915,144	0.896	0.920
6/30/04-05	4,639,517	36,712,692	43,291,323	41,538,323	41,073,478	42,856,550	4,360,787	6,143,858	0.885	0.924
6/30/05-06	4,938,165	32,502,912	38,735,002	38,213,826	37,824,537	38,824,850	5,321,625	6,321,938	0.766	0.786
6/30/06-07	5,183,126	30,945,407	37,583,497	37,547,585	36,541,996	38,242,600	5,596,589	7,297,193	0.705	0.738
6/30/07-08	5,508,425	34,977,057	43,392,810	42,990,216	41,983,120	43,949,211	7,006,063	8,972,154	0.762	0.798
6/30/08-09	5,447,676	35,012,785	44,391,207	43,793,386	43,144,690	45,183,181	8,131,905	10,170,396	0.792	0.829
6/30/09-10	5,525,579	33,582,907	43,523,318	43,531,830	42,525,920	44,754,162	8,943,013	11,171,255	0.770	0.810
6/30/10-11	5,712,303	37,517,697	50,057,563	49,002,192	48,231,730	51,007,581	10,714,033	13,489,884	0.844	0.893
6/30/11-12	5,880,714	36,175,150	50,325,010	49,702,126	48,824,670	51,711,767	12,649,520	15,536,617	0.830	0.879
6/30/12-13	6,162,621	30,516,320	44,452,636	46,789,893	44,494,120	47,273,550	13,977,800	16,757,230	0.722	0.767
6/30/13-14	6,442,136	34,912,372	54,318,214	55,240,509	53,054,450	56,330,000	18,142,078	21,417,628	0.824	0.874
6/30/14-15	6,758,892	34,606,640	59,908,799	60,699,416	58,763,100	62,203,550	24,156,460	27,596,910	0.869	0.920
6/30/15-16	6,843,054	32,795,629	67,287,378	66,215,374	64,397,860	69,293,900	31,602,231	36,498,271	0.941	1.013
6/30/16-17	6,638,078	24,507,676	65,157,278	64,228,283	62,358,250	67,746,520	37,850,574	43,238,844	0.939	1.021
6/30/17-18	6,709,926	11,496,073	70,147,916	68,046,707	66,020,080	72,628,050	54,524,007	61,131,977	0.984	1.082
Total	149,223,468	1,518,946,040	1,738,020,811	1,683,647,283	1,819,290,340	1,886,576,160	300,344,299	367,630,120		
Tot 6/30/84-18	149,223,468	1,368,143,466	1,691,822,751	1,683,647,283	1,657,532,258	1,717,901,899	289,388,791	349,758,433	1.111	1.151

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) - (9) = Sum of Summary Exhibit 8, Pages 2-8

(10) = (6) / (2) / 10

(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Developmental Services - Cluster 1
Total Indemnity (Including Lump Sums) + Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		23,046,128			26,235,805	27,722,793	3,189,677	4,676,666		
6/30/82-83		4,960,536	4,985,556		4,985,221	4,992,945	24,685	32,409		
6/30/83-84		10,072,903	10,547,358		10,547,000	10,585,136	474,097	512,234		
6/30/84-85	181,560	7,574,989	7,632,726	7,635,731	7,585,000	7,647,940	10,011	72,951	4.178	4.212
6/30/85-86	195,247	11,874,262	11,991,169	11,992,978	11,891,000	11,903,000	16,739	28,739	6.090	6.096
6/30/86-87	224,370	15,376,859	15,544,519	15,554,117	15,401,000	15,415,000	24,141	38,141	6.864	6.870
6/30/87-88	262,864	22,385,953	22,724,511	22,707,549	22,706,000	22,726,000	320,047	340,047	8.638	8.646
6/30/88-89	283,884	24,224,434	24,651,290	24,661,384	24,651,000	24,711,530	426,566	487,097	8.683	8.705
6/30/89-90	285,078	18,704,728	19,073,974	19,139,874	18,886,000	18,889,000	181,272	184,272	6.625	6.626
6/30/90-91	267,732	13,789,072	14,118,638	14,116,299	13,898,480	13,929,000	109,408	139,928	5.191	5.203
6/30/91-92	261,442	10,412,174	10,696,302	10,692,618	10,665,730	10,696,000	253,556	283,826	4.080	4.091
6/30/92-93	259,992	5,947,948	6,126,691	6,124,216	5,996,170	6,057,000	48,222	109,052	2.306	2.330
6/30/93-94	257,062	4,767,057	4,923,120	4,921,181	4,845,080	4,893,000	78,023	125,943	1.885	1.903
6/30/94-95	255,854	3,009,689	3,116,664	3,117,194	3,106,550	3,117,000	96,861	107,311	1.214	1.218
6/30/95-96	255,539	4,172,128	4,347,761	4,345,069	4,345,000	4,358,000	172,872	185,872	1.700	1.705
6/30/96-97	270,071	3,349,690	3,494,538	3,494,995	3,382,000	3,404,000	32,310	54,310	1.252	1.260
6/30/97-98	245,367	3,474,504	3,655,036	3,652,583	3,653,000	3,671,000	178,496	196,496	1.489	1.496
6/30/98-99	251,453	3,044,847	3,205,319	3,206,085	3,206,000	3,219,000	161,153	174,153	1.275	1.280
6/30/99-00	255,641	3,342,711	3,553,234	3,550,760	3,551,000	3,571,000	208,289	228,289	1.389	1.397
6/30/00-01	263,918	4,972,554	5,326,552	5,312,982	5,313,000	5,407,000	340,446	434,446	2.013	2.049
6/30/01-02	267,598	3,218,419	3,461,724	3,462,263	3,266,000	3,297,000	47,581	78,581	1.220	1.232
6/30/02-03	274,465	3,921,175	4,271,641	4,264,845	4,264,000	4,291,000	342,825	369,825	1.554	1.563
6/30/03-04	272,384	4,260,608	4,693,360	4,681,635	4,681,000	4,713,000	420,392	452,392	1.719	1.730
6/30/04-05	273,647	3,710,452	4,106,884	4,069,553	3,787,000	3,823,000	76,548	112,548	1.384	1.397
6/30/05-06	285,139	3,993,094	4,460,945	4,407,148	4,407,000	4,488,000	413,906	494,906	1.546	1.574
6/30/06-07	298,516	4,075,021	4,590,350	4,553,167	4,489,300	4,629,000	414,279	553,979	1.504	1.551
6/30/07-08	314,231	2,875,660	3,244,022	3,403,863	3,160,450	3,445,000	284,790	569,340	1.006	1.096
6/30/08-09	302,998	3,535,601	4,070,774	4,124,026	3,999,150	4,156,000	463,549	620,399	1.320	1.372
6/30/09-10	297,252	4,672,193	5,488,931	5,348,765	5,276,050	5,519,000	603,857	846,807	1.775	1.857
6/30/10-11	292,432	3,904,465	4,715,845	4,663,720	4,534,100	4,752,000	629,635	847,535	1.550	1.625
6/30/11-12	295,908	4,188,776	5,200,326	5,103,961	4,959,400	5,230,000	770,624	1,041,224	1.676	1.767
6/30/12-13	301,541	3,750,325	4,808,580	4,826,871	4,656,400	4,868,000	906,075	1,117,675	1.544	1.614
6/30/13-14	309,910	3,890,654	5,248,305	5,191,827	5,036,600	5,305,000	1,145,946	1,414,346	1.625	1.712
6/30/14-15	316,552	3,475,445	5,223,768	5,125,855	4,968,800	5,278,000	1,493,355	1,802,555	1.570	1.667
6/30/15-16	316,565	2,543,021	4,441,812	4,682,770	4,299,000	4,713,000	1,755,979	2,169,979	1.358	1.489
6/30/16-17	292,403	2,171,731	4,892,096	4,846,277	4,743,000	4,920,000	2,571,269	2,748,269	1.622	1.683
6/30/17-18	292,956	936,648	4,224,625	4,622,236	4,113,000	4,647,000	3,176,352	3,710,352	1.404	1.586
Total	9,281,570	257,626,450	256,858,944	241,604,396	279,490,286	284,989,345	21,863,836	27,362,894		
Tot 6/30/84-18	9,281,570	219,546,884	241,326,031	241,604,396	237,722,260	241,688,470	18,175,376	22,141,586	2.561	2.604

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) - (9) = Sum of Section 2, Exhibit 1, Page 1 + Section 2, Exhibit 2, Page 1

(10) = (6) / (2) / 10

(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Mental Health - Cluster 2
Total Indemnity (Including Lump Sums) + Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		21,543,222			23,537,112	24,365,219	1,993,889	2,821,996		
6/30/82-83		3,024,241	3,062,026		3,062,026	3,069,279	37,785	45,038		
6/30/83-84		2,864,047	2,918,429		2,890,970	2,918,050	26,923	54,004		
6/30/84-85	142,561	4,883,803	5,017,150	4,984,070	4,909,000	5,023,010	25,197	139,207	3.443	3.523
6/30/85-86	153,298	4,891,866	5,072,722	5,067,432	4,899,000	4,928,000	7,134	36,134	3.196	3.215
6/30/86-87	176,136	6,911,248	7,211,376	7,223,767	6,924,000	6,964,000	12,752	52,752	3.931	3.954
6/30/87-88	206,319	13,667,706	14,310,836	14,250,457	14,251,000	14,311,000	583,294	643,294	6.907	6.936
6/30/88-89	222,806	14,653,587	15,377,261	15,318,571	15,353,396	15,398,800	699,809	745,213	6.891	6.911
6/30/89-90	223,751	13,993,966	14,754,596	14,700,891	14,715,000	14,774,650	721,034	780,684	6.577	6.603
6/30/90-91	210,162	9,578,058	10,115,803	10,111,098	9,643,000	9,758,295	64,942	180,237	4.588	4.643
6/30/91-92	205,241	5,520,691	5,837,823	5,832,870	5,542,000	5,616,939	21,309	96,249	2.700	2.737
6/30/92-93	176,705	4,852,642	5,162,904	5,155,394	5,156,000	5,174,700	303,358	322,058	2.918	2.928
6/30/93-94	173,075	3,225,121	3,474,888	3,467,592	3,468,000	3,481,650	242,879	256,529	2.004	2.012
6/30/94-95	178,317	3,671,503	3,966,873	3,956,205	3,707,000	3,790,300	35,497	118,797	2.079	2.126
6/30/95-96	175,996	2,732,821	2,939,175	2,932,431	2,766,000	2,853,515	33,179	120,694	1.572	1.621
6/30/96-97	190,083	2,120,780	2,281,753	2,278,604	2,146,000	2,209,540	25,220	88,760	1.129	1.162
6/30/97-98	177,278	3,419,521	3,734,908	3,719,594	3,453,000	3,595,855	33,479	176,334	1.948	2.028
6/30/98-99	189,080	2,526,899	2,745,246	2,738,721	2,701,940	2,707,860	175,041	180,961	1.429	1.432
6/30/99-00	194,494	2,916,057	3,190,019	3,179,593	3,046,200	3,113,230	130,143	197,173	1.566	1.601
6/30/00-01	201,568	4,053,774	4,479,701	4,457,205	4,266,780	4,369,420	213,006	315,646	2.117	2.168
6/30/01-02	203,105	3,225,444	3,594,572	3,580,238	3,433,700	3,512,380	208,256	286,936	1.691	1.729
6/30/02-03	202,515	2,580,495	2,847,569	2,845,898	2,836,680	2,857,350	256,185	276,855	1.401	1.411
6/30/03-04	189,588	4,640,421	5,194,872	5,165,699	4,966,510	5,136,160	326,089	495,739	2.620	2.709
6/30/04-05	186,990	3,645,616	4,090,280	3,934,286	3,934,000	4,090,000	288,384	444,384	2.104	2.187
6/30/05-06	193,254	2,727,106	3,061,721	3,060,733	3,023,000	3,099,000	295,894	371,894	1.564	1.604
6/30/06-07	203,359	2,893,235	3,308,164	3,289,004	3,161,050	3,179,950	267,815	286,715	1.554	1.564
6/30/07-08	212,083	2,305,389	2,667,369	2,789,454	2,558,050	2,700,250	252,661	394,861	1.206	1.273
6/30/08-09	204,679	2,796,304	3,307,725	3,354,925	3,271,000	3,392,000	474,696	595,696	1.598	1.657
6/30/09-10	184,688	1,769,596	2,132,772	2,344,810	2,239,000	2,345,000	469,404	575,404	1.212	1.270
6/30/10-11	169,689	3,083,260	3,795,884	3,717,712	3,718,000	3,867,000	634,740	783,740	2.191	2.279
6/30/11-12	177,399	2,227,908	2,858,498	3,020,359	2,855,000	3,082,000	627,092	854,092	1.609	1.737
6/30/12-13	189,252	2,972,682	3,957,224	4,014,176	3,957,000	4,096,000	984,318	1,123,318	2.091	2.164
6/30/13-14	199,876	3,357,535	4,661,553	4,686,826	4,661,000	4,784,000	1,303,465	1,426,465	2.332	2.393
6/30/14-15	213,700	3,828,883	5,748,330	5,659,494	5,659,000	5,863,000	1,830,117	2,034,117	2.648	2.744
6/30/15-16	211,829	4,763,286	8,237,664	7,328,013	7,328,000	8,408,000	2,564,714	3,644,714	3.459	3.969
6/30/16-17	203,085	3,297,467	7,319,694	6,748,038	6,748,000	7,494,000	3,450,533	4,196,533	3.323	3.690
6/30/17-18	203,925	1,335,977	5,896,540	6,292,265	5,734,000	6,612,000	4,398,023	5,276,023	2.812	3.242
Total	6,545,887	182,502,156	188,333,920	181,206,422	206,520,413	212,941,402	24,018,257	30,439,246		
Tot 6/30/84-18	6,545,887	155,070,647	182,353,464	181,206,422	177,030,306	182,588,854	21,959,659	27,518,208	2.704	2.789

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) - (9) = Sum of Section 3, Exhibit 1, Page 1 + Section 3, Exhibit 2, Page 1

(10) = (6) / (2) / 10

(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Corrections - Cluster 3

Total Indemnity (Including Lump Sums) + Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		5,407,990			6,612,034	7,367,986	1,204,044	1,959,995		
6/30/82-83		2,912,565	2,941,385		2,926,207	2,942,711	13,642	30,146		
6/30/83-84		2,135,674	2,229,338		2,207,178	2,237,034	71,504	101,360		
6/30/84-85	115,258	4,714,755	4,772,081	4,755,097	4,719,575	4,766,000	4,820	51,245	4.095	4.135
6/30/85-86	123,937	6,962,840	7,054,172	7,039,876	6,981,752	7,015,615	18,912	52,775	5.633	5.661
6/30/86-87	142,396	4,532,327	4,596,346	4,601,311	4,558,766	4,579,305	26,439	46,978	3.201	3.216
6/30/87-88	166,792	7,243,858	7,354,108	7,366,751	7,297,052	7,331,060	53,194	87,202	4.375	4.395
6/30/88-89	180,117	8,739,139	8,894,336	8,876,233	8,876,000	8,895,000	136,861	155,861	4.928	4.938
6/30/89-90	180,883	11,343,080	11,577,615	11,575,422	11,575,000	11,578,000	231,920	234,920	6.399	6.401
6/30/90-91	169,902	13,205,929	13,526,805	13,524,466	13,524,000	13,682,844	318,071	476,915	7.960	8.053
6/30/91-92	165,926	6,600,413	6,801,210	6,799,019	6,799,000	6,911,400	198,587	310,987	4.098	4.165
6/30/92-93	174,198	4,516,464	4,658,081	4,656,731	4,591,700	4,641,795	75,237	125,331	2.636	2.665
6/30/93-94	185,946	6,675,170	6,925,335	6,920,353	6,920,000	6,925,000	244,830	249,830	3.722	3.724
6/30/94-95	194,051	7,495,266	7,835,373	7,826,187	7,826,000	7,835,000	330,734	339,734	4.033	4.038
6/30/95-96	205,262	6,870,358	7,206,178	7,196,731	7,196,000	7,206,000	325,642	335,642	3.506	3.511
6/30/96-97	234,073	7,864,616	8,357,947	8,341,818	8,342,000	8,358,000	477,384	493,384	3.564	3.571
6/30/97-98	221,865	10,709,869	11,622,493	11,574,643	11,136,986	11,329,830	427,117	619,961	5.020	5.107
6/30/98-99	256,071	9,605,232	10,591,514	10,541,087	10,138,277	10,316,110	533,045	710,878	3.959	4.029
6/30/99-00	268,486	10,279,574	11,395,350	11,332,191	10,906,533	11,009,440	626,959	729,866	4.062	4.101
6/30/00-01	279,182	13,491,637	15,074,252	14,972,189	14,425,397	14,568,200	933,760	1,076,563	5.167	5.218
6/30/01-02	283,070	10,841,361	12,181,789	12,108,801	11,639,057	12,181,000	797,695	1,339,639	4.112	4.303
6/30/02-03	289,846	11,021,277	12,517,137	12,436,363	11,975,538	12,517,000	954,261	1,495,723	4.132	4.318
6/30/03-04	293,771	9,995,529	11,468,606	11,396,852	10,975,793	11,109,000	980,265	1,113,471	3.736	3.782
6/30/04-05	291,382	10,964,912	12,734,045	11,777,586	11,706,918	12,353,000	742,006	1,388,088	4.018	4.239
6/30/05-06	294,709	7,977,542	9,360,170	8,853,436	8,626,137	9,089,000	648,596	1,111,458	2.927	3.084
6/30/06-07	289,603	6,738,960	7,996,820	7,669,542	7,439,966	8,042,650	701,006	1,303,690	2.569	2.777
6/30/07-08	354,668	6,401,662	7,659,910	7,596,388	7,520,000	7,759,500	1,118,338	1,357,838	2.120	2.188
6/30/08-09	332,413	5,660,515	6,873,279	6,866,885	6,742,000	7,281,400	1,081,485	1,620,885	2.028	2.190
6/30/09-10	336,338	3,670,949	4,532,175	4,984,582	4,646,000	5,234,000	975,051	1,563,051	1.381	1.556
6/30/10-11	333,783	4,681,363	5,877,830	6,117,914	5,898,000	6,423,900	1,216,637	1,742,537	1.767	1.925
6/30/11-12	348,187	3,563,619	4,600,961	5,223,245	4,892,000	5,485,050	1,328,381	1,921,431	1.405	1.575
6/30/12-13	368,022	3,247,426	4,370,166	5,253,374	4,763,000	5,516,050	1,515,574	2,268,624	1.294	1.499
6/30/13-14	390,528	3,847,454	5,436,766	6,295,685	5,804,000	6,611,200	1,956,546	2,763,746	1.486	1.693
6/30/14-15	402,750	4,543,193	7,028,772	7,579,957	7,245,000	7,959,250	2,701,807	3,416,057	1.799	1.976
6/30/15-16	400,013	4,104,584	7,444,330	7,987,247	7,629,000	8,386,500	3,524,416	4,281,916	1.907	2.097
6/30/16-17	352,565	4,362,990	10,134,213	8,984,137	9,464,000	10,640,150	5,101,010	6,277,160	2.684	3.018
6/30/17-18	347,621	1,653,442	8,823,171	8,000,518	8,278,000	9,264,100	6,624,558	7,610,658	2.381	2.665
Total	8,973,614	254,583,536	292,454,062	287,032,617	292,803,867	305,349,080	38,220,331	50,765,544		
Tot 6/30/84-18	8,973,614	244,127,306	287,283,339	287,032,617	281,058,448	292,801,349	36,931,141	48,674,043	3.132	3.263

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) - (9) = Sum of Section 4, Exhibit 1, Page 1 + Section 4, Exhibit 2, Page 1

(10) = (6) / (2) / 10

(11) = (7) / (2) / 10

Commonwealth of Massachusetts

Workers Compensation

Reserve Analysis at June 30, 2018

University of Massachusetts (Amherst) - Cluster 4

Total Indemnity (Including Lump Sums) + Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		2,424,290			2,711,206	2,814,275	286,915	389,985		
6/30/82-83		225,530	227,526		229,124	232,256	3,594	6,726		
6/30/83-84		220,938	231,647		224,907	230,010	3,969	9,072		
6/30/84-85	176,924	2,017,397	2,050,526	2,044,358	2,044,953	2,052,043	27,555	34,645	1.156	1.160
6/30/85-86	188,662	1,676,445	1,704,040	1,699,177	1,709,741	1,743,263	33,296	66,818	0.906	0.924
6/30/86-87	212,277	2,738,466	2,786,409	2,776,469	2,777,000	2,786,000	38,534	47,534	1.308	1.312
6/30/87-88	243,118	2,649,762	2,702,405	2,695,926	2,695,000	2,703,000	45,238	53,238	1.109	1.112
6/30/88-89	248,990	2,313,241	2,375,794	2,370,939	2,370,000	2,377,000	56,759	63,759	0.952	0.955
6/30/89-90	250,404	679,355	696,352	702,699	692,000	702,000	12,645	22,645	0.276	0.280
6/30/90-91	235,170	2,958,942	3,042,567	3,041,940	3,042,000	3,042,000	83,058	83,058	1.294	1.294
6/30/91-92	235,607	3,116,010	3,207,999	3,206,589	3,206,000	3,208,000	89,990	91,990	1.361	1.362
6/30/92-93	241,161	712,440	727,143	727,011	719,696	740,317	7,256	27,877	0.298	0.307
6/30/93-94	254,321	1,251,440	1,282,644	1,281,927	1,267,000	1,295,000	15,560	43,560	0.498	0.509
6/30/94-95	256,665	1,067,175	1,100,581	1,099,675	1,078,423	1,111,476	11,248	44,301	0.420	0.433
6/30/95-96	265,739	835,707	864,052	863,352	844,425	870,865	8,718	35,158	0.318	0.328
6/30/96-97	296,336	700,495	730,863	730,192	707,847	730,726	7,352	30,232	0.239	0.247
6/30/97-98	296,982	651,847	675,825	675,717	661,000	679,000	9,153	27,153	0.223	0.229
6/30/98-99	299,530	926,717	965,760	964,664	941,000	973,260	14,283	46,543	0.314	0.325
6/30/99-00	323,627	1,577,004	1,663,986	1,658,854	1,601,000	1,649,000	23,996	71,996	0.495	0.510
6/30/00-01	338,348	1,853,822	1,964,448	1,957,648	1,958,000	1,964,000	104,178	110,178	0.579	0.580
6/30/01-02	329,555	1,331,168	1,403,334	1,400,363	1,400,000	1,403,000	68,832	71,832	0.425	0.426
6/30/02-03	329,179	1,207,124	1,278,381	1,275,962	1,276,000	1,278,000	68,876	70,876	0.388	0.388
6/30/03-04	344,547	414,340	448,282	451,075	448,000	451,000	33,660	36,660	0.130	0.131
6/30/04-05	325,530	912,330	991,505	980,909	981,000	992,000	68,670	79,670	0.301	0.305
6/30/05-06	403,750	640,322	703,210	731,467	703,000	731,000	62,678	90,678	0.174	0.181
6/30/06-07	420,219	657,640	724,198	761,395	725,000	761,000	67,360	103,360	0.173	0.181
6/30/07-08	425,998	977,504	1,093,282	1,098,688	1,080,000	1,112,000	102,496	134,496	0.254	0.261
6/30/08-09	420,566	1,468,422	1,662,083	1,607,541	1,608,000	1,663,000	139,578	194,578	0.382	0.395
6/30/09-10	433,206	995,802	1,133,930	1,154,365	1,134,000	1,174,850	138,198	179,048	0.262	0.271
6/30/10-11	444,673	1,335,355	1,572,098	1,520,973	1,518,000	1,597,000	182,645	261,645	0.341	0.359
6/30/11-12	467,753	1,437,485	1,724,268	1,676,324	1,677,000	1,725,000	239,515	287,515	0.359	0.369
6/30/12-13	495,398	946,313	1,203,492	1,240,725	1,203,000	1,264,650	256,687	318,337	0.243	0.255
6/30/13-14	518,391	838,943	1,055,653	1,221,055	1,056,000	1,244,750	217,057	405,807	0.204	0.240
6/30/14-15	539,631	1,274,782	1,946,409	1,868,157	1,868,000	2,107,350	593,218	832,568	0.346	0.391
6/30/15-16	585,875	1,135,480	2,108,753	2,026,259	2,005,000	2,309,700	869,520	1,174,220	0.342	0.394
6/30/16-17	594,787	936,832	2,109,540	2,093,186	2,046,000	2,339,950	1,109,169	1,403,119	0.344	0.393
6/30/17-18	607,484	422,003	2,160,991	2,148,496	2,020,000	2,324,650	1,597,997	1,902,647	0.333	0.383
Total	12,050,403	47,528,868	52,319,977	51,754,076	54,228,320	56,382,390	6,699,452	8,853,523		
Tot 6/30/84-18	12,050,403	44,658,110	51,860,805	51,754,076	51,063,083	53,105,850	6,404,974	8,447,740	0.424	0.441

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) - (9) = Sum of Section 5, Exhibit 1, Page 1 + Section 5, Exhibit 2, Page 1

(10) = (6) / (2) / 10

(11) = (7) / (2) / 10

Commonwealth of Massachusetts

Workers Compensation

Reserve Analysis at June 30, 2018

University of Massachusetts (Medical Center) - Cluster 4

Total Indemnity (Including Lump Sums) + Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		1,455,812			1,455,812	1,455,812	0	0		
6/30/82-83		327,566	327,770		328,340	335,999	774	8,433		
6/30/83-84		1,494,800	1,556,739		1,496,283	1,502,058	1,483	7,258		
6/30/84-85	116,303	1,015,470	1,016,139	1,016,392	1,016,598	1,020,009	1,128	4,539	0.874	0.877
6/30/85-86	123,981	2,733,296	2,735,128	2,735,555	2,736,000	2,736,000	2,704	2,704	2.207	2.207
6/30/86-87	139,388	3,777,375	3,779,750	3,779,761	3,780,000	3,794,919	2,625	17,544	2.712	2.723
6/30/87-88	159,499	3,373,806	3,375,836	3,375,798	3,376,000	3,389,006	2,194	15,200	2.117	2.125
6/30/88-89	180,644	3,112,432	3,114,248	3,114,937	3,115,270	3,125,764	2,838	13,332	1.725	1.730
6/30/89-90	142,494	3,797,545	3,799,809	3,800,709	3,800,827	3,813,801	3,282	16,256	2.667	2.676
6/30/90-91	143,694	1,403,520	1,405,169	1,405,157	1,404,925	1,409,332	1,405	5,812	0.978	0.981
6/30/91-92	155,170	2,187,492	2,190,929	2,190,873	2,189,822	2,195,896	2,330	8,404	1.411	1.415
6/30/92-93	163,283	1,033,363	1,034,869	1,034,841	1,035,977	1,044,458	2,614	11,095	0.634	0.640
6/30/93-94	177,184	2,625,768	2,630,155	2,630,003	2,631,000	2,687,871	5,232	62,103	1.485	1.517
6/30/94-95	188,391	940,543	942,824	942,795	943,161	952,133	2,618	11,590	0.501	0.505
6/30/95-96	201,751	874,675	878,581	878,553	881,507	892,217	6,832	17,542	0.437	0.442
6/30/96-97	231,872	619,988	622,867	623,106	624,614	632,798	4,626	12,810	0.269	0.273
6/30/97-98	232,237	1,043,715	1,059,666	1,059,129	1,050,184	1,065,622	6,469	21,906	0.452	0.459
6/30/98-99	232,075	940,822	954,475	954,343	947,917	954,233	7,094	13,410	0.408	0.411
6/30/99-00	211,819	872,750	899,934	898,607	880,459	887,335	7,710	14,585	0.416	0.419
6/30/00-01	215,099	943,388	967,782	966,812	952,353	959,733	8,965	16,345	0.443	0.446
6/30/01-02	227,797	572,336	587,414	587,541	577,126	585,183	4,790	12,847	0.253	0.257
6/30/02-03	242,008	1,331,416	1,388,897	1,385,052	1,385,000	1,451,550	53,584	120,134	0.572	0.600
6/30/03-04	276,758	1,259,443	1,304,386	1,302,439	1,302,000	1,307,020	42,557	47,577	0.470	0.472
6/30/04-05	260,378	367,387	380,754	395,394	381,000	403,550	13,613	36,163	0.146	0.155
6/30/05-06	317,741	1,165,506	1,227,854	1,212,837	1,213,000	1,246,850	47,494	81,344	0.382	0.392
6/30/06-07	325,922	605,124	640,655	658,883	641,000	659,000	35,876	53,876	0.197	0.202
6/30/07-08	354,130	1,693,000	1,799,956	1,767,129	1,767,000	1,826,650	74,000	133,650	0.499	0.516
6/30/08-09	362,309	933,914	1,006,133	1,009,681	1,002,000	1,035,450	68,086	101,536	0.277	0.286
6/30/09-10	383,298	820,629	902,857	922,341	903,000	938,850	82,371	118,221	0.236	0.245
6/30/10-11	394,924	1,025,472	1,175,695	1,150,963	1,148,000	1,228,750	122,528	203,278	0.291	0.311
6/30/11-12	381,943	1,217,588	1,408,747	1,360,224	1,355,000	1,429,950	137,412	212,362	0.355	0.374
6/30/12-13	384,763	679,207	793,655	834,728	793,000	849,850	113,793	170,643	0.206	0.221
6/30/13-14	364,582	1,093,806	1,326,299	1,279,788	1,280,000	1,352,050	186,194	258,244	0.351	0.371
6/30/14-15	370,543	397,784	546,879	621,497	547,000	630,950	149,216	233,166	0.148	0.170
6/30/15-16	382,602	589,734	938,466	942,924	934,000	964,700	344,266	374,966	0.244	0.252
6/30/16-17	395,324	299,794	578,730	780,527	578,000	795,650	278,206	495,856	0.146	0.201
6/30/17-18	398,722	154,386	617,619	906,692	617,000	924,300	462,614	769,914	0.155	0.232
Total	8,838,630	48,780,649	49,917,670	48,526,014	51,070,173	52,485,297	2,289,524	3,704,648		
Tot 6/30/84-18	8,838,630	45,502,471	48,033,161	48,526,014	47,789,738	49,191,428	2,287,267	3,688,957	0.541	0.557

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) - (9) = Sum of Section 6, Exhibit 1, Page 1 + Section 6, Exhibit 2, Page 1

(10) = (6) / (2) / 10

(11) = (7) / (2) / 10

Commonwealth of Massachusetts

Workers Compensation

Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4

Total Indemnity (Including Lump Sums) + Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		3,358,281			3,361,301	3,373,380	3,020	15,099		
6/30/82-83		796,317	796,855		811,448	826,578	15,131	30,261		
6/30/83-84		945,504	988,036		963,997	982,491	18,493	36,987		
6/30/84-85	357,749	1,604,929	1,605,979	1,606,510	1,635,334	1,665,739	30,405	60,810	0.457	0.466
6/30/85-86	380,112	2,253,254	2,254,731	2,255,238	2,292,554	2,329,932	39,300	76,678	0.603	0.613
6/30/86-87	423,770	3,137,628	3,278,671	3,139,732	3,140,000	3,279,455	2,372	141,826	0.741	0.774
6/30/87-88	480,405	5,069,952	5,073,181	5,073,202	5,073,000	5,091,986	3,048	22,033	1.056	1.060
6/30/88-89	495,261	1,941,224	1,942,335	1,942,953	1,943,000	1,949,786	1,776	8,562	0.392	0.394
6/30/89-90	502,691	4,397,880	4,400,495	4,400,423	4,401,000	4,417,676	3,120	19,796	0.875	0.879
6/30/90-91	482,143	1,866,079	1,868,266	1,868,257	1,869,000	1,887,511	2,921	21,432	0.388	0.391
6/30/91-92	492,539	2,201,490	2,209,470	2,209,392	2,209,000	2,271,403	7,510	69,913	0.448	0.461
6/30/92-93	524,541	1,653,844	1,662,023	1,661,916	1,679,326	1,716,282	25,482	62,438	0.320	0.327
6/30/93-94	584,853	1,893,902	1,903,750	1,903,595	1,907,947	1,964,294	14,044	70,391	0.326	0.336
6/30/94-95	587,701	2,345,180	2,372,739	2,372,328	2,373,391	2,442,425	28,211	97,245	0.404	0.416
6/30/95-96	614,868	1,850,889	1,876,623	1,876,397	1,879,180	1,920,160	28,290	69,271	0.306	0.312
6/30/96-97	700,686	2,005,078	2,043,559	2,042,968	2,047,235	2,111,270	42,157	106,192	0.292	0.301
6/30/97-98	684,415	2,782,933	2,832,488	2,831,321	2,831,000	2,837,460	48,067	54,527	0.414	0.415
6/30/98-99	707,796	1,853,631	1,896,351	1,896,217	1,896,000	1,916,760	42,369	63,129	0.268	0.271
6/30/99-00	760,477	1,668,934	1,723,336	1,724,078	1,724,000	1,736,000	55,066	67,066	0.227	0.228
6/30/00-01	811,600	2,278,201	2,392,592	2,390,864	2,390,000	2,392,000	111,799	113,799	0.294	0.295
6/30/01-02	835,038	3,066,571	3,266,953	3,260,464	3,260,000	3,268,000	193,429	201,429	0.390	0.391
6/30/02-03	825,340	1,975,533	2,149,162	2,148,392	2,134,480	2,164,000	158,947	188,467	0.259	0.262
6/30/03-04	849,216	2,181,691	2,406,149	2,405,270	2,390,020	2,423,000	208,329	241,309	0.281	0.285
6/30/04-05	992,508	1,683,358	1,890,718	1,980,852	1,876,560	1,993,000	193,202	309,642	0.189	0.201
6/30/05-06	962,878	2,352,880	2,702,653	2,689,848	2,671,400	2,794,000	318,520	441,120	0.277	0.290
6/30/06-07	1,032,930	1,650,952	1,913,166	2,056,017	1,898,680	2,056,000	247,728	405,048	0.184	0.199
6/30/07-08	1,063,597	3,498,798	4,104,236	3,995,949	3,975,620	4,104,000	476,822	605,202	0.374	0.386
6/30/08-09	1,073,805	2,990,497	3,616,131	3,533,824	3,390,640	3,616,000	400,143	625,503	0.316	0.337
6/30/09-10	1,084,749	4,275,985	5,340,754	4,929,235	4,717,800	5,341,000	441,815	1,065,015	0.435	0.492
6/30/10-11	1,134,164	3,492,890	4,423,851	4,268,216	4,092,970	4,424,000	600,080	931,110	0.361	0.390
6/30/11-12	1,202,674	3,102,159	4,219,199	4,087,684	3,908,270	4,226,000	806,111	1,123,841	0.325	0.351
6/30/12-13	1,284,741	2,626,642	3,791,612	3,878,183	3,640,720	3,878,000	1,014,078	1,251,358	0.283	0.302
6/30/13-14	1,346,902	2,876,797	4,427,453	4,385,215	4,201,010	4,493,000	1,324,213	1,616,203	0.312	0.334
6/30/14-15	1,404,093	2,471,362	4,128,018	4,306,023	4,128,000	4,463,000	1,656,639	1,991,639	0.294	0.318
6/30/15-16	1,454,612	2,523,380	5,141,780	4,980,636	4,981,000	5,142,000	2,457,621	2,618,621	0.342	0.353
6/30/16-17	1,461,588	1,715,282	4,582,783	4,814,016	4,583,000	4,825,770	2,867,718	3,110,488	0.314	0.330
6/30/17-18	1,457,740	1,119,296	6,514,491	5,519,169	5,520,000	6,515,000	4,400,704	5,395,704	0.379	0.447
Total	29,058,181	89,509,202	107,740,589	104,434,385	107,797,882	112,838,358	18,288,679	23,329,156		
Tot 6/30/84-18	29,058,181	84,409,100	105,955,698	104,434,385	102,661,136	107,655,909	18,252,035	23,246,808	0.353	0.370

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) - (9) = Sum of Section 7, Exhibit 1, Page 1 + Section 7, Exhibit 2, Page 1

(10) = (6) / (2) / 10

(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Other - Clusters 5-17 & 95

Total Indemnity (Including Lump Sums) + Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		48,539,250			52,070,225	54,961,792	3,530,976	6,422,542		
6/30/82-83		6,122,919	6,240,748		6,123,967	6,188,538	1,048	65,618		
6/30/83-84		8,924,062	9,144,647		8,977,920	9,569,920	53,858	645,858		
6/30/84-85	732,729	18,032,255	18,529,214	18,376,171	18,365,956	18,540,757	333,701	508,502	2.507	2.530
6/30/85-86	787,208	22,223,840	22,864,157	22,675,918	22,666,435	22,883,130	442,595	659,290	2.879	2.907
6/30/86-87	902,483	23,059,486	23,806,036	23,603,541	23,594,265	23,823,480	534,779	763,994	2.614	2.640
6/30/87-88	1,366,586	32,013,956	33,209,001	33,038,590	33,020,670	33,842,680	1,006,714	1,828,724	2.416	2.476
6/30/88-89	1,486,478	30,044,562	31,322,018	31,036,610	31,034,000	31,914,530	989,438	1,869,968	2.088	2.147
6/30/89-90	1,494,463	29,097,786	30,559,589	30,396,410	30,392,000	31,134,590	1,294,214	2,036,804	2.034	2.083
6/30/90-91	1,405,560	25,146,368	26,672,867	26,565,462	26,565,000	27,170,960	1,418,632	2,024,592	1.890	1.933
6/30/91-92	1,364,510	16,180,639	17,337,137	17,260,835	17,261,000	18,089,700	1,080,361	1,909,061	1.265	1.326
6/30/92-93	1,347,359	12,546,347	13,557,935	13,493,988	13,494,000	13,582,970	947,653	1,036,623	1.002	1.008
6/30/93-94	1,424,410	14,083,868	15,431,853	15,298,959	15,299,000	15,708,780	1,215,132	1,624,912	1.074	1.103
6/30/94-95	1,497,829	12,392,784	13,616,650	13,579,593	13,579,000	14,189,840	1,186,216	1,797,056	0.907	0.947
6/30/95-96	1,582,635	12,368,134	13,830,636	13,778,914	13,778,000	14,434,920	1,409,866	2,066,786	0.871	0.912
6/30/96-97	1,979,748	13,150,048	14,764,068	14,712,782	14,713,000	15,386,230	1,562,952	2,236,182	0.743	0.777
6/30/97-98	1,917,994	10,939,492	12,334,238	12,302,484	12,298,000	12,868,580	1,358,508	1,929,088	0.641	0.671
6/30/98-99	2,081,524	12,016,170	13,747,252	13,702,613	13,700,000	14,326,010	1,683,830	2,309,840	0.658	0.688
6/30/99-00	2,207,243	14,074,376	16,413,392	16,330,567	16,330,000	17,131,720	2,255,624	3,057,344	0.740	0.776
6/30/00-01	2,201,008	13,344,992	15,769,173	15,697,955	15,696,000	16,455,200	2,351,008	3,110,208	0.713	0.748
6/30/01-02	2,292,592	13,345,445	15,922,115	15,868,160	15,862,000	16,626,860	2,516,555	3,281,415	0.692	0.725
6/30/02-03	2,260,534	13,488,699	16,287,521	16,232,357	16,229,000	16,993,660	2,740,301	3,504,961	0.718	0.752
6/30/03-04	2,255,942	12,567,145	15,427,299	15,396,445	15,390,000	16,095,140	2,822,855	3,527,995	0.682	0.713
6/30/04-05	2,309,083	15,428,636	19,097,137	18,399,743	18,407,000	19,202,000	2,978,364	3,773,364	0.797	0.832
6/30/05-06	2,480,693	13,646,462	17,218,449	17,258,356	17,181,000	17,377,000	3,534,538	3,730,538	0.693	0.700
6/30/06-07	2,612,577	14,324,474	18,410,143	18,559,576	18,187,000	18,915,000	3,862,526	4,590,526	0.696	0.724
6/30/07-08	2,783,717	17,225,042	22,824,035	22,338,745	21,922,000	23,001,811	4,696,958	5,776,769	0.788	0.826
6/30/08-09	2,750,907	17,627,533	23,855,082	23,296,503	23,131,900	24,039,331	5,504,367	6,411,798	0.841	0.874
6/30/09-10	2,806,048	17,377,753	23,991,898	23,847,731	23,610,070	24,201,462	6,232,317	6,823,709	0.841	0.862
6/30/10-11	2,942,638	19,994,893	28,496,359	27,562,696	27,322,660	28,714,931	7,327,767	8,720,038	0.929	0.976
6/30/11-12	3,006,849	20,437,615	30,313,011	29,230,330	29,178,000	30,533,767	8,740,385	10,096,152	0.970	1.015
6/30/12-13	3,138,905	16,293,726	25,527,907	26,741,836	25,481,000	26,801,000	9,187,274	10,507,274	0.812	0.854
6/30/13-14	3,311,947	19,007,183	32,162,185	32,180,113	31,015,840	32,540,000	12,008,657	13,532,817	0.936	0.983
6/30/14-15	3,511,622	18,615,192	35,286,624	35,538,433	34,347,300	35,902,000	15,732,108	17,286,808	0.978	1.022
6/30/15-16	3,491,558	17,136,144	38,974,572	38,267,524	37,221,860	39,370,000	20,085,716	22,233,856	1.066	1.128
6/30/16-17	3,338,327	11,723,581	35,540,222	35,962,103	34,196,250	36,731,000	22,472,669	25,007,419	1.024	1.100
6/30/17-18	3,401,479	5,874,321	41,910,478	40,557,330	39,738,080	42,341,000	33,863,759	36,466,679	1.168	1.245
Total	74,475,184	638,415,179	790,395,649	769,089,373	827,379,398	861,590,289	188,964,220	223,175,110		
Tot 6/30/84-18	74,475,184	574,828,947	775,010,254	769,089,373	760,207,286	790,870,039	185,378,339	216,041,092	1.021	1.062

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) - (9) = Sum of Section 8, Exhibit 1, Page 1 + Section 8, Exhibit 2, Page 1

(10) = (6) / (2) / 10

(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Clusters Combined

Total Indemnity (Including Lump Sums) + Medical

Calculation of Implied Development Factors

(1)	(2)	(3)	(4)
Accident Year	Pd Loss Including Lump Sum	Implied Cumulative LDF	Selected Ult Loss Including Lump Sum
All Prior Yrs	105,774,973	1.125	119,022,376
6/30/82-83	18,369,674	1.009	18,527,319
6/30/83-84	26,657,928	1.038	27,666,477
6/30/84-85	39,843,599	1.016	40,495,957
6/30/85-86	52,615,802	1.014	53,357,711
6/30/86-87	59,533,390	1.015	60,408,595
6/30/87-88	86,404,993	1.029	88,906,727
6/30/88-89	85,028,619	1.033	87,857,538
6/30/89-90	82,014,340	1.035	84,885,772
6/30/90-91	67,947,968	1.036	70,413,174
6/30/91-92	46,218,909	1.048	48,430,945
6/30/92-93	31,263,047	1.050	32,815,195
6/30/93-94	34,522,326	1.062	36,646,811
6/30/94-95	30,922,139	1.068	33,025,849
6/30/95-96	29,704,713	1.081	32,112,894
6/30/96-97	29,810,693	1.087	32,397,630
6/30/97-98	33,021,882	1.077	35,565,258
6/30/98-99	30,914,319	1.099	33,972,183
6/30/99-00	34,731,404	1.110	38,568,458
6/30/00-01	40,938,368	1.113	45,558,541
6/30/01-02	35,600,744	1.128	40,155,653
6/30/02-03	35,525,718	1.149	40,826,629
6/30/03-04	35,319,176	1.152	40,693,822
6/30/04-05	36,712,692	1.143	41,965,014
6/30/05-06	32,502,912	1.179	38,324,694
6/30/06-07	30,945,407	1.208	37,392,298
6/30/07-08	34,977,057	1.228	42,966,166
6/30/08-09	35,012,785	1.261	44,163,936
6/30/09-10	33,582,907	1.299	43,640,041
6/30/10-11	37,517,697	1.323	49,619,656
6/30/11-12	36,175,150	1.390	50,268,219
6/30/12-13	30,516,320	1.504	45,883,835
6/30/13-14	34,912,372	1.567	54,692,225
6/30/14-15	34,606,640	1.748	60,483,325
6/30/15-16	32,795,629	2.038	66,845,880
6/30/16-17	24,507,676	2.654	65,052,385
6/30/17-18	11,496,073	6.030	69,324,065
Total	1,518,946,040		1,852,933,250

NOTES:

(2) From Summary Exhibit 8, Page 1, Column (3)

(3) = (4) / (2)

(4) From Summary Exhibit 8, Page 1, Average of Columns (6) and (7)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4

Allocation Methodology

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	5 Year	Initial Loss Costs		Expected Losses				5 Year	Credibility	Distribution	CURRENT		PRIOR	
	Average							Average	Weighted	of Total	Reserve Estimate		Reserve Estimate	
Cluster	Payroll	Indemnity	Medical	Indemnity	Medical	Total	Credibility	Ult Loss	Ult Loss	Losses	Low End	High End	Low End	High End
Berkshire Community College	14,352,732	0.22	0.09	31,576	12,917	44,493	22.3%	15,425	38,010	0.8%	151,093	192,735	161,146	206,516
Bridgewater State College	95,435,506	0.22	0.09	209,958	85,892	295,850	82.7%	371,875	358,703	7.8%	1,425,859	1,818,835	1,297,766	1,663,141
Bristol Community College	41,622,000	0.22	0.09	91,568	37,460	129,028	67.5%	18,082	54,090	1.2%	215,011	274,270	226,092	289,746
Bunker Hill Community College	51,682,668	0.22	0.09	113,702	46,514	160,216	50.8%	86,640	122,819	2.7%	488,212	622,766	410,268	525,775
Cape Cod Community College	19,676,765	0.22	0.09	43,289	17,709	60,998	28.2%	138,902	82,998	1.8%	329,921	420,849	328,118	420,497
Fitchburg State College	43,233,274	0.22	0.09	95,113	38,910	134,023	68.4%	176,714	163,211	3.5%	648,771	827,576	581,018	744,599
Framingham State College	46,669,346	0.22	0.09	102,673	42,002	144,675	70.0%	99,257	112,882	2.5%	448,709	572,376	612,124	784,462
Greenfield Community College	15,001,048	0.22	0.09	33,002	13,501	46,503	23.1%	45,723	46,323	1.0%	184,136	234,885	147,358	188,846
Holyoke Community College	34,486,643	0.22	0.09	75,871	31,038	106,909	40.8%	70,421	92,015	2.0%	365,763	466,569	376,652	482,696
Mass Bay Community College	24,073,612	0.22	0.09	52,962	21,666	74,628	32.5%	47,604	65,846	1.4%	261,739	333,876	225,189	288,589
Mass College of Art	32,850,086	0.22	0.09	72,270	29,565	101,835	62.2%	173,545	146,408	3.2%	581,978	742,375	564,977	724,041
Mass Maritime Academy	22,959,026	0.22	0.09	50,510	20,663	71,173	31.5%	112,378	84,140	1.8%	334,458	426,637	350,109	448,679
Massachusetts College of Liberal Arts	22,586,731	0.22	0.09	49,691	20,328	70,019	53.0%	75,509	72,931	1.6%	289,903	369,802	276,964	354,940
Massasoit Community College	37,081,512	0.22	0.09	81,579	33,373	114,953	65.0%	89,040	98,119	2.1%	390,028	497,523	385,105	493,528
Middlesex Community College	44,811,963	0.22	0.09	98,586	40,331	138,917	69.1%	47,734	75,872	1.6%	301,592	384,713	402,068	515,267
Mt Wachusett Community College	28,197,912	0.22	0.09	62,035	25,378	87,414	58.5%	40,580	60,014	1.3%	238,557	304,305	294,820	377,824
North Essex Community College	33,510,339	0.22	0.09	73,723	30,159	103,882	40.1%	23,264	71,532	1.6%	284,344	362,711	310,037	397,325
North Shore Community College	35,088,121	0.22	0.09	77,194	31,579	108,773	41.2%	67,951	91,939	2.0%	365,461	466,185	385,375	493,874
Quinsigamond Community College	42,455,283	0.22	0.09	93,402	38,210	131,611	45.9%	264,902	192,818	4.2%	766,459	977,700	926,386	1,187,201
Roxbury Community College	15,580,438	0.22	0.09	34,277	14,022	48,299	23.8%	32,369	44,515	1.0%	176,947	225,715	277,219	355,267
Salem State College	86,658,812	0.22	0.09	190,649	77,993	268,642	81.2%	231,699	238,627	5.2%	948,550	1,209,977	918,674	1,177,318
Springfield Tech Community College	34,528,975	0.22	0.09	75,964	31,076	107,040	63.3%	177,379	151,580	3.3%	602,538	768,601	451,248	578,293
UMass (Boston)	202,682,191	0.22	0.09	445,901	182,414	628,315	91.0%	488,168	500,755	10.9%	1,990,521	2,539,122	2,066,352	2,648,115
UMass (Dartmouth)	110,327,597	0.22	0.09	242,721	99,295	342,016	84.7%	540,468	510,014	11.1%	2,027,325	2,586,069	1,945,989	2,493,866
University of Lowell	187,127,582	0.22	0.09	411,681	168,415	580,096	90.3%	662,337	654,396	14.2%	2,601,251	3,318,172	2,187,212	2,803,002
Westfield State College	55,182,119	0.22	0.09	121,401	49,664	171,065	73.4%	258,288	235,085	5.1%	934,472	1,192,018	836,983	1,072,628
Worcester State College	47,124,710	0.22	0.09	103,674	42,412	146,087	70.2%	273,075	235,238	5.1%	935,081	1,192,796	781,732	1,001,822
Total	1,424,986,991			3,134,971	1,282,488			4,629,330	4,600,880		18,288,679	23,329,156	17,726,980	22,717,856

NOTES:

(1) Provided by Commonwealth of Massachusetts; From Summary Exhibit 10, Page 3

(2) From Section 7, Exhibit 1, Page 4

(3) From Section 7, Exhibit 2, Page 4

(4) = (1) * (2) / 100

(5) = (1) * (3) / 100

(6) = (4) + (5)

(7) = P / (P+K); where P = Column (1) and K = 20M (if CV < 1) and K = 50M (if CV > 1). CV is the Coefficient of Variation, as calculated on Summary Exhibit 10, Page 2.

(8) = The Average of Columns (2) - (6) plus The Average of Columns (8) - (12) on Summary Exhibit 10 Page 4.

(9) = (7) * (8) + [1.00 - (7)] * (6)

(10) = (9) / Total (9)

(11) = The Total from Summary Exhibit 8, Page7, Column (8), allocated according to Column (10) of this exhibit.

(12) = The Total from Summary Exhibit 8, Page7, Column (9), allocated according to Column (10) of this exhibit.

(13), (14) From prior Aon analysis as of June 30, 2017

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4

Estimated Loss Costs (Indemnity and Medical Combined)

	(1)	(2)	(3)	(4)	(5)	(6)
Cluster	2018	2017	2016	2015	2014	Coefficient of Variation
Berkshire Community College	0.038	0.123	0.024	0.325	0.030	1.179
Bridgewater State College	0.519	0.272	0.590	0.223	0.329	0.413
Bristol Community College	0.036	0.044	0.049	0.032	0.057	0.232
Bunker Hill Community College	0.496	0.069	0.001	0.230	0.023	1.257
Cape Cod Community College	0.220	0.527	2.171	0.158	0.506	1.158
Fitchburg State College	0.681	0.225	0.106	0.188	0.871	0.821
Framingham State College	0.210	0.312	0.037	0.472	0.022	0.902
Greenfield Community College	1.060	0.145	0.010	0.090	0.236	1.390
Holyoke Community College	0.167	0.713	0.011	0.035	0.089	1.435
Mass Bay Community College	0.152	0.524	0.270	0.015	0.026	1.066
Mass College of Art	0.310	0.950	0.098	1.209	0.055	0.999
Mass Maritime Academy	0.249	0.153	1.834	0.121	0.034	1.592
Massachusetts College of Liberal Arts	0.392	0.756	0.224	0.194	0.084	0.796
Massasoit Community College	0.560	0.158	0.368	0.074	0.041	0.914
Middlesex Community College	0.090	0.107	0.032	0.061	0.245	0.773
Mt Wachusett Community College	0.318	0.206	0.081	0.038	0.087	0.786
North Essex Community College	0.025	0.066	0.213	0.000	0.040	1.218
North Shore Community College	0.078	0.054	0.603	0.042	0.194	1.217
Quinsigamond Community College	0.602	0.141	0.086	2.008	0.265	1.291
Roxbury Community College	0.041	0.000	0.573	0.013	0.384	1.294
Salem State College	0.188	0.046	0.267	0.410	0.444	0.603
Springfield Tech Community College	0.821	0.163	0.064	0.575	0.950	0.761
UMass (Boston)	0.284	0.024	0.211	0.300	0.412	0.583
UMass (Dartmouth)	0.790	0.163	1.069	0.106	0.290	0.876
University of Lowell	0.407	0.533	0.187	0.153	0.487	0.492
Westfield State College	0.460	0.689	0.318	0.647	0.194	0.458
Worcester State College	0.600	1.090	0.152	0.120	0.958	0.765

NOTES:

(1) - (5) - Sum of Indemnity + Medical Losses from Summary Exhibit 10, Page 4 divided by Payroll from Summary Exhibit 10, Page 3.

(6) = Std Deviation / Mean of Columns (1) - (5) Used to calculate "ballast factor" (K) on Summary Exhibit 10, Page 1, Column (7).

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4

Payroll

Cluster	2018	2017	2016	2015	2014	2013	2012	2011
Berkshire Community College	14,513,016	14,696,718	14,456,120	14,062,716	14,035,091	13,566,121	12,961,874	12,765,728
Bridgewater State College	100,133,918	97,400,514	97,128,570	94,066,876	88,447,650	81,947,985	76,987,472	73,247,587
Bristol Community College	40,662,231	42,497,107	42,104,373	42,552,559	40,293,728	37,759,083	35,468,250	33,155,586
Bunker Hill Community College	54,081,418	53,589,800	51,343,817	50,270,901	49,127,405	45,382,743	41,205,115	38,164,922
Cape Cod Community College	20,323,018	20,065,891	19,144,217	19,623,257	19,227,444	17,989,520	17,381,338	17,148,486
Fitchburg State College	45,049,448	43,890,058	44,309,826	42,608,839	40,308,199	37,998,115	35,976,187	34,204,248
Framingham State College	48,824,202	48,220,544	47,747,768	45,795,557	42,758,657	40,576,899	37,321,481	33,532,654
Greenfield Community College	14,787,726	15,305,880	15,235,538	14,856,970	14,819,125	14,413,590	14,351,088	13,421,721
Holyoke Community College	34,789,710	34,835,042	35,011,610	34,474,656	33,322,195	32,555,311	31,361,111	30,596,223
Mass Bay Community College	24,302,975	24,251,880	23,795,629	23,744,806	24,272,772	23,421,254	22,339,575	21,205,789
Mass College of Art	33,915,892	33,946,011	33,494,988	32,310,647	30,582,891	29,531,509	28,328,979	26,762,645
Mass Maritime Academy	23,950,910	23,330,642	23,527,846	22,757,480	21,228,253	20,061,575	18,578,003	17,378,246
Massachusetts College of Liberal Arts	22,767,051	23,143,013	22,994,917	22,519,342	21,509,329	21,001,880	20,035,251	18,732,309
Massasoit Community College	36,026,658	37,949,986	38,340,014	37,682,345	35,408,559	33,406,357	31,525,419	30,340,130
Middlesex Community College	40,626,618	44,371,671	46,520,224	47,127,301	45,414,002	43,177,441	40,195,957	39,162,007
Mt Wachusett Community College	27,192,245	28,153,442	28,286,480	28,917,680	28,439,714	26,759,891	25,995,624	24,563,097
North Essex Community College	34,057,029	33,839,378	33,817,735	33,365,552	32,472,002	31,238,577	28,927,197	27,447,993
North Shore Community College	34,256,484	34,445,788	34,773,439	35,917,163	36,047,728	34,642,152	33,319,965	32,328,218
Quinsigamond Community College	42,665,806	42,310,090	43,077,361	42,878,790	41,344,370	39,013,977	36,409,993	34,059,973
Roxbury Community College	14,671,551	15,152,955	15,833,427	15,813,967	16,430,288	16,551,154	15,935,833	15,402,953
Salem State College	87,993,695	88,794,120	89,125,627	85,785,305	81,595,315	77,905,236	72,888,033	69,431,901
Springfield Tech Community College	34,598,242	34,485,179	34,472,989	35,199,500	33,888,963	31,913,074	30,853,455	29,918,442
UMass (Boston)	206,111,953	212,861,097	212,382,851	195,408,787	186,646,267	178,091,389	163,491,368	152,917,036
UMass (Dartmouth)	113,334,671	110,902,002	112,337,308	107,919,804	107,144,202	108,031,901	102,971,786	98,435,825
University of Lowell	200,073,066	196,482,825	192,533,065	178,925,071	167,623,882	158,366,477	144,359,303	131,389,765
Westfield State College	59,384,668	58,872,900	54,526,913	52,770,682	50,355,432	47,718,557	45,096,498	42,505,518
Worcester State College	48,645,329	47,793,656	48,289,827	46,736,625	44,158,114	41,719,450	38,408,159	35,944,721
UMass (Amherst)	607,483,570	594,786,634	585,875,165	539,631,010	518,390,972	495,397,824	467,753,393	444,672,991
UMass (Medical Center)	398,722,042	395,324,473	382,602,152	370,542,936	364,582,039	384,762,790	381,942,827	394,924,203
Total	2,463,945,144	2,451,699,296	2,423,089,795	2,314,267,125	2,229,874,589	2,164,901,832	2,052,370,532	1,973,760,916

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4

Estimated Ultimate Losses

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
			Indemnity					Medical		
Cluster	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018
Berkshire Community College	0	16,029	0	1,569	225	4,280	29,676	3,534	16,454	5,361
Bridgewater State College	135,414	91,690	441,273	191,055	356,707	155,727	118,503	131,748	74,157	163,102
Bristol Community College	6,106	7,058	1,720	2,861	0	16,920	6,398	18,866	15,748	14,730
Bunker Hill Community College	5,121	71,995	0	5,475	173,656	6,369	43,810	745	31,426	94,604
Cape Cod Community College	63,724	14,456	300,093	47,985	32,893	33,660	16,616	115,497	57,829	11,757
Fitchburg State College	309,857	18,954	21,157	74,201	180,343	41,196	61,230	25,681	24,441	126,510
Framingham State College	1,313	173,633	2,802	127,707	89,953	8,238	42,702	14,796	22,770	12,369
Greenfield Community College	8,328	11,530	0	13,985	53,332	26,574	1,798	1,556	8,145	103,365
Holyoke Community College	11,397	3,610	0	213,133	34,539	18,213	8,464	3,915	35,275	23,561
Mass Bay Community College	5,844	0	38,575	118,180	30,518	467	3,453	25,678	8,955	6,351
Mass College of Art	8,898	294,125	28,047	243,980	81,078	7,951	96,423	4,704	78,503	24,017
Mass Maritime Academy	0	17,552	342,486	19,857	45,886	7,238	10,076	89,084	15,923	13,789
Massachusetts College of Liberal Arts	6,585	25,602	232	128,050	62,602	11,479	18,102	51,308	47,018	26,568
Massasoit Community College	5,955	9,628	83,023	22,931	135,832	8,448	18,290	57,966	37,061	66,068
Middlesex Community College	55,730	11,178	2,698	20,612	16,190	55,732	17,406	11,986	26,778	20,358
Mt Wachusett Community College	0	0	14,338	39,509	34,678	24,654	10,888	8,639	18,401	51,793
North Essex Community College	3,395	0	54,807	3,786	0	9,729	129	17,346	18,656	8,473
North Shore Community College	57,787	12,086	171,345	0	8,040	12,053	3,025	38,226	18,640	18,552
Quinsigamond Community College	70,057	759,838	13,131	22,158	196,192	39,520	101,371	24,011	37,375	60,854
Roxbury Community College	51,059	0	63,735	0	0	12,063	2,034	27,005	0	5,948
Salem State College	270,517	264,544	167,500	20,816	114,595	91,702	87,556	70,483	20,002	50,781
Springfield Tech Community College	277,492	171,645	11,540	36,005	159,839	44,461	30,758	10,497	20,306	124,352
UMass (Boston)	628,014	397,544	321,573	32,953	423,157	141,891	187,830	127,188	18,568	162,123
UMass (Dartmouth)	227,807	76,727	954,769	137,016	700,129	83,270	37,664	245,628	44,113	195,219
University of Lowell	605,215	189,691	211,155	807,809	668,046	211,412	84,481	148,315	238,865	146,700
Westfield State College	39,080	269,461	110,470	319,413	176,282	58,580	72,001	62,854	86,396	96,903
Worcester State College	347,813	37,182	66,934	458,152	201,298	75,030	18,878	6,673	62,985	90,429
Total	3,202,508	2,945,758	3,423,405	3,109,199	3,976,010	1,206,857	1,129,561	1,343,929	1,084,788	1,724,635
Age to Ultimate LDF's	1.665	1.831	2.189	2.927	6.422	1.266	1.309	1.401	1.661	3.448

NOTES:

(1) - (10) - Cumualtive Paid Losses from Summary Exhibit 10, Page 5 multiplied by Age to Ultimate LDF's at the bottom of this exhibit.

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4

Cumulative Paid Losses as of 6/30/18

	Indemnity					Medical				
Cluster	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018
Berkshire Community College	0	8,752	0	536	35	3,382	22,671	2,522	9,905	1,555
Bridgewater State College	81,322	50,065	201,626	65,274	55,547	123,042	90,530	94,029	44,642	47,300
Bristol Community College	3,667	3,854	786	977	0	13,369	4,888	13,465	9,480	4,272
Bunker Hill Community College	3,075	39,311	0	1,870	27,042	5,032	33,468	532	18,918	27,435
Cape Cod Community College	38,269	7,893	137,118	16,394	5,122	26,595	12,694	82,430	34,812	3,410
Fitchburg State College	186,082	10,349	9,667	25,351	28,083	32,549	46,776	18,329	14,713	36,688
Framingham State College	788	94,807	1,280	43,631	14,008	6,509	32,622	10,560	13,707	3,587
Greenfield Community College	5,001	6,296	0	4,778	8,305	20,996	1,374	1,110	4,903	29,976
Holyoke Community College	6,845	1,971	0	72,817	5,378	14,391	6,466	2,794	21,235	6,833
Mass Bay Community College	3,510	0	17,626	40,376	4,752	369	2,638	18,326	5,391	1,842
Mass College of Art	5,344	160,598	12,815	83,356	12,625	6,283	73,662	3,357	47,258	6,965
Mass Maritime Academy	0	9,584	156,488	6,784	7,145	5,719	7,698	63,579	9,585	3,999
Massachusetts College of Liberal Arts	3,955	13,979	106	43,748	9,748	9,069	13,829	36,618	28,304	7,705
Massasoit Community College	3,576	5,257	37,935	7,834	21,152	6,675	13,972	41,370	22,310	19,160
Middlesex Community College	33,469	6,103	1,233	7,042	2,521	44,035	13,297	8,555	16,120	5,904
Mt Wachusett Community College	0	0	6,551	13,498	5,400	19,480	8,317	6,166	11,077	15,020
North Essex Community College	2,039	0	25,042	1,294	0	7,687	99	12,380	11,231	2,457
North Shore Community College	34,704	6,599	78,291	0	1,252	9,524	2,311	27,282	11,221	5,380
Quinsigamond Community College	42,072	414,886	6,000	7,570	30,551	31,225	77,442	17,137	22,499	17,648
Roxbury Community College	30,663	0	29,122	0	0	9,531	1,554	19,274	0	1,725
Salem State College	162,457	144,446	76,534	7,112	17,845	72,455	66,888	50,304	12,041	14,727
Springfield Tech Community College	166,646	93,721	5,273	12,301	24,890	35,129	23,497	7,492	12,224	36,062
UMass (Boston)	377,149	217,066	146,933	11,258	65,894	112,110	143,492	90,774	11,177	47,016
UMass (Dartmouth)	136,807	41,894	436,252	46,811	109,024	65,793	28,773	175,304	26,555	56,614
University of Lowell	363,457	103,575	96,481	275,988	104,028	167,040	64,539	105,852	143,793	42,544
Westfield State College	23,469	147,131	50,476	109,127	27,451	46,285	55,005	44,859	52,009	28,102
Worcester State College	208,876	20,302	30,583	156,528	31,346	59,282	14,421	4,762	37,916	26,225
Total	1,923,242	1,608,439	1,564,218	1,062,257	619,145	953,555	862,923	959,161	653,025	500,150

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4

Fiscal Year 2018 Paid Losses

	Indemnity					Medical				
Cluster	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018
Berkshire Community College	0	0	0	0	35	0	0	0	2,531	1,555
Bridgewater State College	0	0	60,170	27,106	55,547	1,008	3,093	10,252	24,205	47,300
Bristol Community College	0	0	0	0	0	0	0	2,978	6,971	4,272
Bunker Hill Community College	0	0	0	0	27,042	0	0	0	13,580	27,435
Cape Cod Community College	0	0	50,988	11,454	5,122	0	0	34,911	10,271	3,410
Fitchburg State College	47,054	0	0	7,016	28,083	2,406	0	88	6,413	36,688
Framingham State College	0	0	0	23,205	14,008	0	67	0	5,427	3,587
Greenfield Community College	0	0	0	0	8,305	0	0	0	1,726	29,976
Holyoke Community College	0	0	0	37,304	5,378	0	-237	319	10,715	6,833
Mass Bay Community College	0	0	11,028	40,376	4,752	0	0	12,720	3,220	1,842
Mass College of Art	0	49,128	0	41,141	12,625	0	9,502	0	35,492	6,965
Mass Maritime Academy	0	0	58,437	6,784	7,145	0	0	4,897	7,300	3,999
Massachusetts College of Liberal Arts	0	0	0	27,344	9,748	0	0	5,687	10,526	7,705
Massasoit Community College	0	0	0	7,834	21,152	0	0	74	15,204	19,160
Middlesex Community College	0	0	0	0	2,521	299	0	0	1,760	5,904
Mt Wachusett Community College	0	0	0	623	5,400	2,810	0	238	1,220	15,020
North Essex Community College	0	0	0	1,294	0	0	0	0	6,180	2,457
North Shore Community College	0	0	27,453	0	1,252	0	0	5,508	4,269	5,380
Quinsigamond Community College	0	135,427	0	0	30,551	0	2,349	5,540	4,853	17,648
Roxbury Community College	0	0	0	0	0	0	0	1,307	0	1,725
Salem State College	40,220	39,924	26,874	0	17,845	1,442	21,030	15,241	8,191	14,727
Springfield Tech Community College	18,750	65,536	0	6,709	24,890	0	4,082	450	2,367	36,062
UMass (Boston)	63,239	437	44,184	5,026	65,894	4,566	2,683	19,535	5,513	47,016
UMass (Dartmouth)	0	0	90,692	12,981	109,024	1,167	0	1,862	12,058	56,614
University of Lowell	50,973	6,998	2,852	179,915	104,028	2,634	1,466	7,947	88,681	42,544
Westfield State College	0	0	16,959	64,295	27,451	2,600	256	14,559	31,774	28,102
Worcester State College	45,195	0	25,681	138,238	31,346	2,957	0	3,243	28,070	26,225
Total	265,432	297,449	415,319	638,646	619,145	21,891	44,291	147,356	348,518	500,150

Commonwealth of Massachusetts
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Commonwealth of Massachusetts
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Reserve Analysis at June 30, 2018

All Clusters Combined

Indemnity

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		99,005,844			108,674,640	114,499,962	9,668,796	15,494,118		
6/30/82-83		17,126,124	17,333,389		17,220,955	17,326,760	94,831	200,636		
6/30/83-84		23,390,117	24,331,135		24,031,022	24,694,685	640,906	1,304,568		
6/30/84-85	1,823,085	36,546,722	37,304,047	37,101,505	36,969,051	37,360,668	422,330	813,947	2.028	2.049
6/30/85-86	1,952,445	47,647,405	48,670,338	48,461,119	48,179,037	48,510,278	531,633	862,874	2.468	2.485
6/30/86-87	2,220,820	53,723,569	55,139,944	54,814,190	54,320,766	54,757,224	597,198	1,033,655	2.446	2.466
6/30/87-88	2,885,583	76,436,261	78,665,165	78,421,797	78,355,052	79,271,052	1,918,791	2,834,791	2.715	2.747
6/30/88-89	3,098,180	72,897,335	75,386,432	75,028,484	75,052,665	75,968,550	2,155,331	3,071,216	2.422	2.452
6/30/89-90	3,079,763	69,399,802	72,046,840	71,892,372	71,631,827	72,426,477	2,232,025	3,026,675	2.326	2.352
6/30/90-91	2,914,364	55,872,693	58,433,362	58,317,517	57,660,925	58,373,053	1,788,232	2,500,359	1.979	2.003
6/30/91-92	2,880,434	35,317,498	37,154,524	37,068,510	36,796,822	37,739,323	1,479,324	2,421,825	1.277	1.310
6/30/92-93	2,887,238	23,323,012	24,793,210	24,720,342	24,553,951	24,770,024	1,230,940	1,447,012	0.850	0.858
6/30/93-94	3,056,850	26,131,398	27,946,890	27,802,926	27,724,000	28,270,033	1,592,602	2,138,635	0.907	0.925
6/30/94-95	3,158,808	23,933,328	25,732,002	25,678,014	25,406,648	26,169,304	1,473,321	2,235,976	0.804	0.828
6/30/95-96	3,301,791	23,114,921	25,110,954	25,042,682	24,866,068	25,654,242	1,751,147	2,539,321	0.753	0.777
6/30/96-97	3,902,868	22,563,295	24,711,258	24,645,208	24,379,614	25,191,508	1,816,319	2,628,213	0.625	0.645
6/30/97-98	3,776,138	26,317,057	28,834,890	28,742,169	28,013,170	28,906,067	1,696,114	2,589,010	0.742	0.765
6/30/98-99	4,017,530	23,973,586	26,712,731	26,617,851	26,149,133	26,966,203	2,175,548	2,992,617	0.651	0.671
6/30/99-00	4,221,786	26,945,795	30,470,466	30,319,797	29,690,492	30,642,005	2,744,697	3,696,210	0.703	0.726
6/30/00-01	4,310,725	31,337,737	35,574,593	35,383,924	34,639,450	35,564,353	3,301,713	4,226,616	0.804	0.825
6/30/01-02	4,438,755	27,846,970	31,967,892	31,826,121	31,002,883	32,321,373	3,155,913	4,474,403	0.698	0.728
6/30/02-03	4,423,888	27,134,011	31,443,700	31,310,150	30,847,538	32,147,950	3,713,527	5,013,939	0.697	0.727
6/30/03-04	4,482,207	26,592,950	31,150,789	31,024,662	30,416,243	31,325,140	3,823,293	4,732,190	0.679	0.699
6/30/04-05	4,639,517	26,455,972	31,543,860	30,254,607	29,751,918	30,960,000	3,295,947	4,504,028	0.641	0.667
6/30/05-06	4,938,165	23,270,112	28,082,556	27,744,903	27,501,137	27,965,000	4,231,025	4,694,888	0.557	0.566
6/30/06-07	5,183,126	21,129,352	25,993,110	26,307,374	25,442,016	26,354,950	4,312,664	5,225,598	0.491	0.508
6/30/07-08	5,508,425	25,533,663	32,241,155	31,869,977	31,118,050	32,488,061	5,584,387	6,954,398	0.565	0.590
6/30/08-09	5,447,676	24,995,324	32,394,005	32,003,933	31,524,400	32,873,331	6,529,076	7,878,007	0.579	0.603
6/30/09-10	5,525,579	24,723,273	32,736,541	32,663,076	31,978,370	33,534,462	7,255,097	8,811,189	0.579	0.607
6/30/10-11	5,712,303	27,687,176	37,788,487	36,895,320	36,441,210	38,332,531	8,754,034	10,645,355	0.638	0.671
6/30/11-12	5,880,714	26,942,724	38,503,783	37,853,774	37,304,150	39,412,767	10,361,426	12,470,043	0.634	0.670
6/30/12-13	6,162,621	22,383,293	33,706,472	35,573,469	33,899,300	35,849,000	11,516,007	13,465,707	0.550	0.582
6/30/13-14	6,442,136	25,996,580	42,090,383	42,672,322	41,043,990	43,252,000	15,047,410	17,255,420	0.637	0.671
6/30/14-15	6,758,892	25,403,119	46,482,306	47,062,267	45,641,300	47,960,100	20,238,181	22,556,981	0.675	0.710
6/30/15-16	6,843,054	23,548,279	52,447,370	51,528,012	50,184,860	53,680,500	26,636,581	30,132,221	0.733	0.784
6/30/16-17	6,638,078	16,920,299	50,116,115	49,834,126	48,387,250	51,931,200	31,466,951	35,010,901	0.729	0.782
6/30/17-18	6,709,926	7,918,556	54,405,977	53,599,439	52,233,080	55,879,000	44,314,524	47,960,444	0.778	0.833
Total	149,223,468	1,219,485,147	1,387,446,671	1,340,081,938	1,469,032,985	1,519,329,134	249,547,839	299,843,987		
Tot 6/30/84-18	149,223,468	1,079,963,062	1,345,782,147	1,340,081,938	1,319,106,368	1,362,807,727	239,143,306	282,844,665	0.884	0.913

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) Sum of Section 1, Exhibit 1, Page 2, Column 3 and Section 1, Exhibit 1, Page 9, Column 8

(4) From Section 1, Exhibit 1, Page 2, Column 8

(5) From Section 1, Exhibit 1, Page 3, Column 8

(6), (7) Selected based on (3), (4), and (5)

(8) = (6) - (3)

(9) = (7) - (3)

(10) = (6) / (2) / 10

(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Clusters Combined
Indemnity

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Accident Year	Payroll (000's)	Paid Loss Excluding Lump Sum	Implied Paid LDF	Adjstmnt for Extra Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/15-16	Paid Counts 7/1/16-17	Average Outstanding Claim	Average Age
All Prior Yrs		95,064,162							24	20		82
6/30/82-83		16,354,893	1.013	N/A	16,561,798	771,591	17,333,389		1	1	206,905	92
6/30/83-84		21,597,478	1.043	N/A	22,535,463	1,795,672	24,331,135		4	4	234,496	72
6/30/84-85	1,823,085	33,755,458	1.022	N/A	34,508,224	2,795,823	37,304,047	2.046	3	3	250,922	83
6/30/85-86	1,952,445	44,343,804	1.023	N/A	45,360,326	3,310,012	48,670,338	2.493	3	3	338,841	82
6/30/86-87	2,220,820	48,181,819	1.029	N/A	49,589,346	5,550,598	55,139,944	2.483	8	7	201,075	80
6/30/87-88	2,885,583	68,229,244	1.032	N/A	70,445,264	8,219,902	78,665,165	2.726	13	11	201,456	74
6/30/88-89	3,098,180	63,071,096	1.039	N/A	65,532,088	9,854,345	75,386,432	2.433	14	12	205,083	77
6/30/89-90	3,079,763	59,320,504	1.044	N/A	61,948,357	10,098,483	72,046,840	2.339	10	10	262,785	74
6/30/90-91	2,914,364	47,151,253	1.054	N/A	49,678,386	8,754,975	58,433,362	2.005	8	8	315,892	75
6/30/91-92	2,880,434	29,857,025	1.061	N/A	31,666,918	5,487,606	37,154,524	1.290	10	9	201,099	72
6/30/92-93	2,887,238	19,207,894	1.076	N/A	20,664,012	4,129,198	24,793,210	0.859	5	4	364,030	74
6/30/93-94	3,056,850	21,954,364	1.082	N/A	23,752,072	4,194,818	27,946,890	0.914	11	11	163,428	70
6/30/94-95	3,158,808	19,882,468	1.089	N/A	21,648,142	4,083,860	25,732,002	0.815	5	3	588,558	77
6/30/95-96	3,301,791	19,191,051	1.102	N/A	21,149,011	3,961,943	25,110,954	0.761	4	3	652,653	77
6/30/96-97	3,902,868	18,062,143	1.116	N/A	20,157,884	4,553,374	24,711,258	0.633	4	3	698,580	71
6/30/97-98	3,776,138	21,630,180	1.113	N/A	24,082,418	4,752,472	28,834,890	0.764	6	6	408,706	69
6/30/98-99	4,017,530	19,861,648	1.134	N/A	22,530,463	4,182,268	26,712,731	0.665	7	9	296,535	65
6/30/99-00	4,221,786	22,993,427	1.149	N/A	26,413,957	4,056,509	30,470,466	0.722	5	5	684,106	68
6/30/00-01	4,310,725	27,462,873	1.150	N/A	31,576,793	3,997,799	35,574,593	0.825	15	8	514,240	66
6/30/01-02	4,438,755	24,014,301	1.166	N/A	27,989,422	3,978,470	31,967,892	0.720	5	4	993,780	58
6/30/02-03	4,423,888	23,563,202	1.177	N/A	27,725,466	3,718,234	31,443,700	0.711	9	9	462,474	60
6/30/03-04	4,482,207	22,959,430	1.191	N/A	27,344,703	3,806,086	31,150,789	0.695	7	9	487,253	58
6/30/04-05	4,639,517	22,388,318	1.217	N/A	27,246,137	4,297,723	31,543,860	0.680	4	8	607,227	59
6/30/05-06	4,938,165	19,179,683	1.238	N/A	23,738,055	4,344,501	28,082,556	0.569	8	4	1,139,593	67
6/30/06-07	5,183,126	17,764,535	1.258	N/A	22,356,251	3,636,859	25,993,110	0.501	7	6	765,286	63
6/30/07-08	5,508,425	20,733,972	1.304	N/A	27,028,196	5,212,958	32,241,155	0.585	11	14	449,587	60
6/30/08-09	5,447,676	20,880,688	1.332	N/A	27,802,823	4,591,183	32,394,005	0.595	19	19	364,323	55
6/30/09-10	5,525,579	20,060,838	1.371	N/A	27,501,662	5,234,879	32,736,541	0.592	27	16	465,051	59
6/30/10-11	5,712,303	23,025,405	1.404	N/A	32,334,070	5,454,417	37,788,487	0.662	46	28	332,452	58
6/30/11-12	5,880,714	22,364,552	1.467	N/A	32,798,971	5,704,811	38,503,783	0.655	54	41	254,498	55
6/30/12-13	6,162,621	18,848,558	1.527	N/A	28,774,892	4,931,580	33,706,472	0.547	71	37	268,279	56
6/30/13-14	6,442,136	21,993,453	1.631	N/A	35,882,084	6,208,298	42,090,383	0.653	127	85	163,396	54
6/30/14-15	6,758,892	22,685,743	1.771	N/A	40,186,249	6,296,057	46,482,306	0.688	193	132	132,580	53
6/30/15-16	6,843,054	21,947,145	2.066	N/A	45,346,867	7,100,503	52,447,370	0.766	484	220	106,362	52
6/30/16-17	6,638,078	16,084,999	2.733	N/A	43,955,693	6,160,421	50,116,115	0.755	1,272	437	63,777	48
6/30/17-18	6,709,926	7,872,188	5.905	N/A	46,483,906	7,922,071	54,405,977	0.811		1,247	30,964	46
Total	149,223,468	1,063,539,792			1,204,296,370	183,150,301	1,387,446,671		2,504	2,456		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 1, Exhibit 1, Page 7

(4) = (6) / (5) / (3). For this All Clusters Combined exhibit only, this column includes the impact of the "Additional Tail consideration".

(5) Based on information from the MA WCRIB. For this All Clusters Combined exhibit only, impacts shown here are for Escalation of Benefits only.

(6) = (3) x (4) x (5)

(7) From Section 1, Exhibit 1, Page 9, Column 13

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10), (11) Provided by Commonwealth of Massachusetts

(12) = Maximum of [{(6) - (3)} / (11)] and 0

(13) Calculated for claimants that had an indemnity payment within the last calendar year.

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Clusters Combined

Indemnity

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss Excluding Lump Sum	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	1,823,085	2.991	33,755,458	1.022	34,305,682	2,795,823	37,101,505	2.035	1.882
6/30/85-86	1,952,445	3.712	44,343,804	1.023	45,151,107	3,310,012	48,461,119	2.482	2.313
6/30/86-87	2,220,820	3.485	48,181,819	1.029	49,263,592	5,550,598	54,814,190	2.468	2.218
6/30/87-88	2,885,583	3.526	68,229,244	1.032	70,201,895	8,219,902	78,421,797	2.718	2.433
6/30/88-89	3,098,180	2.963	63,071,096	1.039	65,174,140	9,854,345	75,028,484	2.422	2.104
6/30/89-90	3,079,763	2.802	59,320,504	1.044	61,793,889	10,098,483	71,892,372	2.334	2.006
6/30/90-91	2,914,364	1.690	47,151,253	1.054	49,562,541	8,754,975	58,317,517	2.001	1.701
6/30/91-92	2,880,434	1.083	29,857,025	1.061	31,580,904	5,487,606	37,068,510	1.287	1.096
6/30/92-93	2,887,238	0.701	19,207,894	1.076	20,591,143	4,129,198	24,720,342	0.856	0.713
6/30/93-94	3,056,850	0.756	21,954,364	1.082	23,608,108	4,194,818	27,802,926	0.910	0.772
6/30/94-95	3,158,808	0.664	19,882,468	1.089	21,594,154	4,083,860	25,678,014	0.813	0.684
6/30/95-96	3,301,791	0.618	19,191,051	1.102	21,080,739	3,961,943	25,042,682	0.758	0.638
6/30/96-97	3,902,868	0.500	18,062,143	1.116	20,091,834	4,553,374	24,645,208	0.631	0.515
6/30/97-98	3,776,138	0.610	21,630,180	1.113	23,989,697	4,752,472	28,742,169	0.761	0.635
6/30/98-99	4,017,530	0.538	19,861,648	1.134	22,435,583	4,182,268	26,617,851	0.663	0.558
6/30/99-00	4,221,786	0.595	22,993,427	1.149	26,263,288	4,056,509	30,319,797	0.718	0.622
6/30/00-01	4,310,725	0.693	27,462,873	1.150	31,386,125	3,997,799	35,383,924	0.821	0.728
6/30/01-02	4,438,755	0.603	24,014,301	1.166	27,847,651	3,978,470	31,826,121	0.717	0.627
6/30/02-03	4,423,888	0.601	23,563,202	1.177	27,591,916	3,718,234	31,310,150	0.708	0.624
6/30/03-04	4,482,207	0.587	22,959,430	1.191	27,218,576	3,806,086	31,024,662	0.692	0.607
6/30/04-05	4,639,517	0.392	22,388,318	1.217	25,956,884	4,297,723	30,254,607	0.652	0.559
6/30/05-06	4,938,165	0.408	19,179,683	1.238	23,400,402	4,344,501	27,744,903	0.562	0.474
6/30/06-07	5,183,126	0.425	17,764,535	1.258	22,670,515	3,636,859	26,307,374	0.508	0.437
6/30/07-08	5,508,425	0.443	20,733,972	1.304	26,657,018	5,212,958	31,869,977	0.579	0.484
6/30/08-09	5,447,676	0.461	20,880,688	1.332	27,412,751	4,591,183	32,003,933	0.587	0.503
6/30/09-10	5,525,579	0.477	20,060,838	1.371	27,428,197	5,234,879	32,663,076	0.591	0.496
6/30/10-11	5,712,303	0.490	23,025,405	1.404	31,440,903	5,454,417	36,895,320	0.646	0.550
6/30/11-12	5,880,714	0.509	22,364,552	1.467	32,148,962	5,704,811	37,853,774	0.644	0.547
6/30/12-13	6,162,621	0.529	18,848,558	1.527	30,641,889	4,931,580	35,573,469	0.577	0.497
6/30/13-14	6,442,136	0.547	21,993,453	1.631	36,464,024	6,208,298	42,672,322	0.662	0.566
6/30/14-15	6,758,892	0.566	22,685,743	1.771	40,766,210	6,296,057	47,062,267	0.696	0.603
6/30/15-16	6,843,054	0.587	21,947,145	2.066	44,427,509	7,100,503	51,528,012	0.753	0.649
6/30/16-17	6,638,078	0.609	16,084,999	2.733	43,673,705	6,160,421	49,834,126	0.751	0.658
6/30/17-18	6,709,926	0.631	7,872,188	5.905	45,677,367	7,922,071	53,599,439	0.799	0.681
Total	149,223,468		930,523,259		1,159,498,900	180,583,038	1,340,081,938		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 1, Exhibit 1, Page 4, Column 11

(4) From Section 1, Exhibit 1, Page 2, Column 3

(5) From Section 1, Exhibit 1, Page 2, Column 4

(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]

(7) From Section 1, Exhibit 1, Page 9, Column 13

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Clusters Combined
Indemnity

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Exp Ult Loss Excluding Lump Sum	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									2.991	2.991
6/30/85-86									3.712	3.712
6/30/86-87									3.485	3.485
6/30/87-88									3.526	3.526
6/30/88-89									2.963	2.963
6/30/89-90									2.802	2.802
6/30/90-91	2,914,364	49,678,386	1.705	0.983	1.676	2.288	3.835	0.289	1.745	1.690
6/30/91-92	2,880,434	31,666,918	1.099	1.079	1.186	2.221	2.634	0.271	1.088	1.083
6/30/92-93	2,887,238	20,664,012	0.716	1.258	0.900	2.157	1.941	0.240	0.734	0.701
6/30/93-94	3,056,850	23,752,072	0.777	1.242	0.965	2.094	2.020	0.250	0.750	0.756
6/30/94-95	3,158,808	21,648,142	0.685	1.230	0.843	2.033	1.714	0.260	0.666	0.664
6/30/95-96	3,301,791	21,149,011	0.641	1.220	0.782	1.974	1.543	0.270	0.623	0.618
6/30/96-97	3,902,868	20,157,884	0.516	1.208	0.624	1.916	1.196	0.281	0.506	0.500
6/30/97-98	3,776,138	24,082,418	0.638	1.193	0.761	1.860	1.415	0.293	0.613	0.610
6/30/98-99	4,017,530	22,530,463	0.561	1.177	0.660	1.806	1.192	0.306	0.542	0.538
6/30/99-00	4,221,786	26,413,957	0.626	1.158	0.725	1.754	1.271	0.320	0.600	0.595
6/30/00-01	4,310,725	31,576,793	0.733	1.129	0.827	1.702	1.408	0.338	0.699	0.693
6/30/01-02	4,438,755	27,989,422	0.631	1.107	0.698	1.653	1.154	0.355	0.612	0.603
6/30/02-03	4,423,888	27,725,466	0.627	1.103	0.691	1.605	1.109	0.367	0.611	0.601
6/30/03-04	4,482,207	27,344,703	0.610	1.103	0.673	1.558	1.048	0.378	0.595	0.587
6/30/04-05	4,639,517	27,246,137	0.587	1.096	0.644	1.513	0.973	0.392	0.406	0.392
6/30/05-06	4,938,165	23,738,055	0.481	1.085	0.521	1.469	0.766	0.408	0.423	0.408
6/30/06-07	5,183,126	22,356,251	0.431	1.073	0.463	1.426	0.660	0.425	0.440	0.425
6/30/07-08	5,508,425	27,028,196	0.491	1.061	0.521	1.384	0.721	0.443	0.459	0.443
6/30/08-09	5,447,676	27,802,823	0.510	1.049	0.535	1.344	0.719	0.461	0.478	0.461
6/30/09-10	5,525,579	27,501,662	0.498	1.045	0.520	1.305	0.678	0.477	0.494	0.477
6/30/10-11	5,712,303	32,334,070	0.566	1.046	0.592	1.267	0.750	0.490	0.508	0.490
6/30/11-12	5,880,714	32,798,971	0.558	1.039	0.580	1.230	0.713	0.509	0.527	0.509
6/30/12-13	6,162,621	28,774,892	0.467	1.030	0.481	1.194	0.574	0.529	0.548	0.529
6/30/13-14	6,442,136	35,882,084	0.557	1.026	0.571	1.159	0.662	0.547	0.566	0.547
6/30/14-15	6,758,892	40,186,249	0.595	1.020	0.607	1.126	0.683	0.566	0.586	0.566
6/30/15-16	6,843,054	45,346,867	0.663	1.013	0.671	1.093	0.733	0.587	0.609	0.587
6/30/16-17	6,638,078	43,955,693	0.662	1.006	0.666	1.061	0.707	0.609	0.631	0.609
6/30/17-18	6,709,926	46,483,906	0.693	1.000	0.693	1.030	0.714	0.631		0.631
Total	134,163,593	837,815,504								

Trend Last 4 (ex 17-18):	5.8%	Avg 3 (ex 17-18):	0.708
Trend Last 8 (ex 17-18):	3.2%	Avg 5 (ex 17-18):	0.672
Trend Last 12 (ex 17-18):	2.5%	Avg 10 (ex 17-18):	0.694
Prior Selected Trend:	3.0%	Prior Sel Avg:	0.650
Selected Trend:	3.0%	Sel. Loss Cost:	0.650

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 1, Exhibit 1, Page 2, Column 6

(4) = (3) / (2) / 10

(5) Based on information from the MA WCRIB

(6) = (4) x (5)

(7) Based on Selected Trend from (6)

(8) = (6) x (7)

(9) = Sel. Loss Cost / [(5) * (7)]

(10) From prior Aon analysis as of June 30, 2017

(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Clusters Combined
Indemnity

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend		0.960	
(2)	Credibility		87%	
(3)	Average Pmt Trend Statewide		0.960	
(4)	Credibility Weighted Trend		0.960	
		(Low)		(High)
(5)	Selected Range	0.940		0.970
(6)	Incremental Paid for 2018	871,501		871,501
(7)	Estimated Reserve	13,653,513		28,178,527
(8)	Paid to Date (82 & Prior)	95,064,162		95,064,162
(9)	Est Ult Paid for 1982 & Prior	108,717,675		123,242,689

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	998,976	1,184,200
(11)	Projected Number of Years	2	2
(12)	Estimated Reserve	1,997,951	2,368,400
(13)	Paid to Date (82 & Prior)	95,064,162	94,192,661
(14)	Est Ult Paid for 1982 & Prior	97,062,113	96,561,061
(14a)	Paid Counts During Fiscal Year	20	24

		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	102,889,894	109,901,875
(16)	Lump Sum Ultimates	3,950,982	3,950,982
(17)	Ult Loss Including Lump Sums	**106,840,876**	**113,852,857**
(18)	Implied Tail	1.082	1.156
(19)	Ult Loss Inc Lump Sums @ 6/17	106,885,854	114,648,388

NOTES:

(1) From Section 1, Exhibit 1, Page 6
(2) = (Average of Section 1, Exhibit 1, Page 6, Column 3 / 3,000,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 1, Exhibit 1, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 1, Exhibit 1, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) From Section 1, Exhibit 1, Page 9, Column 13
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2017

Commonwealth of Massachusetts

Workers Compensation

Reserve Analysis at June 30, 2018

All Clusters Combined

Indemnity

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	3,761,035	15.140			
1993	2	3,748,741	15.137	0.997		
1994	3	3,655,655	15.112	0.975		
1995	4	3,194,135	14.977	0.874		
1996	5	3,058,848	14.934	0.958		
1997	6	3,023,014	14.922	0.988		
1998	7	3,014,756	14.919	0.997		
1999	8	2,756,848	14.830	0.914		
2000	9	2,909,790	14.884	1.055	n =	27
2001	10	2,865,446	14.868	0.985	S(x) =	54,135
2002	11	2,547,239	14.751	0.889	S(x-sq) =	108,542,313
2003	12	2,422,167	14.700	0.951	S(xy) =	788,533
2004	13	2,289,077	14.644	0.945	S(y) =	393
2005	14	2,336,964	14.664	1.021	D =	44,226
2006	15	2,051,702	14.534	0.878	slope =	-0.050
2007	16	2,039,778	14.528	0.994	Avg Trend =	0.950
2008	17	1,799,337	14.403	0.882		
2009	18	1,743,820	14.372	0.969		
2010	19	1,812,753	14.410	1.040		
2011	20	1,656,071	14.320	0.914		
2012	21	1,565,889	14.264	0.946		
2013	22	1,527,315	14.239	0.975		
2014	23	1,439,828	14.180	0.943		
2015	24	1,427,174	14.171	0.991		
2016	25	1,160,574	13.964	0.813		
2017	26	964,853	13.780	0.831		
2018	27	871,501	13.678	0.903		
					Selected Trend:	**0.960**

NOTES:

(3) 2018 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2017

(4) LN [(3)]

(5) Eg. 2018: 0.903 = 871501 / 964853

Commonwealth of Massachusetts Workers Compensation
All Clusters Combined
INDEMNITY
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432
June-83	858,552	2,079,063	3,017,221	3,810,750	4,609,642	5,393,851	6,194,575	7,153,066	7,958,008	8,806,991	9,470,978	10,033,054	10,617,896	11,118,585	11,511,440	11,832,357	12,136,396	12,447,391	12,810,499	13,089,144	13,380,298	13,654,129	13,942,380	14,231,914	14,539,406	14,849,146	15,118,643	15,379,653	15,594,288	15,766,236	15,942,952	16,094,979	16,155,821	16,220,281	16,286,464	16,354,893
June-84	1,522,536	3,686,963	5,350,672	6,757,899	8,148,886	9,608,045	10,911,357	12,126,179	13,057,188	13,815,581	14,430,389	14,959,403	15,419,688	15,772,255	16,197,151	16,639,612	17,122,286	17,516,764	17,977,580	18,438,292	18,803,484	19,139,323	19,459,619	19,718,217	19,937,128	20,149,887	20,327,863	20,472,356	20,620,991	20,774,456	20,930,657	21,089,748	21,253,389	21,422,776	21,597,478	
June-85	2,512,722	6,084,789	8,830,495	11,054,439	13,342,359	15,590,069	17,427,365	18,998,017	20,498,944	21,563,372	22,525,232	23,442,205	24,219,603	25,046,022	25,818,487	26,459,414	27,121,279	27,778,658	28,406,491	28,976,876	29,543,002	30,030,413	30,523,992	30,983,182	31,363,675	31,712,251	32,055,755	32,412,266	32,782,016	33,018,728	33,237,460	33,400,919	33,574,935	33,755,458		
June-86	3,828,307	9,270,600	13,395,875	16,854,774	20,186,912	22,858,610	24,903,526	26,819,536	28,134,649	29,661,018	30,865,387	32,219,696	33,488,982	34,570,174	35,702,155	36,866,038	37,770,882	38,520,460	39,153,946	39,794,497	40,432,599	41,063,216	41,644,745	42,241,569	42,712,869	43,097,941	43,312,360	43,486,990	43,647,976	43,812,752	43,984,709	44,161,262	44,343,804			
June-87	4,540,457	10,913,697	15,583,325	19,957,432	23,712,974	26,356,678	28,401,253	30,259,862	31,823,542	33,295,483	34,562,410	35,908,967	37,317,032	38,375,710	39,392,496	40,287,844	41,070,876	41,703,092	42,193,153	42,715,548	43,489,344	43,946,144	44,426,128	44,966,121	45,385,703	45,816,061	46,262,977	46,658,728	47,038,292	47,433,435	47,825,788	48,181,819				
June-88	6,620,154	15,480,715	23,458,326	30,204,560	36,116,026	39,838,569	42,256,230	44,503,212	46,313,785	47,917,629	49,366,750	50,785,172	52,214,314	53,499,831	54,758,162	56,029,186	57,216,310	58,242,797	59,272,196	60,251,502	61,225,020	62,100,854	62,859,543	63,676,981	64,434,879	65,136,208	65,842,992	66,547,037	67,192,308	67,731,263	68,229,244					
June-89	6,105,502	16,819,476	24,950,175	31,278,437	35,945,703	38,915,779	41,415,130	43,490,698	45,072,501	46,555,926	47,860,013	49,040,632	50,166,177	51,242,940	52,234,068	53,147,033	54,016,738	54,832,591	55,632,016	56,403,282	57,157,649	57,924,017	58,698,403	59,460,012	60,103,365	60,736,487	61,369,722	61,991,993	62,580,677	63,071,096						
June-90	8,325,393	19,198,639	27,299,181	32,979,315	36,467,113	39,225,080	41,403,021	43,119,245	44,619,978	46,178,291	47,478,622	48,500,081	49,380,975	50,215,035	50,970,670	51,700,073	52,443,554	53,046,968	53,676,223	54,272,144	54,832,428	55,362,682	55,910,367	56,499,344	57,103,580	57,669,285	58,209,342	58,764,730	59,320,504							
June-91	6,727,038	15,771,999	21,820,901	25,665,833	28,606,961	30,755,665	32,249,710	33,434,382	34,630,923	35,639,652	36,661,638	37,733,064	38,765,183	39,734,589	40,612,815	41,479,663	42,275,974	42,925,167	43,635,680	44,069,182	44,462,411	44,863,611	45,327,198	45,737,838	46,124,346	46,460,492	46,799,671	47,151,253								
June-92	5,529,696	11,010,530	14,154,478	16,707,353	18,010,508	19,080,293	19,981,070	20,663,423	21,458,872	22,141,168	22,851,311	23,533,251	24,097,364	24,573,283	25,143,387	25,744,950	26,283,250	26,767,829	27,207,194	27,587,356	27,962,307	28,341,430	28,639,184	28,939,814	29,250,064	29,555,803	29,857,025									
June-93	3,873,223	8,389,572	10,824,326	12,579,041	13,682,345	14,650,572	14,980,197	15,299,706	15,652,059	15,960,508	16,198,969	16,437,335	16,647,751	16,845,525	17,057,906	17,261,464	17,446,939	17,667,638	17,927,011	18,169,867	18,397,903	18,582,538	18,741,996	18,889,448	19,103,497	19,207,894										
June-94	3,781,238	7,763,240	10,451,304	12,041,730	13,184,654	14,033,719	14,780,593	15,679,180	16,229,340	16,777,362	17,232,935	17,804,861	18,235,433	18,616,699	18,971,484	19,309,314	19,603,806	19,888,097	20,167,726	20,466,005	20,764,911	21,069,099	21,363,244	21,655,777	21,954,364											
June-95	4,117,530	8,085,099	10,658,744	12,524,501	13,540,049	14,383,050	15,205,770	15,840,120	16,337,357	16,680,320	17,024,333	17,347,955	17,691,046	17,980,888	18,198,811	18,406,575	18,613,590	18,839,234	19,049,825	19,261,206	19,432,796	19,603,661	19,754,111	19,882,468												
June-96	3,925,641	7,606,581	10,157,406	11,265,946	12,618,021	13,573,564	14,313,197	14,989,243	15,617,069	16,021,237	16,346,275	16,663,225	16,942,675	17,212,063	17,486,480	17,759,866	18,012,627	18,213,137	18,448,007	18,735,501	18,936,140	19,066,742	19,191,051													
June-97	3,802,186	7,776,567	9,916,724	11,863,394	13,377,068	14,556,289	15,406,967	15,928,071	16,176,008	16,397,842	16,558,081	16,798,807	16,939,079	17,083,096	17,228,429	17,411,092	17,558,775	17,699,497	17,796,045	17,892,253	17,978,559	18,062,143														
June-98	3,999,102	8,090,389	11,057,251	13,063,666	14,725,657	15,964,487	16,892,108	17,479,286	18,004,896	18,445,861	18,841,212	19,225,160	19,574,481	19,929,478	20,239,681	20,466,987	20,696,672	20,925,824	21,160,830	21,393,405	21,630,180															
June-99	3,807,499	8,152,795	11,043,621	13,229,580	14,782,416	15,710,384	16,521,760	17,074,054	17,452,452	17,884,931	18,180,175	18,422,658	18,600,387	18,768,162	18,941,104	19,104,918	19,315,841	19,525,405	19,722,092	19,861,648																
June-00	4,950,740	10,538,860	14,135,679	16,504,973	18,268,102	19,419,784	20,242,086	20,650,338	21,022,134	21,259,984	21,435,910	21,642,301	21,850,101	22,046,094	22,243,202	22,435,849	22,633,033	22,831,619	22,993,427																	
June-01	5,803,207	12,402,263	16,670,356	19,654,595	21,577,531	22,938,517	23,908,952	24,600,463	24,859,220	25,164,944	25,501,251	25,878,042	26,218,857	26,521,603	26,803,745	27,072,761	27,282,429	27,462,873																		
June-02	5,765,203	12,277,793	16,238,526	18,865,437	20,310,007	21,368,596	21,931,812	22,319,683	22,695,839	22,992,294	23,221,272	23,431,357	23,602,864	23,742,912	23,833,350	23,923,456	24,014,301																			
June-03	6,502,533	13,090,711	16,966,298	18,968,477	20,360,493	21,059,553	21,569,956	21,885,146	22,172,772	22,423,326	22,650,331	22,839,648	23,075,202	23,267,338	23,452,866	23,563,202																				
June-04	5,782,322	12,048,196	15,821,995	18,335,339	19,734,152	20,590,574	21,163,829	21,542,100	21,767,551	21,965,260	22,174,954	22,374,675	22,578,182	22,775,503	22,959,430																					
June-05	5,772,533	11,867,294	15,701,108	18,020,724	19,113,731	19,972,058	20,719,729	21,201,896	21,449,586	21,670,607	21,920,513	22,106,069	22,237,839	22,388,318																						
June-06	4,757,322	10,205,384	13,459,435	15,194,558	16,291,664	17,297,747	17,913,398	18,224,087	18,407,895	18,771,968	18,961,972	19,087,957	19,179,683																							
June-07	4,763,872	9,431,881	11,584,810	13,586,119	15,001,635	15,786,760	16,403,895	16,782,459	17,158,453	17,399,867	17,594,111	17,764,535																								
June-08	4,973,425	10,276,897	13,437,601	15,869,686	17,473,101	18,454,471	19,096,705	19,591,508	19,964,151	20,335,410	20,733,972																									
June-09	4,815,871	10,151,475	13,666,751	16,148,288	17,821,067	19,248,559	19,973,479	20,414,941	20,595,458	20,880,688																										
June-10	5,243,901	10,948,444	14,508,772	16,517,571	17,830,710	18,623,670	19,213,928	19,635,668	20,060,838																											
June-11	6,252,011	12,542,403	16,418,085	18,781,010	20,600,606	21,620,084	22,471,802	23,025,405																												
June-12	5,840,358	12,172,326	16,214,542	18,988,063	20,565,799	21,638,630	22,364,552																													
June-13	5,964,573	11,594,933	14,963,475	16,921,102	17,900,204	18,848,558																														
June-14	6,327,324	13,568,028	17,741,202	20,360,105	21,993,453																															
June-15	7,233,041	14,180,886	19,044,154	22,685,743																																
June-16	8,117,063	16,348,717	21,947,145																																	
June-17	7,620,426	16,084,999																																		
June-18	7,872,188																																			

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432
June-83	2.422	1.451	1.263	1.210	1.170	1.148	1.155	1.113	1.107	1.075	1.059	1.058	1.047	1.035	1.028	1.026	1.026	1.029	1.022	1.022	1.020	1.021	1.021	1.022	1.021	1.018	1.017	1.014	1.011	1.011	1.010	1.004	1.004	1.004	1.004
June-84	2.422	1.451	1.263	1.206	1.179	1.136	1.111	1.077	1.058	1.045	1.037	1.031	1.023	1.027	1.027	1.029	1.023	1.026	1.026	1.020	1.018	1.017	1.013	1.011	1.011	1.009	1.007	1.007	1.007	1.008	1.008	1.008	1.008	1.008	
June-85	2.422	1.451	1.252	1.207	1.168	1.118	1.090	1.079	1.052	1.045	1.041	1.033	1.034	1.031	1.025	1.025	1.024	1.023	1.020	1.020	1.016	1.016	1.015	1.012	1.011	1.011	1.011	1.011	1.007	1.007	1.005	1.005	1.005		
June-86	2.422	1.445	1.258	1.198	1.132	1.089	1.077	1.049	1.054	1.041	1.044	1.039	1.032	1.033	1.033	1.025	1.020	1.016	1.016	1.016	1.016	1.014	1.014	1.011	1.009	1.005	1.004	1.004	1.004	1.004	1.004	1.004			
June-87	2.404	1.428	1.281	1.188	1.111	1.078	1.065	1.052	1.046	1.038	1.039	1.039	1.028	1.026	1.023	1.019	1.015	1.012	1.012	1.018	1.011	1.011	1.012	1.009	1.009	1.010	1.009	1.008	1.008	1.008	1.007				
June-88	2.338	1.515	1.288	1.196	1.103	1.061	1.053	1.041	1.035	1.030	1.029	1.028	1.025	1.024	1.023	1.021	1.018	1.018	1.017	1.016	1.014	1.012	1.013	1.012	1.011	1.011	1.011	1.010	1.008	1.007					
June-89	2.755	1.483	1.254	1.149	1.083	1.064	1.050	1.036	1.033	1.028	1.025	1.023	1.021	1.019	1.017	1.016	1.015	1.015	1.014	1.013	1.013	1.013	1.013	1.011	1.011	1.010	1.010	1.009	1.008						
June-90	2.306	1.422	1.208	1.106	1.076	1.056	1.041	1.035	1.035	1.028	1.022	1.018	1.017	1.015	1.014	1.014	1.012	1.012	1.011	1.010	1.010	1.010	1.011	1.011	1.010	1.009	1.010	1.009							
June-91	2.345	1.384	1.176	1.115	1.075	1.049	1.037	1.036	1.029	1.029	1.029	1.027	1.025	1.022	1.021	1.019	1.015	1.017	1.010	1.009	1.009	1.010	1.009	1.008	1.007	1.007	1.008								
June-92	1.991	1.286	1.180	1.078	1.059	1.047	1.034	1.038	1.032	1.032	1.030	1.024	1.020	1.023	1.024	1.021	1.018	1.016	1.014	1.014	1.014	1.011	1.010	1.011	1.010	1.010									
June-93	2.166	1.290	1.162	1.088	1.071	1.022	1.021	1.023	1.020	1.015	1.015	1.013	1.012	1.013	1.012	1.011	1.013	1.015	1.014	1.013	1.010	1.009	1.008	1.011	1.005										
June-94	2.053	1.346	1.152	1.095	1.064	1.053	1.061	1.035	1.034	1.027	1.033	1.024	1.021	1.019	1.018	1.015	1.015	1.014	1.015	1.015	1.015	1.014	1.014	1.014											
June-95	1.964	1.318	1.175	1.081	1.062	1.057	1.042	1.031	1.021	1.021	1.019	1.020	1.016	1.012	1.011	1.011	1.012	1.011	1.011	1.009	1.009	1.008	1.006												
June-96	1.938	1.335	1.109	1.120	1.076	1.054	1.047	1.042	1.026	1.020	1.019	1.017	1.016	1.016	1.016	1.014	1.011	1.013	1.016	1.011	1.007	1.007													
June-97	2.045	1.275	1.196	1.128	1.088	1.058	1.034	1.016	1.014	1.010	1.015	1.008	1.009	1.009	1.011	1.008	1.008	1.005	1.005	1.005	1.005														
June-98	2.023	1.367	1.181	1.127	1.084	1.058	1.035	1.030	1.024	1.021	1.020	1.018	1.018	1.016	1.011	1.011	1.011	1.011	1.011	1.011															
June-99	2.141	1.355	1.198	1.117	1.063	1.052	1.033	1.022	1.025	1.017	1.013	1.010	1.009	1.009	1.009	1.011	1.011	1.010	1.007																
June-00	2.129	1.341	1.168	1.107	1.063	1.042	1.020	1.018	1.011	1.008	1.010	1.010	1.009	1.009	1.009	1.009	1.009	1.007																	
June-01	2.137	1.344	1.179	1.098	1.063	1.042	1.029	1.011	1.012	1.013	1.015	1.013	1.012	1.011	1.010	1.008	1.007																		
June-02	2.130	1.323	1.162	1.077	1.052	1.026	1.018	1.017	1.013	1.010	1.009	1.007	1.006	1.004	1.004	1.004																			
June-03	2.013	1.296	1.118	1.073	1.034	1.024	1.015	1.013	1.011	1.010	1.008	1.010	1.008	1.008	1.005																				
June-04	2.084	1.313	1.159	1.076	1.043	1.028	1.018	1.010	1.009	1.010	1.009	1.009	1.009	1.008																					
June-05	2.056	1.323	1.148	1.061	1.045	1.037	1.023	1.012	1.010	1.012	1.008	1.006	1.007																						
June-06	2.145	1.319	1.129	1.072	1.062	1.036	1.017	1.010	1.020	1.010	1.007	1.005																							
June-07	1.980	1.228	1.173	1.104	1.052	1.039	1.023	1.022	1.014	1.011	1.010																								
June-08	2.066	1.308	1.181	1.101	1.056	1.035	1.026	1.019	1.019	1.020																									
June-09	2.108	1.346	1.182	1.104	1.080	1.038	1.022	1.009	1.014																										
June-10	2.088	1.325	1.138	1.079	1.044	1.032	1.022	1.022																											
June-11	2.006	1.309	1.144	1.097	1.049	1.039	1.025																												
June-12	2.084	1.332	1.171	1.083	1.052	1.034																													
June-13	1.944	1.291	1.131	1.058	1.053																														
June-14	2.144	1.308	1.148	1.080																															
June-15	1.961	1.343	1.191																																
June-16	2.014	1.342																																	
June-17	2.111																																		

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	To Ult
Simple Avg																																				
All Yrs	2.153	1.353	1.185	1.115	1.078	1.055	1.043	1.033	1.029	1.024	1.023	1.020	1.018	1.018	1.017	1.016	1.015	1.015	1.014	1.014	1.012	1.012	1.012	1.012	1.011	1.010	1.010	1.009	1.008	1.007	1.007	1.005	1.006	1.006	1.004	
Latest 5	2.035	1.323	1.157	1.080	1.056	1.035	1.024	1.016	1.015	1.012	1.008	1.007	1.008	1.008	1.007	1.009	1.009	1.009	1.010	1.010	1.009	1.009	1.010	1.011	1.009	1.010	1.009	1.008	1.007	1.007	1.007					
Latest 3	2.028	1.331	1.157	1.074	1.052	1.035	1.023	1.017	1.016	1.014	1.008	1.007	1.008	1.007	1.006	1.007	1.009	1.009	1.008	1.009	1.007	1.009	1.009	1.012	1.008	1.009	1.009	1.010	1.008	1.007	1.005	1.006	1.006			
Volume Wtd																																				
All Yrs	2.140	1.353	1.185	1.113	1.074	1.052	1.040	1.031	1.028	1.024	1.023	1.021	1.019	1.018	1.018	1.017	1.015	1.015	1.014	1.014	1.012	1.012	1.012	1.011	1.010	1.010	1.009	1.009	1.007	1.007	1.006	1.005	1.006	1.006	1.004	
Latest 5	2.036	1.325	1.158	1.080	1.056	1.035	1.024	1.016	1.015	1.012	1.008	1.008	1.008	1.008	1.007	1.008	1.009	1.009	1.010	1.010	1.009	1.010	1.010	1.011	1.009	1.010	1.009	1.008	1.007	1.007	1.006					
Latest 3	2.029	1.332	1.159	1.074	1.051	1.035	1.023	1.016	1.016	1.014	1.008	1.007	1.008	1.007	1.006	1.007	1.009	1.009	1.008	1.009	1.007	1.010	1.009	1.012	1.008	1.009	1.009	1.010	1.008	1.007	1.006	1.005	1.006			

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Clusters Combined
Indemnity

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/17		As of 6/18		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	109,240,557	115,766,134	108,674,640	114,499,962	(565,917)	-0.5%	(1,266,172)	-1.1%
6/30/82-83	17,489,646	18,055,660	17,220,955	17,326,760	(268,691)	-1.5%	(728,900)	-4.0%
6/30/83-84	23,821,525	24,583,240	24,031,022	24,694,685	209,497	0.9%	111,445	0.5%
6/30/84-85	37,145,036	38,144,639	36,969,051	37,360,668	(175,984)	-0.5%	(783,971)	-2.1%
6/30/85-86	48,050,033	48,561,273	48,179,037	48,510,278	129,004	0.3%	(50,995)	-0.1%
6/30/86-87	54,181,423	55,267,219	54,320,766	54,757,224	139,344	0.3%	(509,995)	-0.9%
6/30/87-88	78,063,704	80,478,827	78,355,052	79,271,052	291,348	0.4%	(1,207,775)	-1.5%
6/30/88-89	74,857,092	76,397,735	75,052,665	75,968,550	195,574	0.3%	(429,184)	-0.6%
6/30/89-90	71,403,259	72,405,746	71,631,827	72,426,477	228,568	0.3%	20,731	0.0%
6/30/90-91	57,601,925	58,939,370	57,660,925	58,373,053	59,000	0.1%	(566,317)	-1.0%
6/30/91-92	36,697,822	37,810,966	36,796,822	37,739,323	99,000	0.3%	(71,642)	-0.2%
6/30/92-93	24,655,448	25,703,934	24,553,951	24,770,024	(101,497)	-0.4%	(933,910)	-3.6%
6/30/93-94	27,608,000	28,043,338	27,724,000	28,270,033	116,000	0.4%	226,695	0.8%
6/30/94-95	25,467,648	26,281,337	25,406,648	26,169,304	(61,000)	-0.2%	(112,033)	-0.4%
6/30/95-96	25,021,068	25,821,197	24,866,068	25,654,242	(155,000)	-0.6%	(166,955)	-0.6%
6/30/96-97	24,590,614	25,417,473	24,379,614	25,191,508	(211,000)	-0.9%	(225,965)	-0.9%
6/30/97-98	28,092,318	29,001,357	28,013,170	28,906,067	(79,148)	-0.3%	(95,290)	-0.3%
6/30/98-99	26,288,593	27,122,953	26,149,133	26,966,203	(139,460)	-0.5%	(156,750)	-0.6%
6/30/99-00	29,843,243	30,903,025	29,690,492	30,642,005	(152,751)	-0.5%	(261,020)	-0.8%
6/30/00-01	34,846,645	35,912,703	34,639,450	35,564,353	(207,195)	-0.6%	(348,350)	-1.0%
6/30/01-02	31,382,346	32,735,073	31,002,883	32,321,373	(379,463)	-1.2%	(413,700)	-1.3%
6/30/02-03	31,220,511	32,549,000	30,847,538	32,147,950	(372,974)	-1.2%	(401,050)	-1.2%
6/30/03-04	30,716,996	31,828,860	30,416,243	31,325,140	(300,752)	-1.0%	(503,720)	-1.6%
6/30/04-05	30,006,646	31,560,000	29,751,918	30,960,000	(254,728)	-0.8%	(600,000)	-1.9%
6/30/05-06	27,930,197	28,604,000	27,501,137	27,965,000	(429,060)	-1.5%	(639,000)	-2.2%
6/30/06-07	25,901,271	26,737,650	25,442,016	26,354,950	(459,255)	-1.8%	(382,700)	-1.4%
6/30/07-08	31,321,950	32,954,071	31,118,050	32,488,061	(203,900)	-0.7%	(466,010)	-1.4%
6/30/08-09	31,960,170	33,695,993	31,524,400	32,873,331	(435,770)	-1.4%	(822,662)	-2.4%
6/30/09-10	32,316,000	34,303,091	31,978,370	33,534,462	(337,630)	-1.0%	(768,629)	-2.2%
6/30/10-11	37,034,310	39,447,083	36,441,210	38,332,531	(593,100)	-1.6%	(1,114,552)	-2.8%
6/30/11-12	38,146,250	40,914,699	37,304,150	39,412,767	(842,100)	-2.2%	(1,501,932)	-3.7%
6/30/12-13	35,358,100	37,298,000	33,899,300	35,849,000	(1,458,800)	-4.1%	(1,449,000)	-3.9%
6/30/13-14	42,196,230	45,284,000	41,043,990	43,252,000	(1,152,240)	-2.7%	(2,032,000)	-4.5%
6/30/14-15	46,773,570	49,261,500	45,641,300	47,960,100	(1,132,270)	-2.4%	(1,301,400)	-2.6%
6/30/15-16	48,950,900	53,023,900	50,184,860	53,680,500	1,233,960	2.5%	656,600	1.2%
6/30/16-17	50,111,400	53,397,000	48,387,250	51,931,200	(1,724,150)	-3.4%	(1,465,800)	-2.7%
6/30/17-18								
Total	1,426,292,447	1,484,212,042	1,416,799,905	1,463,450,134	(9,492,542)	-0.7%	(20,761,908)	-1.4%

NOTES:

(2), (3) From prior Aon analysis as of June 30, 2017

(4), (5) From Section 1, Exhibit 1, Page 1, Columns 6, 7

(6) = (4) - (2)

(7) = (4) / (2) - 1

(8) = (5) - (3)

(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Clusters Combined
Indemnity

Calculation of Ultimate Lump Sum Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Accident Year	Paid Loss Excluding Lump Sum	Implied Cumulative LDF	Ult Loss Excluding Lump Sum	Selected Incr Lump Sum % Outstdg	Cumulative Lump Sum % Outstdg	Total Lump Sum Outstdg	Paid Lump Sum to Date	Est Ult Lump Sum - Incr Method	Ultimate Lump Sum Percentage	Lump Sum LDF	Est Ult Lump Sum - Paid Method	Selected Est Ultimate Lump Sums	Prior Est Ultimate Lump Sums
All Prior Yrs	95,064,162	1.119	106,395,885	0.0%	0.0%	0	3,941,682	3,941,682	3.7%	1.005	3,960,281	3,950,982	3,950,982
6/30/82-83	16,354,893	1.013	16,561,798	0.0%	0.0%	0	771,231	771,231	4.7%	1.001	771,951	771,591	771,591
6/30/83-84	21,597,478	1.043	22,535,463	0.0%	0.0%	0	1,792,639	1,792,639	8.0%	1.003	1,798,705	1,795,672	1,795,672
6/30/84-85	33,755,458	1.022	34,508,224	0.0%	0.0%	0	2,791,264	2,791,264	8.1%	1.003	2,800,382	2,795,823	2,795,823
6/30/85-86	44,343,804	1.023	45,360,326	0.0%	0.0%	0	3,303,601	3,303,601	7.3%	1.004	3,316,424	3,310,012	3,310,012
6/30/86-87	48,181,819	1.029	49,589,346	0.0%	0.0%	0	5,541,750	5,541,750	11.2%	1.003	5,559,446	5,550,598	5,550,598
6/30/87-88	68,229,244	1.032	70,445,264	0.0%	0.0%	0	8,207,017	8,207,017	11.7%	1.003	8,232,786	8,219,902	8,069,902
6/30/88-89	63,071,096	1.039	65,532,088	0.0%	0.0%	21,023	9,826,239	9,847,261	15.0%	1.004	9,861,428	9,854,345	9,843,833
6/30/89-90	59,320,504	1.044	61,948,357	0.0%	0.0%	5,101	10,079,298	10,084,399	16.3%	1.003	10,112,567	10,098,483	10,104,402
6/30/90-91	47,151,253	1.054	49,678,386	0.0%	0.0%	24,271	8,721,440	8,745,711	17.6%	1.005	8,764,240	8,754,975	8,745,390
6/30/91-92	29,857,025	1.061	31,666,918	0.0%	0.1%	25,117	5,460,474	5,485,591	17.3%	1.005	5,489,621	5,487,606	5,477,171
6/30/92-93	19,207,894	1.076	20,664,012	-0.1%	0.0%	3,183	4,115,118	4,118,301	19.9%	1.006	4,140,096	4,129,198	4,115,775
6/30/93-94	21,954,364	1.082	23,752,072	0.0%	0.0%	6,333	4,177,034	4,183,367	17.6%	1.007	4,206,269	4,194,818	4,200,905
6/30/94-95	19,882,468	1.089	21,648,142	0.0%	0.0%	8,265	4,050,860	4,059,125	18.8%	1.014	4,108,595	4,083,860	4,087,994
6/30/95-96	19,191,051	1.102	21,149,011	0.0%	0.1%	16,453	3,923,870	3,940,323	18.6%	1.015	3,983,563	3,961,943	3,968,585
6/30/96-97	18,062,143	1.116	20,157,884	0.1%	0.1%	25,962	4,501,152	4,527,114	22.5%	1.017	4,579,634	4,553,374	4,559,889
6/30/97-98	21,630,180	1.113	24,082,418	0.0%	0.1%	26,615	4,686,877	4,713,492	19.6%	1.022	4,791,451	4,752,472	4,761,580
6/30/98-99	19,861,648	1.134	22,530,463	0.1%	0.2%	39,176	4,111,938	4,151,114	18.4%	1.025	4,213,422	4,182,268	4,181,108
6/30/99-00	22,993,427	1.149	26,413,957	0.1%	0.3%	73,912	3,952,368	4,026,280	15.2%	1.034	4,086,739	4,056,509	4,031,030
6/30/00-01	27,462,873	1.150	31,576,793	0.0%	0.3%	103,114	3,874,864	3,977,978	12.6%	1.037	4,017,620	3,997,799	4,008,005
6/30/01-02	24,014,301	1.166	27,989,422	0.1%	0.4%	115,946	3,832,669	3,948,615	14.1%	1.046	4,008,325	3,978,470	3,991,067
6/30/02-03	23,563,202	1.177	27,725,466	0.1%	0.5%	141,111	3,570,808	3,711,919	13.4%	1.043	3,724,550	3,718,234	3,695,940
6/30/03-04	22,959,430	1.191	27,344,703	0.1%	0.6%	165,193	3,633,520	3,798,713	13.9%	1.050	3,813,460	3,806,086	3,783,571
6/30/04-05	22,388,318	1.217	27,246,137	0.2%	0.8%	217,091	4,067,653	4,284,745	15.7%	1.060	4,310,701	4,297,723	4,287,900
6/30/05-06	19,179,683	1.238	23,738,055	0.1%	0.9%	222,151	4,090,429	4,312,580	18.2%	1.070	4,376,422	4,344,501	4,370,363
6/30/06-07	17,764,535	1.258	22,356,251	0.1%	1.1%	242,622	3,364,817	3,607,439	16.1%	1.079	3,631,361	3,636,859	3,681,987
6/30/07-08	20,733,972	1.304	27,028,196	0.2%	1.3%	350,756	4,799,691	5,150,448	19.1%	1.091	5,238,801	5,212,958	5,166,790
6/30/08-09	20,880,688	1.332	27,802,823	0.2%	1.5%	415,360	4,114,636	4,529,996	16.3%	1.123	4,619,005	4,591,183	4,574,091
6/30/09-10	20,060,838	1.371	27,501,662	0.2%	1.7%	470,836	4,662,435	5,133,271	18.7%	1.139	5,312,047	5,234,879	5,220,554
6/30/10-11	23,025,405	1.404	32,334,070	0.4%	2.2%	698,901	4,661,771	5,360,672	16.6%	1.185	5,523,265	5,454,417	5,604,143
6/30/11-12	22,364,552	1.467	32,798,971	1.1%	3.3%	1,081,712	4,578,171	5,659,883	17.3%	1.253	5,734,652	5,704,811	5,950,873
6/30/12-13	18,848,558	1.527	28,774,892	1.3%	4.6%	1,325,106	3,534,735	4,859,841	16.9%	1.412	4,991,294	4,931,580	5,347,685
6/30/13-14	21,993,453	1.631	35,882,084	1.4%	6.0%	2,145,656	4,003,126	6,148,782	17.1%	1.661	6,649,706	6,208,298	6,615,053
6/30/14-15	22,685,743	1.771	40,186,249	2.9%	8.8%	3,549,344	2,717,376	6,266,720	15.6%	2.318	6,297,628	6,296,057	7,190,528
6/30/15-16	21,947,145	2.066	45,346,867	3.3%	12.1%	5,505,344	1,601,133	7,106,478	15.7%	4.159	6,659,558	7,100,503	5,662,623
6/30/16-17	16,084,999	2.733	43,955,693	2.5%	14.7%	6,446,404	835,300	7,281,704	16.6%	12.013	10,034,837	6,160,421	7,378,355
6/30/17-18	7,872,188	5.905	46,483,906	2.3%	17.0%	7,882,982	46,368	7,929,351	17.1%	56.728	2,630,376	7,922,071	
Total	1,063,539,792		1,310,692,255			31,355,041	155,945,355	187,300,396	14.3%		186,351,207	187,101,282	180,851,773

NOTES:

(2) From Section 1, Exhibit 1, Page 2, Column 3

(3) = (4) / (2)

(4) From Section 1, Exhibit 1, Page 2, Column 6

(5) From Section 1, Exhibit 1, Page 11

(6) Downward sum of (5)

(7) = (6) x (4)

(8) From Section 1, Exhibit 1, Page 10

(9) = (7) + (8)

(10) = (9) / (4)

(11) From Section 1, Exhibit 1, Page 12

(12) = (8) x (11)

(13) Selected based on (9) and (12)

(14) From prior Aon analysis as of June 30, 2017

Commonwealth of Massachusetts Workers Compensation
All Clusters Combined
INDEMNITY
Lump Sum Development
Incremental Lump Sum Payments

Acc Yr Ending	0-12	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444
All Prior Yrs	0	0	0	0	0	0	12,000	46,500	31,000	20,000	184,000	115,000	138,000	550,984	594,000	318,784	155,500	30,000	362,833	369,668	354,998	72,250	145,500	201,500	118,040	28,000	78,125	0	0	7,500	7,500	0	0	0	0	0	0
Jun-83	0	0	0	0	0	20,000	0	32,500	37,500	80,000	153,481	90,750	77,000	110,000	160,000	0	10,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jun-84	0	0	0	0	25,750	32,500	110,600	178,437	119,500	233,650	204,200	246,501	48,000	102,001	50,000	30,000	37,500	85,000	45,000	0	0	84,000	0	10,000	0	0	150,000	0	0	0	0	0	0	0	0		
Jun-85	0	0	0	98,476	35,500	126,500	146,555	201,250	383,400	565,833	337,200	193,500	294,550	40,000	0	133,500	120,000	30,000	35,000	25,000	0	0	0	0	0	0	0	0	25,000	0	0	0	0	0			
Jun-86	0	0	58,000	116,759	213,100	146,344	336,928	826,899	586,995	10,000	147,000	20,000	86,000	37,500	0	0	0	30,000	55,000	64,000	16,000	45,000	58,275	237,801	0	198,000	2,000	12,000	0	0	0	0	0				
Jun-87	0	81,440	184,322	246,666	253,462	621,607	1,050,537	509,001	398,456	184,806	186,424	102,671	334,859	406,500	240,000	239,999	50,000	132,000	80,000	10,000	0	0	0	135,000	0	0	0	0	0	0	94,000	0					
Jun-88	0	106,671	200,428	418,500	836,484	1,573,442	1,192,500	711,383	849,000	373,400	305,326	241,507	328,463	0	59,910	0	191,667	65,000	85,333	100,001	90,000	150,001	0	58,001	62,000	58,000	0	0	0	0	150,000						
Jun-89	0	239,195	381,000	997,744	1,789,441	1,630,950	1,022,995	995,502	531,500	332,500	603,811	258,100	276,500	92,500	25,000	18,500	63,500	218,333	116,383	160,284	62,500	0	0	10,000	0	1	0	0	0	0							
Jun-90	0	254,094	1,205,138	1,809,296	1,317,952	1,060,755	985,550	993,000	409,534	438,300	365,512	408,833	40,833	46,000	31,000	25,000	106,000	110,125	129,876	27,500	33,333	33,333	33,333	0	184,500	30,500	0	0	0								
Jun-91	13,500	438,707	1,994,750	1,433,327	920,426	1,217,840	758,000	203,289	232,000	140,000	100,001	54,000	0	0	70,000	178,100	102,500	280,000	130,000	0	0	0	60,000	0	158,000	237,000	0	0									
Jun-92	66,000	830,673	583,116	753,497	838,750	535,501	294,500	221,500	181,500	178,000	202,683	31,250	13,500	122,268	33,368	20,867	326,500	107,000	80,001	0	0	0	0	0	0	40,000	0										
Jun-93	62,000	654,058	665,328	971,951	408,250	415,801	286,729	103,000	190,000	85,000	12,000	55,000	0	0	0	0	50,000	58,000	35,000	35,000	0	0	13,500	1	0	14,500											
Jun-94	90,000	679,356	863,226	715,524	525,377	333,501	199,500	201,500	47,500	40,050	0	234,500	71,000	25,000	25,000	120,000	6,000	0	0	0	0	0	0	0	0												
Jun-95	219,963	888,102	977,200	797,324	399,770	225,600	67,000	10,000	70,625	134,875	58,400	35,000	0	112,000	42,500	12,500	0	0	0	0	0	1	0	0													
Jun-96	80,500	705,230	1,049,356	656,831	319,451	110,001	89,167	158,833	123,000	131,001	103,000	62,500	0	18,400	16,600	0	0	0	71,725	32,069	132,068	64,138	0														
Jun-97	134,365	1,184,751	1,074,000	820,183	422,500	172,251	16,000	140,600	106,501	109,001	167,000	17,000	0	0	40,000	40,000	0	0	30,000	27,000	0	0															
Jun-98	408,337	890,613	1,162,675	665,000	431,091	264,909	110,335	161,166	29,000	8,001	10,000	227,750	130,000	119,000	69,000	0	0	0	0	0	0																
Jun-99	251,500	439,250	1,042,681	765,621	367,556	218,197	270,076	179,055	73,001	180,000	52,000	73,001	0	0	65,000	110,000	0	0	0	25,000																	
Jun-00	135,731	994,493	726,541	532,050	394,551	264,499	364,884	198,118	118,001	76,000	31,500	34,000	25,000	12,000	0	0	0	0	45,000																		
Jun-01	108,490	517,820	838,510	515,804	486,170	523,565	239,504	370,500	134,000	18,000	0	0	62,500	0	0	0	60,001	0																			
Jun-02	48,000	251,595	619,400	692,914	768,087	556,815	356,721	325,000	45,136	69,000	53,000	42,000	0	5,000	1	0	0																				
Jun-03	20,000	243,617	973,654	830,735	554,982	452,423	125,001	80,000	6,000	96,000	77,500	60,000	1	1	5,000	45,894																					
Jun-04	47,500	153,200	552,463	917,102	829,753	553,000	162,000	241,501	100,000	0	1,001	36,000	0	0	40,000																						
Jun-05	6,157	171,103	840,367	1,359,602	649,723	301,000	271,000	217,001	194,200	0	0	20,000	0	37,500																							
Jun-06	0	307,301	772,454	1,353,001	484,173	445,500	363,000	103,000	19,700	15,300	177,000	50,000	0																								
Jun-07	36,000	451,583	914,752	703,751	416,002	193,002	149,442	275,002	148,783	76,500	0	0																									
Jun-08	17,730	728,501	774,649	979,000	795,250	372,462	679,872	198,334	148,893	0	105,000																										
Jun-09	285,000	362,500	783,767	808,001	522,676	524,500	314,501	373,691	75,000	65,001																											
Jun-10	0	601,092	797,379	946,609	922,799	554,305	511,501	192,500	136,250																												
Jun-11	315,691	461,993	1,026,227	799,329	1,115,029	406,000	349,502	188,000																													
Jun-12	0	441,786	742,328	1,621,090	868,462	640,401	264,104																														
Jun-13	113,000	371,012	696,259	1,337,661	871,178	145,625																															
Jun-14	102,000	301,628	1,569,902	1,187,866	841,730																																
Jun-15	0	377,841	1,376,990	962,545																																	
Jun-16	21,500	318,702	1,260,931																																		
Jun-17	37,200	798,100																																			
Jun-18	46,368																																				

Cumulative Lump Sum Payments

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444
All Prior Yrs	0	0	0	0	0	0	12,000	58,500	89,500	109,500	293,500	408,500	546,500	1,097,484	1,691,484	2,010,268	2,165,768	2,195,768	2,558,601	2,928,269	3,283,267	3,355,517	3,501,017	3,702,517	3,820,557	3,848,557	3,926,682	3,926,682	3,926,682	3,934,182	3,941,682	3,941,682	3,941,682	3,941,682	3,941,682	3,941,682	3,941,682
Jun-83	0	0	0	0	0	20,000	20,000	52,500	90,000	170,000	323,481	414,231	491,231	601,231	761,231	761,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	
Jun-84	0	0	0	0	25,750	58,250	168,850	347,287	466,787	700,437	904,637	1,151,138	1,199,138	1,301,139	1,351,139	1,381,139	1,418,639	1,503,639	1,548,639	1,548,639	1,548,639	1,632,639	1,632,639	1,642,639	1,642,639	1,642,639	1,792,639	1,792,639	1,792,639	1,792,639	1,792,639	1,792,639	1,792,639	1,792,639	1,792,639		
Jun-85	0	0	0	98,476	133,976	260,476	407,031	608,281	991,681	1,557,514	1,894,714	2,088,214	2,382,764	2,422,764	2,422,764	2,556,264	2,676,264	2,706,264	2,741,264	2,766,264	2,766,264	2,766,264	2,766,264	2,766,264	2,766,264	2,766,264	2,766,264	2,791,264	2,791,264	2,791,264	2,791,264	2,791,264	2,791,264	2,791,264			
Jun-86	0	0	58,000	174,759	387,859	534,203	871,131	1,698,030	2,285,025	2,295,025	2,442,025	2,462,025	2,548,025	2,585,525	2,585,525	2,585,525	2,585,525	2,615,525	2,670,525	2,734,525	2,750,525	2,795,525	2,853,800	3,091,601	3,091,601	3,289,601	3,291,601	3,303,601	3,303,601	3,303,601	3,303,601	3,303,601	3,303,601				
Jun-87	0	81,440	265,762	512,428	765,890	1,387,497	2,438,034	2,947,035	3,345,491	3,530,297	3,716,721	3,819,392	4,154,251	4,560,751	4,800,751	5,040,750	5,090,750	5,222,750	5,302,750	5,312,750	5,312,750	5,312,750	5,312,750	5,447,750	5,447,750	5,447,750	5,447,750	5,447,750	5,447,750	5,541,750	5,541,750						
Jun-88	0	106,671	307,099	725,599	1,562,083	3,135,525	4,328,025	5,039,408	5,888,408	6,261,808	6,567,134	6,808,641	7,137,104	7,137,104	7,197,014	7,197,014	7,388,681	7,453,681	7,539,014	7,639,015	7,729,015	7,879,016	7,879,016	7,937,017	7,999,017	8,057,017	8,057,017	8,057,017	8,057,017	8,057,017	8,207,017						
Jun-89	0	239,195	620,195	1,617,939	3,407,380	5,038,330	6,061,325	7,056,827	7,588,327	7,920,827	8,524,638	8,782,738	9,059,238	9,151,738	9,176,738	9,195,238	9,258,738	9,477,071	9,593,454	9,753,738	9,816,238	9,816,238	9,816,238	9,826,238	9,826,238	9,826,239	9,826,239	9,826,239	9,826,239	9,826,239							
Jun-90	0	254,094	1,459,232	3,268,528	4,586,480	5,647,235	6,632,785	7,625,785	8,035,319	8,473,619	8,839,131	9,247,964	9,288,797	9,334,797	9,365,797	9,390,797	9,496,797	9,606,922	9,736,798	9,764,298	9,797,631	9,830,965	9,864,298	9,864,298	10,048,798	10,079,298	10,079,298	10,079,298	10,079,298								
Jun-91	13,500	452,207	2,446,957	3,880,284	4,800,710	6,018,550	6,776,550	6,979,839	7,211,839	7,351,839	7,451,840	7,505,840	7,505,840	7,505,840	7,575,840	7,753,940	7,856,440	8,136,440	8,266,440	8,266,440	8,266,440	8,266,440	8,326,440	8,326,440	8,484,440	8,721,440	8,721,440	8,721,440								
Jun-92	66,000	896,673	1,479,789	2,233,286	3,072,036	3,607,537	3,902,037	4,123,537	4,305,037	4,483,037	4,685,720	4,716,970	4,730,470	4,852,738	4,886,106	4,906,973	5,233,473	5,340,473	5,420,474	5,420,474	5,420,474	5,420,474	5,420,474	5,420,474	5,420,474	5,460,474	5,460,474										
Jun-93	62,000	716,058	1,381,386	2,353,337	2,761,587	3,177,388	3,464,117	3,567,117	3,757,117	3,842,117	3,854,117	3,909,117	3,909,117	3,909,117	3,909,117	3,909,117	3,959,117	4,017,117	4,052,117	4,087,117	4,087,117	4,087,117	4,100,617	4,100,618	4,100,618	4,115,118											
Jun-94	90,000	769,356	1,632,582	2,348,106	2,873,483	3,206,984	3,406,484	3,607,984	3,655,484	3,695,534	3,695,534	3,930,034	4,001,034	4,026,034	4,051,034	4,171,034	4,177,034	4,177,034	4,177,034	4,177,034	4,177,034	4,177,034	4,177,034	4,177,034	4,177,034												
Jun-95	219,963	1,108,065	2,085,265	2,882,589	3,282,359	3,507,959	3,574,959	3,584,959	3,655,584	3,790,459	3,848,859	3,883,859	3,883,859	3,995,859	4,038,359	4,050,859	4,050,859	4,050,859	4,050,859	4,050,859	4,050,859	4,050,860	4,050,860	4,050,860													
Jun-96	80,500	785,730	1,835,086	2,491,917	2,811,368	2,921,369	3,010,536	3,169,369	3,292,369	3,423,370	3,526,370	3,588,870	3,588,870	3,607,270	3,623,870	3,623,870	3,623,870	3,623,870	3,695,595	3,727,664	3,859,732	3,923,870	3,923,870														
Jun-97	134,365	1,319,116	2,393,116	3,213,299	3,635,799	3,808,050	3,824,050	3,964,650	4,071,151	4,180,152	4,347,152	4,364,152	4,364,152	4,364,152	4,404,152	4,444,152	4,444,152	4,444,152	4,474,152	4,501,152	4,501,152	4,501,152															
Jun-98	408,337	1,298,950	2,461,625	3,126,625	3,557,716	3,822,625	3,932,960	4,094,126	4,123,126	4,131,127	4,141,127	4,368,877	4,498,877	4,617,877	4,686,877	4,686,877	4,686,877	4,686,877	4,686,877	4,686,877	4,686,877															
Jun-99	251,500	690,750	1,733,431	2,499,052	2,866,608	3,084,805	3,354,881	3,533,936	3,606,937	3,786,937	3,838,937	3,911,938	3,911,938	3,911,938	3,976,938	4,086,938	4,086,938	4,086,938	4,086,938	4,111,938																	
Jun-00	135,731	1,130,224	1,856,765	2,388,815	2,783,366	3,047,865	3,412,749	3,610,867	3,728,868	3,804,868	3,836,368	3,870,368	3,895,368	3,907,368	3,907,368	3,907,368	3,907,368	3,907,368	3,952,368																		
Jun-01	108,490	626,310	1,464,820	1,980,624	2,466,794	2,990,359	3,229,863	3,600,363	3,734,363	3,752,363	3,752,363	3,752,363	3,814,863	3,814,863	3,814,863	3,814,863	3,874,864	3,874,864																			
Jun-02	48,000	299,595	918,995	1,611,909	2,379,996	2,936,811	3,293,532	3,618,532	3,663,668	3,732,668	3,785,668	3,827,668	3,827,668	3,832,668	3,832,669	3,832,669	3,832,669																				
Jun-03	20,000	263,617	1,237,271	2,068,006	2,622,988	3,075,411	3,200,412	3,280,412	3,286,412	3,382,412	3,459,912	3,519,912	3,519,913	3,519,914	3,524,914	3,570,808																					
Jun-04	47,500	200,700	753,163	1,670,265	2,500,018	3,053,018	3,215,018	3,456,519	3,556,519	3,556,519	3,557,520	3,593,520	3,593,520	3,593,520	3,633,520																						
Jun-05	6,157	177,260	1,017,627	2,377,229	3,026,952	3,327,952	3,598,952	3,815,953	4,010,153	4,010,153	4,010,153	4,030,153	4,030,153	4,067,653																							
Jun-06	0	307,301	1,079,755	2,432,756	2,916,929	3,362,429	3,725,429	3,828,429	3,848,129	3,863,429	4,040,429	4,090,429	4,090,429																								
Jun-07	36,000	487,583	1,402,335	2,106,086	2,522,088	2,715,090	2,864,532	3,139,534	3,288,317	3,364,817	3,364,817	3,364,817																									
Jun-08	17,730	746,231	1,520,880	2,499,880	3,295,130	3,667,592	4,347,463	4,545,798	4,694,691	4,694,691	4,799,691																										
Jun-09	285,000	647,500	1,431,267	2,239,268	2,761,944	3,286,444	3,600,945	3,974,635	4,049,635	4,114,636																											
Jun-10	0	601,092	1,398,471	2,345,079	3,267,878	3,822,184	4,333,685	4,526,185	4,662,435																												
Jun-11	315,691	777,684	1,803,911	2,603,240	3,718,269	4,124,269	4,473,771	4,661,771																													
Jun-12	0	441,786	1,184,114	2,805,204	3,673,666	4,314,068	4,578,171																														
Jun-13	113,000	484,012	1,180,271	2,517,932	3,389,110	3,534,735																															
Jun-14	102,000	403,628	1,973,530	3,161,396	4,003,126																																
Jun-15	0	377,841	1,754,831	2,717,376																																	
Jun-16	21,500	340,202	1,601,133																																		
Jun-17	37,200	835,300																																			
Jun-18	46,368																																				

Commonwealth of Massachusetts Workers Compensation
All Clusters Combined
INDEMNITY
Lump Sum Development
Incremental Lump Sums as a % of Ultimate Losses Excluding Lump Sums

Acc Yr Ending	*0-12*	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*
All Prior Yrs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.001	0.001	0.005	0.006	0.003	0.001	0.000	0.003	0.003	0.003	0.001	0.001	0.002	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jun-83	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.002	0.002	0.005	0.009	0.005	0.005	0.007	0.010	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Jun-84	0.000	0.000	0.000	0.000	0.001	0.001	0.005	0.008	0.005	0.010	0.009	0.011	0.002	0.005	0.002	0.001	0.002	0.004	0.002	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Jun-85	0.000	0.000	0.000	0.003	0.001	0.004	0.004	0.006	0.011	0.016	0.010	0.006	0.009	0.001	0.000	0.004	0.003	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000			
Jun-86	0.000	0.000	0.001	0.003	0.005	0.003	0.007	0.018	0.013	0.000	0.003	0.000	0.002	0.001	0.000	0.000	0.000	0.001	0.001	0.001	0.000	0.001	0.001	0.005	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Jun-87	0.000	0.002	0.004	0.005	0.005	0.013	0.021	0.010	0.008	0.004	0.004	0.002	0.007	0.008	0.005	0.005	0.001	0.003	0.002	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000					
Jun-88	0.000	0.002	0.003	0.006	0.012	0.022	0.017	0.010	0.012	0.005	0.004	0.003	0.005	0.000	0.001	0.000	0.003	0.001	0.001	0.001	0.001	0.002	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.002						
Jun-89	0.000	0.004	0.006	0.015	0.027	0.025	0.016	0.015	0.008	0.005	0.009	0.004	0.004	0.001	0.000	0.000	0.001	0.003	0.002	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000							
Jun-90	0.000	0.004	0.019	0.029	0.021	0.017	0.016	0.016	0.007	0.007	0.006	0.007	0.001	0.001	0.001	0.000	0.002	0.002	0.002	0.000	0.001	0.001	0.001	0.000	0.003	0.000	0.000	0.000	0.000								
Jun-91	0.000	0.009	0.040	0.029	0.019	0.025	0.015	0.004	0.005	0.003	0.002	0.001	0.000	0.000	0.001	0.004	0.002	0.006	0.003	0.000	0.000	0.000	0.001	0.000	0.003	0.005	0.000	0.000									
Jun-92	0.002	0.026	0.018	0.024	0.026	0.017	0.009	0.007	0.006	0.006	0.006	0.001	0.000	0.004	0.001	0.001	0.010	0.003	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000										
Jun-93	0.003	0.032	0.032	0.047	0.020	0.020	0.014	0.005	0.009	0.004	0.001	0.003	0.000	0.000	0.000	0.000	0.002	0.003	0.002	0.002	0.000	0.000	0.001	0.000	0.000	0.001											
Jun-94	0.004	0.029	0.036	0.030	0.022	0.014	0.008	0.008	0.002	0.002	0.000	0.010	0.003	0.001	0.001	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000												
Jun-95	0.010	0.041	0.045	0.037	0.018	0.010	0.003	0.000	0.003	0.006	0.003	0.002	0.000	0.005	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000													
Jun-96	0.004	0.033	0.050	0.031	0.015	0.005	0.004	0.008	0.006	0.006	0.005	0.003	0.000	0.001	0.001	0.000	0.000	0.000	0.003	0.002	0.006	0.003	0.000														
Jun-97	0.007	0.059	0.053	0.041	0.021	0.009	0.001	0.007	0.005	0.005	0.008	0.001	0.000	0.000	0.002	0.002	0.000	0.000	0.001	0.001	0.000	0.000															
Jun-98	0.017	0.037	0.048	0.028	0.018	0.011	0.005	0.007	0.001	0.000	0.000	0.009	0.005	0.005	0.003	0.000	0.000	0.000	0.000	0.000	0.000																
Jun-99	0.011	0.019	0.046	0.034	0.016	0.010	0.012	0.008	0.003	0.008	0.002	0.003	0.000	0.000	0.003	0.005	0.000	0.000	0.000	0.001																	
Jun-00	0.005	0.038	0.028	0.020	0.015	0.010	0.014	0.008	0.004	0.003	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.002																		
Jun-01	0.003	0.016	0.027	0.016	0.015	0.017	0.008	0.012	0.004	0.001	0.000	0.000	0.002	0.000	0.000	0.000	0.002	0.000																			
Jun-02	0.002	0.009	0.022	0.025	0.027	0.020	0.013	0.012	0.002	0.002	0.002	0.002	0.000	0.000	0.000	0.000	0.000																				
Jun-03	0.001	0.009	0.035	0.030	0.020	0.016	0.005	0.003	0.000	0.003	0.003	0.002	0.000	0.000	0.000	0.002																					
Jun-04	0.002	0.006	0.020	0.034	0.030	0.020	0.006	0.009	0.004	0.000	0.000	0.001	0.000	0.000	0.001																						
Jun-05	0.000	0.006	0.031	0.050	0.024	0.011	0.010	0.008	0.007	0.000	0.000	0.001	0.000	0.001																							
Jun-06	0.000	0.013	0.033	0.057	0.020	0.019	0.015	0.004	0.001	0.001	0.007	0.002	0.000																								
Jun-07	0.002	0.020	0.041	0.031	0.019	0.009	0.007	0.012	0.007	0.003	0.000	0.000																									
Jun-08	0.001	0.027	0.029	0.036	0.029	0.014	0.025	0.007	0.006	0.000	0.004																										
Jun-09	0.010	0.013	0.028	0.029	0.019	0.019	0.011	0.013	0.003	0.002																											
Jun-10	0.000	0.022	0.029	0.034	0.034	0.020	0.019	0.007	0.005																												
Jun-11	0.010	0.014	0.032	0.025	0.034	0.013	0.011	0.006																													
Jun-12	0.000	0.013	0.023	0.049	0.026	0.020	0.008																														
Jun-13	0.004	0.013	0.024	0.046	0.030	0.005																															
Jun-14	0.003	0.008	0.044	0.033	0.023																																
Jun-15	0.000	0.009	0.034	0.024																																	
Jun-16	0.000	0.007	0.028																																		
Jun-17	0.001	0.018																																			
Jun-18	0.001																																				

Averages		*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*
Simple Avg																																					
All Yrs (ex P)	0.003	0.016	0.027	0.027	0.019	0.013	0.010	0.008	0.005	0.004	0.004	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000		
Latest 5	0.001	0.011	0.031	0.036	0.030	0.015	0.015	0.009	0.004	0.001	0.002	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.000					
Latest 3	0.001	0.012	0.035	0.035	0.027	0.012	0.012	0.009	0.004	0.002	0.004	0.001	0.000	0.000	0.001	0.001	0.001	0.000	0.001	0.001	0.002	0.001	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000			
Olympic Avg																																					
All Yrs (ex P)	0.003	0.015	0.027	0.027	0.019	0.014	0.010	0.008	0.005	0.004	0.004	0.003	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
Latest 10	0.002	0.014	0.031	0.036	0.026	0.015	0.011	0.008	0.004	0.002	0.002	0.002	0.000	0.000	0.001	0.001	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000										
Latest 5	0.001	0.010	0.029	0.035	0.030	0.017	0.014	0.009	0.004	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.000					

Commonwealth of Massachusetts Workers Compensation
All Clusters Combined
INDEMNITY
Paid Loss Development
Paid Loss - Lump Sum only

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444
All Prior Yrs	0	0	0	0	0	0	12,000	58,500	89,500	109,500	293,500	408,500	546,500	1,097,484	1,691,484	2,010,268	2,165,768	2,195,768	2,558,601	2,928,269	3,283,267	3,355,517	3,501,017	3,702,517	3,820,557	3,848,557	3,926,682	3,926,682	3,926,682	3,934,182	3,941,682	3,941,682	3,941,682	3,941,682	3,941,682	3,941,682	3,941,682
Jun-83	0	0	0	0	0	20,000	20,000	52,500	90,000	170,000	323,481	414,231	491,231	601,231	761,231	761,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	771,231	
Jun-84	0	0	0	0	25,750	58,250	168,850	347,287	466,787	700,437	904,637	1,151,138	1,199,138	1,301,139	1,351,139	1,381,139	1,418,639	1,503,639	1,548,639	1,548,639	1,548,639	1,632,639	1,632,639	1,642,639	1,642,639	1,642,639	1,792,639	1,792,639	1,792,639	1,792,639	1,792,639	1,792,639	1,792,639	1,792,639	1,792,639		
Jun-85	0	0	0	98,476	133,976	260,476	407,031	608,281	991,681	1,557,514	1,894,714	2,088,214	2,382,764	2,422,764	2,422,764	2,556,264	2,676,264	2,706,264	2,741,264	2,766,264	2,766,264	2,766,264	2,766,264	2,766,264	2,766,264	2,766,264	2,766,264	2,766,264	2,791,264	2,791,264	2,791,264	2,791,264	2,791,264	2,791,264			
Jun-86	0	0	58,000	174,759	387,859	534,203	871,131	1,698,030	2,285,025	2,295,025	2,442,025	2,462,025	2,548,025	2,585,525	2,585,525	2,585,525	2,585,525	2,615,525	2,670,525	2,734,525	2,750,525	2,795,525	2,853,800	3,091,601	3,091,601	3,289,601	3,291,601	3,303,601	3,303,601	3,303,601	3,303,601	3,303,601	3,303,601				
Jun-87	0	81,440	265,762	512,428	765,890	1,387,497	2,438,034	2,947,035	3,345,491	3,530,297	3,716,721	3,819,392	4,154,251	4,560,751	4,800,751	5,040,750	5,090,750	5,222,750	5,302,750	5,312,750	5,312,750	5,312,750	5,312,750	5,447,750	5,447,750	5,447,750	5,447,750	5,447,750	5,447,750	5,447,750	5,541,750	5,541,750					
Jun-88	0	106,671	307,099	725,599	1,562,083	3,135,525	4,328,025	5,039,408	5,888,408	6,261,808	6,567,134	6,808,641	7,137,104	7,137,104	7,197,014	7,197,014	7,388,681	7,453,681	7,539,014	7,639,015	7,729,015	7,879,016	7,879,016	7,937,017	7,999,017	8,057,017	8,057,017	8,057,017	8,057,017	8,057,017	8,207,017						
Jun-89	0	239,195	620,195	1,617,939	3,407,380	5,038,330	6,061,325	7,056,827	7,588,327	7,920,827	8,524,638	8,782,738	9,059,238	9,151,738	9,176,738	9,195,238	9,258,738	9,477,071	9,593,454	9,753,738	9,816,238	9,816,238	9,816,238	9,826,238	9,826,238	9,826,239	9,826,239	9,826,239	9,826,239	9,826,239							
Jun-90	0	254,094	1,459,232	3,268,528	4,586,480	5,647,235	6,632,785	7,625,785	8,035,319	8,473,619	8,839,131	9,247,964	9,288,797	9,334,797	9,365,797	9,390,797	9,496,797	9,606,922	9,736,798	9,764,298	9,797,631	9,830,965	9,864,298	9,864,298	10,048,798	10,079,298	10,079,298	10,079,298	10,079,298								
Jun-91	13,500	452,207	2,446,957	3,880,284	4,800,710	6,018,550	6,776,550	6,979,839	7,211,839	7,351,839	7,451,840	7,505,840	7,505,840	7,505,840	7,575,840	7,753,940	7,856,440	8,136,440	8,266,440	8,266,440	8,266,440	8,266,440	8,326,440	8,326,440	8,484,440	8,721,440	8,721,440	8,721,440									
Jun-92	66,000	896,673	1,479,789	2,233,286	3,072,036	3,607,537	3,902,037	4,123,537	4,305,037	4,483,037	4,685,720	4,716,970	4,730,470	4,852,738	4,886,106	4,906,973	5,233,473	5,340,473	5,420,474	5,420,474	5,420,474	5,420,474	5,420,474	5,420,474	5,420,474	5,460,474	5,460,474										
Jun-93	62,000	716,058	1,381,386	2,353,337	2,761,587	3,177,388	3,464,117	3,567,117	3,757,117	3,842,117	3,854,117	3,909,117	3,909,117	3,909,117	3,909,117	3,909,117	3,959,117	4,017,117	4,052,117	4,087,117	4,087,117	4,087,117	4,100,617	4,100,618	4,100,618	4,115,118											
Jun-94	90,000	769,356	1,632,582	2,348,106	2,873,483	3,206,984	3,406,484	3,607,984	3,655,484	3,695,534	3,695,534	3,930,034	4,001,034	4,026,034	4,051,034	4,171,034	4,177,034	4,177,034	4,177,034	4,177,034	4,177,034	4,177,034	4,177,034	4,177,034	4,177,034												
Jun-95	219,963	1,108,065	2,085,265	2,882,589	3,282,359	3,507,959	3,574,959	3,584,959	3,655,584	3,790,459	3,848,859	3,883,859	3,883,859	3,995,859	4,038,359	4,050,859	4,050,859	4,050,859	4,050,859	4,050,859	4,050,859	4,050,860	4,050,860	4,050,860													
Jun-96	80,500	785,730	1,835,086	2,491,917	2,811,368	2,921,369	3,010,536	3,169,369	3,292,369	3,423,370	3,526,370	3,588,870	3,588,870	3,607,270	3,623,870	3,623,870	3,623,870	3,623,870	3,695,595	3,727,664	3,859,732	3,923,870	3,923,870														
Jun-97	134,365	1,319,116	2,393,116	3,213,299	3,635,799	3,808,050	3,824,050	3,964,650	4,071,151	4,180,152	4,347,152	4,364,152	4,364,152	4,364,152	4,404,152	4,444,152	4,444,152	4,444,152	4,474,152	4,501,152	4,501,152	4,501,152															
Jun-98	408,337	1,298,950	2,461,625	3,126,625	3,557,716	3,822,625	3,932,960	4,094,126	4,123,126	4,131,127	4,141,127	4,368,877	4,498,877	4,617,877	4,686,877	4,686,877	4,686,877	4,686,877	4,686,877	4,686,877	4,686,877																
Jun-99	251,500	690,750	1,733,431	2,499,052	2,866,608	3,084,805	3,354,881	3,533,936	3,606,937	3,786,937	3,838,937	3,911,938	3,911,938	3,911,938	3,976,938	4,086,938	4,086,938	4,086,938	4,086,938	4,111,938																	
Jun-00	135,731	1,130,224	1,856,765	2,388,815	2,783,366	3,047,865	3,412,749	3,610,867	3,728,868	3,804,868	3,836,368	3,870,368	3,895,368	3,907,368	3,907,368	3,907,368	3,907,368	3,907,368	3,952,368																		
Jun-01	108,490	626,310	1,464,820	1,980,624	2,466,794	2,990,359	3,229,863	3,600,363	3,734,363	3,752,363	3,752,363	3,752,363	3,814,863	3,814,863	3,814,863	3,814,863	3,874,864	3,874,864																			
Jun-02	48,000	299,595	918,995	1,611,909	2,379,996	2,936,811	3,293,532	3,618,532	3,663,668	3,732,668	3,785,668	3,827,668	3,827,668	3,832,668	3,832,669	3,832,669	3,832,669																				
Jun-03	20,000	263,617	1,237,271	2,068,006	2,622,988	3,075,411	3,200,412	3,280,412	3,286,412	3,382,412	3,459,912	3,519,912	3,519,913	3,519,914	3,524,914	3,570,808																					
Jun-04	47,500	200,700	753,163	1,670,265	2,500,018	3,053,018	3,215,018	3,456,519	3,556,519	3,556,519	3,557,520	3,593,520	3,593,520	3,593,520	3,633,520																						
Jun-05	6,157	177,260	1,017,627	2,377,229	3,026,952	3,327,952	3,598,952	3,815,953	4,010,153	4,010,153	4,010,153	4,030,153	4,030,153	4,067,653																							
Jun-06	0	307,301	1,079,755	2,432,756	2,916,929	3,362,429	3,725,429	3,828,429	3,848,129	3,863,429	4,040,429	4,090,429	4,090,429																								
Jun-07	36,000	487,583	1,402,335	2,106,086	2,522,088	2,715,090	2,864,532	3,139,534	3,288,317	3,364,817	3,364,817	3,364,817																									
Jun-08	17,730	746,231	1,520,880	2,499,880	3,295,130	3,667,592	4,347,463	4,545,798	4,694,691	4,694,691	4,799,691																										
Jun-09	285,000	647,500	1,431,267	2,239,268	2,761,944	3,286,444	3,600,945	3,974,635	4,049,635	4,114,636																											
Jun-10	0	601,092	1,398,471	2,345,079	3,267,878	3,822,184	4,333,685	4,526,185	4,662,435																												
Jun-11	315,691	777,684	1,803,911	2,603,240	3,718,269	4,124,269	4,473,771	4,661,771																													
Jun-12	0	441,786	1,184,114	2,805,204	3,673,666	4,314,068	4,578,171																														
Jun-13	113,000	484,012	1,180,271	2,517,932	3,389,110	3,534,735																															
Jun-14	102,000	403,628	1,973,530	3,161,396	4,003,126																																
Jun-15	0	377,841	1,754,831	2,717,376																																	
Jun-16	21,500	340,202	1,601,133																																		
Jun-17	37,200	835,300																																			
Jun-18	46,368																																				

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	To Ult
All Prior Yrs							4.875	1.530	1.223	2.680	1.392	1.338	2.008	1.541	1.188	1.077	1.014	1.165	1.144	1.121	1.022	1.043	1.058	1.032	1.007	1.020	1.000	1.000	1.002	1.002	1.000	1.000	1.000	1.000	1.000	1.000	
Jun-83						1.000	2.625	1.714	1.889	1.903	1.281	1.186	1.224	1.266	1.000	1.013	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Jun-84					2.262	2.899	2.057	1.344	1.501	1.292	1.272	1.042	1.085	1.038	1.022	1.027	1.060	1.030	1.000	1.000	1.054	1.000	1.006	1.000	1.000	1.091	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Jun-85				1.360	1.944	1.563	1.494	1.630	1.571	1.216	1.102	1.141	1.017	1.000	1.055	1.047	1.011	1.013	1.009	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.009	1.000	1.000	1.000	1.000	1.000			
Jun-86			3.013	2.219	1.377	1.631	1.949	1.346	1.004	1.064	1.008	1.035	1.015	1.000	1.000	1.000	1.012	1.021	1.024	1.006	1.016	1.021	1.083	1.000	1.064	1.001	1.004	1.000	1.000	1.000	1.000	1.000					
Jun-87		3.263	1.928	1.495	1.812	1.757	1.209	1.135	1.055	1.053	1.028	1.088	1.098	1.053	1.050	1.010	1.026	1.015	1.002	1.000	1.000	1.000	1.025	1.000	1.000	1.000	1.000	1.000	1.000	1.017	1.000						
Jun-88		2.879	2.363	2.153	2.007	1.380	1.164	1.168	1.063	1.049	1.037	1.048	1.000	1.008	1.000	1.027	1.009	1.011	1.013	1.012	1.019	1.000	1.007	1.008	1.007	1.000	1.000	1.000	1.000	1.019							
Jun-89		2.593	2.609	2.106	1.479	1.203	1.164	1.075	1.044	1.076	1.030	1.031	1.010	1.003	1.002	1.007	1.024	1.012	1.017	1.006	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000								
Jun-90		5.743	2.240	1.403	1.231	1.175	1.150	1.054	1.055	1.043	1.046	1.004	1.005	1.003	1.003	1.011	1.012	1.014	1.003	1.003	1.003	1.003	1.000	1.019	1.003	1.000	1.000	1.000									
Jun-91	33.497	5.411	1.586	1.237	1.254	1.126	1.030	1.033	1.019	1.014	1.007	1.000	1.000	1.009	1.024	1.013	1.036	1.016	1.000	1.000	1.000	1.007	1.000	1.019	1.028	1.000	1.000										
Jun-92	13.586	1.650	1.509	1.376	1.174	1.082	1.057	1.044	1.041	1.045	1.007	1.003	1.026	1.007	1.004	1.067	1.020	1.015	1.000	1.000	1.000	1.000	1.000	1.000	1.007	1.000											
Jun-93	11.549	1.929	1.704	1.173	1.151	1.090	1.030	1.053	1.023	1.003	1.014	1.000	1.000	1.000	1.000	1.013	1.015	1.009	1.009	1.000	1.000	1.003	1.000	1.000	1.004												
Jun-94	8.548	2.122	1.438	1.224	1.116	1.062	1.059	1.013	1.011	1.000	1.063	1.018	1.006	1.006	1.030	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
Jun-95	5.038	1.882	1.382	1.139	1.069	1.019	1.003	1.020	1.037	1.015	1.009	1.000	1.029	1.011	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
Jun-96	9.761	2.336	1.358	1.128	1.039	1.031	1.053	1.039	1.040	1.030	1.018	1.000	1.005	1.005	1.000	1.000	1.000	1.020	1.009	1.035	1.017	1.000															
Jun-97	9.817	1.814	1.343	1.131	1.047	1.004	1.037	1.027	1.027	1.040	1.004	1.000	1.000	1.009	1.009	1.000	1.000	1.007	1.006	1.000	1.000																
Jun-98	3.181	1.895	1.270	1.138	1.074	1.029	1.041	1.007	1.002	1.002	1.055	1.030	1.026	1.015	1.000	1.000	1.000	1.000	1.000	1.000																	
Jun-99	2.747	2.509	1.442	1.147	1.076	1.088	1.053	1.021	1.050	1.014	1.019	1.000	1.000	1.017	1.028	1.000	1.000	1.000	1.006																		
Jun-00	8.327	1.643	1.287	1.165	1.095	1.120	1.058	1.033	1.020	1.008	1.009	1.006	1.003	1.000	1.000	1.000	1.000	1.012																			
Jun-01	5.773	2.339	1.352	1.245	1.212	1.080	1.115	1.037	1.005	1.000	1.000	1.017	1.000	1.000	1.000	1.016	1.000																				
Jun-02	6.242	3.067	1.754	1.477	1.234	1.121	1.099	1.012	1.019	1.014	1.011	1.000	1.001	1.000	1.000	1.000																					
Jun-03	13.181	4.693	1.671	1.268	1.172	1.041	1.025	1.002	1.029	1.023	1.017	1.000	1.000	1.001	1.013																						
Jun-04	4.225	3.753	2.218	1.497	1.221	1.053	1.075	1.029	1.000	1.000	1.010	1.000	1.000	1.011																							
Jun-05	28.790	5.741	2.336	1.273	1.099	1.081	1.060	1.051	1.000	1.000	1.005	1.000	1.009																								
Jun-06		3.514	2.253	1.199	1.153	1.108	1.028	1.005	1.004	1.046	1.012	1.000																									
Jun-07	13.544	2.876	1.502	1.198	1.077	1.055	1.096	1.047	1.023	1.000	1.000																										
Jun-08	42.089	2.038	1.644	1.318	1.113	1.185	1.046	1.033	1.000	1.022																											
Jun-09	2.272	2.210	1.565	1.233	1.190	1.096	1.104	1.019	1.016																												
Jun-10		2.327	1.677	1.394	1.170	1.134	1.044	1.030																													
Jun-11	2.463	2.320	1.443	1.428	1.109	1.085	1.042																														
Jun-12		2.680	2.369	1.310	1.174	1.061																															
Jun-13	4.283	2.439	2.133	1.346	1.043																																
Jun-14	3.957	4.889	1.602	1.266																																	
Jun-15		4.644	1.549																																		
Jun-16	15.823	4.706																																			
Jun-17	22.454																																				

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	To Ult
Simple Avg																																					
All Yrs (ex P)	11.789	3.064	1.785	1.368	1.273	1.212	1.206	1.108	1.094	1.076	1.043	1.027	1.024	1.021	1.012	1.013	1.012	1.011	1.006	1.004	1.007	1.002	1.009	1.004	1.010	1.009	1.000	1.001	1.000	1.006	1.000	1.000	1.000	1.000	1.000		
Latest 5	11.630	3.872	1.819	1.349	1.137	1.112	1.066	1.027	1.009	1.014	1.009	1.000	1.002	1.003	1.008	1.003	1.000	1.008	1.004	1.007	1.003	1.001	1.000	1.008	1.008	1.000	1.000	1.000	1.000	1.007	1.000						
Latest 3	19.139	4.747	1.761	1.307	1.109	1.093	1.063	1.027	1.013	1.023	1.006	1.000	1.003	1.004	1.004	1.005	1.000	1.004	1.004	1.012	1.006	1.000	1.000	1.000	1.013	1.000	1.000	1.000	1.000	1.012	1.000	1.000	1.000				
Volume Wtd																																					
All Yrs (ex P)	6.819	2.568	1.636	1.296	1.179	1.119	1.086	1.053	1.035	1.033	1.025	1.018	1.013	1.010	1.010	1.012	1.013	1.011	1.006	1.004	1.005	1.002	1.007	1.006	1.010	1.003	1.000	1.001	1.000	1.011	1.000	1.000	1.000	1.000	1.000		
Latest 5	8.918	3.758	1.748	1.344	1.135	1.110	1.063	1.026	1.008	1.015	1.009	1.000	1.002	1.002	1.008	1.003	1.000	1.007	1.004	1.006	1.003	1.001	1.000	1.011	1.009	1.000	1.000	1.000	1.000	1.011	1.000	1.000					
Latest 3	26.462	4.751	1.711	1.304	1.111	1.092	1.061	1.028	1.012	1.024	1.006	1.000	1.003	1.004	1.004	1.005	1.000	1.004	1.004	1.010	1.005	1.000	1.000	1.000	1.016	1.000	1.000	1.000	1.000	1.015	1.000	1.000	1.000				

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Clusters Combined
Indemnity

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
444	100.0%	1.2%	0.0%	0.3%	0.1%	1.000	1.000
432	98.8%	2.9%	1.2%	0.7%	0.4%	0.981	0.971
420	95.8%	-2.0%	4.2%	-0.5%	-0.3%	0.969	0.955
408	97.8%	0.1%	2.2%	0.0%	0.0%	0.888	0.837
396	97.8%	0.6%	2.2%	0.2%	0.1%	0.857	0.794
384	97.2%	0.3%	2.8%	0.1%	0.0%	0.857	0.796
372	96.9%	0.6%	3.1%	0.2%	0.1%	0.839	0.772
360	96.2%	0.5%	3.8%	0.2%	0.1%	0.835	0.768
348	95.8%	0.8%	4.2%	0.3%	0.2%	0.823	0.753
336	94.9%	0.6%	5.1%	0.2%	0.1%	0.823	0.754
324	94.3%	1.3%	5.7%	0.5%	0.3%	0.812	0.740
312	93.0%	0.5%	7.0%	0.2%	0.1%	0.819	0.749
300	92.4%	0.6%	7.6%	0.2%	0.1%	0.801	0.725
288	91.8%	1.1%	8.2%	0.4%	0.3%	0.785	0.705
276	90.7%	1.1%	9.3%	0.5%	0.3%	0.782	0.701
264	89.6%	-0.2%	10.4%	-0.1%	-0.1%	0.777	0.696
252	89.8%	1.7%	10.2%	0.7%	0.5%	0.742	0.650
240	88.2%	1.1%	11.8%	0.5%	0.4%	0.751	0.663
228	87.1%	0.1%	12.9%	0.0%	0.0%	0.744	0.655
216	87.0%	1.2%	13.0%	0.6%	0.4%	0.717	0.620
204	85.8%	0.8%	14.2%	0.4%	0.3%	0.714	0.617
192	85.0%	1.0%	15.0%	0.6%	0.4%	0.702	0.603
180	84.0%	1.8%	16.0%	1.0%	0.8%	0.694	0.595
168	82.2%	1.4%	17.8%	0.8%	0.6%	0.699	0.602
156	80.8%	1.3%	19.2%	0.8%	0.6%	0.694	0.597
144	79.5%	2.7%	20.5%	1.8%	1.4%	0.688	0.590
132	76.7%	1.6%	23.3%	1.1%	0.9%	0.699	0.605
120	75.1%	2.2%	24.9%	1.5%	1.2%	0.692	0.597
108	72.9%	1.7%	27.1%	1.2%	1.1%	0.691	0.596
96	71.2%	3.0%	28.8%	2.3%	2.0%	0.683	0.587
84	68.2%	2.7%	31.8%	2.1%	1.8%	0.688	0.593
72	65.5%	4.2%	34.5%	3.4%	3.1%	0.686	0.592
60	61.3%	4.8%	38.7%	4.1%	3.7%	0.695	0.603
48	56.5%	8.1%	43.5%	7.0%	6.6%	0.703	0.614
36	48.4%	11.8%	51.6%	10.7%	10.2%	0.723	0.640
24	36.6%	19.7%	63.4%	18.5%	18.0%	0.749	0.672
12	16.9%	16.9%	83.1%	16.6%	16.4%	0.781	0.714
Total		100.0%					

NOTES:

(2) = 1 / Section 1, Exhibit 1, Page 2, Column 4

(3) Incremental % based on (2)

(4) = 1 - (2)

(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}

(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}

(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Clusters Combined
Indemnity

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	9,668,796	15,494,118		8,515,063	13,652,726
6/30/82-83	94,831	200,636	0.981	92,989	196,740
6/30/83-84	640,906	1,304,568	0.969	609,713	1,237,989
6/30/84-85	422,330	813,947	0.888	387,099	748,594
6/30/85-86	531,633	862,874	0.857	471,893	766,738
6/30/86-87	597,198	1,033,655	0.857	519,838	896,047
6/30/87-88	1,918,791	2,834,791	0.839	1,668,810	2,455,634
6/30/88-89	2,155,331	3,071,216	0.835	1,846,919	2,627,223
6/30/89-90	2,232,025	3,026,675	0.823	1,882,759	2,552,480
6/30/90-91	1,788,232	2,500,359	0.823	1,504,582	2,105,265
6/30/91-92	1,479,324	2,421,825	0.812	1,238,148	2,035,234
6/30/92-93	1,230,940	1,447,012	0.819	1,015,095	1,195,262
6/30/93-94	1,592,602	2,138,635	0.801	1,297,131	1,747,124
6/30/94-95	1,473,321	2,235,976	0.785	1,200,054	1,819,622
6/30/95-96	1,751,147	2,539,321	0.782	1,404,894	2,035,480
6/30/96-97	1,816,319	2,628,213	0.777	1,448,939	2,091,404
6/30/97-98	1,696,114	2,589,010	0.742	1,334,163	2,031,118
6/30/98-99	2,175,548	2,992,617	0.751	1,678,485	2,315,206
6/30/99-00	2,744,697	3,696,210	0.744	2,082,497	2,801,325
6/30/00-01	3,301,713	4,226,616	0.717	2,461,355	3,144,064
6/30/01-02	3,155,913	4,474,403	0.714	2,322,327	3,291,238
6/30/02-03	3,713,527	5,013,939	0.702	2,676,322	3,627,450
6/30/03-04	3,823,293	4,732,190	0.694	2,717,335	3,350,033
6/30/04-05	3,295,947	4,504,028	0.699	2,301,945	3,157,746
6/30/05-06	4,231,025	4,694,888	0.694	2,943,463	3,282,767
6/30/06-07	4,312,664	5,225,598	0.688	2,952,759	3,601,171
6/30/07-08	5,584,387	6,954,398	0.699	3,815,190	4,745,084
6/30/08-09	6,529,076	7,878,007	0.692	4,391,026	5,314,420
6/30/09-10	7,255,097	8,811,189	0.691	4,852,240	5,964,609
6/30/10-11	8,754,034	10,645,355	0.683	5,822,915	7,110,069
6/30/11-12	10,361,426	12,470,043	0.688	6,896,131	8,325,370
6/30/12-13	11,516,007	13,465,707	0.686	7,713,360	9,038,706
6/30/13-14	15,047,410	17,255,420	0.695	10,204,305	11,740,292
6/30/14-15	20,238,181	22,556,981	0.703	13,979,178	15,631,195
6/30/15-16	26,636,581	30,132,221	0.723	19,014,353	21,545,881
6/30/16-17	31,466,951	35,010,901	0.749	23,402,439	26,082,560
6/30/17-18	44,314,524	47,960,444	0.781	34,229,959	37,136,986
Total	249,547,839	299,843,987		182,895,672	221,400,852
			(7) Total Discount Factor:	0.733	0.738

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	9,668,796	15,494,118
(9) Projected Number of Years:	284376	455709
(10) Projected Paid Loss per Year:	34	34
(11) Discounted Value at 4%:	1,533,602	2,480,291

NOTES:

(2), (3) From Section 1, Exhibit 1, Page 1, Columns 8, 9

(4) From Section 1, Exhibit 1, Page 13, Column 7

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Clusters Combined
Indemnity

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	9,668,796	15,494,118		8,024,113	12,868,980
6/30/82-83	94,831	200,636	0.981	92,108	194,875
6/30/83-84	640,906	1,304,568	0.969	595,175	1,206,983
6/30/84-85	422,330	813,947	0.888	371,146	718,968
6/30/85-86	531,633	862,874	0.857	445,570	724,361
6/30/86-87	597,198	1,033,655	0.857	486,576	836,954
6/30/87-88	1,918,791	2,834,791	0.839	1,562,811	2,295,310
6/30/88-89	2,155,331	3,071,216	0.835	1,718,537	2,442,937
6/30/89-90	2,232,025	3,026,675	0.823	1,740,377	2,359,478
6/30/90-91	1,788,232	2,500,359	0.823	1,391,273	1,947,350
6/30/91-92	1,479,324	2,421,825	0.812	1,142,759	1,882,236
6/30/92-93	1,230,940	1,447,012	0.819	930,781	1,096,920
6/30/93-94	1,592,602	2,138,635	0.801	1,183,392	1,596,115
6/30/94-95	1,473,321	2,235,976	0.785	1,095,788	1,660,690
6/30/95-96	1,751,147	2,539,321	0.782	1,274,205	1,845,434
6/30/96-97	1,816,319	2,628,213	0.777	1,312,044	1,891,325
6/30/97-98	1,696,114	2,589,010	0.742	1,200,785	1,826,307
6/30/98-99	2,175,548	2,992,617	0.751	1,498,409	2,069,540
6/30/99-00	2,744,697	3,696,210	0.744	1,845,588	2,481,568
6/30/00-01	3,301,713	4,226,616	0.717	2,165,692	2,763,478
6/30/01-02	3,155,913	4,474,403	0.714	2,032,621	2,879,512
6/30/02-03	3,713,527	5,013,939	0.702	2,321,936	3,151,663
6/30/03-04	3,823,293	4,732,190	0.694	2,345,526	2,886,490
6/30/04-05	3,295,947	4,504,028	0.699	1,974,105	2,712,733
6/30/05-06	4,231,025	4,694,888	0.694	2,523,817	2,821,265
6/30/06-07	4,312,664	5,225,598	0.688	2,516,499	3,077,493
6/30/07-08	5,584,387	6,954,398	0.699	3,251,416	4,042,675
6/30/08-09	6,529,076	7,878,007	0.692	3,724,371	4,513,248
6/30/09-10	7,255,097	8,811,189	0.691	4,112,728	5,080,701
6/30/10-11	8,754,034	10,645,355	0.683	4,931,726	6,031,748
6/30/11-12	10,361,426	12,470,043	0.688	5,852,162	7,074,637
6/30/12-13	11,516,007	13,465,707	0.686	6,580,250	7,717,605
6/30/13-14	15,047,410	17,255,420	0.695	8,771,083	10,104,561
6/30/14-15	20,238,181	22,556,981	0.703	12,135,307	13,586,344
6/30/15-16	26,636,581	30,132,221	0.723	16,762,614	19,012,640
6/30/16-17	31,466,951	35,010,901	0.749	20,995,353	23,416,434
6/30/17-18	44,314,524	47,960,444	0.781	31,170,765	33,845,317
Total	249,547,839	299,843,987		162,079,409	196,664,874
			(7) Total Discount Factor:	0.649	0.656

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	9,668,796	15,494,118
(9) Projected Number of Years:	284376	455709
(10) Projected Paid Loss per Year:	34	34
(11) Discounted Value at 6%:	1,533,602	2,480,291

NOTES:

(2), (3) From Section 1, Exhibit 1, Page 1, Columns 8, 9

(4) From Section 1, Exhibit 1, Page 13, Column 8

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Clusters Combined
Total Indemnity (Including Lump Sums) + Medical

Calculation of Fiscal Year 7/01/18 - 19 Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
						Cumulative	Incremental Paid		Estimated Payments from		FY 07/01/18 - 06/30/19	
Accident	Est Ult Losses	Est Ult Losses	Paid Losses	Reserves	Reserves	Percent	as a % of	as a % of	07/01/18 - 06/30/19		as a % of Reserves	
Year	(Low)	(High)	to Date	(Low)	(High)	Paid	Ultimates	Reserves	(Low)	(High)	(Low)	(High)
All Prior Yrs	118,473,281	124,654,112	107,978,632	10,494,649	16,675,480				983,036	1,081,340	9.4%	6.5%
6/30/82-83	18,513,208	18,636,049	18,412,956	100,253	223,093	99.1%	1.0%	114.9%	51,574	110,469	51.4%	49.5%
6/30/83-84	27,467,348	28,186,690	26,813,052	654,297	1,373,638	96.4%	1.0%	27.4%	200,912	473,344	30.7%	34.5%
6/30/84-85	42,169,463	42,613,455	41,710,595	458,868	902,860	98.4%	1.0%	62.3%	267,940	520,204	58.4%	57.6%
6/30/85-86	54,780,741	55,175,677	54,187,811	592,930	987,866	98.6%	1.0%	69.6%	325,326	525,071	54.9%	53.2%
6/30/86-87	62,546,031	63,022,158	61,868,526	677,506	1,153,633	98.5%	1.0%	68.6%	354,057	599,350	52.3%	52.0%
6/30/87-88	90,639,722	91,621,732	88,583,151	2,056,571	3,038,581	97.2%	1.0%	35.8%	587,355	929,598	28.6%	30.6%
6/30/88-89	89,110,665	90,145,410	86,744,750	2,365,915	3,400,660	96.8%	1.0%	31.1%	737,105	1,089,255	31.2%	32.0%
6/30/89-90	84,835,827	85,693,717	82,379,061	2,456,765	3,314,655	96.6%	1.0%	29.5%	645,270	878,526	26.3%	26.5%
6/30/90-91	71,954,405	72,887,943	69,883,074	2,071,330	3,004,868	96.5%	1.0%	28.5%	442,854	662,986	21.4%	22.1%
6/30/91-92	49,956,552	51,075,338	48,224,714	1,731,838	2,850,624	95.5%	2.0%	44.1%	431,980	738,451	24.9%	25.9%
6/30/92-93	32,863,173	33,163,205	31,451,337	1,411,836	1,711,868	95.3%	2.0%	42.3%	366,994	471,960	26.0%	27.6%
6/30/93-94	36,509,027	37,154,595	34,692,753	1,816,274	2,461,842	94.2%	2.0%	34.4%	381,631	526,669	21.0%	21.4%
6/30/94-95	33,075,102	33,926,698	31,378,576	1,696,525	2,548,121	93.7%	2.0%	31.6%	318,998	525,213	18.8%	20.6%
6/30/95-96	32,041,687	32,908,813	30,052,450	1,989,237	2,856,363	92.5%	2.0%	26.8%	326,792	507,772	16.4%	17.8%
6/30/96-97	32,290,849	33,179,838	30,135,254	2,155,595	3,044,584	92.1%	2.0%	25.2%	186,624	310,902	8.7%	10.2%
6/30/97-98	35,360,170	36,342,347	33,297,642	2,062,528	3,044,704	92.9%	2.0%	28.1%	241,306	424,387	11.7%	13.9%
6/30/98-99	33,946,133	34,849,973	31,328,970	2,617,164	3,521,003	91.1%	1.8%	20.2%	351,571	467,063	13.4%	13.3%
6/30/99-00	38,896,192	40,002,725	35,586,700	3,309,491	4,416,024	90.2%	0.9%	8.9%	457,170	613,052	13.8%	13.9%
6/30/00-01	46,137,530	47,257,553	41,998,904	4,138,626	5,258,648	89.9%	0.3%	2.7%	558,521	717,153	13.5%	13.6%
6/30/01-02	39,681,883	41,118,423	35,820,273	3,861,610	5,298,150	88.7%	1.3%	11.2%	627,739	844,095	16.3%	15.9%
6/30/02-03	40,720,698	42,174,560	36,106,059	4,614,638	6,068,501	87.1%	1.6%	12.0%	498,590	637,590	10.8%	10.5%
6/30/03-04	40,289,323	41,371,320	35,441,425	4,847,898	5,929,895	86.8%	0.3%	2.4%	602,103	765,316	12.4%	12.9%
6/30/04-05	41,436,478	43,224,550	37,049,772	4,386,706	6,174,778	87.5%	2.0%	16.0%	646,564	929,133	14.7%	15.0%
6/30/05-06	37,897,537	38,919,850	32,568,645	5,328,893	6,351,205	84.8%	2.7%	18.0%	787,676	1,014,341	14.8%	16.0%
6/30/06-07	36,788,996	38,499,600	31,173,306	5,615,690	7,326,294	82.8%	2.0%	11.5%	705,461	955,205	12.6%	13.0%
6/30/07-08	42,061,120	44,033,211	35,037,656	7,023,464	8,995,555	81.4%	1.4%	7.6%	730,914	975,454	10.4%	10.8%
6/30/08-09	43,514,690	45,550,181	35,337,479	8,177,211	10,212,702	79.4%	2.0%	9.9%	1,050,853	1,390,638	12.9%	13.6%
6/30/09-10	42,829,920	45,053,312	33,857,789	8,972,131	11,195,523	77.1%	2.3%	10.0%	1,024,158	1,429,018	11.4%	12.8%
6/30/10-11	48,875,730	51,680,581	38,107,931	10,767,799	13,572,650	75.8%	1.3%	5.2%	1,040,950	1,402,211	9.7%	10.3%
6/30/11-12	49,373,670	52,278,767	36,656,780	12,716,890	15,621,987	72.1%	3.7%	13.2%	1,490,849	1,887,308	11.7%	12.1%
6/30/12-13	44,783,120	47,544,900	30,735,769	14,047,351	16,809,131	66.6%	5.5%	16.6%	2,269,748	2,707,741	16.2%	16.1%
6/30/13-14	53,220,450	56,577,250	35,070,953	18,149,497	21,506,297	63.9%	2.7%	7.5%	1,671,115	2,073,858	9.2%	9.6%
6/30/14-15	59,329,100	62,914,400	34,897,464	24,431,636	28,016,936	57.1%	6.8%	15.8%	3,768,859	4,352,606	15.4%	15.5%
6/30/15-16	65,156,860	70,251,200	33,131,807	32,025,053	37,119,393	48.9%	8.2%	16.0%	5,127,841	5,962,553	16.0%	16.1%
6/30/16-17	63,188,250	68,710,970	24,801,254	38,386,996	43,909,716	37.6%	11.3%	18.2%	7,034,958	8,055,740	18.3%	18.3%
6/30/17-18	66,912,080	73,497,400	11,610,345	55,301,735	61,887,055	16.5%	21.1%	25.2%	7,034,958	13,548,060	12.7%	21.9%
Total	1,847,627,011	1,915,898,501	1,544,113,614	303,513,397	371,784,886				44,330,351	61,103,635	14.6%	16.4%

NOTES:

(2) Exhibit 1, Page 1, Column (4) + Exhibit 2, Page 1, Column (4)

(3) Exhibit 1, Page 1, Column (5) + Exhibit 2, Page 1, Column (5)

(4) Exhibit 1, Page 1, Column (2) + Exhibit 2, Page 1, Column (2)

(5) = (2) - (4)

(6) = (3) - (4)

(7) = (4) / Average of Columns (2), (3)

(8) = (7) - Prior Year's (7)

(9) = (8) / (1.00 - (7))

(10), (11) Sum of Columns (10), (11) for all clusters

(12) = (10) / (5)

(13) = (11) / (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Clusters Combined
Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Paid Loss	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		6,769,129			7,308,855	7,561,294	539,726	792,165		
6/30/82-83		1,243,549	1,248,477		1,245,377	1,261,545	1,828	17,996		
6/30/83-84		3,267,811	3,285,059		3,277,233	3,330,015	9,422	62,203		
6/30/84-85	1,823,085	3,296,878	3,319,768	3,316,824	3,307,365	3,354,830	10,487	57,952	0.181	0.184
6/30/85-86	1,952,445	4,968,398	5,005,782	5,005,054	4,997,444	5,028,662	29,047	60,264	0.256	0.258
6/30/86-87	2,220,820	5,809,821	5,863,162	5,864,507	5,854,265	5,884,935	44,444	75,114	0.264	0.265
6/30/87-88	2,885,583	9,968,732	10,084,714	10,086,477	10,063,670	10,123,680	94,938	154,948	0.349	0.351
6/30/88-89	3,098,180	12,131,284	12,290,849	12,293,141	12,290,000	12,403,860	158,716	272,576	0.397	0.400
6/30/89-90	3,079,763	12,614,539	12,815,588	12,824,056	12,830,000	12,883,240	215,461	268,701	0.417	0.418
6/30/90-91	2,914,364	12,075,274	12,316,755	12,315,163	12,285,480	12,506,890	210,206	431,616	0.422	0.429
6/30/91-92	2,880,434	10,901,411	11,126,348	11,123,687	11,075,730	11,250,014	174,319	348,603	0.385	0.391
6/30/92-93	2,887,238	7,940,036	8,136,436	8,133,756	8,118,917	8,187,498	178,882	247,462	0.281	0.284
6/30/93-94	3,056,850	8,390,929	8,624,855	8,620,684	8,614,027	8,685,562	223,098	294,634	0.282	0.284
6/30/94-95	3,158,808	6,988,812	7,219,702	7,215,964	7,206,876	7,268,870	218,065	280,058	0.228	0.230
6/30/95-96	3,301,791	6,589,792	6,832,053	6,828,765	6,824,043	6,881,436	234,251	291,644	0.207	0.208
6/30/96-97	3,902,868	7,247,398	7,584,337	7,579,257	7,583,082	7,641,056	335,684	393,658	0.194	0.196
6/30/97-98	3,776,138	6,704,825	7,079,765	7,073,302	7,070,000	7,141,280	365,175	436,455	0.187	0.189
6/30/98-99	4,017,530	6,940,733	7,393,185	7,385,880	7,382,000	7,447,030	441,267	506,297	0.184	0.185
6/30/99-00	4,221,786	7,785,609	8,368,786	8,354,851	8,348,700	8,455,720	563,091	670,111	0.198	0.200
6/30/00-01	4,310,725	9,600,632	10,399,907	10,371,731	10,362,080	10,551,200	761,448	950,568	0.240	0.245
6/30/01-02	4,438,755	7,753,775	8,450,008	8,441,709	8,435,000	8,552,050	681,225	798,275	0.190	0.193
6/30/02-03	4,423,888	8,391,707	9,296,608	9,278,718	9,253,160	9,404,610	861,453	1,012,903	0.209	0.213
6/30/03-04	4,482,207	8,726,226	9,792,165	9,774,753	9,737,080	9,909,180	1,010,854	1,182,954	0.217	0.221
6/30/04-05	4,639,517	10,256,720	11,747,462	11,283,717	11,321,560	11,896,550	1,064,840	1,639,830	0.244	0.256
6/30/05-06	4,938,165	9,232,800	10,652,446	10,468,923	10,323,400	10,859,850	1,090,600	1,627,050	0.209	0.220
6/30/06-07	5,183,126	9,816,055	11,590,387	11,240,211	11,099,980	11,887,650	1,283,925	2,071,595	0.214	0.229
6/30/07-08	5,508,425	9,443,394	11,151,656	11,120,239	10,865,070	11,461,150	1,421,676	2,017,756	0.197	0.208
6/30/08-09	5,447,676	10,017,460	11,997,202	11,789,453	11,620,290	12,309,850	1,602,830	2,292,390	0.213	0.226
6/30/09-10	5,525,579	8,859,634	10,786,777	10,868,754	10,547,550	11,219,700	1,687,916	2,360,066	0.191	0.203
6/30/10-11	5,712,303	9,830,522	12,269,076	12,106,872	11,790,520	12,675,050	1,959,998	2,844,528	0.206	0.222
6/30/11-12	5,880,714	9,232,426	11,821,227	11,848,353	11,520,520	12,299,000	2,288,094	3,066,574	0.196	0.209
6/30/12-13	6,162,621	8,133,027	10,746,164	11,216,425	10,594,820	11,424,550	2,461,793	3,291,523	0.172	0.185
6/30/13-14	6,442,136	8,915,793	12,227,831	12,568,186	12,010,460	13,078,000	3,094,667	4,162,207	0.186	0.203
6/30/14-15	6,758,892	9,203,521	13,426,493	13,637,150	13,121,800	14,243,450	3,918,279	5,039,929	0.194	0.211
6/30/15-16	6,843,054	9,247,350	14,840,008	14,687,362	14,213,000	15,613,400	4,965,650	6,366,050	0.208	0.228
6/30/16-17	6,638,078	7,587,377	15,041,164	14,394,157	13,971,000	15,815,320	6,383,623	8,227,943	0.210	0.238
6/30/17-18	6,709,926	3,577,517	15,741,939	14,447,268	13,787,000	16,749,050	10,209,483	13,171,533	0.205	0.250
Total	149,223,468	299,460,894	350,574,141	343,565,345	350,257,354	367,247,027	50,796,461	67,786,133		
Tot 6/30/84-18	149,223,468	288,180,404	346,040,605	343,565,345	338,425,889	355,094,173	50,245,485	66,913,768	0.227	0.238

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 1, Exhibit 2, Page 2, Column 3

(4) From Section 1, Exhibit 2, Page 2, Column 8

(5) From Section 1, Exhibit 2, Page 3, Column 8

(6), (7) Selected based on (3), (4), and (5)

(8) = (6) - (3)

(9) = (7) - (3)

(10) = (6) / (2) / 10

(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Clusters Combined
Medical

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Accident Year	Payroll (000's)	Paid Loss	Paid LDF	Adjustment for Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/16-17	Paid Counts 7/1/17-18	Average Outstanding Claim
All Prior Yrs		6,769,129							6	11	
6/30/82-83		1,243,549	1.004	N/A	1,248,477	N/A	1,248,477		1	1	4,927
6/30/83-84		3,267,811	1.005	N/A	3,285,059	N/A	3,285,059		2	3	5,749
6/30/84-85	1,823,085	3,296,878	1.007	N/A	3,319,768	N/A	3,319,768	0.182	3	3	7,630
6/30/85-86	1,952,445	4,968,398	1.008	N/A	5,005,782	N/A	5,005,782	0.256	2	1	37,384
6/30/86-87	2,220,820	5,809,821	1.009	N/A	5,863,162	N/A	5,863,162	0.264	3	3	17,780
6/30/87-88	2,885,583	9,968,732	1.012	N/A	10,084,714	N/A	10,084,714	0.349	8	7	16,569
6/30/88-89	3,098,180	12,131,284	1.013	N/A	12,290,849	N/A	12,290,849	0.397	11	9	17,729
6/30/89-90	3,079,763	12,614,539	1.016	N/A	12,815,588	N/A	12,815,588	0.416	11	7	28,721
6/30/90-91	2,914,364	12,075,274	1.020	N/A	12,316,755	N/A	12,316,755	0.423	14	15	16,099
6/30/91-92	2,880,434	10,901,411	1.021	N/A	11,126,348	N/A	11,126,348	0.386	11	11	20,449
6/30/92-93	2,887,238	7,940,036	1.025	N/A	8,136,436	N/A	8,136,436	0.282	6	5	39,280
6/30/93-94	3,056,850	8,390,929	1.028	N/A	8,624,855	N/A	8,624,855	0.282	17	14	16,709
6/30/94-95	3,158,808	6,988,812	1.033	N/A	7,219,702	N/A	7,219,702	0.229	15	13	17,761
6/30/95-96	3,301,791	6,589,792	1.037	N/A	6,832,053	N/A	6,832,053	0.207	4	4	60,565
6/30/96-97	3,902,868	7,247,398	1.046	N/A	7,584,337	N/A	7,584,337	0.194	12	11	30,631
6/30/97-98	3,776,138	6,704,825	1.056	N/A	7,079,765	N/A	7,079,765	0.187	12	9	41,660
6/30/98-99	4,017,530	6,940,733	1.065	N/A	7,393,185	N/A	7,393,185	0.184	18	14	32,318
6/30/99-00	4,221,786	7,785,609	1.075	N/A	8,368,786	N/A	8,368,786	0.198	17	18	32,399
6/30/00-01	4,310,725	9,600,632	1.083	N/A	10,399,907	N/A	10,399,907	0.241	22	14	57,091
6/30/01-02	4,438,755	7,753,775	1.090	N/A	8,450,008	N/A	8,450,008	0.190	25	19	36,644
6/30/02-03	4,423,888	8,391,707	1.108	N/A	9,296,608	N/A	9,296,608	0.210	32	21	43,091
6/30/03-04	4,482,207	8,726,226	1.122	N/A	9,792,165	N/A	9,792,165	0.218	33	28	38,069
6/30/04-05	4,639,517	10,256,720	1.145	N/A	11,747,462	N/A	11,747,462	0.253	24	23	64,815
6/30/05-06	4,938,165	9,232,800	1.154	N/A	10,652,446	N/A	10,652,446	0.216	31	25	56,786
6/30/06-07	5,183,126	9,816,055	1.181	N/A	11,590,387	N/A	11,590,387	0.224	37	31	57,237
6/30/07-08	5,508,425	9,443,394	1.181	N/A	11,151,656	N/A	11,151,656	0.202	35	25	68,330
6/30/08-09	5,447,676	10,017,460	1.198	N/A	11,997,202	N/A	11,997,202	0.220	56	46	43,038
6/30/09-10	5,525,579	8,859,634	1.218	N/A	10,786,777	N/A	10,786,777	0.195	56	47	41,003
6/30/10-11	5,712,303	9,830,522	1.248	N/A	12,269,076	N/A	12,269,076	0.215	80	58	42,044
6/30/11-12	5,880,714	9,232,426	1.280	N/A	11,821,227	N/A	11,821,227	0.201	88	65	39,828
6/30/12-13	6,162,621	8,133,027	1.321	N/A	10,746,164	N/A	10,746,164	0.174	112	72	36,294
6/30/13-14	6,442,136	8,915,793	1.371	N/A	12,227,831	N/A	12,227,831	0.190	200	133	24,903
6/30/14-15	6,758,892	9,203,521	1.459	N/A	13,426,493	N/A	13,426,493	0.199	399	191	22,110
6/30/15-16	6,843,054	9,247,350	1.605	N/A	14,840,008	N/A	14,840,008	0.217	1,532	442	12,653
6/30/16-17	6,638,078	7,587,377	1.982	N/A	15,041,164	N/A	15,041,164	0.227	2,237	1,335	5,583
6/30/17-18	6,709,926	3,577,517	4.400	N/A	15,741,939	N/A	15,741,939	0.235		2,213	5,497
Total	149,223,468	299,460,894			350,574,141		350,574,141		5,172	4,947	

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3), (4) From Section 1, Exhibit 2, Page 7

(5) Based on information from the MA WCRIB 7/1/16 filing. Consideration for development beyond 252 months made in selection of LDF's.

(6) = (3) x (4) x (5)

(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10), (11) Provided by Commonwealth of Massachusetts

(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Clusters Combined
Medical

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	1,823,085	0.198	3,296,878	1.007	3,316,824	N/A	3,316,824	0.182	0.182
6/30/85-86	1,952,445	0.298	4,968,398	1.008	5,005,054	N/A	5,005,054	0.256	0.256
6/30/86-87	2,220,820	0.308	5,809,821	1.009	5,864,507	N/A	5,864,507	0.264	0.264
6/30/87-88	2,885,583	0.387	9,968,732	1.012	10,086,477	N/A	10,086,477	0.350	0.350
6/30/88-89	3,098,180	0.448	12,131,284	1.013	12,293,141	N/A	12,293,141	0.397	0.397
6/30/89-90	3,079,763	0.489	12,614,539	1.016	12,824,056	N/A	12,824,056	0.416	0.416
6/30/90-91	2,914,364	0.420	12,075,274	1.020	12,315,163	N/A	12,315,163	0.423	0.423
6/30/91-92	2,880,434	0.381	10,901,411	1.021	11,123,687	N/A	11,123,687	0.386	0.386
6/30/92-93	2,887,238	0.278	7,940,036	1.025	8,133,756	N/A	8,133,756	0.282	0.282
6/30/93-94	3,056,850	0.277	8,390,929	1.028	8,620,684	N/A	8,620,684	0.282	0.282
6/30/94-95	3,158,808	0.225	6,988,812	1.033	7,215,964	N/A	7,215,964	0.228	0.228
6/30/95-96	3,301,791	0.204	6,589,792	1.037	6,828,765	N/A	6,828,765	0.207	0.207
6/30/96-97	3,902,868	0.192	7,247,398	1.046	7,579,257	N/A	7,579,257	0.194	0.194
6/30/97-98	3,776,138	0.185	6,704,825	1.056	7,073,302	N/A	7,073,302	0.187	0.187
6/30/98-99	4,017,530	0.182	6,940,733	1.065	7,385,880	N/A	7,385,880	0.184	0.184
6/30/99-00	4,221,786	0.195	7,785,609	1.075	8,354,851	N/A	8,354,851	0.198	0.198
6/30/00-01	4,310,725	0.234	9,600,632	1.083	10,371,731	N/A	10,371,731	0.241	0.241
6/30/01-02	4,438,755	0.189	7,753,775	1.090	8,441,709	N/A	8,441,709	0.190	0.190
6/30/02-03	4,423,888	0.207	8,391,707	1.108	9,278,718	N/A	9,278,718	0.210	0.210
6/30/03-04	4,482,207	0.215	8,726,226	1.122	9,774,753	N/A	9,774,753	0.218	0.218
6/30/04-05	4,639,517	0.189	10,256,720	1.145	11,283,717	N/A	11,283,717	0.243	0.243
6/30/05-06	4,938,165	0.192	9,232,800	1.154	10,468,923	N/A	10,468,923	0.212	0.212
6/30/06-07	5,183,126	0.193	9,816,055	1.181	11,240,211	N/A	11,240,211	0.217	0.217
6/30/07-08	5,508,425	0.195	9,443,394	1.181	11,120,239	N/A	11,120,239	0.202	0.202
6/30/08-09	5,447,676	0.198	10,017,460	1.198	11,789,453	N/A	11,789,453	0.216	0.216
6/30/09-10	5,525,579	0.206	8,859,634	1.218	10,868,754	N/A	10,868,754	0.197	0.197
6/30/10-11	5,712,303	0.208	9,830,522	1.248	12,106,872	N/A	12,106,872	0.212	0.212
6/30/11-12	5,880,714	0.210	9,232,426	1.280	11,848,353	N/A	11,848,353	0.201	0.201
6/30/12-13	6,162,621	0.212	8,133,027	1.321	11,216,425	N/A	11,216,425	0.182	0.182
6/30/13-14	6,442,136	0.214	8,915,793	1.371	12,568,186	N/A	12,568,186	0.195	0.195
6/30/14-15	6,758,892	0.216	9,203,521	1.459	13,637,150	N/A	13,637,150	0.202	0.202
6/30/15-16	6,843,054	0.218	9,247,350	1.605	14,687,362	N/A	14,687,362	0.215	0.215
6/30/16-17	6,638,078	0.221	7,587,377	1.982	14,394,157	N/A	14,394,157	0.217	0.217
6/30/17-18	6,709,926	0.223	3,577,517	4.400	14,447,268	N/A	14,447,268	0.215	0.215
Total	149,223,468		288,180,404		343,565,345		343,565,345		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 1, Exhibit 2, Page 4, Column 11

(4) From Section 1, Exhibit 2, Page 2, Column 3

(5) From Section 1, Exhibit 2, Page 2, Column 4

(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]

(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Clusters Combined
Medical

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Expected Ult Loss	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									0.198	0.198
6/30/85-86									0.298	0.298
6/30/86-87									0.308	0.308
6/30/87-88									0.387	0.387
6/30/88-89									0.448	0.448
6/30/89-90									0.489	0.489
6/30/90-91	2,914,364	12,316,755	0.423	1.194	0.505	1.321	0.667	0.143	0.418	0.420
6/30/91-92	2,880,434	11,126,348	0.386	1.189	0.459	1.308	0.601	0.145	0.381	0.381
6/30/92-93	2,887,238	8,136,436	0.282	1.189	0.335	1.295	0.434	0.146	0.277	0.278
6/30/93-94	3,056,850	8,624,855	0.282	1.178	0.332	1.282	0.426	0.149	0.275	0.277
6/30/94-95	3,158,808	7,219,702	0.229	1.170	0.267	1.270	0.340	0.151	0.224	0.225
6/30/95-96	3,301,791	6,832,053	0.207	1.155	0.239	1.257	0.301	0.155	0.204	0.204
6/30/96-97	3,902,868	7,584,337	0.194	1.137	0.221	1.245	0.275	0.159	0.193	0.192
6/30/97-98	3,776,138	7,079,765	0.187	1.135	0.213	1.232	0.262	0.161	0.185	0.185
6/30/98-99	4,017,530	7,393,185	0.184	1.135	0.209	1.220	0.255	0.162	0.182	0.182
6/30/99-00	4,221,786	8,368,786	0.198	1.135	0.225	1.208	0.272	0.164	0.194	0.195
6/30/00-01	4,310,725	10,399,907	0.241	1.109	0.268	1.196	0.320	0.170	0.234	0.234
6/30/01-02	4,438,755	8,450,008	0.190	1.101	0.210	1.184	0.248	0.173	0.188	0.189
6/30/02-03	4,423,888	9,296,608	0.210	1.073	0.225	1.173	0.264	0.179	0.208	0.207
6/30/03-04	4,482,207	9,792,165	0.218	1.046	0.229	1.161	0.265	0.185	0.215	0.215
6/30/04-05	4,639,517	11,747,462	0.253	1.036	0.262	1.149	0.301	0.189	0.191	0.189
6/30/05-06	4,938,165	10,652,446	0.216	1.032	0.223	1.138	0.253	0.192	0.193	0.192
6/30/06-07	5,183,126	11,590,387	0.224	1.032	0.231	1.127	0.260	0.193	0.195	0.193
6/30/07-08	5,508,425	11,151,656	0.202	1.032	0.209	1.116	0.233	0.195	0.197	0.195
6/30/08-09	5,447,676	11,997,202	0.220	1.027	0.226	1.105	0.250	0.198	0.200	0.198
6/30/09-10	5,525,579	10,786,777	0.195	1.000	0.195	1.094	0.214	0.206	0.208	0.206
6/30/10-11	5,712,303	12,269,076	0.215	1.000	0.215	1.083	0.233	0.208	0.210	0.208
6/30/11-12	5,880,714	11,821,227	0.201	1.000	0.201	1.072	0.216	0.210	0.212	0.210
6/30/12-13	6,162,621	10,746,164	0.174	1.000	0.174	1.062	0.185	0.212	0.214	0.212
6/30/13-14	6,442,136	12,227,831	0.190	1.000	0.190	1.051	0.199	0.214	0.216	0.214
6/30/14-15	6,758,892	13,426,493	0.199	1.000	0.199	1.041	0.207	0.216	0.218	0.216
6/30/15-16	6,843,054	14,840,008	0.217	1.000	0.217	1.030	0.223	0.218	0.221	0.218
6/30/16-17	6,638,078	15,041,164	0.227	1.000	0.227	1.020	0.231	0.221	0.223	0.221
6/30/17-18	6,709,926	15,741,939	0.235	1.000	0.235	1.010	0.237	0.223		0.223
Total	134,163,593	296,660,741								

Trend Last 4 (ex 17-18):	6.4%	Avg 3 (ex 17-18):	0.220
Trend Last 8 (ex 17-18):	1.4%	Avg 5 (ex 17-18):	0.209
Trend Last 12 (ex 17-18):	-0.7%	Avg 10 (ex 17-18):	0.219
Prior Selected Trend:	1.0%	Prior Sel Avg:	0.225
Selected Trend:	1.0%	Sel. Loss Cost:	0.225

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 1, Exhibit 2, Page 2, Column 6

(4) = (3) / (2) / 10

(5) Based on information from the MA WCIRB

(6) = (4) x (5)

(7) Based on Selected Trend from (6)

(8) = (6) x (7)

(9) = Sel. Loss Cost / [(5) * (7)]

(10) From prior Aon analysis as of June 30, 2017

(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Clusters Combined
Medical

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend	0.950	
(2)	Credibility	88%	
(3)	Average Pmt Trend Statewide	0.950	
(4)	Credibility Weighted Trend	0.950	
		(Low)	(High)
(5)	Selected Range	0.900	0.960
(6)	Incremental Paid for 2018	162,440	162,440
(7)	Estimated Reserve	1,461,960	3,898,560
(8)	Paid to Date (82 & Prior)	6,769,129	6,769,129
(9)	Est Ult Paid for 1982 & Prior	8,231,089	10,667,689

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	109,468	95,535
(11)	Projected Number of Years	5	5
(12)	Estimated Reserve	547,342	477,676
(13)	Paid to Date (82 & Prior)	6,769,129	6,606,689
(14)	Est Ult Paid for 1982 & Prior	7,316,471	7,084,365
(14a)	Paid Counts During Fiscal Year	11	6
		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	7,773,780	10,667,689
(16)	Lump Sum Ultimates	N/A	N/A
(17)	Ult Loss Including Lump Sums	**7,773,780**	**10,667,689**
(18)	Implied Tail	1.148	1.576
(19)	Ult Loss Inc Lump Sums @ 6/17	7,300,708	8,506,577

NOTES:

(1) From Section 1, Exhibit 2, Page 6
(2) = (Average of Section 1, Exhibit 2, Page 6, Column 3 / 175,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 1, Exhibit 2, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 1, Exhibit 2, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) Lump Sums are considered in Indemnity analysis (Section 1)
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2017

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Clusters Combined

Medical

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	401,487	12.903			
1993	2	281,130	12.547	0.700		
1994	3	275,063	12.525	0.978		
1995	4	195,978	12.186	0.712		
1996	5	235,244	12.368	1.200		
1997	6	119,211	11.689	0.507		
1998	7	74,969	11.225	0.629		
1999	8	167,971	12.032	2.241		
2000	9	112,165	11.628	0.668	n =	27
2001	10	83,644	11.334	0.746	S(x) =	54,135
2002	11	54,441	10.905	0.651	S(x-sq) =	108,542,313
2003	12	53,298	10.884	0.979	S(xy) =	632,023
2004	13	73,810	11.209	1.385	S(y) =	315
2005	14	86,676	11.370	1.174	D =	44,226
2006	15	71,904	11.183	0.830	slope =	-0.027
2007	16	66,960	11.112	0.931	Avg Trend =	0.973
2008	17	71,871	11.183	1.073		
2009	18	156,441	11.960	2.177		
2010	19	168,137	12.033	1.075		
2011	20	139,603	11.847	0.830		
2012	21	102,690	11.539	0.736		
2013	22	106,562	11.576	1.038		
2014	23	115,903	11.661	1.088		
2015	24	120,640	11.701	1.041		
2016	25	86,803	11.371	0.720		
2017	26	79,162	11.279	0.912		
2018	27	162,440	11.998	2.052		
					Selected Trend:	**0.950**

NOTES:

(3) 2018 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2017

(4) LN [(3)]

(5) Eg. 2018: 2.052 = 162440 / 79162

Commonwealth of Massachusetts Workers Compensation
All Clusters Combined
MEDICAL
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432
June-83	80,157	194,108	281,698	355,785	430,372	505,456	583,349	673,674	790,768	861,582	915,134	975,815	1,007,922	1,082,827	1,139,603	1,141,641	1,147,008	1,150,280	1,152,153	1,152,412	1,154,034	1,170,882	1,177,268	1,193,197	1,205,857	1,216,414	1,222,393	1,225,876	1,230,254	1,233,433	1,237,128	1,241,152	1,241,812	1,242,695	1,242,918	1,243,549
June-84	278,846	675,251	979,952	1,237,679	1,497,148	1,692,853	1,965,008	2,259,281	2,488,041	2,658,528	2,815,940	2,906,236	2,927,914	2,961,604	2,990,903	3,026,971	3,061,107	3,088,013	3,103,364	3,110,882	3,148,274	3,167,361	3,181,238	3,187,495	3,198,788	3,205,196	3,216,959	3,243,352	3,245,106	3,246,544	3,252,369	3,255,405	3,256,073	3,260,710	3,267,811	
June-85	281,180	680,904	988,156	1,248,041	1,524,376	1,767,225	2,056,915	2,259,407	2,404,861	2,595,178	2,656,702	2,691,247	2,723,491	2,743,570	2,791,601	2,825,986	2,858,120	2,885,590	2,909,085	2,936,115	2,962,423	2,989,438	3,016,883	3,039,299	3,063,056	3,088,322	3,111,388	3,139,070	3,181,218	3,200,244	3,226,838	3,252,799	3,279,382	3,296,878		
June-86	525,630	1,272,862	1,847,229	2,295,762	2,801,909	3,261,873	3,656,708	3,915,488	4,146,092	4,242,208	4,302,418	4,368,117	4,405,703	4,495,556	4,540,345	4,569,414	4,631,690	4,679,159	4,717,866	4,751,566	4,788,347	4,826,166	4,848,695	4,868,351	4,898,350	4,937,177	4,944,321	4,952,720	4,957,299	4,962,311	4,967,016	4,968,034	4,968,398			
June-87	679,622	1,645,768	2,495,914	3,175,646	3,758,601	4,235,026	4,616,701	4,839,601	4,982,646	5,092,983	5,194,073	5,273,395	5,401,744	5,450,543	5,483,690	5,500,132	5,518,035	5,536,163	5,551,275	5,565,383	5,582,877	5,601,832	5,621,525	5,656,386	5,681,277	5,707,463	5,726,299	5,745,711	5,758,976	5,782,095	5,801,310	5,809,821				
June-88	1,191,827	3,330,054	5,139,009	6,298,489	7,138,465	7,736,797	8,238,504	8,487,549	8,654,240	8,771,119	8,871,380	8,936,796	8,998,468	9,039,583	9,080,840	9,108,289	9,182,392	9,269,235	9,323,809	9,379,358	9,460,451	9,506,848	9,566,385	9,624,005	9,677,988	9,708,186	9,746,800	9,886,893	9,920,342	9,951,259	9,968,732					
June-89	1,301,800	4,749,050	6,698,392	8,042,212	9,005,556	9,741,252	10,145,151	10,401,975	10,588,606	10,754,116	10,897,219	11,056,485	11,133,041	11,233,906	11,311,779	11,394,541	11,460,208	11,520,998	11,631,220	11,709,730	11,752,400	11,801,214	11,852,925	11,887,968	11,930,739	11,975,978	12,009,867	12,042,782	12,105,126	12,131,284						
June-90	1,971,011	6,207,955	8,378,887	9,502,646	10,377,079	10,866,795	11,178,293	11,460,398	11,654,311	11,744,612	11,853,219	11,929,544	12,013,692	12,102,616	12,193,641	12,288,370	12,363,890	12,414,703	12,454,464	12,472,674	12,492,856	12,504,730	12,520,503	12,538,576	12,563,968	12,583,220	12,596,340	12,608,229	12,614,539							
June-91	2,079,021	6,481,845	8,128,761	9,129,342	9,569,888	9,922,223	10,074,064	10,149,765	10,198,433	10,318,761	10,419,870	10,494,642	10,576,694	10,667,922	10,767,927	10,925,448	11,031,802	11,209,381	11,429,660	11,537,541	11,643,261	11,766,239	11,823,905	11,860,583	11,883,680	11,906,673	12,001,274	12,075,274								
June-92	2,582,717	6,069,511	7,466,854	8,202,774	8,503,875	8,669,993	8,827,343	9,030,623	9,135,160	9,257,875	9,372,582	9,437,134	9,514,021	9,594,979	9,639,410	9,684,641	9,729,562	9,777,992	9,843,570	9,998,090	10,162,177	10,366,472	10,602,914	10,713,579	10,783,184	10,867,633	10,901,411									
June-93	1,951,667	5,170,869	6,081,502	6,489,487	6,751,595	6,861,506	6,914,496	6,958,865	7,037,255	7,082,866	7,132,331	7,201,081	7,259,683	7,329,612	7,401,491	7,505,162	7,578,974	7,640,635	7,679,794	7,714,728	7,755,902	7,826,543	7,862,414	7,891,312	7,912,531	7,940,036										
June-94	2,254,109	4,622,918	5,401,604	5,967,695	6,235,895	6,548,173	6,736,695	6,864,534	6,987,145	7,147,202	7,266,001	7,394,198	7,524,153	7,640,660	7,736,000	7,790,584	7,842,474	7,909,569	7,974,641	8,037,509	8,101,818	8,151,347	8,269,070	8,324,376	8,390,929											
June-95	2,029,019	3,973,539	4,748,104	5,104,898	5,297,904	5,458,376	5,592,474	5,756,438	5,903,503	6,059,664	6,161,322	6,276,889	6,428,588	6,491,856	6,546,028	6,596,908	6,642,430	6,764,444	6,797,406	6,837,368	6,873,333	6,913,170	6,955,590	6,988,812												
June-96	1,766,253	4,182,294	4,865,024	5,174,865	5,452,218	5,598,854	5,739,120	5,855,214	5,980,868	6,100,238	6,209,752	6,290,753	6,361,945	6,411,788	6,464,381	6,495,988	6,521,070	6,537,735	6,548,588	6,563,090	6,572,319	6,581,022	6,589,792													
June-97	1,766,725	3,725,485	4,494,601	4,941,702	5,201,917	5,412,606	5,536,117	5,694,640	5,852,834	5,984,835	6,131,050	6,244,244	6,315,764	6,399,332	6,491,158	6,664,852	6,857,883	7,062,337	7,148,622	7,195,566	7,222,769	7,247,398														
June-98	1,434,653	3,363,240	4,046,082	4,435,465	4,731,267	4,919,954	5,122,526	5,375,830	5,487,330	5,608,858	5,703,803	5,850,033	5,931,380	6,078,298	6,191,362	6,271,642	6,360,866	6,472,141	6,564,185	6,651,123	6,704,825															
June-99	1,427,577	3,215,372	3,912,893	4,351,301	4,694,328	4,986,960	5,249,952	5,556,545	5,746,199	5,876,662	5,994,567	6,154,782	6,268,261	6,402,584	6,478,357	6,567,127	6,706,225	6,780,244	6,865,083	6,940,733																
June-00	1,919,617	4,021,129	4,792,481	5,313,057	5,734,824	6,105,211	6,329,799	6,555,866	6,681,932	6,813,975	6,898,518	6,996,942	7,138,790	7,262,102	7,372,673	7,504,980	7,586,347	7,678,527	7,785,609																	
June-01	1,955,272	4,077,952	5,089,014	5,933,836	6,650,457	7,105,631	7,471,084	7,767,438	8,000,937	8,307,585	8,507,669	8,703,774	8,845,415	9,003,056	9,140,745	9,370,399	9,497,154	9,600,632																		
June-02	1,477,425	3,509,146	4,573,760	5,338,916	5,731,628	5,955,713	6,085,017	6,292,071	6,517,249	6,663,212	6,917,679	7,073,118	7,209,384	7,329,953	7,511,596	7,630,888	7,753,775																			
June-03	969,154	3,818,930	5,475,517	6,135,434	6,529,665	6,778,078	6,990,986	7,205,533	7,374,939	7,547,463	7,650,965	7,822,367	7,992,803	8,161,223	8,308,529	8,391,707																				
June-04	1,457,859	4,815,053	6,241,371	6,962,594	7,265,206	7,595,768	7,812,538	7,975,825	8,092,945	8,180,931	8,285,856	8,395,996	8,479,408	8,616,680	8,726,226																					
June-05	2,296,467	6,044,403	7,443,461	8,222,874	8,698,237	9,004,663	9,337,914	9,544,673	9,739,666	9,917,957	10,021,865	10,121,156	10,181,518	10,256,720																						
June-06	2,480,251	5,605,314	6,838,991	7,488,958	7,923,458	8,230,916	8,500,027	8,685,758	8,828,551	8,921,703	9,020,980	9,122,357	9,232,800																							
June-07	2,697,227	6,287,742	7,783,576	8,319,615	8,708,706	8,952,407	9,197,087	9,352,229	9,474,608	9,611,791	9,739,228	9,816,055																								
June-08	3,229,281	6,460,123	7,505,731	8,076,203	8,364,088	8,613,325	8,799,265	9,008,163	9,151,259	9,310,231	9,443,394																									
June-09	3,247,133	6,451,648	7,766,520	8,400,468	8,775,739	9,090,669	9,368,582	9,601,209	9,871,493	10,017,460																										
June-10	3,060,289	6,279,753	7,213,128	7,731,312	8,124,749	8,370,005	8,627,030	8,770,757	8,859,634																											
June-11	3,709,038	7,016,744	8,085,690	8,709,130	9,137,711	9,403,213	9,626,927	9,830,522																												
June-12	3,189,372	6,711,576	7,783,683	8,387,093	8,798,309	9,000,424	9,232,426																													
June-13	2,903,130	6,057,463	7,167,331	7,672,962	7,986,604	8,133,027																														
June-14	2,931,171	6,504,914	7,878,217	8,567,157	8,915,793																															
June-15	3,735,022	6,999,911	8,327,951	9,203,521																																
June-16	4,192,776	7,734,684	9,247,350																																	
June-17	3,731,583	7,587,377																																		
June-18	3,577,517																																			

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432
June-83	2.422	1.451	1.263	1.210	1.174	1.154	1.155	1.174	1.090	1.062	1.066	1.033	1.074	1.052	1.002	1.005	1.003	1.002	1.000	1.001	1.015	1.005	1.014	1.011	1.009	1.005	1.003	1.004	1.003	1.003	1.003	1.001	1.001	1.000	1.001
June-84	2.422	1.451	1.263	1.210	1.131	1.161	1.150	1.101	1.069	1.059	1.032	1.007	1.012	1.010	1.012	1.011	1.009	1.005	1.002	1.012	1.006	1.004	1.002	1.004	1.002	1.004	1.008	1.001	1.000	1.002	1.001	1.000	1.001	1.002	
June-85	2.422	1.451	1.263	1.221	1.159	1.164	1.098	1.064	1.079	1.024	1.013	1.012	1.007	1.018	1.012	1.011	1.010	1.008	1.009	1.009	1.009	1.009	1.007	1.008	1.008	1.007	1.009	1.013	1.006	1.008	1.008	1.008	1.005		
June-86	2.422	1.451	1.243	1.220	1.164	1.121	1.071	1.059	1.023	1.014	1.015	1.009	1.020	1.010	1.006	1.014	1.010	1.008	1.007	1.008	1.008	1.005	1.004	1.006	1.008	1.001	1.002	1.001	1.001	1.001	1.000	1.000			
June-87	2.422	1.517	1.272	1.184	1.127	1.090	1.048	1.030	1.022	1.020	1.015	1.024	1.009	1.006	1.003	1.003	1.003	1.003	1.003	1.003	1.003	1.004	1.006	1.004	1.005	1.003	1.003	1.002	1.004	1.003	1.001				
June-88	2.794	1.543	1.226	1.133	1.084	1.065	1.030	1.020	1.014	1.011	1.007	1.007	1.005	1.005	1.003	1.008	1.009	1.006	1.006	1.009	1.005	1.006	1.006	1.006	1.003	1.004	1.014	1.003	1.003	1.002					
June-89	3.648	1.410	1.201	1.120	1.082	1.041	1.025	1.018	1.016	1.013	1.015	1.007	1.009	1.007	1.007	1.006	1.005	1.010	1.007	1.004	1.004	1.004	1.003	1.004	1.004	1.003	1.003	1.005	1.002						
June-90	3.150	1.350	1.134	1.092	1.047	1.029	1.025	1.017	1.008	1.009	1.006	1.007	1.007	1.008	1.008	1.006	1.004	1.003	1.001	1.002	1.001	1.001	1.001	1.002	1.002	1.001	1.001	1.001							
June-91	3.118	1.254	1.123	1.048	1.037	1.015	1.008	1.005	1.012	1.010	1.007	1.008	1.009	1.009	1.015	1.010	1.016	1.020	1.009	1.009	1.011	1.005	1.003	1.002	1.002	1.008	1.006								
June-92	2.350	1.230	1.099	1.037	1.020	1.018	1.023	1.012	1.013	1.012	1.007	1.008	1.009	1.005	1.005	1.005	1.005	1.007	1.016	1.016	1.020	1.023	1.010	1.006	1.008	1.003									
June-93	2.649	1.176	1.067	1.040	1.016	1.008	1.006	1.011	1.006	1.007	1.010	1.008	1.010	1.010	1.014	1.010	1.008	1.005	1.005	1.005	1.009	1.005	1.004	1.003	1.003										
June-94	2.051	1.168	1.105	1.045	1.050	1.029	1.019	1.018	1.023	1.017	1.018	1.018	1.015	1.012	1.007	1.007	1.009	1.008	1.008	1.008	1.006	1.014	1.007	1.008											
June-95	1.958	1.195	1.075	1.038	1.030	1.025	1.029	1.026	1.026	1.017	1.019	1.024	1.010	1.008	1.008	1.007	1.018	1.005	1.006	1.005	1.006	1.006	1.005												
June-96	2.368	1.163	1.064	1.054	1.027	1.025	1.020	1.021	1.020	1.018	1.013	1.011	1.008	1.008	1.005	1.004	1.003	1.002	1.002	1.001	1.001	1.001													
June-97	2.109	1.206	1.099	1.053	1.041	1.023	1.029	1.028	1.023	1.024	1.018	1.011	1.013	1.014	1.027	1.029	1.030	1.012	1.007	1.004	1.003														
June-98	2.344	1.203	1.096	1.067	1.040	1.041	1.049	1.021	1.022	1.017	1.026	1.014	1.025	1.019	1.013	1.014	1.017	1.014	1.013	1.008															
June-99	2.252	1.217	1.112	1.079	1.062	1.053	1.058	1.034	1.023	1.020	1.027	1.018	1.021	1.012	1.014	1.021	1.011	1.013	1.011																
June-00	2.095	1.192	1.109	1.079	1.065	1.037	1.036	1.019	1.020	1.012	1.014	1.020	1.017	1.015	1.018	1.011	1.012	1.014																	
June-01	2.086	1.248	1.166	1.121	1.068	1.051	1.040	1.030	1.038	1.024	1.023	1.016	1.018	1.015	1.025	1.014	1.011																		
June-02	2.375	1.303	1.167	1.074	1.039	1.022	1.034	1.036	1.022	1.038	1.022	1.019	1.017	1.025	1.016	1.016																			
June-03	3.940	1.434	1.121	1.064	1.038	1.031	1.031	1.024	1.023	1.014	1.022	1.022	1.021	1.018	1.010																				
June-04	3.303	1.296	1.116	1.043	1.045	1.029	1.021	1.015	1.011	1.013	1.013	1.010	1.016	1.013																					
June-05	2.632	1.231	1.105	1.058	1.035	1.037	1.022	1.020	1.018	1.010	1.010	1.006	1.007																						
June-06	2.260	1.220	1.095	1.058	1.039	1.033	1.022	1.016	1.011	1.011	1.011	1.012																							
June-07	2.331	1.238	1.069	1.047	1.028	1.027	1.017	1.013	1.014	1.013	1.008																								
June-08	2.000	1.162	1.076	1.036	1.030	1.022	1.024	1.016	1.017	1.014																									
June-09	1.987	1.204	1.082	1.045	1.036	1.031	1.025	1.028	1.015																										
June-10	2.052	1.149	1.072	1.051	1.030	1.031	1.017	1.010																											
June-11	1.892	1.152	1.077	1.049	1.029	1.024	1.021																												
June-12	2.104	1.160	1.078	1.049	1.023	1.026																													
June-13	2.087	1.183	1.071	1.041	1.018																														
June-14	2.219	1.211	1.087	1.041																															
June-15	1.874	1.190	1.105																																
June-16	1.845	1.196																																	
June-17	2.033																																		

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	To Ult
Simple Avg																																				
All Yrs	2.400	1.271	1.130	1.085	1.059	1.049	1.040	1.032	1.025	1.019	1.018	1.014	1.016	1.014	1.011	1.011	1.010	1.008	1.007	1.007	1.007	1.007	1.006	1.005	1.005	1.004	1.005	1.004	1.003	1.003	1.003	1.002	1.002	1.001	1.001	
Latest 5	2.012	1.188	1.084	1.046	1.027	1.026	1.021	1.017	1.015	1.012	1.013	1.014	1.016	1.017	1.017	1.015	1.016	1.011	1.008	1.005	1.005	1.010	1.006	1.004	1.004	1.004	1.006	1.002	1.003	1.003	1.003					
Latest 3	1.917	1.199	1.088	1.044	1.023	1.027	1.021	1.018	1.016	1.013	1.010	1.009	1.015	1.019	1.017	1.013	1.011	1.014	1.010	1.004	1.004	1.007	1.005	1.006	1.004	1.004	1.003	1.003	1.003	1.002	1.003	1.003	1.002			
Volume Wtd																																				
All Yrs	2.274	1.236	1.110	1.066	1.045	1.036	1.029	1.022	1.019	1.016	1.014	1.013	1.013	1.012	1.011	1.010	1.010	1.009	1.007	1.007	1.007	1.007	1.005	1.004	1.004	1.004	1.005	1.003	1.003	1.003	1.002	1.002	1.003	1.002	1.001	
Latest 5	1.994	1.188	1.084	1.046	1.027	1.026	1.021	1.017	1.015	1.012	1.013	1.013	1.015	1.017	1.017	1.015	1.016	1.011	1.008	1.005	1.005	1.011	1.006	1.004	1.004	1.004	1.005	1.003	1.003	1.003	1.002					
Latest 3	1.915	1.198	1.089	1.044	1.024	1.027	1.021	1.018	1.016	1.013	1.010	1.009	1.014	1.018	1.017	1.014	1.011	1.014	1.010	1.004	1.004	1.008	1.005	1.006	1.004	1.004	1.003	1.003	1.003	1.002	1.003	1.002	1.003			

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Clusters Combined
Medical

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/17		As of 6/18		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	7,222,490	7,619,355	7,308,855	7,561,294	86,364	1.2%	(58,061)	-0.8%
6/30/82-83	1,244,030	1,263,465	1,245,377	1,261,545	1,347	0.1%	(1,920)	-0.2%
6/30/83-84	3,270,233	3,322,684	3,277,233	3,330,015	7,000	0.2%	7,330	0.2%
6/30/84-85	3,291,365	3,336,963	3,307,365	3,354,830	16,000	0.5%	17,867	0.5%
6/30/85-86	5,000,434	5,031,682	4,997,444	5,028,662	(2,990)	-0.1%	(3,020)	-0.1%
6/30/86-87	5,851,295	5,878,865	5,854,265	5,884,935	2,970	0.1%	6,070	0.1%
6/30/87-88	10,053,715	10,111,590	10,063,670	10,123,680	9,955	0.1%	12,090	0.1%
6/30/88-89	12,272,000	12,382,786	12,290,000	12,403,860	18,000	0.1%	21,074	0.2%
6/30/89-90	12,837,000	12,893,250	12,830,000	12,883,240	(7,000)	-0.1%	(10,010)	-0.1%
6/30/90-91	12,228,500	12,311,690	12,285,480	12,506,890	56,980	0.5%	195,200	1.6%
6/30/91-92	11,059,830	11,123,684	11,075,730	11,250,014	15,900	0.1%	126,330	1.1%
6/30/92-93	8,106,897	8,176,338	8,118,917	8,187,498	12,020	0.1%	11,160	0.1%
6/30/93-94	8,560,495	8,631,690	8,614,027	8,685,562	53,532	0.6%	53,872	0.6%
6/30/94-95	7,188,857	7,247,922	7,206,876	7,268,870	18,019	0.3%	20,948	0.3%
6/30/95-96	6,840,043	6,895,486	6,824,043	6,881,436	(16,000)	-0.2%	(14,050)	-0.2%
6/30/96-97	7,608,037	7,667,006	7,583,082	7,641,056	(24,955)	-0.3%	(25,950)	-0.3%
6/30/97-98	7,066,000	7,139,400	7,070,000	7,141,280	4,000	0.1%	1,880	0.0%
6/30/98-99	7,357,000	7,421,940	7,382,000	7,447,030	25,000	0.3%	25,090	0.3%
6/30/99-00	8,285,670	8,396,460	8,348,700	8,455,720	63,030	0.8%	59,260	0.7%
6/30/00-01	10,333,040	10,520,520	10,362,080	10,551,200	29,040	0.3%	30,680	0.3%
6/30/01-02	8,400,000	8,517,230	8,435,000	8,552,050	35,000	0.4%	34,820	0.4%
6/30/02-03	9,313,170	9,466,020	9,253,160	9,404,610	(60,010)	-0.6%	(61,410)	-0.6%
6/30/03-04	9,724,140	9,894,020	9,737,080	9,909,180	12,940	0.1%	15,160	0.2%
6/30/04-05	11,369,460	11,995,700	11,321,560	11,896,550	(47,900)	-0.4%	(99,150)	-0.8%
6/30/05-06	10,346,340	10,882,000	10,323,400	10,859,850	(22,940)	-0.2%	(22,150)	-0.2%
6/30/06-07	11,140,250	11,971,100	11,099,980	11,887,650	(40,270)	-0.4%	(83,450)	-0.7%
6/30/07-08	10,836,400	11,483,550	10,865,070	11,461,150	28,670	0.3%	(22,400)	-0.2%
6/30/08-09	11,601,720	12,360,800	11,620,290	12,309,850	18,570	0.2%	(50,950)	-0.4%
6/30/09-10	10,629,720	11,433,600	10,547,550	11,219,700	(82,170)	-0.8%	(213,900)	-1.9%
6/30/10-11	11,940,120	12,824,250	11,790,520	12,675,050	(149,600)	-1.3%	(149,200)	-1.2%
6/30/11-12	11,612,780	12,530,350	11,520,520	12,299,000	(92,260)	-0.8%	(231,350)	-1.8%
6/30/12-13	10,891,290	11,803,500	10,594,820	11,424,550	(296,470)	-2.7%	(378,950)	-3.2%
6/30/13-14	12,303,880	13,467,150	12,010,460	13,078,000	(293,420)	-2.4%	(389,150)	-2.9%
6/30/14-15	13,297,700	14,540,250	13,121,800	14,243,450	(175,900)	-1.3%	(296,800)	-2.0%
6/30/15-16	14,660,000	16,036,310	14,213,000	15,613,400	(447,000)	-3.0%	(422,910)	-2.6%
6/30/16-17	14,120,500	17,382,300	13,971,000	15,815,320	(149,500)	-1.1%	(1,566,980)	-9.0%
6/30/17-18								
Total	337,864,401	353,960,905	336,470,354	350,497,977	(1,394,047)	-0.4%	(3,462,928)	-1.0%

NOTES:

(2), (3) From prior Aon analysis as of June 30, 2017

(4), (5) From Section 1, Exhibit 2, Page 1, Columns 6, 7

(6) = (4) - (2)

(7) = (4) / (2) - 1

(8) = (5) - (3)

(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Clusters Combined
Medical

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
444	100.0%	0.4%	0.0%	0.1%	0.0%	1.000	1.000
432	99.6%	0.1%	0.4%	0.0%	0.0%	0.981	0.971
420	99.5%	0.2%	0.5%	0.0%	0.0%	0.952	0.930
408	99.3%	0.1%	0.7%	0.0%	0.0%	0.931	0.900
396	99.3%	0.2%	0.7%	0.0%	0.0%	0.902	0.858
384	99.1%	0.2%	0.9%	0.1%	0.0%	0.887	0.839
372	98.8%	0.1%	1.2%	0.0%	0.0%	0.880	0.829
360	98.7%	0.3%	1.3%	0.1%	0.0%	0.861	0.803
348	98.4%	0.4%	1.6%	0.1%	0.1%	0.855	0.795
336	98.0%	0.1%	2.0%	0.0%	0.0%	0.853	0.794
324	98.0%	0.4%	2.0%	0.1%	0.1%	0.825	0.756
312	97.6%	0.3%	2.4%	0.1%	0.1%	0.824	0.755
300	97.3%	0.5%	2.7%	0.2%	0.1%	0.813	0.741
288	96.8%	0.3%	3.2%	0.1%	0.1%	0.812	0.740
276	96.5%	0.9%	3.5%	0.4%	0.2%	0.800	0.725
264	95.6%	0.9%	4.4%	0.4%	0.2%	0.812	0.742
252	94.7%	0.8%	5.3%	0.4%	0.2%	0.813	0.744
240	93.9%	0.8%	6.1%	0.4%	0.3%	0.809	0.738
228	93.0%	0.7%	7.0%	0.3%	0.2%	0.802	0.730
216	92.3%	0.6%	7.7%	0.3%	0.2%	0.791	0.715
204	91.8%	1.5%	8.2%	0.8%	0.6%	0.775	0.694
192	90.3%	1.2%	9.7%	0.6%	0.5%	0.782	0.704
180	89.1%	1.8%	10.9%	1.0%	0.8%	0.776	0.696
168	87.3%	0.6%	12.7%	0.4%	0.3%	0.779	0.702
156	86.7%	2.0%	13.3%	1.2%	1.0%	0.760	0.677
144	84.7%	0.0%	15.3%	0.0%	0.0%	0.763	0.681
132	84.7%	1.2%	15.3%	0.8%	0.6%	0.734	0.643
120	83.5%	1.4%	16.5%	0.9%	0.8%	0.726	0.633
108	82.1%	2.0%	17.9%	1.4%	1.2%	0.719	0.626
96	80.1%	2.0%	19.9%	1.5%	1.3%	0.721	0.629
84	78.1%	2.4%	21.9%	1.9%	1.7%	0.720	0.628
72	75.7%	2.8%	24.3%	2.2%	2.0%	0.721	0.630
60	72.9%	4.4%	27.1%	3.7%	3.4%	0.722	0.633
48	68.5%	6.2%	31.5%	5.4%	5.1%	0.734	0.649
36	62.3%	11.9%	37.7%	10.8%	10.3%	0.751	0.672
24	50.4%	27.7%	49.6%	26.1%	25.4%	0.784	0.715
12	22.7%	22.7%	77.3%	22.3%	22.1%	0.835	0.781
Total		100.0%					

NOTES:

(2) = 1 / Section 1, Exhibit 2, Page 2, Column 4

(3) Incremental % based on (2)

(4) = 1 - (2)

(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}

(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}

(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Clusters Combined
Medical

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	539,726	792,165		517,249	757,269
6/30/82-83	1,828	17,996	0.981	1,798	17,657
6/30/83-84	9,422	62,203	0.952	9,007	59,453
6/30/84-85	10,487	57,952	0.931	9,771	54,077
6/30/85-86	29,047	60,264	0.902	26,605	55,101
6/30/86-87	44,444	75,114	0.887	39,830	67,469
6/30/87-88	94,938	154,948	0.880	83,487	136,549
6/30/88-89	158,716	272,576	0.861	137,188	235,520
6/30/89-90	215,461	268,701	0.855	182,743	228,159
6/30/90-91	210,206	431,616	0.853	175,888	361,698
6/30/91-92	174,319	348,603	0.825	143,952	288,283
6/30/92-93	178,882	247,462	0.824	146,135	201,764
6/30/93-94	223,098	294,634	0.813	180,264	236,326
6/30/94-95	218,065	280,058	0.812	174,337	223,428
6/30/95-96	234,251	291,644	0.800	184,524	229,261
6/30/96-97	335,684	393,658	0.812	266,760	313,206
6/30/97-98	365,175	436,455	0.813	289,338	346,691
6/30/98-99	441,267	506,297	0.809	347,820	398,902
6/30/99-00	563,091	670,111	0.802	440,671	522,923
6/30/00-01	761,448	950,568	0.791	590,676	733,455
6/30/01-02	681,225	798,275	0.775	524,544	614,353
6/30/02-03	861,453	1,012,903	0.782	661,181	778,630
6/30/03-04	1,010,854	1,182,954	0.776	780,072	914,069
6/30/04-05	1,064,840	1,639,830	0.779	817,513	1,255,866
6/30/05-06	1,090,600	1,627,050	0.760	838,328	1,244,013
6/30/06-07	1,283,925	2,071,595	0.763	975,518	1,565,383
6/30/07-08	1,421,676	2,017,756	0.734	1,062,739	1,505,860
6/30/08-09	1,602,830	2,292,390	0.726	1,176,978	1,681,682
6/30/09-10	1,687,916	2,360,066	0.719	1,227,284	1,716,441
6/30/10-11	1,959,998	2,844,528	0.721	1,410,695	2,054,830
6/30/11-12	2,288,094	3,066,574	0.720	1,641,850	2,212,334
6/30/12-13	2,461,793	3,291,523	0.721	1,772,964	2,380,882
6/30/13-14	3,094,667	4,162,207	0.722	2,231,470	3,011,337
6/30/14-15	3,918,279	5,039,929	0.734	2,854,796	3,684,080
6/30/15-16	4,965,650	6,366,050	0.751	3,726,284	4,782,914
6/30/16-17	6,383,623	8,227,943	0.784	4,988,519	6,436,087
6/30/17-18	10,209,483	13,171,533	0.835	8,506,753	10,986,731
Total	50,796,461	67,786,133		39,145,530	52,292,680
			(7) Total Discount Factor:	0.771	0.771

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	539,726	792,165
(9) Projected Number of Years:	5	5
(10) Projected Paid Loss per Year:	107,945	158,433
(11) Discounted Value at 4%:	490,164	719,422

NOTES:

(2), (3) From Section 1, Exhibit 2, Page 1, Columns 8, 9

(4) From Section 1, Exhibit 2, Page 9, Column 7

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Clusters Combined
Medical

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	539,726	792,165		506,874	741,235
6/30/82-83	1,828	17,996	0.971	1,783	17,494
6/30/83-84	9,422	62,203	0.930	8,813	58,168
6/30/84-85	10,487	57,952	0.900	9,446	52,311
6/30/85-86	29,047	60,264	0.858	25,518	52,801
6/30/86-87	44,444	75,114	0.839	37,819	64,133
6/30/87-88	94,938	154,948	0.829	78,595	128,678
6/30/88-89	158,716	272,576	0.803	128,159	219,970
6/30/89-90	215,461	268,701	0.795	169,288	211,473
6/30/90-91	210,206	431,616	0.794	162,017	333,424
6/30/91-92	174,319	348,603	0.756	131,852	264,249
6/30/92-93	178,882	247,462	0.755	133,354	183,989
6/30/93-94	223,098	294,634	0.741	163,770	214,058
6/30/94-95	218,065	280,058	0.740	157,758	202,056
6/30/95-96	234,251	291,644	0.725	165,946	206,046
6/30/96-97	335,684	393,658	0.742	241,227	283,405
6/30/97-98	365,175	436,455	0.744	261,644	313,886
6/30/98-99	441,267	506,297	0.738	313,999	360,008
6/30/99-00	563,091	670,111	0.730	396,686	470,081
6/30/00-01	761,448	950,568	0.715	529,842	656,255
6/30/01-02	681,225	798,275	0.694	469,231	549,480
6/30/02-03	861,453	1,012,903	0.704	591,125	696,639
6/30/03-04	1,010,854	1,182,954	0.696	699,871	820,589
6/30/04-05	1,064,840	1,639,830	0.702	731,928	1,123,041
6/30/05-06	1,090,600	1,627,050	0.677	751,269	1,112,069
6/30/06-07	1,283,925	2,071,595	0.681	869,756	1,392,332
6/30/07-08	1,421,676	2,017,756	0.643	940,458	1,331,708
6/30/08-09	1,602,830	2,292,390	0.633	1,033,260	1,475,914
6/30/09-10	1,687,916	2,360,066	0.626	1,073,259	1,501,596
6/30/10-11	1,959,998	2,844,528	0.629	1,229,217	1,793,931
6/30/11-12	2,288,094	3,066,574	0.628	1,430,694	1,933,053
6/30/12-13	2,461,793	3,291,523	0.630	1,549,710	2,085,542
6/30/13-14	3,094,667	4,162,207	0.633	1,953,605	2,640,632
6/30/14-15	3,918,279	5,039,929	0.649	2,514,627	3,249,587
6/30/15-16	4,965,650	6,366,050	0.672	3,328,893	4,275,243
6/30/16-17	6,383,623	8,227,943	0.715	4,537,913	5,856,702
6/30/17-18	10,209,483	13,171,533	0.781	7,942,952	10,262,114
Total	50,796,461	67,786,133		35,272,160	47,133,896
			(7) Total Discount Factor:	0.694	0.695

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	539,726	792,165
(9) Projected Number of Years:	5	5
(10) Projected Paid Loss per Year:	107,945	158,433
(11) Discounted Value at 6%:	468,345	687,399

NOTES:

(2), (3) From Section 1, Exhibit 2, Page 1, Columns 8, 9

(4) From Section 1, Exhibit 2, Page 9, Column 8

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Developmental Services - Cluster 1

Indemnity

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		21,831,090			25,012,244	26,489,327	3,181,154	4,658,237		
6/30/82-83		4,699,567	4,724,221		4,724,221	4,728,945	24,654	29,378		
6/30/83-84		8,653,964	9,125,011		9,125,000	9,134,136	471,036	480,172		
6/30/84-85	181,560	6,810,805	6,865,940	6,868,805	6,818,000	6,865,940	7,195	55,135	3.755	3.782
6/30/85-86	195,247	10,272,096	10,381,941	10,383,460	10,282,000	10,293,000	9,904	20,904	5.266	5.272
6/30/86-87	224,370	13,480,506	13,637,903	13,646,640	13,494,000	13,507,000	13,494	26,494	6.014	6.020
6/30/87-88	262,864	19,901,199	20,223,810	20,205,463	20,205,000	20,224,000	303,801	322,801	7.686	7.694
6/30/88-89	283,884	20,217,051	20,614,155	20,624,356	20,614,000	20,624,000	396,949	406,949	7.261	7.265
6/30/89-90	285,078	15,018,718	15,356,884	15,419,658	15,169,000	15,169,000	150,282	150,282	5.321	5.321
6/30/90-91	267,732	10,867,057	11,166,092	11,163,972	10,976,000	10,976,000	108,943	108,943	4.100	4.100
6/30/91-92	261,442	7,718,462	7,969,000	7,965,785	7,966,000	7,969,000	247,538	250,538	3.047	3.048
6/30/92-93	259,992	4,189,576	4,342,833	4,340,767	4,231,000	4,273,000	41,424	83,424	1.627	1.644
6/30/93-94	257,062	3,496,223	3,631,287	3,629,647	3,566,000	3,601,000	69,777	104,777	1.387	1.401
6/30/94-95	255,854	2,081,529	2,171,280	2,171,906	2,171,000	2,172,000	89,471	90,471	0.849	0.849
6/30/95-96	255,539	3,168,105	3,323,063	3,320,574	3,321,000	3,323,000	152,895	154,895	1.300	1.300
6/30/96-97	270,071	2,467,027	2,591,897	2,592,315	2,479,000	2,492,000	11,973	24,973	0.918	0.923
6/30/97-98	245,367	2,696,148	2,857,469	2,854,916	2,855,000	2,857,000	158,853	160,853	1.164	1.164
6/30/98-99	251,453	2,410,298	2,553,809	2,554,045	2,554,000	2,554,000	143,702	143,702	1.016	1.016
6/30/99-00	255,641	2,487,342	2,673,246	2,670,718	2,671,000	2,673,000	183,658	185,658	1.045	1.046
6/30/00-01	263,918	3,425,275	3,731,554	3,719,894	3,720,000	3,732,000	294,725	306,725	1.410	1.414
6/30/01-02	267,598	2,229,481	2,436,959	2,437,638	2,241,000	2,252,000	11,519	22,519	0.837	0.842
6/30/02-03	274,465	3,053,235	3,366,656	3,359,290	3,359,000	3,367,000	305,765	313,765	1.224	1.227
6/30/03-04	272,384	3,344,570	3,731,715	3,719,475	3,719,000	3,732,000	374,430	387,430	1.365	1.370
6/30/04-05	273,647	2,658,617	2,990,990	2,954,869	2,672,000	2,685,000	13,383	26,383	0.976	0.981
6/30/05-06	285,139	2,760,967	3,144,617	3,101,247	3,101,000	3,145,000	340,033	384,033	1.088	1.103
6/30/06-07	298,516	2,886,985	3,311,521	3,278,764	3,279,000	3,312,000	392,015	425,015	1.098	1.109
6/30/07-08	314,231	1,546,966	1,800,615	1,972,637	1,801,000	1,973,000	254,034	426,034	0.573	0.628
6/30/08-09	302,998	2,334,096	2,748,456	2,807,400	2,748,000	2,807,000	413,904	472,904	0.907	0.926
6/30/09-10	297,252	3,347,831	4,008,621	3,889,723	3,890,000	4,009,000	542,169	661,169	1.309	1.349
6/30/10-11	292,432	2,885,418	3,546,667	3,481,963	3,482,000	3,547,000	596,582	661,582	1.191	1.213
6/30/11-12	295,908	2,945,081	3,725,962	3,658,157	3,658,000	3,726,000	712,919	780,919	1.236	1.259
6/30/12-13	301,541	2,610,770	3,409,108	3,440,994	3,409,000	3,441,000	798,230	830,230	1.131	1.141
6/30/13-14	309,910	2,929,774	4,023,996	3,935,459	3,935,000	4,024,000	1,005,226	1,094,226	1.270	1.298
6/30/14-15	316,552	2,497,353	3,922,264	3,796,580	3,797,000	3,922,000	1,299,647	1,424,647	1.199	1.239
6/30/15-16	316,565	1,585,983	3,012,680	3,255,360	3,013,000	3,255,000	1,427,017	1,669,017	0.952	1.028
6/30/16-17	292,403	1,425,456	3,487,736	3,479,058	3,479,000	3,488,000	2,053,544	2,062,544	1.190	1.193
6/30/17-18	292,956	649,664	3,107,957	3,341,442	3,108,000	3,341,000	2,458,336	2,691,336	1.061	1.140
Total	9,281,570	207,584,286	203,717,914	190,042,978	226,644,465	229,683,349	19,060,179	22,099,062		
Tot 6/30/84-18	9,281,570	172,399,665	189,868,682	190,042,978	187,783,000	189,330,940	15,383,335	16,931,275	2.023	2.040

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) Sum of Section 2, Exhibit 1, Page 2, Column 3 and Section 2, Exhibit 1, Page 9, Column 8

(4) From Section 2, Exhibit 1, Page 2, Column 8

(5) From Section 2, Exhibit 1, Page 3, Column 8

(6), (7) Selected based on (3), (4), and (5)

(8) = (6) - (3)

(9) = (7) - (3)

(10) = (6) / (2) / 10

(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Developmental Services - Cluster 1
Indemnity

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Accident Year	Payroll (000's)	Paid Loss Excluding Lump Sum	Paid LDF	Adjstmnt for Extra Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/16-17	Paid Counts 7/1/17-18	Average Outstanding Claim	Average Age
All Prior Yrs		20,565,592							6	5		81
6/30/82-83		4,309,167	1.006	1.000	4,333,821	390,400	4,724,221		0	0		
6/30/83-84		8,104,814	1.008	1.050	8,575,861	549,150	9,125,011		3	3	157,016	72
6/30/84-85	181,560	5,655,954	1.010	1.000	5,711,089	1,154,851	6,865,940	3.782	0	0		
6/30/85-86	195,247	9,334,452	1.012	1.000	9,444,297	937,644	10,381,941	5.317	0	0		
6/30/86-87	224,370	11,412,789	1.014	1.000	11,570,186	2,067,717	13,637,903	6.078	0	0		
6/30/87-88	262,864	17,105,435	1.019	1.000	17,428,046	2,795,764	20,223,810	7.694	2	2	161,306	70
6/30/88-89	283,884	16,577,438	1.024	1.000	16,974,542	3,639,613	20,614,155	7.261	2	2	198,552	88
6/30/89-90	285,078	11,631,137	1.029	1.000	11,969,303	3,387,581	15,356,884	5.387	0	0		
6/30/90-91	267,732	8,301,627	1.035	1.000	8,594,248	2,571,844	11,166,092	4.171	0	0		
6/30/91-92	261,442	5,912,050	1.041	1.000	6,157,164	1,811,836	7,969,000	3.048	2	2	122,557	67
6/30/92-93	259,992	3,210,473	1.047	1.000	3,360,298	982,535	4,342,833	1.670	0	0		
6/30/93-94	257,062	2,527,522	1.052	1.000	2,658,703	972,585	3,631,287	1.413	0	0		
6/30/94-95	255,854	1,526,329	1.057	1.000	1,613,574	557,706	2,171,280	0.849	0	0		
6/30/95-96	255,539	2,421,465	1.062	1.000	2,572,677	750,386	3,323,063	1.300	1	1	151,211	62
6/30/96-97	270,071	1,787,477	1.068	1.000	1,908,594	683,303	2,591,897	0.960	0	0		
6/30/97-98	245,367	2,162,985	1.073	1.000	2,321,093	536,377	2,857,469	1.165	1	1	158,108	58
6/30/98-99	251,453	1,758,227	1.079	1.000	1,897,477	656,332	2,553,809	1.016	0	0		
6/30/99-00	255,641	2,144,841	1.086	1.000	2,328,333	344,912	2,673,246	1.046	1	1	183,492	74
6/30/00-01	263,918	3,174,172	1.095	1.000	3,476,818	254,737	3,731,554	1.414	5	2	151,323	66
6/30/01-02	267,598	1,946,268	1.104	1.000	2,149,315	287,644	2,436,959	0.911	0	0		
6/30/02-03	274,465	2,720,211	1.113	1.000	3,026,241	340,415	3,366,656	1.227	1	1	306,030	73
6/30/03-04	272,384	3,034,745	1.123	1.000	3,408,400	323,315	3,731,715	1.370	2	3	124,552	61
6/30/04-05	273,647	2,315,265	1.136	1.000	2,630,267	360,723	2,990,990	1.093	0	0		
6/30/05-06	285,139	2,439,465	1.148	1.000	2,800,342	344,275	3,144,617	1.103	1	1	360,877	68
6/30/06-07	298,516	2,467,452	1.159	1.000	2,859,642	451,879	3,311,521	1.109	1	1	392,189	71
6/30/07-08	314,231	1,381,465	1.169	1.000	1,615,464	185,151	1,800,615	0.573	1	2	116,999	59
6/30/08-09	302,998	2,000,096	1.186	1.000	2,372,856	375,600	2,748,456	0.907	2	2	186,380	57
6/30/09-10	297,252	2,829,952	1.207	1.000	3,414,602	594,019	4,008,621	1.349	4	1	584,650	43
6/30/10-11	292,432	2,466,418	1.230	1.000	3,032,492	514,174	3,546,667	1.213	5	2	283,037	63
6/30/11-12	295,908	2,431,645	1.264	1.000	3,074,048	651,915	3,725,962	1.259	7	4	160,601	58
6/30/12-13	301,541	2,076,543	1.302	1.000	2,703,806	705,302	3,409,108	1.131	8	3	209,088	56
6/30/13-14	309,910	2,380,774	1.374	1.000	3,271,586	752,410	4,023,996	1.298	16	13	68,524	51
6/30/14-15	316,552	2,294,853	1.491	1.000	3,422,264	500,000	3,922,264	1.239	23	19	59,337	53
6/30/15-16	316,565	1,453,482	1.720	1.000	2,499,678	513,002	3,012,680	0.952	52	16	65,387	51
6/30/16-17	292,403	1,290,456	2.242	1.000	2,893,402	594,334	3,487,736	1.193	195	47	34,105	50
6/30/17-18	292,956	624,664	4.175	1.000	2,607,957	500,000	3,107,957	1.061		166	11,948	46
Total	9,281,570	175,777,702			170,678,484	33,039,430	203,717,914		341	300		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3), (4) From Section 2, Exhibit 1, Page 7

(5) Based on information from the MA WCIRB

(6) = (3) x (4) x (5)

(7) From Section 2, Exhibit 1, Page 9, Column 13

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10), (11) Provided by Commonwealth of Massachusetts

(12) = Maximum of [{(6) - (3)} / (11)] and 0

(13) Calculated for claimants that had an indemnity payment within the last calendar year.

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Developmental Services - Cluster 1
Indemnity

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss Excluding Lump Sum	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	181,560	3.309	5,655,954	1.010	5,713,954	1,154,851	6,868,805	3.783	3.147
6/30/85-86	195,247	4.904	9,334,452	1.012	9,445,816	937,644	10,383,460	5.318	4.838
6/30/86-87	224,370	5.443	11,412,789	1.014	11,578,923	2,067,717	13,646,640	6.082	5.161
6/30/87-88	262,864	6.253	17,105,435	1.019	17,409,699	2,795,764	20,205,463	7.687	6.623
6/30/88-89	283,884	6.133	16,577,438	1.024	16,984,743	3,639,613	20,624,356	7.265	5.983
6/30/89-90	285,078	4.978	11,631,137	1.029	12,032,077	3,387,581	15,419,658	5.409	4.221
6/30/90-91	267,732	3.187	8,301,627	1.035	8,592,128	2,571,844	11,163,972	4.170	3.209
6/30/91-92	261,442	2.324	5,912,050	1.041	6,153,949	1,811,836	7,965,785	3.047	2.354
6/30/92-93	259,992	1.275	3,210,473	1.047	3,358,232	982,535	4,340,767	1.670	1.292
6/30/93-94	257,062	1.021	2,527,522	1.052	2,657,062	972,585	3,629,647	1.412	1.034
6/30/94-95	255,854	0.635	1,526,329	1.057	1,614,200	557,706	2,171,906	0.849	0.631
6/30/95-96	255,539	0.990	2,421,465	1.062	2,570,188	750,386	3,320,574	1.299	1.006
6/30/96-97	270,071	0.709	1,787,477	1.068	1,909,012	683,303	2,592,315	0.960	0.707
6/30/97-98	245,367	0.931	2,162,985	1.073	2,318,539	536,377	2,854,916	1.164	0.945
6/30/98-99	251,453	0.756	1,758,227	1.079	1,897,714	656,332	2,554,045	1.016	0.755
6/30/99-00	255,641	0.898	2,144,841	1.086	2,325,806	344,912	2,670,718	1.045	0.910
6/30/00-01	263,918	1.267	3,174,172	1.095	3,465,157	254,737	3,719,894	1.409	1.313
6/30/01-02	267,598	0.806	1,946,268	1.104	2,149,994	287,644	2,437,638	0.911	0.803
6/30/02-03	274,465	1.076	2,720,211	1.113	3,018,875	340,415	3,359,290	1.224	1.100
6/30/03-04	272,384	1.210	3,034,745	1.123	3,396,159	323,315	3,719,475	1.366	1.247
6/30/04-05	273,647	0.851	2,315,265	1.136	2,594,146	360,723	2,954,869	1.080	0.948
6/30/05-06	285,139	0.864	2,439,465	1.148	2,756,973	344,275	3,101,247	1.088	0.967
6/30/06-07	298,516	0.878	2,467,452	1.159	2,826,885	451,879	3,278,764	1.098	0.947
6/30/07-08	314,231	0.892	1,381,465	1.169	1,787,486	185,151	1,972,637	0.628	0.569
6/30/08-09	302,998	0.907	2,000,096	1.186	2,431,800	375,600	2,807,400	0.927	0.803
6/30/09-10	297,252	0.915	2,829,952	1.207	3,295,704	594,019	3,889,723	1.309	1.109
6/30/10-11	292,432	0.918	2,466,418	1.230	2,967,789	514,174	3,481,963	1.191	1.015
6/30/11-12	295,908	0.929	2,431,645	1.264	3,006,243	651,915	3,658,157	1.236	1.016
6/30/12-13	301,541	0.942	2,076,543	1.302	2,735,692	705,302	3,440,994	1.141	0.907
6/30/13-14	309,910	0.951	2,380,774	1.374	3,183,049	752,410	3,935,459	1.270	1.027
6/30/14-15	316,552	0.961	2,294,853	1.491	3,296,580	500,000	3,796,580	1.199	1.041
6/30/15-16	316,565	0.973	1,453,482	1.720	2,742,358	513,002	3,255,360	1.028	0.866
6/30/16-17	292,403	0.984	1,290,456	2.242	2,884,724	594,334	3,479,058	1.190	0.987
6/30/17-18	292,956	0.995	624,664	4.175	2,841,442	500,000	3,341,442	1.141	0.970
Total	9,281,570		142,798,128		157,943,097	32,099,880	190,042,978		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 2, Exhibit 1, Page 4, Column 11

(4) From Section 2, Exhibit 1, Page 2, Column 3

(5) From Section 2, Exhibit 1, Page 2, Column 4

(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]

(7) From Section 2, Exhibit 1, Page 9, Column 13

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Developmental Services - Cluster 1

Indemnity

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Exp Ult Loss Excluding Lump Sum	Unadjusted Loss Cost	Benefit Level Factor	Benefit Adjusted Loss Cost	Loss Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									3.309	3.309
6/30/85-86									4.904	4.904
6/30/86-87									5.443	5.443
6/30/87-88									6.253	6.253
6/30/88-89									6.133	6.133
6/30/89-90									4.978	4.978
6/30/90-91	267,732	8,594,248	3.210	0.983	3.156	1.150	3.629	0.884	3.216	3.187
6/30/91-92	261,442	6,157,164	2.355	1.079	2.540	1.144	2.907	0.810	2.325	2.324
6/30/92-93	259,992	3,360,298	1.292	1.258	1.626	1.138	1.851	0.698	1.285	1.275
6/30/93-94	257,062	2,658,703	1.034	1.242	1.284	1.133	1.455	0.711	1.030	1.021
6/30/94-95	255,854	1,613,574	0.631	1.230	0.776	1.127	0.875	0.721	0.640	0.635
6/30/95-96	255,539	2,572,677	1.007	1.220	1.229	1.122	1.378	0.731	0.986	0.990
6/30/96-97	270,071	1,908,594	0.707	1.208	0.854	1.116	0.953	0.742	0.715	0.709
6/30/97-98	245,367	2,321,093	0.946	1.193	1.128	1.110	1.253	0.755	0.928	0.931
6/30/98-99	251,453	1,897,477	0.755	1.177	0.888	1.105	0.981	0.769	0.762	0.756
6/30/99-00	255,641	2,328,333	0.911	1.158	1.055	1.099	1.160	0.785	0.889	0.898
6/30/00-01	263,918	3,476,818	1.317	1.129	1.487	1.094	1.627	0.810	1.254	1.267
6/30/01-02	267,598	2,149,315	0.803	1.107	0.889	1.088	0.968	0.830	0.810	0.806
6/30/02-03	274,465	3,026,241	1.103	1.103	1.216	1.083	1.317	0.837	1.076	1.076
6/30/03-04	272,384	3,408,400	1.251	1.103	1.380	1.078	1.487	0.841	1.194	1.210
6/30/04-05	273,647	2,630,267	0.961	1.096	1.053	1.072	1.130	0.851	0.860	0.851
6/30/05-06	285,139	2,800,342	0.982	1.085	1.065	1.067	1.137	0.864	0.874	0.864
6/30/06-07	298,516	2,859,642	0.958	1.073	1.028	1.062	1.091	0.878	0.888	0.878
6/30/07-08	314,231	1,615,464	0.514	1.061	0.546	1.056	0.576	0.892	0.902	0.892
6/30/08-09	302,998	2,372,856	0.783	1.049	0.821	1.051	0.863	0.907	0.917	0.907
6/30/09-10	297,252	3,414,602	1.149	1.045	1.200	1.046	1.255	0.915	0.925	0.915
6/30/10-11	292,432	3,032,492	1.037	1.046	1.085	1.041	1.129	0.918	0.929	0.918
6/30/11-12	295,908	3,074,048	1.039	1.039	1.080	1.036	1.118	0.929	0.939	0.929
6/30/12-13	301,541	2,703,806	0.897	1.030	0.924	1.030	0.952	0.942	0.953	0.942
6/30/13-14	309,910	3,271,586	1.056	1.026	1.083	1.025	1.110	0.951	0.961	0.951
6/30/14-15	316,552	3,422,264	1.081	1.020	1.103	1.020	1.125	0.961	0.971	0.961
6/30/15-16	316,565	2,499,678	0.790	1.013	0.800	1.015	0.812	0.973	0.984	0.973
6/30/16-17	292,403	2,893,402	0.990	1.006	0.995	1.010	1.005	0.984	0.995	0.984
6/30/17-18	292,956	2,607,957	0.890	1.000	0.890	1.005	0.895	0.995		0.995
Total	7,848,567	84,671,339								

Trend Last 4 (ex 17-18):	-5.6%	Avg 3 (ex 17-18):	0.981
Trend Last 8 (ex 17-18):	-3.1%	Avg 5 (ex 17-18):	1.001
Trend Last 12 (ex 17-18):	0.9%	Avg 10 (ex 17-18):	0.995
Prior Selected Trend:	0.5%	Prior Sel Avg:	1.000
Selected Trend:	0.5%	Sel. Loss Cost:	1.000

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 2, Exhibit 1, Page 2, Column 6

(4) = (3) / (2) / 10

(5) Based on information from the MA WCRIB

(6) = (4) x (5)

(7) Based on Selected Trend from (6)

(8) = (6) x (7)

(9) = Sel. Loss Cost / [(5) * (7)]

(10) From prior Aon analysis as of June 30, 2017

(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Developmental Services - Cluster 1
Indemnity

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend	0.960	
(2)	Credibility	41%	
(3)	Average Pmt Trend Statewide	0.960	
(4)	Credibility Weighted Trend	0.960	
		(Low)	(High)
(5)	Selected Range	0.950	0.965
(6)	Incremental Paid for 2018	237,468	237,468
(7)	Estimated Reserve	4,511,887	6,508,774
(8)	Paid to Date (82 & Prior)	20,565,592	20,565,592
(9)	Est Ult Paid for 1982 & Prior	25,077,479	27,074,366

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	264,346	302,843
(11)	Projected Number of Years	7	7
(12)	Estimated Reserve	1,850,421	2,119,900
(13)	Paid to Date (82 & Prior)	20,565,592	20,328,124
(14)	Est Ult Paid for 1982 & Prior	22,416,013	22,448,024
(14a)	Paid Counts During Fiscal Year	5	6
		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	23,746,746	25,223,829
(16)	Lump Sum Ultimates	1,265,498	1,265,498
(17)	Ult Loss Including Lump Sums	**25,012,244**	**26,489,327**
(18)	Implied Tail	1.155	1.227
(19)	Ult Loss Inc Lump Sums @ 6/17	25,169,925	26,799,320

NOTES:

(1) From Section 2, Exhibit 1, Page 6
(2) = (Average of Section 2, Exhibit 1, Page 6, Column 3 / 3,000,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 2, Exhibit 1, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 2, Exhibit 1, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) From Section 2, Exhibit 1, Page 9, Column 13
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2017

Commonwealth of Massachusetts

Workers Compensation

Reserve Analysis at June 30, 2018

Department of Developmental Services - Cluster 1

Indemnity

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	689,918	13.444			
1993	2	793,381	13.584	1.150		
1994	3	677,152	13.426	0.854		
1995	4	616,229	13.331	0.910		
1996	5	581,038	13.273	0.943		
1997	6	667,765	13.412	1.149		
1998	7	676,041	13.424	1.012		
1999	8	626,143	13.347	0.926		
2000	9	638,144	13.366	1.019	n =	27
2001	10	586,837	13.283	0.920	S(x) =	54,135
2002	11	551,859	13.221	0.940	S(x-sq) =	108,542,313
2003	12	510,510	13.143	0.925	S(xy) =	707,118
2004	13	475,438	13.072	0.931	S(y) =	353
2005	14	461,151	13.041	0.970	D =	44,226
2006	15	476,801	13.075	1.034	slope =	-0.038
2007	16	429,059	12.969	0.900	Avg Trend =	0.962
2008	17	388,693	12.871	0.906		
2009	18	397,505	12.893	1.023		
2010	19	401,537	12.903	1.010		
2011	20	390,154	12.874	0.972		
2012	21	372,558	12.828	0.955		
2013	22	384,664	12.860	1.032		
2014	23	380,197	12.848	0.988		
2015	24	352,959	12.774	0.928		
2016	25	290,691	12.580	0.824		
2017	26	264,879	12.487	0.911		
2018	26	237,468	12.378	0.817		
					Selected Trend:	**0.960**

NOTES:

(3) 2018 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2017

(4) LN [(3)]

(5) Eg. 2018: 0.817 = 237468 / 264879

Commonwealth of Massachusetts Workers Compensation
Department of Developmental Services - Cluster 1
INDEMNITY
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Accident Yr End	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432
June-83	303,088	716,212	1,018,528	1,273,160	1,522,276	1,772,634	2,026,466	2,293,172	2,479,591	2,709,942	2,878,245	2,989,792	3,133,165	3,273,307	3,334,466	3,383,940	3,420,864	3,471,952	3,531,863	3,593,426	3,656,287	3,718,769	3,782,583	3,849,168	3,918,660	3,991,417	4,067,350	4,144,239	4,190,906	4,231,391	4,273,198	4,309,167	4,309,167	4,309,167	4,309,167
June-84	588,752	1,391,250	1,978,503	2,473,129	2,957,038	3,430,512	3,850,638	4,248,292	4,569,012	4,852,567	5,084,077	5,325,765	5,500,225	5,591,777	5,716,071	5,844,905	5,981,927	6,097,750	6,217,962	6,335,407	6,446,404	6,561,447	6,682,092	6,807,737	6,918,835	7,027,806	7,138,148	7,248,169	7,362,291	7,479,325	7,598,225	7,719,150	7,843,266	7,972,071	8,104,814
June-85	722,238	1,706,685	2,427,085	3,021,356	3,575,162	4,153,362	4,555,210	4,859,145	5,067,185	5,195,242	5,289,258	5,335,046	5,422,572	5,464,010	5,505,997	5,522,923	5,523,036	5,580,502	5,609,877	5,639,252	5,659,166	5,650,202	5,650,202	5,650,202	5,650,202	5,650,202	5,650,202	5,652,195	5,655,860	5,655,860	5,655,954	5,655,954	5,655,954	5,655,954	
June-86	1,095,655	2,589,088	3,658,454	4,589,190	5,452,112	6,125,447	6,630,963	7,055,749	7,268,651	7,575,650	7,835,016	8,089,718	8,284,822	8,452,458	8,677,431	8,856,536	8,960,945	9,024,666	9,066,019	9,108,290	9,147,296	9,188,006	9,230,664	9,275,183	9,320,262	9,334,452	9,334,452	9,334,452	9,334,452	9,334,452	9,334,452	9,334,452	9,334,452		
June-87	1,432,565	3,348,783	4,705,173	6,001,822	7,077,490	7,800,986	8,402,000	9,027,460	9,393,871	9,735,307	10,048,389	10,319,413	10,602,871	10,771,580	10,933,614	11,088,267	11,148,911	11,204,986	11,255,712	11,281,293	11,313,500	11,347,192	11,382,355	11,412,789	11,412,789	11,412,789	11,412,789	11,412,789	11,412,789	11,412,789	11,412,789	11,412,789			
June-88	2,142,725	4,931,624	7,312,968	9,157,962	10,751,119	11,652,385	12,239,990	12,826,004	13,145,803	13,410,989	13,647,380	13,914,189	14,176,053	14,393,869	14,564,189	14,732,219	14,899,699	15,069,301	15,232,127	15,401,826	15,590,731	15,776,168	15,939,935	16,091,855	16,248,755	16,410,714	16,574,836	16,739,445	16,857,172	16,979,214	17,105,435				
June-89	2,139,859	5,737,843	8,345,508	10,235,005	11,538,085	12,380,476	13,056,104	13,607,875	13,950,193	14,223,676	14,460,790	14,677,503	14,820,152	14,959,611	15,088,991	15,215,644	15,354,762	15,504,713	15,612,328	15,710,703	15,815,015	15,923,590	16,033,593	16,140,651	16,239,237	16,310,241	16,382,887	16,458,118	16,535,361	16,577,438					
June-90	2,678,119	5,989,136	8,059,169	9,355,215	10,163,757	10,729,296	11,079,915	11,298,239	11,383,933	11,541,269	11,650,902	11,599,979	11,605,663	11,609,714	11,609,714	11,609,714	11,609,714	11,609,714	11,610,392	11,610,392	11,612,790	11,614,053	11,614,400	11,617,685	11,631,137	11,631,137	11,631,137	11,631,137	11,631,137						
June-91	2,055,995	4,525,519	5,956,270	6,809,892	7,377,934	7,700,162	7,848,119	7,941,980	8,070,661	8,111,443	8,150,308	8,195,730	8,243,748	8,275,457	8,287,806	8,289,633	8,289,633	8,289,927	8,295,115	8,296,069	8,296,953	8,297,667	8,298,631	8,299,673	8,300,774	8,301,627	8,301,627	8,301,627							
June-92	1,556,680	2,907,997	3,613,911	4,262,894	4,511,682	4,736,540	4,868,155	4,962,680	5,049,867	5,098,658	5,131,848	5,177,939	5,259,492	5,311,896	5,373,855	5,435,773	5,480,341	5,518,481	5,558,121	5,598,760	5,641,750	5,685,342	5,729,682	5,774,150	5,819,387	5,864,563	5,912,050								
June-93	931,603	1,916,981	2,439,817	2,755,036	2,906,872	3,136,998	3,162,217	3,209,301	3,219,019	3,198,001	3,197,828	3,197,728	3,197,728	3,197,728	3,204,287	3,210,473	3,210,473	3,210,473	3,210,473	3,210,473	3,210,473	3,210,473	3,210,473	3,210,473	3,210,473	3,210,473									
June-94	923,316	1,598,259	1,935,049	2,093,050	2,066,940	2,146,254	2,134,209	2,198,365	2,247,827	2,310,431	2,340,041	2,380,852	2,417,221	2,452,624	2,487,353	2,524,486	2,527,522	2,527,522	2,527,522	2,527,522	2,527,522	2,527,522	2,527,522	2,527,522	2,527,522										
June-95	684,696	1,108,550	1,371,127	1,495,864	1,512,391	1,513,346	1,516,782	1,516,872	1,519,087	1,525,732	1,525,732	1,526,329	1,526,329	1,526,329	1,526,329	1,526,329	1,526,329	1,526,329	1,526,329	1,526,329	1,526,329	1,526,329	1,526,329	1,526,329											
June-96	662,860	1,328,147	1,644,584	1,839,246	1,990,102	2,077,055	2,112,857	2,140,474	2,201,270	2,201,845	2,202,890	2,202,890	2,182,890	2,187,427	2,194,160	2,208,436	2,231,248	2,258,374	2,287,650	2,319,312	2,348,935	2,388,784	2,421,465												
June-97	698,135	1,214,849	1,461,845	1,657,511	1,722,983	1,773,677	1,788,438	1,787,621	1,785,332	1,785,117	1,785,270	1,787,627	1,787,477	1,787,477	1,787,477	1,787,477	1,787,477	1,787,477	1,787,477	1,787,477	1,787,477	1,787,477													
June-98	573,338	1,086,539	1,414,459	1,559,175	1,673,532	1,729,564	1,772,059	1,810,392	1,842,420	1,881,278	1,926,278	1,959,704	1,981,242	2,002,689	2,024,867	2,047,330	2,069,948	2,092,836	2,116,101	2,139,333	2,162,985														
June-99	474,980	1,002,186	1,286,380	1,461,855	1,602,851	1,676,266	1,728,806	1,734,926	1,734,926	1,735,176	1,735,217	1,735,938	1,735,938	1,745,975	1,758,227	1,758,227	1,758,227	1,758,227	1,758,227	1,758,227															
June-00	554,623	1,006,163	1,264,666	1,446,800	1,556,201	1,579,597	1,684,607	1,741,958	1,774,284	1,814,835	1,849,313	1,888,484	1,924,733	1,960,546	1,996,627	2,033,129	2,070,234	2,107,204	2,144,841																
June-01	727,441	1,320,455	1,784,558	2,038,666	2,257,429	2,391,407	2,505,985	2,630,995	2,692,967	2,745,367	2,798,403	2,855,751	2,911,077	2,965,792	3,017,890	3,070,914	3,124,951	3,174,172																	
June-02	660,993	1,170,323	1,474,134	1,719,436	1,840,352	1,925,268	1,929,260	1,934,317	1,935,028	1,938,322	1,946,247	1,946,268	1,946,268	1,946,268	1,946,268	1,946,268	1,946,268																		
June-03	681,649	1,386,238	1,930,433	2,233,645	2,345,508	2,434,780	2,476,294	2,514,232	2,549,374	2,574,011	2,599,103	2,623,851	2,648,895	2,674,405	2,699,825	2,720,211																			
June-04	615,642	1,250,196	1,708,083	2,040,603	2,220,200	2,394,408	2,518,890	2,590,854	2,651,972	2,714,242	2,777,430	2,840,573	2,904,693	2,968,719	3,034,745																				
June-05	629,880	1,271,294	1,746,413	2,055,018	2,203,801	2,285,267	2,302,225	2,315,265	2,315,265	2,315,265	2,315,265	2,315,265	2,315,265	2,315,265																					
June-06	562,846	1,157,132	1,564,874	1,794,067	1,951,884	2,062,228	2,165,020	2,239,388	2,319,829	2,390,156	2,415,470	2,427,360	2,439,465																						
June-07	526,806	1,054,827	1,513,205	1,806,536	2,009,359	2,144,089	2,257,101	2,357,734	2,399,788	2,422,230	2,444,639	2,467,452																							
June-08	492,006	840,226	1,027,421	1,150,550	1,226,279	1,259,770	1,289,567	1,309,318	1,325,773	1,349,256	1,381,465																								
June-09	609,589	1,045,186	1,367,431	1,598,834	1,731,424	1,807,061	1,866,572	1,918,036	1,959,565	2,000,096																									
June-10	611,726	1,437,135	2,071,218	2,345,985	2,542,928	2,700,053	2,771,498	2,805,389	2,829,952																										
June-11	714,837	1,318,901	1,664,634	1,948,510	2,176,832	2,332,885	2,417,198	2,466,418																											
June-12	737,468	1,470,092	1,872,540	2,089,074	2,233,894	2,365,672	2,431,645																												
June-13	748,452	1,316,963	1,677,597	1,855,465	1,995,318	2,076,543																													
June-14	693,795	1,434,737	1,895,910	2,203,839	2,380,774																														
June-15	685,778	1,336,264	1,894,169	2,294,853																															
June-16	713,131	1,227,202	1,453,482																																
June-17	684,027	1,290,456																																	
June-18	624,664																																		

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432
June-83	2.363	1.422	1.250	1.196	1.164	1.143	1.132	1.081	1.093	1.062	1.039	1.048	1.045	1.019	1.015	1.011	1.015	1.017	1.017	1.017	1.017	1.017	1.018	1.018	1.019	1.019	1.019	1.011	1.010	1.010	1.008	1.000	1.000	1.000	1.000
June-84	2.363	1.422	1.250	1.196	1.160	1.122	1.103	1.075	1.062	1.048	1.048	1.033	1.017	1.022	1.023	1.023	1.019	1.020	1.019	1.018	1.018	1.018	1.019	1.016	1.016	1.016	1.015	1.016	1.016	1.016	1.016	1.016	1.016	1.017	
June-85	2.363	1.422	1.245	1.183	1.162	1.097	1.067	1.043	1.025	1.018	1.009	1.016	1.008	1.008	1.003	1.000	1.010	1.005	1.005	1.004	0.998	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000		
June-86	2.363	1.413	1.254	1.188	1.123	1.083	1.064	1.030	1.042	1.034	1.033	1.024	1.020	1.027	1.021	1.012	1.007	1.005	1.005	1.004	1.004	1.005	1.005	1.005	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
June-87	2.338	1.405	1.276	1.179	1.102	1.077	1.074	1.041	1.036	1.032	1.027	1.027	1.016	1.015	1.014	1.005	1.005	1.005	1.002	1.003	1.003	1.003	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
June-88	2.302	1.483	1.252	1.174	1.084	1.050	1.048	1.025	1.020	1.018	1.020	1.019	1.015	1.012	1.012	1.011	1.011	1.011	1.011	1.012	1.012	1.010	1.010	1.010	1.010	1.010	1.010	1.007	1.007	1.007					
June-89	2.681	1.454	1.226	1.127	1.073	1.055	1.042	1.025	1.020	1.017	1.015	1.010	1.009	1.009	1.008	1.009	1.010	1.007	1.006	1.007	1.007	1.007	1.007	1.006	1.004	1.004	1.005	1.005	1.003						
June-90	2.236	1.346	1.161	1.086	1.056	1.033	1.020	1.008	1.014	1.009	0.996	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000							
June-91	2.201	1.316	1.143	1.083	1.044	1.019	1.012	1.016	1.005	1.005	1.006	1.006	1.004	1.001	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000								
June-92	1.868	1.243	1.180	1.058	1.050	1.028	1.019	1.018	1.010	1.007	1.009	1.016	1.010	1.012	1.012	1.008	1.007	1.007	1.007	1.008	1.008	1.008	1.008	1.008	1.008	1.008									
June-93	2.058	1.273	1.129	1.055	1.079	1.008	1.015	1.003	0.993	1.000	1.000	1.000	1.000	1.002	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000										
June-94	1.731	1.211	1.082	0.988	1.038	0.994	1.030	1.022	1.028	1.013	1.017	1.015	1.015	1.014	1.015	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000											
June-95	1.619	1.237	1.091	1.011	1.001	1.002	1.000	1.001	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
June-96	2.004	1.238	1.118	1.082	1.044	1.017	1.013	1.028	1.000	1.000	1.000	0.991	1.002	1.003	1.007	1.010	1.012	1.013	1.014	1.013	1.017	1.014													
June-97	1.740	1.203	1.134	1.040	1.029	1.008	1.000	0.999	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
June-98	1.895	1.302	1.102	1.073	1.033	1.025	1.022	1.018	1.021	1.024	1.017	1.011	1.011	1.011	1.011	1.011	1.011	1.011	1.011	1.011															
June-99	2.110	1.284	1.136	1.096	1.046	1.031	1.004	1.000	1.000	1.000	1.000	1.000	1.006	1.007	1.000	1.000	1.000	1.000	1.000																
June-00	1.814	1.257	1.144	1.076	1.015	1.066	1.034	1.019	1.023	1.019	1.021	1.019	1.019	1.018	1.018	1.018	1.018	1.018																	
June-01	1.815	1.351	1.142	1.107	1.059	1.048	1.050	1.024	1.019	1.019	1.020	1.019	1.019	1.018	1.018	1.018	1.016																		
June-02	1.771	1.260	1.166	1.070	1.046	1.002	1.003	1.000	1.002	1.004	1.000	1.000	1.000	1.000	1.000	1.000																			
June-03	2.034	1.393	1.157	1.050	1.038	1.017	1.015	1.014	1.010	1.010	1.010	1.010	1.010	1.010	1.008																				
June-04	2.031	1.366	1.195	1.088	1.078	1.052	1.029	1.024	1.023	1.023	1.023	1.023	1.022	1.022																					
June-05	2.018	1.374	1.177	1.072	1.037	1.007	1.006	1.000	1.000	1.000	1.000	1.000	1.000																						
June-06	2.056	1.352	1.146	1.088	1.057	1.050	1.034	1.036	1.030	1.011	1.005	1.005																							
June-07	2.002	1.435	1.194	1.112	1.067	1.053	1.045	1.018	1.009	1.009	1.009																								
June-08	1.708	1.223	1.120	1.066	1.027	1.024	1.015	1.013	1.018	1.024																									
June-09	1.715	1.308	1.169	1.083	1.044	1.033	1.028	1.022	1.021																										
June-10	2.349	1.441	1.133	1.084	1.062	1.026	1.012	1.009																											
June-11	1.845	1.262	1.171	1.117	1.072	1.036	1.020																												
June-12	1.993	1.274	1.116	1.069	1.059	1.028																													
June-13	1.760	1.274	1.106	1.075	1.041																														
June-14	2.068	1.321	1.162	1.080																															
June-15	1.949	1.418	1.212																																
June-16	1.721	1.184																																	
June-17	1.887																																		

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	To Ult
Simple Avg																																				
All Yrs	2.022	1.328	1.168	1.095	1.064	1.041	1.033	1.022	1.020	1.016	1.013	1.012	1.011	1.010	1.009	1.007	1.007	1.007	1.006	1.006	1.006	1.006	1.005	1.005	1.005	1.006	1.005	1.005	1.005	1.006	1.005	1.004	1.005	1.008	1.000	
Latest 5	1.877	1.294	1.153	1.085	1.055	1.029	1.024	1.019	1.016	1.013	1.009	1.007	1.010	1.014	1.009	1.009	1.009	1.008	1.005	1.005	1.003	1.004	1.002	1.002	1.002	1.005	1.003	1.002	1.002	1.005	1.005					
Latest 3	1.852	1.308	1.160	1.075	1.057	1.030	1.020	1.014	1.016	1.015	1.005	1.009	1.011	1.011	1.008	1.012	1.011	1.010	1.004	1.008	1.006	1.005	1.000	1.003	1.003	1.003	1.002	1.004	1.003	1.002	1.000	1.005	1.005			
Volume Wtd																																				
All Yrs	2.090	1.349	1.183	1.109	1.071	1.046	1.038	1.024	1.021	1.018	1.015	1.014	1.011	1.011	1.009	1.007	1.008	1.007	1.006	1.006	1.006	1.006	1.006	1.005	1.005	1.005	1.005	1.004	1.005	1.005	1.004	1.005	1.007	1.011	1.000	
Latest 5	1.874	1.296	1.154	1.085	1.056	1.030	1.024	1.019	1.015	1.013	1.010	1.008	1.011	1.014	1.010	1.010	1.010	1.009	1.006	1.005	1.003	1.005	1.002	1.002	1.003	1.005	1.004	1.003	1.003	1.005	1.004					
Latest 3	1.850	1.311	1.162	1.075	1.058	1.030	1.019	1.014	1.015	1.013	1.005	1.010	1.011	1.012	1.010	1.013	1.012	1.010	1.004	1.009	1.007	1.005	1.000	1.004	1.003	1.002	1.002	1.004	1.004	1.003	1.000	1.005	1.007			

Dev Factor Selection																																				
Industry 1	2.946	1.574	1.235	1.110	1.036	1.025	1.016	1.009	1.007	1.006	1.006	1.010	1.003	1.005	1.003	1.004	1.005	1.003																		
Industry 2		1.901	1.354	1.158	1.073	1.026	1.025	1.013	1.006	1.010	1.006	1.014	1.007	1.003	1.003	1.003	1.002	1.006	1.002	1.003																
Prior	*1.903*	*1.323*	*1.137*	*1.086*	*1.053*	*1.031*	*1.028*	*1.020*	*1.018*	*1.011*	*1.010*	*1.011*	*1.012*	*1.010*	*1.010*	*1.008*	*1.008*	*1.004*	*1.006*	*1.004*	*1.005*	*1.005*	*1.005*	*1.005*	*1.005*	*1.005*	*1.006*	*1.006*	*1.005*	*1.005*	*1.005*	*1.002*	*1.002*	*1.002*	*1.011*	
Selected	1.862	1.304	1.153	1.085	1.055	1.030	1.028	1.019	1.017	1.015	1.009	1.010	1.010	1.012	1.010	1.007	1.008	1.009	1.006	1.006	1.005	1.005	1.005	1.005	1.005	1.005	1.006	1.006	1.005	1.005	1.005	1.002	1.002	1.002	1.002	1.006
FacToUlt	4.175	2.242	1.720	1.491	1.374	1.302	1.264	1.230	1.207	1.186	1.169	1.159	1.148	1.136	1.123	1.113	1.104	1.095	1.086	1.079	1.073	1.068	1.062	1.057	1.052	1.047	1.041	1.035	1.029	1.024	1.019	1.014	1.012	1.010	1.008	1.006
Percent of Ult	24.0%	44.6%	58.1%	67.1%	72.8%	76.8%	79.1%	81.3%	82.9%	84.3%	85.5%	86.3%	87.1%	88.0%	89.0%	89.9%	90.6%	91.3%	92.1%	92.7%	93.2%	93.7%	94.1%	94.6%	95.1%	95.5%	96.0%	96.6%	97.2%	97.7%	98.1%	98.6%	98.8%	99.0%	99.2%	99.4%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Developmental Services - Cluster 1
Indemnity

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/17		As of 6/18		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	25,169,925	26,799,320	25,012,244	26,489,327	(157,681)	-0.6%	(309,993)	-1.2%
6/30/82-83	4,969,315	4,974,280	4,724,221	4,728,945	(245,094)	-4.9%	(245,335)	-4.9%
6/30/83-84	9,028,000	9,037,030	9,125,000	9,134,136	97,000	1.1%	97,106	1.1%
6/30/84-85	6,899,000	6,966,911	6,818,000	6,865,940	(81,000)	-1.2%	(100,971)	-1.4%
6/30/85-86	10,282,000	10,293,000	10,282,000	10,293,000	0	0.0%	0	0.0%
6/30/86-87	13,615,000	13,683,000	13,494,000	13,507,000	(121,000)	-0.9%	(176,000)	-1.3%
6/30/87-88	20,210,000	20,881,000	20,205,000	20,224,000	(5,000)	0.0%	(657,000)	-3.1%
6/30/88-89	20,709,000	20,720,000	20,614,000	20,624,000	(95,000)	-0.5%	(96,000)	-0.5%
6/30/89-90	15,169,000	15,169,000	15,169,000	15,169,000	0	0.0%	0	0.0%
6/30/90-91	10,976,000	10,976,000	10,976,000	10,976,000	0	0.0%	0	0.0%
6/30/91-92	7,966,000	7,970,000	7,966,000	7,969,000	0	0.0%	(1,000)	0.0%
6/30/92-93	4,231,000	4,273,000	4,231,000	4,273,000	0	0.0%	0	0.0%
6/30/93-94	3,566,000	3,601,000	3,566,000	3,601,000	0	0.0%	0	0.0%
6/30/94-95	2,185,000	2,185,000	2,171,000	2,172,000	(14,000)	-0.6%	(13,000)	-0.6%
6/30/95-96	3,307,000	3,309,000	3,321,000	3,323,000	14,000	0.4%	14,000	0.4%
6/30/96-97	2,479,000	2,492,000	2,479,000	2,492,000	0	0.0%	0	0.0%
6/30/97-98	2,847,000	2,850,000	2,855,000	2,857,000	8,000	0.3%	7,000	0.2%
6/30/98-99	2,568,000	2,569,000	2,554,000	2,554,000	(14,000)	-0.5%	(15,000)	-0.6%
6/30/99-00	2,645,000	2,647,000	2,671,000	2,673,000	26,000	1.0%	26,000	1.0%
6/30/00-01	3,683,000	3,695,000	3,720,000	3,732,000	37,000	1.0%	37,000	1.0%
6/30/01-02	2,241,000	2,252,000	2,241,000	2,252,000	0	0.0%	0	0.0%
6/30/02-03	3,361,000	3,369,000	3,359,000	3,367,000	(2,000)	-0.1%	(2,000)	-0.1%
6/30/03-04	3,673,000	3,685,000	3,719,000	3,732,000	46,000	1.3%	47,000	1.3%
6/30/04-05	2,672,000	2,685,000	2,672,000	2,685,000	0	0.0%	0	0.0%
6/30/05-06	3,115,000	3,158,000	3,101,000	3,145,000	(14,000)	-0.4%	(13,000)	-0.4%
6/30/06-07	3,287,000	3,317,000	3,279,000	3,312,000	(8,000)	-0.2%	(5,000)	-0.2%
6/30/07-08	1,783,000	1,973,000	1,801,000	1,973,000	18,000	1.0%	0	0.0%
6/30/08-09	2,741,000	2,812,000	2,748,000	2,807,000	7,000	0.3%	(5,000)	-0.2%
6/30/09-10	3,921,000	4,048,000	3,890,000	4,009,000	(31,000)	-0.8%	(39,000)	-1.0%
6/30/10-11	3,480,000	3,548,000	3,482,000	3,547,000	2,000	0.1%	(1,000)	0.0%
6/30/11-12	3,626,000	3,695,000	3,658,000	3,726,000	32,000	0.9%	31,000	0.8%
6/30/12-13	3,410,000	3,448,000	3,409,000	3,441,000	(1,000)	0.0%	(7,000)	-0.2%
6/30/13-14	3,962,000	4,059,000	3,935,000	4,024,000	(27,000)	-0.7%	(35,000)	-0.9%
6/30/14-15	3,659,000	3,712,000	3,797,000	3,922,000	138,000	3.8%	210,000	5.7%
6/30/15-16	3,304,000	3,507,000	3,013,000	3,255,000	(291,000)	-8.8%	(252,000)	-7.2%
6/30/16-17	3,479,000	3,482,000	3,479,000	3,488,000	0	0.0%	6,000	0.2%
6/30/17-18								
Total	224,218,240	227,840,541	223,536,465	226,342,349	(681,775)	-0.3%	(1,498,192)	-0.7%

NOTES:

(2), (3) From prior Aon analysis as of June 30, 2017

(4), (5) From Section 2, Exhibit 1, Page 1, Columns 6, 7

(6) = (4) - (2)

(7) = (4) / (2) - 1

(8) = (5) - (3)

(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Developmental Services - Cluster 1
Indemnity

Calculation of Ultimate Lump Sum Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Accident Year	Paid Loss Excluding Lump Sum	Implied Cumulative LDF	Ult Loss Excluding Lump Sum	Selected Incr Lump Sum % Outstdg	Cumulative Lump Sum % Outstdg	Total Lump Sum Outstdg	Paid Lump Sum to Date	Est Ult Lump Sum - Incr Method	Ultimate Lump Sum Percentage	Lump Sum LDF	Est Ult Lump Sum - Paid Method	Selected Est Ultimate Lump Sums	Prior Est Ultimate Lump Sums
All Prior Yrs	20,565,592	1.191	24,485,288	0.0%	0.0%	0	1,265,498	1,265,498	5.2%	1.000	1,265,498	1,265,498	1,265,498
6/30/82-83	4,309,167	1.006	4,333,821	0.0%	0.0%	0	390,400	390,400	9.0%	1.000	390,400	390,400	390,400
6/30/83-84	8,104,814	1.058	8,575,861	0.0%	0.0%	0	549,150	549,150	6.4%	1.000	549,150	549,150	549,150
6/30/84-85	5,655,954	1.010	5,711,089	0.0%	0.0%	0	1,154,851	1,154,851	20.2%	1.000	1,154,851	1,154,851	1,154,851
6/30/85-86	9,334,452	1.012	9,444,297	0.0%	0.0%	0	937,644	937,644	9.9%	1.000	937,644	937,644	937,644
6/30/86-87	11,412,789	1.014	11,570,186	0.0%	0.0%	0	2,067,717	2,067,717	17.9%	1.000	2,067,717	2,067,717	2,067,717
6/30/87-88	17,105,435	1.019	17,428,046	0.0%	0.0%	0	2,795,764	2,795,764	16.0%	1.000	2,795,764	2,795,764	2,795,764
6/30/88-89	16,577,438	1.024	16,974,542	0.0%	0.0%	0	3,639,613	3,639,613	21.4%	1.000	3,639,613	3,639,613	3,639,613
6/30/89-90	11,631,137	1.029	11,969,303	0.0%	0.0%	0	3,387,581	3,387,581	28.3%	1.000	3,387,581	3,387,581	3,396,050
6/30/90-91	8,301,627	1.035	8,594,248	0.0%	0.0%	0	2,565,430	2,565,430	29.9%	1.005	2,578,257	2,571,844	2,573,133
6/30/91-92	5,912,050	1.041	6,157,164	0.0%	0.0%	0	1,806,412	1,806,412	29.3%	1.006	1,817,260	1,811,836	1,812,744
6/30/92-93	3,210,473	1.047	3,360,298	0.0%	0.0%	0	979,103	979,103	29.1%	1.007	985,967	982,535	983,028
6/30/93-94	2,527,522	1.052	2,658,703	0.0%	0.0%	0	968,701	968,701	36.4%	1.008	976,468	972,585	973,073
6/30/94-95	1,526,329	1.057	1,613,574	0.0%	0.0%	0	555,200	555,200	34.4%	1.009	560,211	557,706	557,986
6/30/95-96	2,421,465	1.062	2,572,677	0.0%	0.0%	0	746,640	746,640	29.0%	1.010	754,133	750,386	750,763
6/30/96-97	1,787,477	1.068	1,908,594	0.0%	0.0%	0	679,550	679,550	35.6%	1.011	687,056	683,303	683,646
6/30/97-98	2,162,985	1.073	2,321,093	0.0%	0.0%	0	533,163	533,163	23.0%	1.012	539,591	536,377	536,647
6/30/98-99	1,758,227	1.079	1,897,477	0.0%	0.0%	0	652,071	652,071	34.4%	1.013	660,592	656,332	656,662
6/30/99-00	2,144,841	1.086	2,328,333	0.0%	0.0%	0	342,501	342,501	14.7%	1.014	347,324	344,912	346,237
6/30/00-01	3,174,172	1.095	3,476,818	0.1%	0.1%	3,477	251,103	254,580	7.3%	1.015	254,893	254,737	256,564
6/30/01-02	1,946,268	1.104	2,149,315	0.1%	0.2%	4,299	283,214	287,512	13.4%	1.016	287,776	287,644	288,875
6/30/02-03	2,720,211	1.113	3,026,241	0.1%	0.3%	9,079	333,024	342,102	11.3%	1.017	338,727	340,415	345,922
6/30/03-04	3,034,745	1.123	3,408,400	0.2%	0.5%	17,042	309,825	326,867	9.6%	1.032	319,764	323,315	328,940
6/30/04-05	2,315,265	1.136	2,630,267	0.2%	0.7%	18,412	343,352	361,764	13.8%	1.048	359,682	360,723	366,134
6/30/05-06	2,439,465	1.148	2,800,342	0.2%	0.9%	25,203	321,502	346,705	12.4%	1.063	341,845	344,275	349,680
6/30/06-07	2,467,452	1.159	2,859,642	0.2%	1.1%	31,456	419,533	450,989	15.8%	1.079	452,769	451,879	460,670
6/30/07-08	1,381,465	1.169	1,615,464	0.3%	1.4%	22,616	165,501	188,117	11.6%	1.101	182,185	185,151	189,663
6/30/08-09	2,000,096	1.186	2,372,856	0.3%	1.7%	40,339	334,000	374,339	15.8%	1.128	376,861	375,600	384,647
6/30/09-10	2,829,952	1.207	3,414,602	0.3%	2.0%	68,292	517,879	586,171	17.2%	1.162	601,867	594,019	607,464
6/30/10-11	2,466,418	1.230	3,032,492	0.4%	2.4%	73,701	419,000	492,701	16.2%	1.278	535,648	514,174	500,000
6/30/11-12	2,431,645	1.264	3,074,048	0.9%	3.3%	101,201	513,436	614,637	20.0%	1.342	689,192	651,915	617,607
6/30/12-13	2,076,543	1.302	2,703,806	1.3%	4.6%	123,422	534,227	657,649	24.3%	1.409	752,956	705,302	677,432
6/30/13-14	2,380,774	1.374	3,271,586	1.7%	6.2%	203,410	549,000	752,410	23.0%	1.738	954,327	752,410	782,684
6/30/14-15	2,294,853	1.491	3,422,264	2.8%	9.0%	308,910	202,500	511,410	14.9%	2.324	470,510	500,000	508,724
6/30/15-16	1,453,482	1.720	2,499,678	3.9%	12.9%	322,792	132,501	455,293	18.2%	4.307	570,711	513,002	557,532
6/30/16-17	1,290,456	2.242	2,893,402	3.0%	15.9%	459,334	135,000	594,334	20.5%	11.648	1,572,514	594,334	568,409
6/30/17-18	624,664	4.175	2,607,957	2.2%	18.1%	472,694	25,000	497,694	19.1%	64.065	1,601,635	500,000	
Total	175,777,702		195,163,772			2,305,679	31,806,584	34,112,264	17.5%		36,758,939	34,304,928	33,861,555

NOTES:

(2) From Section 2, Exhibit 1, Page 2, Column 3

(3) = (4) / (2)

(4) From Section 2, Exhibit 1, Page 2, Column 6

(5) From Section 2, Exhibit 1, Page 11

(6) Downward sum of (5)

(7) = (6) x (4)

(8) From Section 2, Exhibit 1, Page 10

(9) = (7) + (8)

(10) = (9) / (4)

(11) From Section 2, Exhibit 1, Page 12

(12) = (8) x (11)

(13) Selected based on (9) and (12)

(14) From prior Aon analysis as of June 30, 2017

Commonwealth of Massachusetts Workers Compensation
Department of Developmental Services - Cluster 1
INDEMNITY

Lump Sum Development
Incremental Lump Sum Payments

Acc Yr Ending	0-12	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444
All Prior Yrs	0	0	0	0	0	0	12,000	24,000	9,000	0	0	40,000	0	172,000	110,000	50,000	70,500	30,000	208,333	116,667	324,998	0	60,000	35,000	0	3,000	0	0	0	0	0	0	0	0	0	0	0
Jun-83	0	0	0	0	0	0	0	0	25,500	25,000	52,900	7,000	30,000	95,000	145,000	0	10,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jun-84	0	0	0	0	0	32,500	19,000	0	45,000	108,650	69,000	145,000	0	45,000	0	30,000	10,000	0	45,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Jun-85	0	0	0	12,500	32,500	24,500	92,001	128,250	196,400	182,000	70,000	48,500	205,700	0	0	30,000	52,500	30,000	0	25,000	0	0	0	0	0	0	0	0	25,000	0	0	0	0	0			
Jun-86	0	0	23,500	19,200	19,100	93,844	174,500	476,000	95,500	0	0	0	36,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Jun-87	0	36,440	6,089	107,500	67,961	393,241	517,987	205,500	149,499	10,000	92,500	15,000	146,000	125,000	120,000	75,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
Jun-88	0	9,000	98,700	314,201	299,750	663,711	365,000	263,001	345,000	230,400	71,500	91,500	40,000	0	0	0	0	0	0	0	1	0	0	0	4,000	0	0	0	0	0	0						
Jun-89	0	51,500	107,000	525,918	831,350	467,250	201,495	468,000	227,500	96,000	182,000	228,100	128,500	0	0	0	0	33,333	45,833	45,834	0	0	0	0	0	0	0	0	0	0							
Jun-90	0	83,875	561,509	740,856	246,000	295,600	525,500	290,000	127,241	77,000	235,834	135,833	33,333	0	0	0	0	0	0	0	0	0	0	0	4,500	30,500	0	0	0								
Jun-91	10,000	315,052	866,050	279,500	174,700	509,340	313,000	57,788	15,000	25,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
Jun-92	54,000	344,161	128,250	87,501	545,500	236,500	52,500	15,000	30,000	60,000	88,000	0	0	0	0	0	165,000	0	0	0	0	0	0	0	0	0	0										
Jun-93	33,000	174,000	164,503	395,750	49,500	66,500	75,850	0	20,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0											
Jun-94	20,500	90,701	289,500	222,500	110,000	82,500	118,000	0	35,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
Jun-95	4,000	156,500	207,200	162,500	15,000	0	0	10,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0													
Jun-96	52,000	212,180	221,000	48,960	42,000	0	48,667	18,833	43,000	35,000	25,000	0	0	0	0	0	0	0	0	0	0	0	0														
Jun-97	36,500	178,250	214,000	155,300	85,500	10,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0															
Jun-98	10,000	108,163	240,000	120,000	30,000	0	0	0	0	0	0	25,000	0	0	0	0	0	0	0	0	0																
Jun-99	0	182,500	192,000	113,220	1,824	7,437	11,035	14,055	0	0	0	0	0	0	65,000	65,000	0	0	0	0																	
Jun-00	12,500	57,501	82,000	36,500	38,500	8,500	10,500	27,500	10,000	0	0	34,000	25,000	0	0	0	0	0	0																		
Jun-01	17,500	22,844	43,510	37,903	34,170	41,676	38,500	15,000	0	0	0	0	0	0	0	0	0	0																			
Jun-02	0	800	23,940	52,775	72,135	32,564	76,000	25,000	0	0	0	0	0	0	0	0	0																				
Jun-03	0	0	48,352	99,400	91,822	48,450	10,000	0	0	30,000	0	0	0	0	5,000	0																					
Jun-04	0	0	88,974	64,100	121,250	0	0	5,501	0	0	0	30,000	0	0	0																						
Jun-05	0	7,500	39,052	104,600	42,000	94,000	20,000	0	36,200	0	0	0	0	0																							
Jun-06	0	14,800	50,202	87,500	46,500	30,000	3,500	14,000	19,700	15,300	35,000	5,000	0																								
Jun-07	0	8,500	85,000	83,750	78,000	6,000	6,000	20,000	120,783	11,500	0	0																									
Jun-08	0	37,000	17,501	25,000	45,000	30,000	3,000	8,000	0	0	0																										
Jun-09	0	24,000	55,000	41,000	35,500	90,500	34,500	48,500	5,000	0																											
Jun-10	0	12,500	57,878	128,398	138,602	52,001	98,500	30,000	0																												
Jun-11	0	27,523	53,478	75,263	75,237	72,000	67,500	48,000																													
Jun-12	0	35,436	120,064	151,936	128,500	42,500	35,000																														
Jun-13	0	101,200	70,600	223,200	111,602	27,625																															
Jun-14	0	35,000	261,500	187,500	65,000																																
Jun-15	0	10,000	80,000	112,500																																	
Jun-16	0	115,000	17,501																																		
Jun-17	35,000	100,000																																			
Jun-18	25,000																																				

Cumulative Lump Sum Payments

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444
All Prior Yrs	0	0	0	0	0	0	12,000	36,000	45,000	45,000	45,000	85,000	85,000	257,000	367,000	417,000	487,500	517,500	725,833	842,500	1,167,498	1,167,498	1,227,498	1,262,498	1,262,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498
Jun-83	0	0	0	0	0	0	0	0	25,500	50,500	103,400	110,400	140,400	235,400	380,400	380,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400		
Jun-84	0	0	0	0	0	32,500	51,500	51,500	96,500	205,150	274,150	419,150	419,150	464,150	464,150	494,150	504,150	504,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150			
Jun-85	0	0	0	12,500	45,000	69,500	161,501	289,751	486,151	668,151	738,151	786,651	992,351	992,351	992,351	1,022,351	1,074,851	1,104,851	1,104,851	1,129,851	1,129,851	1,129,851	1,129,851	1,129,851	1,129,851	1,129,851	1,129,851	1,129,851	1,154,851	1,154,851	1,154,851	1,154,851	1,154,851	1,154,851			
Jun-86	0	0	23,500	42,700	61,800	155,644	330,144	806,144	901,644	901,644	901,644	901,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644					
Jun-87	0	36,440	42,529	150,029	217,990	611,231	1,129,218	1,334,718	1,484,217	1,494,217	1,586,717	1,601,717	1,747,717	1,872,717	1,992,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717						
Jun-88	0	9,000	107,700	421,901	721,651	1,385,362	1,750,362	2,013,363	2,358,363	2,588,763	2,660,263	2,751,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,764	2,791,764	2,791,764	2,795,764	2,795,764	2,795,764	2,795,764	2,795,764	2,795,764	2,795,764						
Jun-89	0	51,500	158,500	684,418	1,515,768	1,983,018	2,184,513	2,652,513	2,880,013	2,976,013	3,158,013	3,386,113	3,514,613	3,514,613	3,514,613	3,514,613	3,514,613	3,547,946	3,593,779	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613							
Jun-90	0	83,875	645,384	1,386,240	1,632,240	1,927,840	2,453,340	2,743,340	2,870,581	2,947,581	3,183,415	3,319,248	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,357,081	3,387,581	3,387,581	3,387,581	3,387,581									
Jun-91	10,000	325,052	1,191,102	1,470,602	1,645,302	2,154,642	2,467,642	2,525,430	2,540,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430									
Jun-92	54,000	398,161	526,411	613,912	1,159,412	1,395,912	1,448,412	1,463,412	1,493,412	1,553,412	1,641,412	1,641,412	1,641,412	1,641,412	1,641,412	1,641,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412										
Jun-93	33,000	207,000	371,503	767,253	816,753	883,253	959,103	959,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103											
Jun-94	20,500	111,201	400,701	623,201	733,201	815,701	933,701	933,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701												
Jun-95	4,000	160,500	367,700	530,200	545,200	545,200	545,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200													
Jun-96	52,000	264,180	485,180	534,140	576,140	576,140	624,807	643,640	686,640	721,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640														
Jun-97	36,500	214,750	428,750	584,050	669,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550															
Jun-98	10,000	118,163	358,163	478,163	508,163	508,163	508,163	508,163	508,163	508,163	508,163	533,163	533,163	533,163	533,163	533,163	533,163	533,163	533,163	533,163	533,163																
Jun-99	0	182,500	374,500	487,720	489,544	496,981	508,016	522,071	522,071	522,071	522,071	522,071	522,071	522,071	587,071	652,071	652,071	652,071	652,071	652,071																	
Jun-00	12,500	70,001	152,001	188,501	227,001	235,501	246,001	273,501	283,501	283,501	283,501	317,501	342,501	342,501	342,501	342,501	342,501	342,501	342,501																		
Jun-01	17,500	40,344	83,854	121,757	155,927	197,603	236,103	251,103	251,103	251,103	251,103	251,103	251,103	251,103	251,103	251,103	251,103	251,103																			
Jun-02	0	800	24,740	77,515	149,650	182,214	258,214	283,214	283,214	283,214	283,214	283,214	283,214	283,214	283,214	283,214	283,214																				
Jun-03	0	0	48,352	147,752	239,574	288,024	298,024	298,024	298,024	328,024	328,024	328,024	328,024	328,024	328,024	333,024	333,024																				
Jun-04	0	0	88,974	153,074	274,324	274,324	274,324	279,825	279,825	279,825	279,825	309,825	309,825	309,825	309,825																						
Jun-05	0	7,500	46,552	151,152	193,152	287,152	307,152	307,152	343,352	343,352	343,352	343,352	343,352	343,352																							
Jun-06	0	14,800	65,002	152,502	199,002	229,002	232,502	246,502	266,202	281,502	316,502	321,502	321,502																								
Jun-07	0	8,500	93,500	177,250	255,250	261,250	267,250	287,250	408,033	419,533	419,533	419,533																									
Jun-08	0	37,000	54,501	79,501	124,501	154,501	157,501	165,501	165,501	165,501	165,501																										
Jun-09	0	24,000	79,000	120,000	155,500	246,000	280,500	329,000	334,000	334,000																											
Jun-10	0	12,500	70,378	198,776	337,378	389,379	487,879	517,879	517,879																												
Jun-11	0	27,523	81,000	156,263	231,500	303,500	371,000	419,000																													
Jun-12	0	35,436	155,500	307,436	435,936	478,436	513,436																														
Jun-13	0	101,200	171,800	395,000	506,602	534,227																															
Jun-14	0	35,000	296,500	484,000	549,000																																
Jun-15	0	10,000	90,000	202,500																																	
Jun-16	0	115,000	132,501																																		
Jun-17	35,000	135,000																																			
Jun-18	25,000																																				

Commonwealth of Massachusetts Workers Compensation
Department of Developmental Services - Cluster 1
INDEMNITY
Lump Sum Development
Incremental Lump Sums as a % of Ultimate Losses Excluding Lump Sums

Acc Yr Ending	0-12	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444
All Prior Yrs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.002	0.000	0.007	0.004	0.002	0.003	0.001	0.009	0.005	0.013	0.000	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jun-83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.006	0.012	0.002	0.007	0.022	0.033	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Jun-84	0.000	0.000	0.000	0.000	0.000	0.004	0.002	0.000	0.005	0.013	0.008	0.017	0.000	0.005	0.000	0.003	0.001	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Jun-85	0.000	0.000	0.000	0.002	0.006	0.004	0.016	0.022	0.034	0.032	0.012	0.008	0.036	0.000	0.000	0.005	0.009	0.005	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000			
Jun-86	0.000	0.000	0.002	0.002	0.002	0.010	0.018	0.050	0.010	0.000	0.000	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Jun-87	0.000	0.003	0.001	0.009	0.006	0.034	0.045	0.018	0.013	0.001	0.008	0.001	0.013	0.011	0.010	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
Jun-88	0.000	0.001	0.006	0.018	0.017	0.038	0.021	0.015	0.020	0.013	0.004	0.005	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000						
Jun-89	0.000	0.003	0.006	0.031	0.049	0.028	0.012	0.028	0.013	0.006	0.011	0.013	0.008	0.000	0.000	0.000	0.000	0.002	0.003	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000							
Jun-90	0.000	0.007	0.047	0.062	0.021	0.025	0.044	0.024	0.011	0.006	0.020	0.011	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000								
Jun-91	0.001	0.037	0.101	0.033	0.020	0.059	0.036	0.007	0.002	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000									
Jun-92	0.009	0.056	0.021	0.014	0.089	0.038	0.009	0.002	0.005	0.010	0.014	0.000	0.000	0.000	0.000	0.000	0.027	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000										
Jun-93	0.010	0.052	0.049	0.118	0.015	0.020	0.023	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000											
Jun-94	0.008	0.034	0.109	0.084	0.041	0.031	0.044	0.000	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000												
Jun-95	0.002	0.097	0.128	0.101	0.009	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000													
Jun-96	0.020	0.082	0.086	0.019	0.016	0.000	0.019	0.007	0.017	0.014	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000														
Jun-97	0.019	0.093	0.112	0.081	0.045	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
Jun-98	0.004	0.047	0.103	0.052	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																
Jun-99	0.000	0.096	0.101	0.060	0.001	0.004	0.006	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.034	0.034	0.000	0.000	0.000	0.000																	
Jun-00	0.005	0.025	0.035	0.016	0.017	0.004	0.005	0.012	0.004	0.000	0.000	0.015	0.011	0.000	0.000	0.000	0.000	0.000	0.000																		
Jun-01	0.005	0.007	0.013	0.011	0.010	0.012	0.011	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																			
Jun-02	0.000	0.000	0.011	0.025	0.034	0.015	0.035	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																				
Jun-03	0.000	0.000	0.016	0.033	0.030	0.016	0.003	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.002	0.000																					
Jun-04	0.000	0.000	0.026	0.019	0.036	0.000	0.000	0.002	0.000	0.000	0.000	0.009	0.000	0.000	0.000																						
Jun-05	0.000	0.003	0.015	0.040	0.016	0.036	0.008	0.000	0.014	0.000	0.000	0.000	0.000	0.000																							
Jun-06	0.000	0.005	0.018	0.031	0.017	0.011	0.001	0.005	0.007	0.005	0.012	0.002	0.000																								
Jun-07	0.000	0.003	0.030	0.029	0.027	0.002	0.002	0.007	0.042	0.004	0.000	0.000																									
Jun-08	0.000	0.023	0.011	0.015	0.028	0.019	0.002	0.005	0.000	0.000	0.000																										
Jun-09	0.000	0.010	0.023	0.017	0.015	0.038	0.015	0.020	0.002	0.000																											
Jun-10	0.000	0.004	0.017	0.038	0.041	0.015	0.029	0.009	0.000																												
Jun-11	0.000	0.009	0.018	0.025	0.025	0.024	0.022	0.016																													
Jun-12	0.000	0.012	0.039	0.049	0.042	0.014	0.011																														
Jun-13	0.000	0.037	0.026	0.083	0.041	0.010																															
Jun-14	0.000	0.011	0.080	0.057	0.020																																
Jun-15	0.000	0.003	0.023	0.033																																	
Jun-16	0.000	0.046	0.007																																		
Jun-17	0.012	0.035																																			
Jun-18	0.010																																				

Averages		12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444
Simple Avg																																					
All Yrs (ex P)	0.003	0.024	0.038	0.037	0.023	0.017	0.015	0.010	0.008	0.005	0.004	0.004	0.003	0.002	0.004	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Latest 5	0.004	0.026	0.035	0.049	0.034	0.020	0.016	0.011	0.010	0.002	0.002	0.002	0.000	0.000	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000					
Latest 3	0.007	0.028	0.037	0.058	0.034	0.016	0.021	0.015	0.001	0.001	0.004	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
Olympic Avg																																					
All Yrs (ex P)	0.003	0.022	0.036	0.035	0.022	0.016	0.014	0.008	0.007	0.004	0.004	0.003	0.002	0.001	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Latest 10	0.001	0.017	0.023	0.035	0.027	0.016	0.008	0.007	0.003	0.001	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000										
Latest 5	0.003	0.028	0.030	0.047	0.036	0.018	0.016	0.011	0.003	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000						

Dev Factor Selection																																					
Prior	NA	0.022	0.030	0.040	0.029	0.017	0.012	0.007	0.006	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Selected	NA	0.022	0.030	0.039	0.028	0.017	0.013	0.009	0.004	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FacToUlt	NA	0.181	0.159	0.129	0.090	0.062	0.046	0.033	0.024	0.020	0.017	0.014	0.011	0.009	0.007	0.005	0.003	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Commonwealth of Massachusetts Workers Compensation
Department of Developmental Services - Cluster 1
INDEMNITY

Paid Loss Development
Paid Loss - Lump Sum only

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444
All Prior Yrs	0	0	0	0	0	0	12,000	36,000	45,000	45,000	45,000	85,000	85,000	257,000	367,000	417,000	487,500	517,500	725,833	842,500	1,167,498	1,167,498	1,227,498	1,262,498	1,262,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498	1,265,498
Jun-83	0	0	0	0	0	0	0	0	25,500	50,500	103,400	110,400	140,400	235,400	380,400	380,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	390,400	
Jun-84	0	0	0	0	0	32,500	51,500	51,500	96,500	205,150	274,150	419,150	419,150	464,150	464,150	494,150	504,150	504,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150	549,150		
Jun-85	0	0	0	12,500	45,000	69,500	161,501	289,751	486,151	668,151	738,151	786,651	992,351	992,351	992,351	1,022,351	1,074,851	1,104,851	1,104,851	1,129,851	1,129,851	1,129,851	1,129,851	1,129,851	1,129,851	1,129,851	1,129,851	1,129,851	1,154,851	1,154,851	1,154,851	1,154,851	1,154,851	1,154,851			
Jun-86	0	0	23,500	42,700	61,800	155,644	330,144	806,144	901,644	901,644	901,644	901,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644	937,644					
Jun-87	0	36,440	42,529	150,029	217,990	611,231	1,129,218	1,334,718	1,484,217	1,494,217	1,586,717	1,601,717	1,747,717	1,872,717	1,992,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717	2,067,717					
Jun-88	0	9,000	107,700	421,901	721,651	1,385,362	1,750,362	2,013,363	2,358,363	2,588,763	2,660,263	2,751,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,763	2,791,764	2,791,764	2,791,764	2,795,764	2,795,764	2,795,764	2,795,764	2,795,764	2,795,764	2,795,764						
Jun-89	0	51,500	158,500	684,418	1,515,768	1,983,018	2,184,513	2,652,513	2,880,013	2,976,013	3,158,013	3,386,113	3,514,613	3,514,613	3,514,613	3,514,613	3,514,613	3,547,946	3,593,779	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613	3,639,613							
Jun-90	0	83,875	645,384	1,386,240	1,632,240	1,927,840	2,453,340	2,743,340	2,870,581	2,947,581	3,183,415	3,319,248	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,352,581	3,357,081	3,387,581	3,387,581	3,387,581	3,387,581								
Jun-91	10,000	325,052	1,191,102	1,470,602	1,645,302	2,154,642	2,467,642	2,525,430	2,540,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430	2,565,430									
Jun-92	54,000	398,161	526,411	613,912	1,159,412	1,395,912	1,448,412	1,463,412	1,493,412	1,553,412	1,641,412	1,641,412	1,641,412	1,641,412	1,641,412	1,641,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412	1,806,412										
Jun-93	33,000	207,000	371,503	767,253	816,753	883,253	959,103	959,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103	979,103											
Jun-94	20,500	111,201	400,701	623,201	733,201	815,701	933,701	933,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701	968,701												
Jun-95	4,000	160,500	367,700	530,200	545,200	545,200	545,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200	555,200													
Jun-96	52,000	264,180	485,180	534,140	576,140	576,140	624,807	643,640	686,640	721,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640	746,640														
Jun-97	36,500	214,750	428,750	584,050	669,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550	679,550															
Jun-98	10,000	118,163	358,163	478,163	508,163	508,163	508,163	508,163	508,163	508,163	508,163	533,163	533,163	533,163	533,163	533,163	533,163	533,163	533,163	533,163	533,163																
Jun-99	0	182,500	374,500	487,720	489,544	496,981	508,016	522,071	522,071	522,071	522,071	522,071	522,071	522,071	587,071	652,071	652,071	652,071	652,071	652,071																	
Jun-00	12,500	70,001	152,001	188,501	227,001	235,501	246,001	273,501	283,501	283,501	283,501	317,501	342,501	342,501	342,501	342,501	342,501	342,501	342,501																		
Jun-01	17,500	40,344	83,854	121,757	155,927	197,603	236,103	251,103	251,103	251,103	251,103	251,103	251,103	251,103	251,103	251,103	251,103	251,103																			
Jun-02	0	800	24,740	77,515	149,650	182,214	258,214	283,214	283,214	283,214	283,214	283,214	283,214	283,214	283,214	283,214	283,214																				
Jun-03	0	0	48,352	147,752	239,574	288,024	298,024	298,024	298,024	328,024	328,024	328,024	328,024	328,024	333,024	333,024																					
Jun-04	0	0	88,974	153,074	274,324	274,324	274,324	279,825	279,825	279,825	279,825	309,825	309,825	309,825	309,825																						
Jun-05	0	7,500	46,552	151,152	193,152	287,152	307,152	307,152	343,352	343,352	343,352	343,352	343,352	343,352																							
Jun-06	0	14,800	65,002	152,502	199,002	229,002	232,502	246,502	266,202	281,502	316,502	321,502	321,502																								
Jun-07	0	8,500	93,500	177,250	255,250	261,250	267,250	287,250	408,033	419,533	419,533	419,533																									
Jun-08	0	37,000	54,501	79,501	124,501	154,501	157,501	165,501	165,501	165,501	165,501																										
Jun-09	0	24,000	79,000	120,000	155,500	246,000	280,500	329,000	334,000	334,000																											
Jun-10	0	12,500	70,378	198,776	337,378	389,379	487,879	517,879	517,879																												
Jun-11	0	27,523	81,000	156,263	231,500	303,500	371,000	419,000																													
Jun-12	0	35,436	155,500	307,436	435,936	478,436	513,436																														
Jun-13	0	101,200	171,800	395,000	506,602	534,227																															
Jun-14	0	35,000	296,500	484,000	549,000																																
Jun-15	0	10,000	90,000	202,500																																	
Jun-16	0	115,000	132,501																																		
Jun-17	35,000	135,000																																			
Jun-18	25,000																																				

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	To Ult
All Prior Yrs							3.000	1.250	1.000	1.000	1.889	1.000	3.024	1.428	1.136	1.169	1.062	1.403	1.161	1.386	1.000	1.051	1.029	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Jun-83									1.980	2.048	1.068	1.272	1.677	1.616	1.000	1.026	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Jun-84						1.585	1.000	1.874	2.126	1.336	1.529	1.000	1.107	1.000	1.065	1.020	1.000	1.089	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Jun-85				3.600	1.544	2.324	1.794	1.678	1.374	1.105	1.066	1.261	1.000	1.000	1.030	1.051	1.028	1.000	1.023	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.022	1.000	1.000	1.000	1.000					
Jun-86			1.817	1.447	2.519	2.121	2.442	1.118	1.000	1.000	1.000	1.040	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Jun-87		1.167	3.528	1.453	2.804	1.847	1.182	1.112	1.007	1.062	1.009	1.091	1.072	1.064	1.038	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Jun-88		11.967	3.917	1.710	1.920	1.263	1.150	1.171	1.098	1.028	1.034	1.015	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000							
Jun-89		3.078	4.318	2.215	1.308	1.102	1.214	1.086	1.033	1.061	1.072	1.038	1.000	1.000	1.000	1.000	1.009	1.013	1.013	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000								
Jun-90		7.695	2.148	1.177	1.181	1.273	1.118	1.046	1.027	1.080	1.043	1.010	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.009	1.000	1.000	1.000									
Jun-91	32.505	3.664	1.235	1.119	1.310	1.145	1.023	1.006	1.010	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000										
Jun-92	7.373	1.322	1.166	1.889	1.204	1.038	1.010	1.021	1.040	1.057	1.000	1.000	1.000	1.000	1.000	1.101	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000											
Jun-93	6.273	1.795	2.065	1.065	1.081	1.086	1.000	1.021	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
Jun-94	5.424	3.603	1.555	1.177	1.113	1.145	1.000	1.037	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
Jun-95	40.125	2.291	1.442	1.028	1.000	1.000	1.018	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
Jun-96	5.080	1.837	1.101	1.079	1.000	1.084	1.030	1.067	1.051	1.035	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000															
Jun-97	5.884	1.997	1.362	1.146	1.015	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																
Jun-98	11.816	3.031	1.335	1.063	1.000	1.000	1.000	1.000	1.000	1.000	1.049	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
Jun-99		2.052	1.302	1.004	1.015	1.022	1.028	1.000	1.000	1.000	1.000	1.000	1.000	1.125	1.111	1.000	1.000	1.000	1.000																		
Jun-00	5.600	2.171	1.240	1.204	1.037	1.045	1.112	1.037	1.000	1.000	1.120	1.079	1.000	1.000	1.000	1.000	1.000	1.000																			
Jun-01	2.305	2.078	1.452	1.281	1.267	1.195	1.064	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																				
Jun-02		30.925	3.133	1.931	1.218	1.417	1.097	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																					
Jun-03			3.056	1.621	1.202	1.035	1.000	1.000	1.101	1.000	1.000	1.000	1.000	1.015	1.000																						
Jun-04			1.720	1.792	1.000	1.000	1.020	1.000	1.000	1.000	1.107	1.000	1.000	1.000																							
Jun-05		6.207	3.247	1.278	1.487	1.070	1.000	1.118	1.000	1.000	1.000	1.000	1.000																								
Jun-06		4.392	2.346	1.305	1.151	1.015	1.060	1.080	1.057	1.124	1.016	1.000																									
Jun-07		11.000	1.896	1.440	1.024	1.023	1.075	1.420	1.028	1.000	1.000																										
Jun-08		1.473	1.459	1.566	1.241	1.019	1.051	1.000	1.000	1.000																											
Jun-09		3.292	1.519	1.296	1.582	1.140	1.173	1.015	1.000																												
Jun-10		5.630	2.824	1.697	1.154	1.253	1.061	1.000																													
Jun-11		2.943	1.929	1.481	1.311	1.222	1.129																														
Jun-12		4.388	1.977	1.418	1.097	1.073																															
Jun-13		1.698	2.299	1.283	1.055																																
Jun-14		8.471	1.632	1.134																																	
Jun-15		9.000	2.250																																		
Jun-16		1.152																																			
Jun-17	3.857																																				

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	To Ult
Simple Avg																																					
All Yrs (ex P)	11.477	5.011	2.076	1.463	1.305	1.226	1.138	1.108	1.109	1.074	1.045	1.034	1.037	1.037	1.012	1.010	1.002	1.006	1.002	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.003	1.000	1.000	1.000	1.000	1.000	1.000			
Latest 5		4.942	2.018	1.403	1.240	1.142	1.098	1.103	1.017	1.025	1.025	1.000	1.000	1.003	1.022	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000						
Latest 3		6.208	2.061	1.278	1.154	1.183	1.121	1.005	1.009	1.041	1.005	1.000	1.000	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Volume Wtd																																					
All Yrs (ex P)		2.671	1.680	1.314	1.233	1.164	1.109	1.071	1.039	1.039	1.032	1.026	1.011	1.013	1.008	1.010	1.003	1.004	1.003	1.000	1.000	1.000	1.000	1.000	1.002	1.000	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000			
Latest 5		2.853	1.944	1.337	1.171	1.152	1.099	1.094	1.018	1.023	1.021	1.000	1.000	1.003	1.036	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Latest 3		3.244	1.937	1.257	1.121	1.172	1.111	1.005	1.013	1.040	1.005	1.000	1.000	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					

Dev Factor Selection																																					
Prior	5.500	2.738	1.854	1.391	1.232	1.050	1.050	1.100	1.030	1.025	1.020	1.015	1.015	1.015	1.015	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Selected	5.500	2.704	1.854	1.337	1.233	1.050	1.050	1.100	1.030	1.025	1.020	1.015	1.015	1.015	1.015	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
FacToUlt	64.065	11.648	4.307	2.324	1.738	1.409	1.342	1.278	1.162	1.128	1.101	1.079	1.063	1.048	1.032	1.017	1.016	1.015	1.014	1.013	1.012	1.011	1.010	1.009	1.008	1.007	1.006	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Percent of Ult	1.6%	8.6%	23.2%	43.0%	57.5%	71.0%	74.5%	78.2%	86.0%	88.6%	90.8%	92.7%	94.0%	95.5%	96.9%	98.3%	98.4%	98.5%	98.6%	98.7%	98.8%	98.9%	99.0%	99.1%	99.2%	99.3%	99.4%	99.5%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Developmental Services - Cluster 1
Indemnity

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
444	100.0%	0.6%	0.0%	0.1%	0.1%	1.000	1.000
432	99.4%	0.2%	0.6%	0.0%	0.0%	0.981	0.971
420	99.2%	0.2%	0.8%	0.1%	0.0%	0.953	0.931
408	99.0%	0.2%	1.0%	0.1%	0.0%	0.929	0.897
396	98.8%	0.2%	1.2%	0.1%	0.0%	0.908	0.868
384	98.6%	0.5%	1.4%	0.1%	0.1%	0.889	0.841
372	98.1%	0.5%	1.9%	0.1%	0.1%	0.888	0.840
360	97.7%	0.5%	2.3%	0.2%	0.1%	0.880	0.830
348	97.2%	0.6%	2.8%	0.2%	0.1%	0.870	0.815
336	96.6%	0.6%	3.4%	0.2%	0.1%	0.861	0.804
324	96.0%	0.5%	4.0%	0.2%	0.1%	0.850	0.789
312	95.5%	0.5%	4.5%	0.2%	0.1%	0.835	0.769
300	95.1%	0.5%	4.9%	0.2%	0.1%	0.820	0.749
288	94.6%	0.5%	5.4%	0.2%	0.1%	0.805	0.730
276	94.1%	0.5%	5.9%	0.2%	0.1%	0.791	0.711
264	93.7%	0.5%	6.3%	0.2%	0.1%	0.776	0.693
252	93.2%	0.5%	6.8%	0.2%	0.2%	0.763	0.675
240	92.7%	0.5%	7.3%	0.3%	0.2%	0.751	0.661
228	92.1%	0.8%	7.9%	0.4%	0.3%	0.740	0.648
216	91.3%	0.7%	8.7%	0.4%	0.3%	0.737	0.645
204	90.6%	0.7%	9.4%	0.3%	0.3%	0.730	0.637
192	89.9%	0.9%	10.1%	0.5%	0.3%	0.720	0.625
180	89.0%	1.0%	11.0%	0.6%	0.4%	0.715	0.620
168	88.0%	0.9%	12.0%	0.5%	0.4%	0.712	0.617
156	87.1%	0.8%	12.9%	0.5%	0.4%	0.706	0.610
144	86.3%	0.8%	13.7%	0.5%	0.4%	0.697	0.599
132	85.5%	1.2%	14.5%	0.8%	0.7%	0.686	0.587
120	84.3%	1.4%	15.7%	1.0%	0.8%	0.685	0.586
108	82.9%	1.5%	17.1%	1.1%	0.9%	0.685	0.588
96	81.3%	2.2%	18.7%	1.7%	1.4%	0.686	0.589
84	79.1%	2.3%	20.9%	1.8%	1.6%	0.693	0.600
72	76.8%	4.0%	23.2%	3.2%	2.9%	0.698	0.606
60	72.8%	5.7%	27.2%	4.8%	4.4%	0.717	0.631
48	67.1%	8.9%	32.9%	7.8%	7.3%	0.740	0.660
36	58.1%	13.5%	41.9%	12.3%	11.7%	0.769	0.697
24	44.6%	20.6%	55.4%	19.5%	18.9%	0.798	0.734
12	24.0%	24.0%	76.0%	23.5%	23.3%	0.825	0.768
Total		100.0%					

NOTES:

(2) = 1 / Section 2, Exhibit 1, Page 2, Column 4

(3) Incremental % based on (2)

(4) = 1 - (2)

(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}

(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}

(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Developmental Services - Cluster 1
Indemnity

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	3,181,154	4,658,237		2,782,190	4,074,025
6/30/82-83	24,654	29,378	0.981	24,175	28,808
6/30/83-84	471,036	480,172	0.953	448,718	457,421
6/30/84-85	7,195	55,135	0.929	6,686	51,234
6/30/85-86	9,904	20,904	0.908	8,996	18,987
6/30/86-87	13,494	26,494	0.889	11,995	23,550
6/30/87-88	303,801	322,801	0.888	269,802	286,676
6/30/88-89	396,949	406,949	0.880	349,460	358,264
6/30/89-90	150,282	150,282	0.870	130,680	130,680
6/30/90-91	108,943	108,943	0.861	93,769	93,769
6/30/91-92	247,538	250,538	0.850	210,344	212,893
6/30/92-93	41,424	83,424	0.835	34,572	69,624
6/30/93-94	69,777	104,777	0.820	57,192	85,879
6/30/94-95	89,471	90,471	0.805	72,020	72,825
6/30/95-96	152,895	154,895	0.791	120,868	122,449
6/30/96-97	11,973	24,973	0.776	9,296	19,389
6/30/97-98	158,853	160,853	0.763	121,132	122,657
6/30/98-99	143,702	143,702	0.751	107,916	107,916
6/30/99-00	183,658	185,658	0.740	135,883	137,363
6/30/00-01	294,725	306,725	0.737	217,180	226,022
6/30/01-02	11,519	22,519	0.730	8,408	16,437
6/30/02-03	305,765	313,765	0.720	220,210	225,972
6/30/03-04	374,430	387,430	0.715	267,657	276,950
6/30/04-05	13,383	26,383	0.712	9,530	18,788
6/30/05-06	340,033	384,033	0.706	239,952	271,002
6/30/06-07	392,015	425,015	0.697	273,141	296,134
6/30/07-08	254,034	426,034	0.686	174,389	292,464
6/30/08-09	413,904	472,904	0.685	283,548	323,967
6/30/09-10	542,169	661,169	0.685	371,531	453,077
6/30/10-11	596,582	661,582	0.686	408,976	453,536
6/30/11-12	712,919	780,919	0.693	494,391	541,547
6/30/12-13	798,230	830,230	0.698	557,111	579,445
6/30/13-14	1,005,226	1,094,226	0.717	720,636	784,440
6/30/14-15	1,299,647	1,424,647	0.740	961,534	1,054,014
6/30/15-16	1,427,017	1,669,017	0.769	1,096,939	1,282,962
6/30/16-17	2,053,544	2,062,544	0.798	1,639,077	1,646,260
6/30/17-18	2,458,336	2,691,336	0.825	2,028,944	2,221,247
Total	19,060,179	22,099,062		14,968,847	17,438,672
			(7) Total Discount Factor:	0.785	0.789

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	3,181,154	4,658,237
(9) Projected Number of Years:	7	7
(10) Projected Paid Loss per Year:	454,451	665,462
(11) Discounted Value at 4%:	2,782,190	4,074,025

NOTES:

(2), (3) From Section 2, Exhibit 1, Page 1, Columns 8, 9

(4) From Section 2, Exhibit 1, Page 13, Column 7

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Developmental Services - Cluster 1
Indemnity

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	3,181,154	4,658,237		2,613,024	3,826,311
6/30/82-83	24,654	29,378	0.971	23,946	28,535
6/30/83-84	471,036	480,172	0.931	438,311	446,813
6/30/84-85	7,195	55,135	0.897	6,454	49,458
6/30/85-86	9,904	20,904	0.868	8,592	18,134
6/30/86-87	13,494	26,494	0.841	11,342	22,270
6/30/87-88	303,801	322,801	0.840	255,271	271,236
6/30/88-89	396,949	406,949	0.830	329,457	337,756
6/30/89-90	150,282	150,282	0.815	122,536	122,536
6/30/90-91	108,943	108,943	0.804	87,549	87,549
6/30/91-92	247,538	250,538	0.789	195,302	197,669
6/30/92-93	41,424	83,424	0.769	31,840	64,123
6/30/93-94	69,777	104,777	0.749	52,252	78,461
6/30/94-95	89,471	90,471	0.730	65,280	66,009
6/30/95-96	152,895	154,895	0.711	108,705	110,127
6/30/96-97	11,973	24,973	0.693	8,296	17,304
6/30/97-98	158,853	160,853	0.675	107,291	108,642
6/30/98-99	143,702	143,702	0.661	95,012	95,012
6/30/99-00	183,658	185,658	0.648	118,947	120,242
6/30/00-01	294,725	306,725	0.645	190,125	197,866
6/30/01-02	11,519	22,519	0.637	7,338	14,346
6/30/02-03	305,765	313,765	0.625	191,222	196,225
6/30/03-04	374,430	387,430	0.620	231,982	240,036
6/30/04-05	13,383	26,383	0.617	8,260	16,284
6/30/05-06	340,033	384,033	0.610	207,344	234,174
6/30/06-07	392,015	425,015	0.599	234,880	254,653
6/30/07-08	254,034	426,034	0.587	149,077	250,013
6/30/08-09	413,904	472,904	0.586	242,620	277,205
6/30/09-10	542,169	661,169	0.588	318,529	388,442
6/30/10-11	596,582	661,582	0.589	351,248	389,518
6/30/11-12	712,919	780,919	0.600	427,629	468,418
6/30/12-13	798,230	830,230	0.606	483,806	503,201
6/30/13-14	1,005,226	1,094,226	0.631	634,208	690,359
6/30/14-15	1,299,647	1,424,647	0.660	858,336	940,891
6/30/15-16	1,427,017	1,669,017	0.697	994,898	1,163,617
6/30/16-17	2,053,544	2,062,544	0.734	1,508,118	1,514,728
6/30/17-18	2,458,336	2,691,336	0.768	1,889,065	2,068,109
Total	19,060,179	22,099,062		13,608,091	15,876,270
			(7) Total Discount Factor:	0.714	0.718

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	3,181,154	4,658,237
(9) Projected Number of Years:	7	7
(10) Projected Paid Loss per Year:	454,451	665,462
(11) Discounted Value at 6%:	2,613,024	3,826,311

NOTES:

(2), (3) From Section 2, Exhibit 1, Page 1, Columns 8, 9

(4) From Section 2, Exhibit 1, Page 13, Column 8

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Developmental Services - Cluster 1
Total Indemnity (Including Lump Sums) + Medical

Calculation of Fiscal Year 7/01/18 - 19 Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
						Cumulative	Incremental Paid		Estimated Payments from		FY 07/01/18 - 06/30/19	
Accident	Est Ult Losses	Est Ult Losses	Paid Losses	Reserves	Reserves	Percent	as a % of	as a % of	07/01/18 - 06/30/19		as a % of Reserves	
Year	(Low)	(High)	to Date	(Low)	(High)	Paid	Ultimates	Reserves	(Low)	(High)	(Low)	(High)
All Prior Yrs	26,235,805	27,722,793	23,046,128	3,189,677	4,676,666				229,768	252,745	7.2%	5.4%
6/30/82-83	4,985,221	4,992,945	4,960,536	24,685	32,409	99.4%	0.5%	87.4%	21,571	28,320	87.4%	87.4%
6/30/83-84	10,547,000	10,585,136	10,072,903	474,097	512,234	95.3%	1.5%	32.1%	152,363	164,619	32.1%	32.1%
6/30/84-85	7,585,000	7,647,940	7,574,989	10,011	72,951	99.5%	0.4%	73.4%	7,352	53,579	73.4%	73.4%
6/30/85-86	11,891,000	11,903,000	11,874,262	16,739	28,739	99.8%	0.1%	52.3%	8,758	15,036	52.3%	52.3%
6/30/86-87	15,401,000	15,415,000	15,376,859	24,141	38,141	99.8%	0.1%	49.5%	11,945	18,871	49.5%	49.5%
6/30/87-88	22,706,000	22,726,000	22,385,953	320,047	340,047	98.5%	0.5%	34.4%	110,139	117,021	34.4%	34.4%
6/30/88-89	24,651,000	24,711,530	24,224,434	426,566	487,097	98.1%	1.0%	54.0%	230,461	263,164	54.0%	54.0%
6/30/89-90	18,886,000	18,889,000	18,704,728	181,272	184,272	99.0%	0.5%	51.7%	93,662	95,213	51.7%	51.7%
6/30/90-91	13,898,480	13,929,000	13,789,072	109,408	139,928	99.1%	0.5%	55.8%	61,053	78,084	55.8%	55.8%
6/30/91-92	10,665,730	10,696,000	10,412,174	253,556	283,826	97.5%	0.8%	29.8%	75,594	84,619	29.8%	29.8%
6/30/92-93	5,996,170	6,057,000	5,947,948	48,222	109,052	98.7%	0.8%	57.5%	27,717	62,681	57.5%	57.5%
6/30/93-94	4,845,080	4,893,000	4,767,057	78,023	125,943	97.9%	1.0%	47.7%	37,251	60,130	47.7%	47.7%
6/30/94-95	3,106,550	3,117,000	3,009,689	96,861	107,311	96.7%	1.0%	30.5%	29,525	32,710	30.5%	30.5%
6/30/95-96	4,345,000	4,358,000	4,172,128	172,872	185,872	95.9%	1.0%	24.3%	41,938	45,092	24.3%	24.3%
6/30/96-97	3,382,000	3,404,000	3,349,690	32,310	54,310	98.7%	1.0%	78.3%	25,312	42,548	78.3%	78.3%
6/30/97-98	3,653,000	3,671,000	3,474,504	178,496	196,496	94.9%	1.0%	19.5%	34,862	38,378	19.5%	19.5%
6/30/98-99	3,206,000	3,219,000	3,044,847	161,153	174,153	94.8%	1.0%	19.2%	30,879	33,371	19.2%	19.2%
6/30/99-00	3,551,000	3,571,000	3,342,711	208,289	228,289	93.9%	1.0%	16.3%	33,979	37,241	16.3%	16.3%
6/30/00-01	5,313,000	5,407,000	4,972,554	340,446	434,446	92.8%	1.0%	13.8%	47,098	60,102	13.8%	13.8%
6/30/01-02	3,266,000	3,297,000	3,218,419	47,581	78,581	98.1%	1.0%	52.0%	24,752	40,878	52.0%	52.0%
6/30/02-03	4,264,000	4,291,000	3,921,175	342,825	369,825	91.7%	1.0%	12.0%	41,154	44,396	12.0%	12.0%
6/30/03-04	4,681,000	4,713,000	4,260,608	420,392	452,392	90.7%	1.0%	10.3%	43,467	46,775	10.3%	10.3%
6/30/04-05	3,787,000	3,823,000	3,710,452	76,548	112,548	97.5%	1.0%	40.2%	30,806	45,294	40.2%	40.2%
6/30/05-06	4,407,000	4,488,000	3,993,094	413,906	494,906	89.8%	2.0%	19.6%	81,022	96,878	19.6%	19.6%
6/30/06-07	4,489,300	4,629,000	4,075,021	414,279	553,979	89.4%	2.0%	18.8%	78,027	104,339	18.8%	18.8%
6/30/07-08	3,160,450	3,445,000	2,875,660	284,790	569,340	87.1%	2.0%	15.5%	44,049	88,060	15.5%	15.5%
6/30/08-09	3,999,150	4,156,000	3,535,601	463,549	620,399	86.7%	2.0%	15.0%	69,751	93,352	15.0%	15.0%
6/30/09-10	5,276,050	5,519,000	4,672,193	603,857	846,807	86.6%	2.0%	14.9%	89,871	126,030	14.9%	14.9%
6/30/10-11	4,534,100	4,752,000	3,904,465	629,635	847,535	84.1%	2.0%	12.6%	79,163	106,559	12.6%	12.6%
6/30/11-12	4,959,400	5,230,000	4,188,776	770,624	1,041,224	82.2%	2.0%	11.2%	86,676	117,112	11.2%	11.2%
6/30/12-13	4,656,400	4,868,000	3,750,325	906,075	1,117,675	78.8%	3.5%	16.3%	147,815	182,335	16.3%	16.3%
6/30/13-14	5,036,600	5,305,000	3,890,654	1,145,946	1,414,346	75.2%	3.5%	14.2%	162,429	200,473	14.2%	14.2%
6/30/14-15	4,968,800	5,278,000	3,475,445	1,493,355	1,802,555	67.8%	7.4%	23.0%	343,938	415,151	23.0%	23.0%
6/30/15-16	4,299,000	4,713,000	2,543,021	1,755,979	2,169,979	56.4%	11.4%	26.2%	459,450	567,773	26.2%	26.2%
6/30/16-17	4,743,000	4,920,000	2,171,731	2,571,269	2,748,269	44.9%	11.5%	20.9%	536,524	573,457	20.9%	20.9%
6/30/17-18	4,113,000	4,647,000	936,648	3,176,352	3,710,352	21.4%	23.6%	30.0%	952,103	1,112,168	30.0%	30.0%
Total	279,490,286	284,989,345	257,626,450	21,863,836	27,362,894				4,582,227	5,544,555	21.0%	20.3%

NOTES:

(2) Exhibit 1, Page 1, Column (4) + Exhibit 2, Page 1, Column (4)

(3) Exhibit 1, Page 1, Column (5) + Exhibit 2, Page 1, Column (5)

(4) Exhibit 1, Page 1, Column (2) + Exhibit 2, Page 1, Column (2)

(5) = (2) - (4)

(6) = (3) - (4)

(7) = (4) / Average of Columns (2), (3)

(8) = (7) - Prior Year's (7)

(9) = (8) / (1.00 - (7))

(10) = (5) * (9)

(11) = (6) * (9)

(12) = (10) / (5)

(13) = (11) / (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Developmental Services - Cluster 1
Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Paid Loss	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		1,215,038			1,223,561	1,233,466	8,524	18,428		
6/30/82-83		260,969	261,335		261,000	264,000	31	3,031		
6/30/83-84		1,418,938	1,422,347		1,422,000	1,451,000	3,062	32,062		
6/30/84-85	181,560	764,185	766,786	766,926	767,000	782,000	2,815	17,815	0.422	0.431
6/30/85-86	195,247	1,602,166	1,609,228	1,609,518	1,609,000	1,610,000	6,835	7,835	0.824	0.825
6/30/86-87	224,370	1,896,353	1,906,617	1,907,477	1,907,000	1,908,000	10,647	11,647	0.850	0.850
6/30/87-88	262,864	2,484,754	2,500,701	2,502,087	2,501,000	2,502,000	16,246	17,246	0.951	0.952
6/30/88-89	283,884	4,007,382	4,037,135	4,037,028	4,037,000	4,087,530	29,618	80,148	1.422	1.440
6/30/89-90	285,078	3,686,010	3,717,090	3,720,215	3,717,000	3,720,000	30,990	33,990	1.304	1.305
6/30/90-91	267,732	2,922,015	2,952,546	2,952,328	2,922,480	2,953,000	465	30,985	1.092	1.103
6/30/91-92	261,442	2,693,712	2,727,302	2,726,834	2,699,730	2,727,000	6,018	33,288	1.033	1.043
6/30/92-93	259,992	1,758,372	1,783,858	1,783,449	1,765,170	1,784,000	6,798	25,628	0.679	0.686
6/30/93-94	257,062	1,270,834	1,291,833	1,291,534	1,279,080	1,292,000	8,246	21,166	0.498	0.503
6/30/94-95	255,854	928,160	945,383	945,288	935,550	945,000	7,390	16,840	0.366	0.369
6/30/95-96	255,539	1,004,022	1,024,699	1,024,495	1,024,000	1,035,000	19,978	30,978	0.401	0.405
6/30/96-97	270,071	882,663	902,641	902,680	903,000	912,000	20,337	29,337	0.334	0.338
6/30/97-98	245,367	778,357	797,567	797,668	798,000	814,000	19,643	35,643	0.325	0.332
6/30/98-99	251,453	634,549	651,510	652,040	652,000	665,000	17,451	30,451	0.259	0.264
6/30/99-00	255,641	855,368	879,988	880,041	880,000	898,000	24,632	42,632	0.344	0.351
6/30/00-01	263,918	1,547,279	1,594,998	1,593,088	1,593,000	1,675,000	45,721	127,721	0.604	0.635
6/30/01-02	267,598	988,937	1,024,765	1,024,625	1,025,000	1,045,000	36,063	56,063	0.383	0.391
6/30/02-03	274,465	867,940	904,986	905,555	905,000	924,000	37,060	56,060	0.330	0.337
6/30/03-04	272,384	916,039	961,645	962,160	962,000	981,000	45,961	64,961	0.353	0.360
6/30/04-05	273,647	1,051,835	1,115,894	1,114,683	1,115,000	1,138,000	63,165	86,165	0.407	0.416
6/30/05-06	285,139	1,232,127	1,316,328	1,305,901	1,306,000	1,343,000	73,873	110,873	0.458	0.471
6/30/06-07	298,516	1,188,036	1,278,830	1,274,403	1,210,300	1,317,000	22,264	128,964	0.405	0.441
6/30/07-08	314,231	1,328,694	1,443,408	1,431,226	1,359,450	1,472,000	30,756	143,306	0.433	0.468
6/30/08-09	302,998	1,201,505	1,322,318	1,316,626	1,251,150	1,349,000	49,645	147,495	0.413	0.445
6/30/09-10	297,252	1,324,362	1,480,310	1,459,042	1,386,050	1,510,000	61,688	185,638	0.466	0.508
6/30/10-11	292,432	1,019,046	1,169,178	1,181,757	1,052,100	1,205,000	33,054	185,954	0.360	0.412
6/30/11-12	295,908	1,243,695	1,474,364	1,445,803	1,301,400	1,504,000	57,705	260,305	0.440	0.508
6/30/12-13	301,541	1,139,556	1,399,472	1,385,877	1,247,400	1,427,000	107,844	287,444	0.414	0.473
6/30/13-14	309,910	960,880	1,224,309	1,256,369	1,101,600	1,281,000	140,720	320,120	0.355	0.413
6/30/14-15	316,552	978,091	1,301,504	1,329,275	1,171,800	1,356,000	193,709	377,909	0.370	0.428
6/30/15-16	316,565	957,038	1,429,131	1,427,410	1,286,000	1,458,000	328,962	500,962	0.406	0.461
6/30/16-17	292,403	746,274	1,404,360	1,367,219	1,264,000	1,432,000	517,726	685,726	0.432	0.490
6/30/17-18	292,956	286,984	1,116,668	1,280,794	1,005,000	1,306,000	718,016	1,019,016	0.343	0.446
Total	9,281,570	50,042,164	53,141,030	51,561,418	52,845,821	55,305,996	2,803,657	5,263,832		
Tot 6/30/84-18	9,281,570	47,147,220	51,457,349	51,561,418	49,939,260	52,357,530	2,792,040	5,210,310	0.538	0.564

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 2, Exhibit 2, Page 2, Column 3

(4) From Section 2, Exhibit 2, Page 2, Column 8

(5) From Section 2, Exhibit 2, Page 3, Column 8

(6), (7) Selected based on (3), (4), and (5)

(8) = (6) - (3)

(9) = (7) - (3)

(10) = (6) / (2) / 10

(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Developmental Services - Cluster 1
Medical

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Accident Year	Payroll (000's)	Paid Loss	Paid LDF	Adjustment for Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/16-17	Paid Counts 7/1/17-18	Average Outstanding Claim
All Prior Yrs		1,215,038							1	3	
6/30/82-83		260,969	1.001	1.000	261,335	N/A	261,335		0	0	
6/30/83-84		1,418,938	1.002	1.000	1,422,347	N/A	1,422,347		1	2	1,704
6/30/84-85	181,560	764,185	1.003	1.000	766,786	N/A	766,786	0.422	1	0	
6/30/85-86	195,247	1,602,166	1.004	1.000	1,609,228	N/A	1,609,228	0.824	0	0	
6/30/86-87	224,370	1,896,353	1.005	1.000	1,906,617	N/A	1,906,617	0.850	0	0	
6/30/87-88	262,864	2,484,754	1.006	1.000	2,500,701	N/A	2,500,701	0.951	1	1	15,947
6/30/88-89	283,884	4,007,382	1.007	1.000	4,037,135	N/A	4,037,135	1.422	3	2	14,876
6/30/89-90	285,078	3,686,010	1.008	1.000	3,717,090	N/A	3,717,090	1.304	1	1	31,080
6/30/90-91	267,732	2,922,015	1.010	1.000	2,952,546	N/A	2,952,546	1.103	2	2	15,266
6/30/91-92	261,442	2,693,712	1.012	1.000	2,727,302	N/A	2,727,302	1.043	3	3	11,196
6/30/92-93	259,992	1,758,372	1.014	1.000	1,783,858	N/A	1,783,858	0.686	0	0	
6/30/93-94	257,062	1,270,834	1.017	1.000	1,291,833	N/A	1,291,833	0.503	1	1	20,999
6/30/94-95	255,854	928,160	1.019	1.000	945,383	N/A	945,383	0.370	0	0	
6/30/95-96	255,539	1,004,022	1.021	1.000	1,024,699	N/A	1,024,699	0.401	0	0	
6/30/96-97	270,071	882,663	1.023	1.000	902,641	N/A	902,641	0.334	0	0	
6/30/97-98	245,367	778,357	1.025	1.000	797,567	N/A	797,567	0.325	1	2	9,605
6/30/98-99	251,453	634,549	1.027	1.000	651,510	N/A	651,510	0.259	1	0	
6/30/99-00	255,641	855,368	1.029	1.000	879,988	N/A	879,988	0.344	1	1	24,620
6/30/00-01	263,918	1,547,279	1.031	1.000	1,594,998	N/A	1,594,998	0.604	5	4	11,930
6/30/01-02	267,598	988,937	1.036	1.000	1,024,765	N/A	1,024,765	0.383	3	3	11,942
6/30/02-03	274,465	867,940	1.043	1.000	904,986	N/A	904,986	0.330	5	3	12,349
6/30/03-04	272,384	916,039	1.050	1.000	961,645	N/A	961,645	0.353	4	4	11,401
6/30/04-05	273,647	1,051,835	1.061	1.000	1,115,894	N/A	1,115,894	0.408	1	1	64,059
6/30/05-06	285,139	1,232,127	1.068	1.000	1,316,328	N/A	1,316,328	0.462	3	3	28,067
6/30/06-07	298,516	1,188,036	1.076	1.000	1,278,830	N/A	1,278,830	0.428	5	4	22,698
6/30/07-08	314,231	1,328,694	1.086	1.000	1,443,408	N/A	1,443,408	0.459	3	3	38,238
6/30/08-09	302,998	1,201,505	1.101	1.000	1,322,318	N/A	1,322,318	0.436	7	7	17,259
6/30/09-10	297,252	1,324,362	1.118	1.000	1,480,310	N/A	1,480,310	0.498	7	4	38,987
6/30/10-11	292,432	1,019,046	1.147	1.000	1,169,178	N/A	1,169,178	0.400	10	6	25,022
6/30/11-12	295,908	1,243,695	1.185	1.000	1,474,364	N/A	1,474,364	0.498	10	7	32,953
6/30/12-13	301,541	1,139,556	1.228	1.000	1,399,472	N/A	1,399,472	0.464	18	6	43,319
6/30/13-14	309,910	960,880	1.274	1.000	1,224,309	N/A	1,224,309	0.395	27	26	10,132
6/30/14-15	316,552	978,091	1.331	1.000	1,301,504	N/A	1,301,504	0.411	46	23	14,061
6/30/15-16	316,565	957,038	1.493	1.000	1,429,131	N/A	1,429,131	0.451	156	39	12,105
6/30/16-17	292,403	746,274	1.882	1.000	1,404,360	N/A	1,404,360	0.480	230	125	5,265
6/30/17-18	292,956	286,984	3.891	1.000	1,116,668	N/A	1,116,668	0.381		237	3,501
Total	9,281,570	50,042,164			53,141,030		53,141,030		557	523	

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3), (4) From Section 2, Exhibit 2, Page 7

(5) Based on information from the MA WCRIB 7/1/16 filing. Consideration for development beyond 252 months made in selection of LDF's.

(6) = (3) x (4) x (5)

(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10), (11) Provided by Commonwealth of Massachusetts

(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Developmental Services - Cluster 1
Medical

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	181,560	0.445	764,185	1.003	766,926	N/A	766,926	0.422	0.422
6/30/85-86	195,247	0.858	1,602,166	1.004	1,609,518	N/A	1,609,518	0.824	0.824
6/30/86-87	224,370	0.921	1,896,353	1.005	1,907,477	N/A	1,907,477	0.850	0.850
6/30/87-88	262,864	1.034	2,484,754	1.006	2,502,087	N/A	2,502,087	0.952	0.952
6/30/88-89	283,884	1.417	4,007,382	1.007	4,037,028	N/A	4,037,028	1.422	1.422
6/30/89-90	285,078	1.435	3,686,010	1.008	3,720,215	N/A	3,720,215	1.305	1.305
6/30/90-91	267,732	1.095	2,922,015	1.010	2,952,328	N/A	2,952,328	1.103	1.103
6/30/91-92	261,442	1.029	2,693,712	1.012	2,726,834	N/A	2,726,834	1.043	1.043
6/30/92-93	259,992	0.675	1,758,372	1.014	1,783,449	N/A	1,783,449	0.686	0.686
6/30/93-94	257,062	0.495	1,270,834	1.017	1,291,534	N/A	1,291,534	0.502	0.502
6/30/94-95	255,854	0.367	928,160	1.019	945,288	N/A	945,288	0.369	0.369
6/30/95-96	255,539	0.397	1,004,022	1.021	1,024,495	N/A	1,024,495	0.401	0.401
6/30/96-97	270,071	0.335	882,663	1.023	902,680	N/A	902,680	0.334	0.334
6/30/97-98	245,367	0.327	778,357	1.025	797,668	N/A	797,668	0.325	0.325
6/30/98-99	251,453	0.267	634,549	1.027	652,040	N/A	652,040	0.259	0.259
6/30/99-00	255,641	0.345	855,368	1.029	880,041	N/A	880,041	0.344	0.344
6/30/00-01	263,918	0.580	1,547,279	1.031	1,593,088	N/A	1,593,088	0.604	0.604
6/30/01-02	267,598	0.381	988,937	1.036	1,024,625	N/A	1,024,625	0.383	0.383
6/30/02-03	274,465	0.335	867,940	1.043	905,555	N/A	905,555	0.330	0.330
6/30/03-04	272,384	0.357	916,039	1.050	962,160	N/A	962,160	0.353	0.353
6/30/04-05	273,647	0.400	1,051,835	1.061	1,114,683	N/A	1,114,683	0.407	0.407
6/30/05-06	285,139	0.404	1,232,127	1.068	1,305,901	N/A	1,305,901	0.458	0.458
6/30/06-07	298,516	0.408	1,188,036	1.076	1,274,403	N/A	1,274,403	0.427	0.427
6/30/07-08	314,231	0.411	1,328,694	1.086	1,431,226	N/A	1,431,226	0.455	0.455
6/30/08-09	302,998	0.416	1,201,505	1.101	1,316,626	N/A	1,316,626	0.435	0.435
6/30/09-10	297,252	0.430	1,324,362	1.118	1,459,042	N/A	1,459,042	0.491	0.491
6/30/10-11	292,432	0.433	1,019,046	1.147	1,181,757	N/A	1,181,757	0.404	0.404
6/30/11-12	295,908	0.437	1,243,695	1.185	1,445,803	N/A	1,445,803	0.489	0.489
6/30/12-13	301,541	0.440	1,139,556	1.228	1,385,877	N/A	1,385,877	0.460	0.460
6/30/13-14	309,910	0.443	960,880	1.274	1,256,369	N/A	1,256,369	0.405	0.405
6/30/14-15	316,552	0.446	978,091	1.331	1,329,275	N/A	1,329,275	0.420	0.420
6/30/15-16	316,565	0.450	957,038	1.493	1,427,410	N/A	1,427,410	0.451	0.451
6/30/16-17	292,403	0.453	746,274	1.882	1,367,219	N/A	1,367,219	0.468	0.468
6/30/17-18	292,956	0.457	286,984	3.891	1,280,794	N/A	1,280,794	0.437	0.437
Total	9,281,570		47,147,220		51,561,418		51,561,418		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 2, Exhibit 2, Page 4, Column 11

(4) From Section 2, Exhibit 2, Page 2, Column 3

(5) From Section 2, Exhibit 2, Page 2, Column 4

(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]

(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Developmental Services - Cluster 1
Medical

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Expected Ult Loss	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									0.445	0.445
6/30/85-86									0.858	0.858
6/30/86-87									0.921	0.921
6/30/87-88									1.034	1.034
6/30/88-89									1.417	1.417
6/30/89-90									1.435	1.435
6/30/90-91	267,732	2,952,546	1.103	1.194	1.317	1.233	1.623	0.313	1.094	1.095
6/30/91-92	261,442	2,727,302	1.043	1.189	1.240	1.224	1.517	0.316	1.026	1.029
6/30/92-93	259,992	1,783,858	0.686	1.189	0.816	1.214	0.991	0.319	0.677	0.675
6/30/93-94	257,062	1,291,833	0.503	1.178	0.592	1.205	0.714	0.324	0.497	0.495
6/30/94-95	255,854	945,383	0.370	1.170	0.432	1.196	0.517	0.329	0.369	0.367
6/30/95-96	255,539	1,024,699	0.401	1.155	0.463	1.188	0.550	0.335	0.399	0.397
6/30/96-97	270,071	902,641	0.334	1.137	0.380	1.179	0.448	0.343	0.337	0.335
6/30/97-98	245,367	797,567	0.325	1.135	0.369	1.170	0.432	0.346	0.328	0.327
6/30/98-99	251,453	651,510	0.259	1.135	0.294	1.161	0.341	0.349	0.269	0.267
6/30/99-00	255,641	879,988	0.344	1.135	0.391	1.153	0.450	0.352	0.340	0.345
6/30/00-01	263,918	1,594,998	0.604	1.109	0.670	1.144	0.767	0.363	0.568	0.580
6/30/01-02	267,598	1,024,765	0.383	1.101	0.422	1.135	0.479	0.368	0.377	0.381
6/30/02-03	274,465	904,986	0.330	1.073	0.354	1.127	0.399	0.380	0.337	0.335
6/30/03-04	272,384	961,645	0.353	1.046	0.369	1.119	0.413	0.393	0.352	0.357
6/30/04-05	273,647	1,115,894	0.408	1.036	0.422	1.110	0.469	0.400	0.413	0.400
6/30/05-06	285,139	1,316,328	0.462	1.032	0.476	1.102	0.525	0.404	0.416	0.404
6/30/06-07	298,516	1,278,830	0.428	1.032	0.442	1.094	0.484	0.408	0.417	0.408
6/30/07-08	314,231	1,443,408	0.459	1.032	0.474	1.086	0.515	0.411	0.419	0.411
6/30/08-09	302,998	1,322,318	0.436	1.027	0.448	1.078	0.483	0.416	0.423	0.416
6/30/09-10	297,252	1,480,310	0.498	1.000	0.498	1.070	0.533	0.430	0.436	0.430
6/30/10-11	292,432	1,169,178	0.400	1.000	0.400	1.062	0.424	0.433	0.438	0.433
6/30/11-12	295,908	1,474,364	0.498	1.000	0.498	1.054	0.525	0.437	0.439	0.437
6/30/12-13	301,541	1,399,472	0.464	1.000	0.464	1.046	0.485	0.440	0.441	0.440
6/30/13-14	309,910	1,224,309	0.395	1.000	0.395	1.038	0.410	0.443	0.443	0.443
6/30/14-15	316,552	1,301,504	0.411	1.000	0.411	1.030	0.424	0.446	0.445	0.446
6/30/15-16	316,565	1,429,131	0.451	1.000	0.451	1.023	0.462	0.450	0.446	0.450
6/30/16-17	292,403	1,404,360	0.480	1.000	0.480	1.015	0.488	0.453	0.448	0.453
6/30/17-18	292,956	1,116,668	0.381	1.000	0.381	1.008	0.384	0.457		0.457
Total	7,848,567	36,919,792								

Trend Last 4 (ex 17-18):	7.0%	Avg 3 (ex 17-18):	0.458
Trend Last 8 (ex 17-18):	-0.5%	Avg 5 (ex 17-18):	0.454
Trend Last 12 (ex 17-18):	-0.5%	Avg 10 (ex 17-18):	0.475
Prior Selected Trend:	0.4%	Prior Sel Avg:	0.450
Selected Trend:	0.75%	Sel. Loss Cost:	0.460

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 2, Exhibit 2, Page 2, Column 6

(4) = (3) / (2) / 10

(5) Based on information from the MA WCIRB

(6) = (4) x (5)

(7) Based on Selected Trend from (6)

(8) = (6) x (7)

(9) = Sel. Loss Cost / [(5) * (7)]

(10) From prior Aon analysis as of June 30, 2017

(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Developmental Services - Cluster 1
Medical

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend	0.775	
(2)	Credibility	31%	
(3)	Average Pmt Trend Statewide	0.950	
(4)	Credibility Weighted Trend	0.896	
		(Low)	(High)
(5)	Selected Range	0.850	0.941
(6)	Incremental Paid for 2018	2,321	2,321
(7)	Estimated Reserve	13,154	36,974
(8)	Paid to Date (82 & Prior)	1,215,038	1,215,038
(9)	Est Ult Paid for 1982 & Prior	1,228,191	1,252,011

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	1,298	735
(11)	Projected Number of Years	3	3
(12)	Estimated Reserve	3,893	2,204
(13)	Paid to Date (82 & Prior)	1,215,038	1,212,716
(14)	Est Ult Paid for 1982 & Prior	1,218,931	1,214,921
(14a)	Paid Counts During Fiscal Year	3	1
		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	1,223,561	1,233,466
(16)	Lump Sum Ultimates	N/A	N/A
(17)	Ult Loss Including Lump Sums	**1,223,561**	**1,233,466**
(18)	Implied Tail	1.007	1.015
(19)	Ult Loss Inc Lump Sums @ 6/17	1,214,098	1,216,106

NOTES:

(1) From Section 2, Exhibit 2, Page 6
(2) = (Average of Section 2, Exhibit 2, Page 6, Column 3 / 175,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 2, Exhibit 2, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 2, Exhibit 2, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) Lump Sums are considered in Indemnity analysis (Section 1)
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2017

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Developmental Services - Cluster 1
Medical

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	76,171	11.241			
1993	2	75,723	11.235	0.994		
1994	3	63,040	11.052	0.833		
1995	4	28,227	10.248	0.448		
1996	5	63,291	11.055	2.242		
1997	6	29,585	10.295	0.467		
1998	7	13,039	9.476	0.441		
1999	8	13,407	9.504	1.028		
2000	9	11,930	9.387	0.890	n =	27
2001	10	9,078	9.114	0.761	S(x) =	54,135
2002	11	5,110	8.539	0.563	S(x-sq) =	108,542,313
2003	12	6,295	8.748	1.232	S(xy) =	458,405
2004	13	4,115	8.322	0.654	S(y) =	229
2005	14	17,494	9.770	4.251	D =	44,226
2006	15	5,802	8.666	0.332	slope =	-0.216
2007	16	8,975	9.102	1.547	Avg Trend =	0.784
2008	17	3,912	8.272	0.436		
2009	18	2,186	7.690	0.559		
2010	19	4,246	8.354	1.943		
2011	20	1,195	7.086	0.281		
2012	21	179	5.189	0.150		
2013	22	179	5.189	1.000		
2014	23	179	5.189	1.000		
2015	24	632	6.449	3.527		
2016	25	1,473	7.295	2.330		
2017	26	99	4.593	0.067		
2018	27	2,321	7.750	23.502		
					Selected Trend:	**0.775**

NOTES:

(3) 2018 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2017

(4) LN [(3)]

(5) Eg. 2018: 23.502 = 2321 / 99

Commonwealth of Massachusetts Workers Compensation
Department of Developmental Services - Cluster 1
MEDICAL
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432
June-83	21,006	49,638	70,591	88,239	105,504	122,855	138,893	160,692	180,838	198,763	206,648	244,385	249,094	254,712	256,363	256,876	257,735	258,257	258,537	258,637	259,334	259,869	260,265	260,719	260,969	260,969	260,969	260,969	260,969	260,969	260,969	260,969	260,969	260,969	260,969	260,969
June-84	130,216	307,707	437,592	546,990	654,018	741,928	857,012	959,232	1,050,170	1,118,632	1,160,913	1,192,447	1,199,268	1,203,920	1,225,075	1,249,653	1,268,798	1,290,858	1,296,673	1,300,275	1,316,793	1,333,199	1,342,906	1,349,107	1,358,330	1,363,288	1,375,051	1,401,444	1,403,198	1,404,636	1,410,461	1,413,497	1,414,165	1,414,337	1,418,938	
June-85	89,170	210,713	299,656	374,570	455,180	522,720	582,177	634,207	685,633	702,603	713,358	717,026	720,062	720,920	726,880	729,520	730,301	731,081	731,204	731,204	731,218	731,218	731,218	731,218	731,218	731,218	731,218	739,645	763,916	764,161	764,174	764,179	764,185	764,185		
June-86	189,273	447,261	636,052	765,617	939,707	1,103,818	1,243,019	1,358,130	1,444,684	1,485,929	1,499,042	1,514,132	1,520,647	1,537,037	1,547,606	1,553,176	1,564,852	1,567,432	1,573,496	1,575,982	1,582,467	1,586,081	1,593,552	1,596,723	1,600,637	1,602,166	1,602,166	1,602,166	1,602,166	1,602,166	1,602,166	1,602,166	1,602,166			
June-87	243,465	575,319	884,604	1,135,085	1,272,135	1,441,924	1,619,831	1,685,111	1,741,279	1,772,270	1,801,621	1,842,953	1,884,775	1,889,603	1,894,366	1,894,597	1,895,476	1,895,651	1,895,651	1,895,651	1,896,140	1,896,353	1,896,353	1,896,353	1,896,353	1,896,353	1,896,353	1,896,353	1,896,353	1,896,353	1,896,353	1,896,353				
June-88	363,164	980,917	1,485,789	1,802,447	2,044,603	2,209,730	2,337,274	2,381,902	2,440,826	2,450,413	2,453,714	2,458,155	2,468,582	2,469,709	2,470,273	2,472,242	2,472,926	2,474,120	2,475,679	2,476,698	2,479,622	2,480,422	2,482,560	2,482,824	2,483,087	2,483,417	2,483,681	2,483,878	2,484,224	2,484,620	2,484,754					
June-89	524,148	1,718,544	2,367,574	2,805,123	3,095,247	3,298,078	3,424,849	3,485,100	3,510,635	3,573,650	3,625,589	3,648,159	3,663,581	3,699,511	3,725,869	3,746,061	3,765,157	3,783,602	3,796,379	3,809,734	3,820,868	3,838,465	3,852,950	3,867,441	3,882,545	3,902,335	3,923,798	3,945,246	3,991,672	4,007,382						
June-90	721,216	2,076,487	2,697,946	3,042,168	3,365,956	3,509,844	3,547,356	3,618,254	3,660,798	3,669,321	3,673,294	3,674,043	3,675,267	3,676,903	3,676,903	3,676,975	3,676,975	3,677,208	3,677,264	3,677,264	3,677,264	3,677,264	3,680,769	3,681,790	3,685,474	3,685,625	3,685,774	3,685,840	3,686,010							
June-91	573,775	1,832,452	2,336,684	2,570,536	2,690,503	2,737,602	2,767,093	2,783,177	2,796,096	2,807,853	2,815,389	2,817,526	2,821,013	2,824,311	2,824,746	2,835,316	2,844,386	2,852,912	2,862,970	2,871,036	2,880,572	2,890,850	2,897,227	2,902,044	2,903,974	2,909,098	2,916,555	2,922,015								
June-92	682,252	1,646,809	2,002,754	2,139,991	2,195,456	2,229,059	2,250,251	2,258,976	2,271,388	2,282,222	2,299,759	2,312,696	2,324,613	2,341,522	2,353,263	2,361,934	2,370,332	2,377,427	2,385,401	2,392,636	2,402,525	2,411,498	2,588,626	2,601,391	2,629,981	2,681,217	2,693,712									
June-93	530,227	1,313,078	1,537,374	1,593,966	1,619,013	1,650,226	1,662,183	1,669,637	1,672,913	1,676,324	1,679,743	1,683,745	1,688,008	1,694,444	1,700,344	1,735,033	1,740,584	1,747,278	1,750,189	1,752,832	1,755,026	1,755,793	1,758,341	1,758,372	1,758,372	1,758,372										
June-94	507,386	988,866	1,093,334	1,170,915	1,212,098	1,230,432	1,235,833	1,243,122	1,247,382	1,251,645	1,252,686	1,255,338	1,260,284	1,261,941	1,262,624	1,262,948	1,263,197	1,263,431	1,264,853	1,267,940	1,270,183	1,270,498	1,270,668	1,270,736	1,270,834											
June-95	419,212	715,818	815,621	863,086	890,307	917,113	922,985	923,881	924,606	926,605	926,605	926,605	926,605	926,605	926,779	927,514	927,514	927,514	927,514	928,160	928,160	928,160	928,160	928,160												
June-96	382,658	780,302	879,753	927,773	959,109	977,572	986,429	994,587	997,113	999,835	999,878	999,878	1,002,373	1,003,880	1,003,880	1,004,022	1,004,022	1,004,022	1,004,022	1,004,022	1,004,022	1,004,022	1,004,022													
June-97	375,777	680,288	796,380	819,630	848,942	854,522	862,163	870,431	872,306	876,115	878,979	880,535	881,313	882,123	882,572	882,572	882,572	882,663	882,663	882,663	882,663	882,663														
June-98	271,043	554,887	629,610	674,301	694,718	711,568	723,173	728,434	739,218	743,949	744,590	744,993	744,993	746,349	751,655	753,336	760,571	764,236	776,156	777,189	778,357															
June-99	200,054	434,499	509,933	556,932	596,752	611,737	618,749	622,442	625,193	627,351	628,383	630,351	632,095	633,627	633,750	634,493	634,493	634,493	634,549	634,549																
June-00	278,690	480,160	554,610	607,363	639,042	681,279	703,362	725,333	730,593	734,009	743,547	751,052	758,824	768,373	779,490	794,445	813,062	835,378	855,368																	
June-01	312,280	500,976	665,683	751,467	818,710	893,280	968,370	1,062,045	1,117,446	1,168,471	1,217,356	1,269,474	1,306,387	1,358,630	1,416,743	1,462,400	1,503,318	1,547,279																		
June-02	197,389	476,132	547,189	630,575	673,854	722,281	746,769	768,857	788,866	810,710	820,868	840,995	861,213	880,964	949,420	969,248	988,937																			
June-03	163,049	459,264	666,927	739,223	775,337	800,620	814,827	825,961	832,962	839,586	845,639	851,935	856,279	861,497	865,605	867,940																				
June-04	79,919	361,725	544,497	684,486	731,761	788,111	824,704	835,702	842,619	849,442	861,676	877,029	885,864	891,975	916,039																					
June-05	394,825	766,546	887,167	942,140	987,834	999,094	1,003,380	1,005,881	1,006,180	1,046,856	1,049,675	1,050,861	1,051,002	1,051,835																						
June-06	318,539	662,581	842,645	941,494	1,038,675	1,080,705	1,115,105	1,134,878	1,157,537	1,168,675	1,180,575	1,209,017	1,232,127																							
June-07	310,954	746,618	936,091	1,034,943	1,071,013	1,094,137	1,114,504	1,128,520	1,148,970	1,163,078	1,178,181	1,188,036																								
June-08	418,873	692,272	777,557	805,740	842,963	874,236	948,911	1,045,997	1,133,617	1,240,354	1,328,694																									
June-09	491,289	882,544	982,774	1,088,621	1,119,184	1,136,600	1,146,349	1,161,838	1,190,931	1,201,505																										
June-10	412,961	823,720	1,038,592	1,141,629	1,181,671	1,235,565	1,291,253	1,312,494	1,324,362																											
June-11	434,256	781,068	901,778	953,435	989,604	1,003,572	1,011,746	1,019,046																												
June-12	463,779	899,638	985,560	1,039,330	1,099,797	1,146,122	1,243,695																													
June-13	317,812	782,569	959,446	1,070,185	1,129,117	1,139,556																														
June-14	343,501	744,703	854,796	927,960	960,880																															
June-15	337,278	703,991	883,924	978,091																																
June-16	441,825	812,574	957,038																																	
June-17	435,827	746,274																																		
June-18	286,984																																			

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432
June-83	2.363	1.422	1.250	1.196	1.164	1.131	1.157	1.125	1.099	1.040	1.183	1.019	1.023	1.006	1.002	1.003	1.002	1.001	1.000	1.003	1.002	1.002	1.002	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
June-84	2.363	1.422	1.250	1.196	1.134	1.155	1.119	1.095	1.065	1.038	1.027	1.006	1.004	1.018	1.020	1.015	1.017	1.005	1.003	1.013	1.012	1.007	1.005	1.007	1.004	1.009	1.019	1.001	1.001	1.004	1.002	1.000	1.000	1.003	
June-85	2.363	1.422	1.250	1.215	1.148	1.114	1.089	1.081	1.025	1.015	1.005	1.004	1.001	1.008	1.004	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.012	1.033	1.000	1.000	1.000	1.000	1.000		
June-86	2.363	1.422	1.204	1.227	1.175	1.126	1.093	1.064	1.029	1.009	1.010	1.004	1.011	1.007	1.004	1.008	1.002	1.004	1.002	1.004	1.002	1.005	1.002	1.002	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
June-87	2.363	1.538	1.283	1.121	1.133	1.123	1.040	1.033	1.018	1.017	1.023	1.023	1.003	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
June-88	2.701	1.515	1.213	1.134	1.081	1.058	1.019	1.025	1.004	1.001	1.002	1.004	1.000	1.000	1.001	1.000	1.000	1.001	1.000	1.001	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
June-89	3.279	1.378	1.185	1.103	1.066	1.038	1.018	1.007	1.018	1.015	1.007	1.004	1.010	1.007	1.005	1.005	1.005	1.003	1.004	1.003	1.005	1.004	1.004	1.004	1.005	1.006	1.005	1.012	1.004						
June-90	2.879	1.299	1.128	1.106	1.043	1.011	1.020	1.012	1.002	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.001	1.000	1.000	1.000	1.000							
June-91	3.194	1.275	1.100	1.047	1.018	1.011	1.006	1.005	1.004	1.003	1.001	1.001	1.001	1.000	1.004	1.003	1.003	1.004	1.003	1.003	1.004	1.002	1.002	1.001	1.002	1.003	1.002								
June-92	2.414	1.216	1.069	1.026	1.015	1.010	1.004	1.005	1.005	1.008	1.006	1.005	1.007	1.005	1.004	1.004	1.003	1.003	1.003	1.004	1.004	1.073	1.005	1.011	1.019	1.005									
June-93	2.476	1.171	1.037	1.016	1.019	1.007	1.004	1.002	1.002	1.002	1.002	1.003	1.004	1.003	1.020	1.003	1.004	1.002	1.002	1.001	1.000	1.001	1.000	1.000	1.000										
June-94	1.949	1.106	1.071	1.035	1.015	1.004	1.006	1.003	1.003	1.001	1.002	1.004	1.001	1.001	1.000	1.000	1.000	1.001	1.002	1.002	1.000	1.000	1.000	1.000											
June-95	1.708	1.139	1.058	1.032	1.030	1.006	1.001	1.001	1.002	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000												
June-96	2.039	1.127	1.055	1.034	1.019	1.009	1.008	1.003	1.003	1.000	1.000	1.002	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
June-97	1.810	1.171	1.029	1.036	1.007	1.009	1.010	1.002	1.004	1.003	1.002	1.001	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
June-98	2.047	1.135	1.071	1.030	1.024	1.016	1.007	1.015	1.006	1.001	1.001	1.000	1.002	1.007	1.002	1.010	1.005	1.016	1.001	1.002															
June-99	2.172	1.174	1.092	1.071	1.025	1.011	1.006	1.004	1.003	1.002	1.003	1.003	1.002	1.000	1.001	1.000	1.000	1.000	1.000																
June-00	1.723	1.155	1.095	1.052	1.066	1.032	1.031	1.007	1.005	1.013	1.010	1.010	1.013	1.014	1.019	1.023	1.027	1.024																	
June-01	1.604	1.329	1.129	1.089	1.091	1.084	1.097	1.052	1.046	1.042	1.043	1.029	1.040	1.043	1.032	1.028	1.029																		
June-02	2.412	1.149	1.152	1.069	1.072	1.034	1.030	1.026	1.028	1.013	1.025	1.024	1.023	1.078	1.021	1.020																			
June-03	2.817	1.452	1.108	1.049	1.033	1.018	1.014	1.008	1.008	1.007	1.007	1.005	1.006	1.005	1.003																				
June-04	4.526	1.505	1.257	1.069	1.077	1.046	1.013	1.008	1.008	1.014	1.018	1.010	1.007	1.027																					
June-05	1.941	1.157	1.062	1.049	1.011	1.004	1.002	1.000	1.040	1.003	1.001	1.000	1.001																						
June-06	2.080	1.272	1.117	1.103	1.040	1.032	1.018	1.020	1.010	1.010	1.024	1.019																							
June-07	2.401	1.254	1.106	1.035	1.022	1.019	1.013	1.018	1.012	1.013	1.008																								
June-08	1.653	1.123	1.036	1.046	1.037	1.085	1.102	1.084	1.094	1.071																									
June-09	1.796	1.114	1.108	1.028	1.016	1.009	1.014	1.025	1.009																										
June-10	1.995	1.261	1.099	1.035	1.046	1.045	1.016	1.009																											
June-11	1.799	1.155	1.057	1.038	1.014	1.008	1.007																												
June-12	1.940	1.096	1.055	1.058	1.042	1.085																													
June-13	2.462	1.226	1.115	1.055	1.009																														
June-14	2.168	1.148	1.086	1.035																															
June-15	2.087	1.256	1.107																																
June-16	1.839	1.178																																	
June-17	1.712																																		

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	To Ult
Simple Avg																																				
All Yrs	2.270	1.258	1.122	1.076	1.055	1.045	1.033	1.026	1.020	1.013	1.016	1.008	1.007	1.011	1.007	1.006	1.005	1.003	1.001	1.002	1.002	1.007	1.001	1.002	1.003	1.002	1.004	1.006	1.001	1.001	1.000	1.000	1.000	1.002	1.000	
Latest 5	2.054	1.181	1.084	1.044	1.025	1.046	1.030	1.031	1.033	1.022	1.012	1.012	1.015	1.033	1.015	1.016	1.012	1.008	1.000	1.001	1.000	1.015	1.001	1.003	1.005	1.003	1.001	1.002	1.001	1.001	1.000					
Latest 3	1.880	1.194	1.103	1.050	1.022	1.046	1.012	1.039	1.038	1.031	1.011	1.010	1.005	1.036	1.019	1.024	1.019	1.013	1.000	1.001	1.000	1.000	1.000	1.004	1.007	1.002	1.002	1.004	1.001	1.000	1.000	1.000	1.000			
Volume Wtd																																				
All Yrs	2.233	1.245	1.114	1.070	1.047	1.037	1.025	1.020	1.016	1.011	1.009	1.006	1.006	1.008	1.006	1.005	1.005	1.003	1.002	1.002	1.002	1.009	1.002	1.003	1.004	1.002	1.003	1.005	1.001	1.001	1.001	1.000	1.000	1.003	1.000	
Latest 5	2.020	1.177	1.084	1.045	1.026	1.046	1.028	1.030	1.033	1.024	1.012	1.012	1.017	1.035	1.018	1.019	1.015	1.008	1.000	1.001	1.000	1.024	1.002	1.003	1.005	1.003	1.002	1.003	1.002	1.001	1.001					
Latest 3	1.863	1.192	1.103	1.050	1.022	1.048	1.013	1.037	1.038	1.032	1.012	1.010	1.004	1.037	1.021	1.025	1.022	1.014	1.000	1.000	1.000	1.000	1.000	1.005	1.008	1.002	1.003	1.005	1.002	1.000	1.000	1.000	1.000			

Dev Factor Sel	.																																			
Industry 1	1.952	1.145	1.055	1.025	1.015	1.012	1.012	1.013	1.010	1.009	1.011	1.010	1.009	1.008	1.009	1.007	1.007	1.006																		
Industry 2		1.268	1.086	1.037	1.014	1.010	1.014	1.010	1.007	1.010	1.011	1.009	1.008	1.009	1.010	1.007	1.007	1.009	1.006	1.006																
Prior	2.139	1.260	1.123	1.043	1.038	1.036	1.034	1.027	1.016	1.011	1.009	1.007	1.007	1.010	1.007	1.005	1.004	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.001	1.001	1.001	1.001	1.001	1.001	1.002	
Selected	2.068	1.260	1.122	1.044	1.038	1.036	1.033	1.026	1.016	1.013	1.009	1.008	1.007	1.011	1.007	1.006	1.005	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001
FacToUlt	3.891	1.882	1.493	1.331	1.274	1.228	1.185	1.147	1.118	1.101	1.086	1.076	1.068	1.061	1.050	1.043	1.036	1.031	1.029	1.027	1.025	1.023	1.021	1.019	1.017	1.014	1.012	1.010	1.008	1.007	1.006	1.005	1.004	1.003	1.002	1.001
Percent of Ult	25.7%	53.1%	67.0%	75.2%	78.5%	81.4%	84.4%	87.2%	89.5%	90.9%	92.1%	92.9%	93.6%	94.3%	95.3%	95.9%	96.5%	97.0%	97.2%	97.4%	97.6%	97.8%	98.0%	98.2%	98.4%	98.6%	98.8%	99.0%	99.2%	99.3%	99.4%	99.5%	99.6%	99.7%	99.8%	99.9%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Developmental Services - Cluster 1
Medical

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/17		As of 6/18		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	1,214,098	1,216,106	1,223,561	1,233,466	9,463	0.8%	17,360	1.4%
6/30/82-83	261,000	267,000	261,000	264,000	0	0.0%	(3,000)	-1.1%
6/30/83-84	1,418,000	1,446,000	1,422,000	1,451,000	4,000	0.3%	5,000	0.3%
6/30/84-85	767,000	782,000	767,000	782,000	0	0.0%	0	0.0%
6/30/85-86	1,609,000	1,610,000	1,609,000	1,610,000	0	0.0%	0	0.0%
6/30/86-87	1,907,000	1,908,000	1,907,000	1,908,000	0	0.0%	0	0.0%
6/30/87-88	2,501,000	2,502,000	2,501,000	2,502,000	0	0.0%	0	0.0%
6/30/88-89	4,022,000	4,071,506	4,037,000	4,087,530	15,000	0.4%	16,024	0.4%
6/30/89-90	3,721,000	3,725,000	3,717,000	3,720,000	(4,000)	-0.1%	(5,000)	-0.1%
6/30/90-91	2,920,500	2,950,000	2,922,480	2,953,000	1,980	0.1%	3,000	0.1%
6/30/91-92	2,689,830	2,718,000	2,699,730	2,727,000	9,900	0.4%	9,000	0.3%
6/30/92-93	1,767,150	1,786,000	1,765,170	1,784,000	(1,980)	-0.1%	(2,000)	-0.1%
6/30/93-94	1,280,070	1,293,000	1,279,080	1,292,000	(990)	-0.1%	(1,000)	-0.1%
6/30/94-95	936,540	946,000	935,550	945,000	(990)	-0.1%	(1,000)	-0.1%
6/30/95-96	1,026,000	1,036,000	1,024,000	1,035,000	(2,000)	-0.2%	(1,000)	-0.1%
6/30/96-97	904,000	913,000	903,000	912,000	(1,000)	-0.1%	(1,000)	-0.1%
6/30/97-98	797,000	813,000	798,000	814,000	1,000	0.1%	1,000	0.1%
6/30/98-99	652,000	666,000	652,000	665,000	0	0.0%	(1,000)	-0.2%
6/30/99-00	860,000	878,000	880,000	898,000	20,000	2.3%	20,000	2.3%
6/30/00-01	1,553,000	1,632,000	1,593,000	1,675,000	40,000	2.6%	43,000	2.6%
6/30/01-02	1,008,000	1,028,000	1,025,000	1,045,000	17,000	1.7%	17,000	1.7%
6/30/02-03	906,000	925,000	905,000	924,000	(1,000)	-0.1%	(1,000)	-0.1%
6/30/03-04	943,000	963,000	962,000	981,000	19,000	2.0%	18,000	1.9%
6/30/04-05	1,119,000	1,142,000	1,115,000	1,138,000	(4,000)	-0.4%	(4,000)	-0.4%
6/30/05-06	1,289,000	1,323,000	1,306,000	1,343,000	17,000	1.3%	20,000	1.5%
6/30/06-07	1,209,350	1,313,000	1,210,300	1,317,000	950	0.1%	4,000	0.3%
6/30/07-08	1,244,760	1,384,000	1,359,450	1,472,000	114,690	9.2%	88,000	6.4%
6/30/08-09	1,213,480	1,350,000	1,251,150	1,349,000	37,670	3.1%	(1,000)	-0.1%
6/30/09-10	1,355,160	1,528,000	1,386,050	1,510,000	30,890	2.3%	(18,000)	-1.2%
6/30/10-11	1,074,600	1,232,000	1,052,100	1,205,000	(22,500)	-2.1%	(27,000)	-2.2%
6/30/11-12	1,244,700	1,430,000	1,301,400	1,504,000	56,700	4.6%	74,000	5.2%
6/30/12-13	1,269,900	1,461,000	1,247,400	1,427,000	(22,500)	-1.8%	(34,000)	-2.3%
6/30/13-14	1,105,200	1,288,000	1,101,600	1,281,000	(3,600)	-0.3%	(7,000)	-0.5%
6/30/14-15	1,181,700	1,371,000	1,171,800	1,356,000	(9,900)	-0.8%	(15,000)	-1.1%
6/30/15-16	1,369,000	1,552,000	1,286,000	1,458,000	(83,000)	-6.1%	(94,000)	-6.1%
6/30/16-17	1,277,100	1,780,000	1,264,000	1,432,000	(13,100)	-1.0%	(348,000)	-19.6%
6/30/17-18								
Total	51,616,138	54,228,612	51,840,821	53,999,996	224,683	0.4%	(228,616)	-0.4%

NOTES:

(2), (3) From prior Aon analysis as of June 30, 2017

(4), (5) From Section 2, Exhibit 2, Page 1, Columns 6, 7

(6) = (4) - (2)

(7) = (4) / (2) - 1

(8) = (5) - (3)

(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Developmental Services - Cluster 1
Medical

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
444	100.0%	0.1%	0.0%	0.0%	0.0%	1.000	1.000
432	99.9%	0.1%	0.1%	0.0%	0.0%	0.981	0.971
420	99.8%	0.1%	0.2%	0.0%	0.0%	0.959	0.939
408	99.7%	0.1%	0.3%	0.0%	0.0%	0.939	0.911
396	99.6%	0.1%	0.4%	0.0%	0.0%	0.921	0.885
384	99.5%	0.1%	0.5%	0.0%	0.0%	0.903	0.860
372	99.4%	0.1%	0.6%	0.0%	0.0%	0.886	0.836
360	99.3%	0.1%	0.7%	0.0%	0.0%	0.869	0.813
348	99.2%	0.2%	0.8%	0.1%	0.0%	0.853	0.792
336	99.0%	0.2%	1.0%	0.1%	0.0%	0.851	0.790
324	98.8%	0.2%	1.2%	0.1%	0.0%	0.844	0.781
312	98.6%	0.2%	1.4%	0.1%	0.0%	0.835	0.769
300	98.4%	0.2%	1.6%	0.1%	0.0%	0.824	0.756
288	98.2%	0.2%	1.8%	0.1%	0.0%	0.813	0.741
276	98.0%	0.2%	2.0%	0.1%	0.1%	0.801	0.725
264	97.8%	0.2%	2.2%	0.1%	0.1%	0.789	0.710
252	97.6%	0.2%	2.4%	0.1%	0.1%	0.776	0.694
240	97.4%	0.2%	2.6%	0.1%	0.1%	0.764	0.678
228	97.2%	0.2%	2.8%	0.1%	0.1%	0.752	0.663
216	97.0%	0.5%	3.0%	0.3%	0.2%	0.740	0.648
204	96.5%	0.6%	3.5%	0.3%	0.2%	0.750	0.663
192	95.9%	0.6%	4.1%	0.4%	0.3%	0.759	0.676
180	95.3%	1.0%	4.7%	0.6%	0.4%	0.764	0.683
168	94.3%	0.7%	5.7%	0.4%	0.3%	0.777	0.701
156	93.6%	0.7%	6.4%	0.4%	0.3%	0.771	0.694
144	92.9%	0.8%	7.1%	0.5%	0.4%	0.765	0.686
132	92.1%	1.2%	7.9%	0.8%	0.6%	0.762	0.681
120	90.9%	1.4%	9.1%	1.0%	0.8%	0.765	0.686
108	89.5%	2.3%	10.5%	1.7%	1.4%	0.768	0.690
96	87.2%	2.8%	12.8%	2.1%	1.8%	0.782	0.708
84	84.4%	2.9%	15.6%	2.3%	2.0%	0.793	0.723
72	81.4%	2.9%	18.6%	2.4%	2.1%	0.797	0.727
60	78.5%	3.3%	21.5%	2.8%	2.6%	0.796	0.725
48	75.2%	8.2%	24.8%	7.1%	6.7%	0.794	0.723
36	67.0%	13.8%	33.0%	12.5%	12.0%	0.817	0.753
24	53.1%	27.4%	46.9%	25.9%	25.1%	0.843	0.788
12	25.7%	25.7%	74.3%	25.2%	25.0%	0.873	0.827
Total		100.0%					

NOTES:

(2) = 1 / Section 2, Exhibit 2, Page 2, Column 4

(3) Incremental % based on (2)

(4) = 1 - (2)

(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}

(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}

(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Developmental Services - Cluster 1
Medical

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	8,524	18,428		8,042	17,388
6/30/82-83	31	3,031	0.981	30	2,972
6/30/83-84	3,062	32,062	0.959	2,935	30,733
6/30/84-85	2,815	17,815	0.939	2,644	16,729
6/30/85-86	6,835	7,835	0.921	6,291	7,212
6/30/86-87	10,647	11,647	0.903	9,612	10,515
6/30/87-88	16,246	17,246	0.886	14,387	15,273
6/30/88-89	29,618	80,148	0.869	25,734	69,639
6/30/89-90	30,990	33,990	0.853	26,424	28,982
6/30/90-91	465	30,985	0.851	395	26,357
6/30/91-92	6,018	33,288	0.844	5,079	28,095
6/30/92-93	6,798	25,628	0.835	5,676	21,396
6/30/93-94	8,246	21,166	0.824	6,797	17,447
6/30/94-95	7,390	16,840	0.813	6,007	13,688
6/30/95-96	19,978	30,978	0.801	16,000	24,810
6/30/96-97	20,337	29,337	0.789	16,040	23,138
6/30/97-98	19,643	35,643	0.776	15,251	27,673
6/30/98-99	17,451	30,451	0.764	13,333	23,266
6/30/99-00	24,632	42,632	0.752	18,516	32,048
6/30/00-01	45,721	127,721	0.740	33,812	94,454
6/30/01-02	36,063	56,063	0.750	27,046	42,045
6/30/02-03	37,060	56,060	0.759	28,128	42,549
6/30/03-04	45,961	64,961	0.764	35,120	49,638
6/30/04-05	63,165	86,165	0.777	49,109	66,991
6/30/05-06	73,873	110,873	0.771	56,991	85,535
6/30/06-07	22,264	128,964	0.765	17,042	98,715
6/30/07-08	30,756	143,306	0.762	23,439	109,212
6/30/08-09	49,645	147,495	0.765	37,980	112,838
6/30/09-10	61,688	185,638	0.768	47,384	142,592
6/30/10-11	33,054	185,954	0.782	25,849	145,423
6/30/11-12	57,705	260,305	0.793	45,757	206,407
6/30/12-13	107,844	287,444	0.797	85,933	229,042
6/30/13-14	140,720	320,120	0.796	111,944	254,659
6/30/14-15	193,709	377,909	0.794	153,774	299,999
6/30/15-16	328,962	500,962	0.817	268,808	409,356
6/30/16-17	517,726	685,726	0.843	436,551	578,210
6/30/17-18	718,016	1,019,016	0.873	627,178	890,098
Total	2,803,657	5,263,832		2,311,038	4,295,121
			(7) Total Discount Factor:	0.824	0.816

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	8,524	18,428
(9) Projected Number of Years:	3	3
(10) Projected Paid Loss per Year:	2,841	6,143
(11) Discounted Value at 4%:	8,042	17,388

NOTES:
(2), (3) From Section 2, Exhibit 2, Page 1, Columns 8, 9
(4) From Section 2, Exhibit 2, Page 9, Column 7
(5) = (2) x (4)
(6) = (3) x (4)
(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)
(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Developmental Services - Cluster 1
Medical

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	8,524	18,428		7,822	16,912
6/30/82-83	31	3,031	0.971	30	2,944
6/30/83-84	3,062	32,062	0.939	2,876	30,112
6/30/84-85	2,815	17,815	0.911	2,565	16,231
6/30/85-86	6,835	7,835	0.885	6,048	6,932
6/30/86-87	10,647	11,647	0.860	9,157	10,017
6/30/87-88	16,246	17,246	0.836	13,586	14,422
6/30/88-89	29,618	80,148	0.813	24,093	65,198
6/30/89-90	30,990	33,990	0.792	24,531	26,906
6/30/90-91	465	30,985	0.790	367	24,471
6/30/91-92	6,018	33,288	0.781	4,702	26,009
6/30/92-93	6,798	25,628	0.769	5,231	19,719
6/30/93-94	8,246	21,166	0.756	6,231	15,993
6/30/94-95	7,390	16,840	0.741	5,474	12,473
6/30/95-96	19,978	30,978	0.725	14,488	22,466
6/30/96-97	20,337	29,337	0.710	14,430	20,816
6/30/97-98	19,643	35,643	0.694	13,629	24,731
6/30/98-99	17,451	30,451	0.678	11,836	20,654
6/30/99-00	24,632	42,632	0.663	16,328	28,261
6/30/00-01	45,721	127,721	0.648	29,619	82,739
6/30/01-02	36,063	56,063	0.663	23,913	37,175
6/30/02-03	37,060	56,060	0.676	25,053	37,897
6/30/03-04	45,961	64,961	0.683	31,410	44,394
6/30/04-05	63,165	86,165	0.701	44,310	60,444
6/30/05-06	73,873	110,873	0.694	51,233	76,893
6/30/06-07	22,264	128,964	0.686	15,266	88,426
6/30/07-08	30,756	143,306	0.681	20,959	97,657
6/30/08-09	49,645	147,495	0.686	34,038	101,126
6/30/09-10	61,688	185,638	0.690	42,558	128,069
6/30/10-11	33,054	185,954	0.708	23,415	131,726
6/30/11-12	57,705	260,305	0.723	41,698	188,097
6/30/12-13	107,844	287,444	0.727	78,439	209,069
6/30/13-14	140,720	320,120	0.725	102,047	232,144
6/30/14-15	193,709	377,909	0.723	139,982	273,093
6/30/15-16	328,962	500,962	0.753	247,866	377,464
6/30/16-17	517,726	685,726	0.788	407,802	540,132
6/30/17-18	718,016	1,019,016	0.827	594,063	843,100
Total	2,803,657	5,263,832		2,137,092	3,954,912
			(7) Total Discount Factor:	0.762	0.751

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	8,524	18,428
(9) Projected Number of Years:	3	3
(10) Projected Paid Loss per Year:	2,841	6,143
(11) Discounted Value at 6%:	7,822	16,912

NOTES:

(2), (3) From Section 2, Exhibit 2, Page 1, Columns 8, 9

(4) From Section 2, Exhibit 2, Page 9, Column 8

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Mental Health - Cluster 2

Indemnity

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		20,727,208			22,711,750	23,538,009	1,984,543	2,810,801		
6/30/82-83		2,883,944	2,920,972		2,920,972	2,926,814	37,028	42,870		
6/30/83-84		2,655,007	2,708,050		2,680,970	2,708,050	25,963	53,044		
6/30/84-85	142,561	4,387,003	4,516,666	4,483,493	4,409,000	4,517,000	21,997	129,997	3.093	3.168
6/30/85-86	153,298	4,634,091	4,812,777	4,807,442	4,639,000	4,668,000	4,909	33,909	3.026	3.045
6/30/86-87	176,136	6,208,413	6,501,914	6,514,071	6,215,000	6,254,000	6,587	45,587	3.529	3.551
6/30/87-88	206,319	11,798,654	12,422,276	12,365,697	12,366,000	12,422,000	567,346	623,346	5.994	6.021
6/30/88-89	222,806	12,597,882	13,298,021	13,238,958	13,274,396	13,298,000	676,514	700,118	5.958	5.968
6/30/89-90	223,751	12,054,003	12,790,461	12,736,062	12,736,000	12,790,000	681,997	735,997	5.692	5.716
6/30/90-91	210,162	7,830,550	8,342,983	8,338,498	7,870,000	7,967,565	39,450	137,015	3.745	3.791
6/30/91-92	205,241	4,260,079	4,555,116	4,550,521	4,281,000	4,350,025	20,921	89,946	2.086	2.119
6/30/92-93	176,705	3,706,099	3,992,764	3,985,830	3,986,000	3,993,000	279,901	286,901	2.256	2.260
6/30/93-94	173,075	2,575,204	2,809,606	2,802,713	2,803,000	2,810,000	227,796	234,796	1.620	1.624
6/30/94-95	178,317	2,818,005	3,090,574	3,080,724	2,832,000	2,905,540	13,995	87,535	1.588	1.629
6/30/95-96	175,996	1,924,351	2,106,617	2,100,866	1,934,000	2,012,185	9,649	87,834	1.099	1.143
6/30/96-97	190,083	1,571,537	1,714,449	1,711,896	1,579,000	1,636,870	7,463	65,333	0.831	0.861
6/30/97-98	177,278	2,912,109	3,208,714	3,194,061	2,927,000	3,064,595	14,891	152,486	1.651	1.729
6/30/98-99	189,080	1,674,780	1,857,168	1,852,678	1,815,940	1,819,860	141,160	145,080	0.960	0.962
6/30/99-00	194,494	2,313,702	2,559,106	2,549,924	2,422,500	2,482,230	108,798	168,528	1.246	1.276
6/30/00-01	201,568	3,299,797	3,686,028	3,665,519	3,482,700	3,575,420	182,903	275,623	1.728	1.774
6/30/01-02	203,105	2,606,204	2,939,471	2,926,410	2,779,700	2,850,830	173,496	244,626	1.369	1.404
6/30/02-03	202,515	1,796,796	2,012,869	2,013,524	2,013,000	2,014,000	216,204	217,204	0.994	0.994
6/30/03-04	189,588	3,243,956	3,693,073	3,671,224	3,487,450	3,619,140	243,494	375,184	1.839	1.909
6/30/04-05	186,990	2,723,646	3,087,949	2,973,929	2,974,000	3,088,000	250,355	364,355	1.590	1.651
6/30/05-06	193,254	1,859,383	2,108,250	2,146,122	2,108,000	2,146,000	248,617	286,617	1.091	1.110
6/30/06-07	203,359	2,221,812	2,561,102	2,559,256	2,431,050	2,432,950	209,238	211,138	1.195	1.196
6/30/07-08	212,083	1,641,504	1,919,419	2,054,669	1,823,050	1,952,250	181,546	310,746	0.860	0.921
6/30/08-09	204,679	1,978,196	2,372,198	2,456,159	2,372,000	2,456,000	393,804	477,804	1.159	1.200
6/30/09-10	184,688	1,231,427	1,506,139	1,718,404	1,613,000	1,718,000	381,573	486,573	0.873	0.930
6/30/10-11	169,689	2,282,187	2,845,393	2,821,851	2,822,000	2,917,000	539,813	634,813	1.663	1.719
6/30/11-12	177,399	1,674,313	2,179,478	2,344,504	2,179,000	2,403,000	504,687	728,687	1.228	1.355
6/30/12-13	189,252	2,398,582	3,228,976	3,283,140	3,229,000	3,365,000	830,418	966,418	1.706	1.778
6/30/13-14	199,876	2,760,679	3,880,255	3,895,874	3,880,000	3,993,000	1,119,321	1,232,321	1.941	1.998
6/30/14-15	213,700	2,979,242	4,588,681	4,563,105	4,563,000	4,703,000	1,583,758	1,723,758	2.135	2.201
6/30/15-16	211,829	3,785,814	6,790,996	6,038,966	6,039,000	6,961,000	2,253,186	3,175,186	2.851	3.286
6/30/16-17	203,085	2,412,028	5,808,088	5,462,000	5,462,000	5,982,000	3,049,972	3,569,972	2.690	2.946
6/30/17-18	203,925	996,294	4,652,637	5,211,395	4,653,000	5,368,000	3,656,706	4,371,706	2.282	2.632
Total	6,545,887	151,424,482	154,069,236	148,119,486	172,314,478	177,708,332	20,889,995	26,283,850		
Tot 6/30/84-18	6,545,887	125,158,324	148,440,214	148,119,486	144,000,786	148,535,460	18,842,462	23,377,136	2.200	2.269

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) Sum of Section 3, Exhibit 1, Page 2, Column 3 and Section 3, Exhibit 1, Page 9, Column 8

(4) From Section 3, Exhibit 1, Page 2, Column 8

(5) From Section 3, Exhibit 1, Page 3, Column 8

(6), (7) Selected based on (3), (4), and (5)

(8) = (6) - (3)

(9) = (7) - (3)

(10) = (6) / (2) / 10

(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Mental Health - Cluster 2
Indemnity

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Accident Year	Payroll (000's)	Paid Loss Excluding Lump Sum	Paid LDF	Adjstmnt for Extra Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/16-17	Paid Counts 7/1/17-18	Average Outstanding Claim	Average Age
All Prior Yrs		20,061,528							5	5		89
6/30/82-83		2,789,944	1.013	1.000	2,826,831	94,141	2,920,972		1	1	36,887	92
6/30/83-84		2,245,006	1.023	1.000	2,297,434	410,616	2,708,050		0	0		
6/30/84-85	142,561	3,835,920	1.034	1.000	3,964,757	551,910	4,516,666	3.168	1	1	128,837	77
6/30/85-86	153,298	4,048,163	1.044	1.000	4,225,970	586,807	4,812,777	3.139	0	0		
6/30/86-87	176,136	5,376,022	1.054	1.000	5,668,274	833,640	6,501,914	3.691	0	0		
6/30/87-88	206,319	10,113,632	1.061	1.000	10,734,726	1,687,550	12,422,276	6.021	2	1	621,094	66
6/30/88-89	222,806	10,622,240	1.066	1.000	11,319,416	1,978,605	13,298,021	5.968	3	3	232,392	81
6/30/89-90	223,751	10,016,363	1.073	1.000	10,749,764	2,040,696	12,790,461	5.716	2	2	366,701	78
6/30/90-91	210,162	6,165,086	1.083	1.000	6,675,021	1,667,962	8,342,983	3.970	0	0		
6/30/91-92	205,241	3,230,938	1.091	1.000	3,524,431	1,030,685	4,555,116	2.219	0	0		
6/30/92-93	176,705	2,912,020	1.098	1.000	3,197,096	795,668	3,992,764	2.260	1	1	285,076	67
6/30/93-94	173,075	2,216,620	1.105	1.000	2,450,124	359,482	2,809,606	1.623	1	1	233,504	68
6/30/94-95	178,317	2,341,581	1.116	1.000	2,612,718	477,856	3,090,574	1.733	0	0		
6/30/95-96	175,996	1,440,291	1.125	1.000	1,620,859	485,759	2,106,617	1.197	0	0		
6/30/96-97	190,083	1,057,037	1.133	1.000	1,197,885	516,564	1,714,449	0.902	0	0		
6/30/97-98	177,278	2,101,308	1.139	1.000	2,394,251	814,463	3,208,714	1.810	0	0		
6/30/98-99	189,080	1,254,530	1.144	1.000	1,434,808	422,360	1,857,168	0.982	1	0		
6/30/99-00	194,494	1,634,502	1.147	1.000	1,875,467	683,639	2,559,106	1.316	0	0		
6/30/00-01	201,568	2,503,297	1.151	1.000	2,881,901	804,127	3,686,028	1.829	0	0		
6/30/01-02	203,105	2,097,298	1.155	1.000	2,423,283	516,188	2,939,471	1.447	0	0		
6/30/02-03	202,515	1,299,796	1.160	1.000	1,507,531	505,338	2,012,869	0.994	1	1	207,735	48
6/30/03-04	189,588	2,662,956	1.165	1.000	3,101,855	591,218	3,693,073	1.948	1	0		
6/30/04-05	186,990	2,088,646	1.169	1.000	2,442,115	645,834	3,087,949	1.651	1	1	353,469	66
6/30/05-06	193,254	1,356,633	1.175	1.000	1,594,449	513,801	2,108,250	1.091	1	0		
6/30/06-07	203,359	1,791,061	1.181	1.000	2,116,082	445,020	2,561,102	1.259	0	0		
6/30/07-08	212,083	1,303,214	1.201	1.000	1,564,876	354,542	1,919,419	0.905	0	0		
6/30/08-09	204,679	1,651,196	1.225	1.000	2,022,480	349,718	2,372,198	1.159	1	1	371,283	51
6/30/09-10	184,688	1,060,427	1.243	1.000	1,318,164	187,974	1,506,139	0.816	0	0		
6/30/10-11	169,689	1,956,057	1.264	1.000	2,472,685	372,708	2,845,393	1.677	5	4	129,157	59
6/30/11-12	177,399	1,493,513	1.298	1.000	1,938,000	241,479	2,179,478	1.229	2	1	444,486	53
6/30/12-13	189,252	2,131,582	1.335	1.000	2,844,763	384,213	3,228,976	1.706	8	4	178,295	58
6/30/13-14	199,876	2,454,263	1.392	1.000	3,417,307	462,948	3,880,255	1.941	11	6	160,507	57
6/30/14-15	213,700	2,706,742	1.504	1.000	4,070,366	518,315	4,588,681	2.147	18	11	123,966	56
6/30/15-16	211,829	3,548,313	1.712	1.000	6,076,261	714,735	6,790,996	3.206	59	25	101,118	57
6/30/16-17	203,085	2,323,528	2.173	1.000	5,049,217	758,871	5,808,088	2.860	207	58	46,995	47
6/30/17-18	203,925	981,294	4.102	1.000	4,025,742	626,894	4,652,637	2.282		212	14,361	46
Total	6,545,887	128,872,548			129,636,909	24,432,327	154,069,236		332	339		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3), (4) From Section 3, Exhibit 1, Page 7

(5) Based on information from the MA WCRIB

(6) = (3) x (4) x (5)

(7) From Section 3, Exhibit 1, Page 9, Column 13

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10), (11) Provided by Commonwealth of Massachusetts

(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Mental Health - Cluster 2
Indemnity

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss Excluding Lump Sum	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	142,561	2.065	3,835,920	1.034	3,931,583	551,910	4,483,493	3.145	2.758
6/30/85-86	153,298	2.674	4,048,163	1.044	4,220,635	586,807	4,807,442	3.136	2.753
6/30/86-87	176,136	3.352	5,376,022	1.054	5,680,432	833,640	6,514,071	3.698	3.225
6/30/87-88	206,319	4.729	10,113,632	1.061	10,678,148	1,687,550	12,365,697	5.993	5.176
6/30/88-89	222,806	4.650	10,622,240	1.066	11,260,352	1,978,605	13,238,958	5.942	5.054
6/30/89-90	223,751	4.448	10,016,363	1.073	10,695,366	2,040,696	12,736,062	5.692	4.780
6/30/90-91	210,162	3.148	6,165,086	1.083	6,670,536	1,667,962	8,338,498	3.968	3.174
6/30/91-92	205,241	1.690	3,230,938	1.091	3,519,836	1,030,685	4,550,521	2.217	1.715
6/30/92-93	176,705	1.765	2,912,020	1.098	3,190,161	795,668	3,985,830	2.256	1.805
6/30/93-94	173,075	1.374	2,216,620	1.105	2,443,232	359,482	2,802,713	1.619	1.412
6/30/94-95	178,317	1.412	2,341,581	1.116	2,602,868	477,856	3,080,724	1.728	1.460
6/30/95-96	175,996	0.892	1,440,291	1.125	1,615,108	485,759	2,100,866	1.194	0.918
6/30/96-97	190,083	0.619	1,057,037	1.133	1,195,332	516,564	1,711,896	0.901	0.629
6/30/97-98	177,278	1.283	2,101,308	1.139	2,379,598	814,463	3,194,061	1.802	1.342
6/30/98-99	189,080	0.740	1,254,530	1.144	1,430,318	422,360	1,852,678	0.980	0.756
6/30/99-00	194,494	0.928	1,634,502	1.147	1,866,285	683,639	2,549,924	1.311	0.960
6/30/00-01	201,568	1.352	2,503,297	1.151	2,861,392	804,127	3,665,519	1.818	1.420
6/30/01-02	203,105	1.145	2,097,298	1.155	2,410,222	516,188	2,926,410	1.441	1.187
6/30/02-03	202,515	0.747	1,299,796	1.160	1,508,187	505,338	2,013,524	0.994	0.745
6/30/03-04	189,588	1.555	2,662,956	1.165	3,080,006	591,218	3,671,224	1.936	1.625
6/30/04-05	186,990	0.885	2,088,646	1.169	2,328,094	645,834	2,973,929	1.590	1.245
6/30/05-06	193,254	0.956	1,356,633	1.175	1,632,321	513,801	2,146,122	1.111	0.845
6/30/06-07	203,359	1.035	1,791,061	1.181	2,114,235	445,020	2,559,256	1.258	1.040
6/30/07-08	212,083	1.119	1,303,214	1.201	1,700,126	354,542	2,054,669	0.969	0.802
6/30/08-09	204,679	1.212	1,651,196	1.225	2,106,441	349,718	2,456,159	1.200	1.029
6/30/09-10	184,688	1.302	1,060,427	1.243	1,530,430	187,974	1,718,404	0.930	0.829
6/30/10-11	169,689	1.391	1,956,057	1.264	2,449,142	372,708	2,821,851	1.663	1.443
6/30/11-12	177,399	1.498	1,493,513	1.298	2,103,025	241,479	2,344,504	1.322	1.185
6/30/12-13	189,252	1.617	2,131,582	1.335	2,898,928	384,213	3,283,140	1.735	1.532
6/30/13-14	199,876	1.737	2,454,263	1.392	3,432,926	462,948	3,895,874	1.949	1.718
6/30/14-15	213,700	1.869	2,706,742	1.504	4,044,790	518,315	4,563,105	2.135	1.893
6/30/15-16	211,829	2.015	3,548,313	1.712	5,324,232	714,735	6,038,966	2.851	2.513
6/30/16-17	203,085	2.171	2,323,528	2.173	4,703,129	758,871	5,462,000	2.690	2.316
6/30/17-18	203,925	2.336	981,294	4.102	4,584,501	626,894	5,211,395	2.556	2.248
Total	6,545,887		103,776,071		124,191,916	23,927,570	148,119,486		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 3, Exhibit 1, Page 4, Column 11

(4) From Section 3, Exhibit 1, Page 2, Column 3

(5) From Section 3, Exhibit 1, Page 2, Column 4

(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]

(7) From Section 3, Exhibit 1, Page 9, Column 13

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Mental Health - Cluster 2
Indemnity

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Exp Ult Loss Excluding Lump Sum	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									2.065	2.065
6/30/85-86									2.674	2.674
6/30/86-87									3.352	3.352
6/30/87-88									4.729	4.729
6/30/88-89									4.650	4.650
6/30/89-90									4.448	4.448
6/30/90-91	210,162	6,675,021	3.176	0.983	3.123	6.649	20.763	0.382	3.146	3.148
6/30/91-92	205,241	3,524,431	1.717	1.079	1.852	6.214	11.510	0.373	1.689	1.690
6/30/92-93	176,705	3,197,096	1.809	1.258	2.276	5.807	13.216	0.342	1.743	1.765
6/30/93-94	173,075	2,450,124	1.416	1.242	1.758	5.427	9.540	0.371	1.352	1.374
6/30/94-95	178,317	2,612,718	1.465	1.230	1.803	5.072	9.143	0.401	1.412	1.412
6/30/95-96	175,996	1,620,859	0.921	1.220	1.124	4.741	5.328	0.432	0.891	0.892
6/30/96-97	190,083	1,197,885	0.630	1.208	0.761	4.430	3.374	0.467	0.618	0.619
6/30/97-98	177,278	2,394,251	1.351	1.193	1.611	4.141	6.671	0.506	1.283	1.283
6/30/98-99	189,080	1,434,808	0.759	1.177	0.893	3.870	3.457	0.549	0.739	0.740
6/30/99-00	194,494	1,875,467	0.964	1.158	1.117	3.617	4.039	0.597	0.926	0.928
6/30/00-01	201,568	2,881,901	1.430	1.129	1.614	3.380	5.455	0.655	1.353	1.352
6/30/01-02	203,105	2,423,283	1.193	1.107	1.321	3.159	4.171	0.715	1.145	1.145
6/30/02-03	202,515	1,507,531	0.744	1.103	0.821	2.952	2.424	0.768	0.745	0.747
6/30/03-04	189,588	3,101,855	1.636	1.103	1.804	2.759	4.978	0.822	1.556	1.555
6/30/04-05	186,990	2,442,115	1.306	1.096	1.431	2.579	3.690	0.885	0.838	0.885
6/30/05-06	193,254	1,594,449	0.825	1.085	0.895	2.410	2.157	0.956	0.906	0.956
6/30/06-07	203,359	2,116,082	1.041	1.073	1.116	2.252	2.514	1.035	0.980	1.035
6/30/07-08	212,083	1,564,876	0.738	1.061	0.783	2.105	1.648	1.119	1.060	1.119
6/30/08-09	204,679	2,022,480	0.988	1.049	1.036	1.967	2.039	1.212	1.148	1.212
6/30/09-10	184,688	1,318,164	0.714	1.045	0.746	1.838	1.371	1.302	1.233	1.302
6/30/10-11	169,689	2,472,685	1.457	1.046	1.524	1.718	2.619	1.391	1.317	1.391
6/30/11-12	177,399	1,938,000	1.092	1.039	1.135	1.606	1.823	1.498	1.419	1.498
6/30/12-13	189,252	2,844,763	1.503	1.030	1.548	1.501	2.324	1.617	1.532	1.617
6/30/13-14	199,876	3,417,307	1.710	1.026	1.754	1.403	2.460	1.737	1.646	1.737
6/30/14-15	213,700	4,070,366	1.905	1.020	1.944	1.311	2.548	1.869	1.770	1.869
6/30/15-16	211,829	6,076,261	2.868	1.013	2.905	1.225	3.559	2.015	1.909	2.015
6/30/16-17	203,085	5,049,217	2.486	1.006	2.501	1.145	2.864	2.171	2.056	2.171
6/30/17-18	203,925	4,025,742	1.974	1.000	1.974	1.070	2.112	2.336		2.336
Total	5,421,016	77,849,737								

Trend Last 4 (ex 17-18):	15.8%	Avg 3 (ex 17-18):	2.990
Trend Last 8 (ex 17-18):	17.3%	Avg 5 (ex 17-18):	2.751
Trend Last 12 (ex 17-18):	11.4%	Avg 10 (ex 17-18):	2.325
Prior Selected Trend:	7.0%	Prior Sel Avg:	2.200
Selected Trend:	7.0%	Sel. Loss Cost:	2.500

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 3, Exhibit 1, Page 2, Column 6

(4) = (3) / (2) / 10

(5) Based on information from the MA WCRIB

(6) = (4) x (5)

(7) Based on Selected Trend from (6)

(8) = (6) x (7)

(9) = Sel. Loss Cost / [(5) * (7)]

(10) From prior Aon analysis as of June 30, 2017

(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Mental Health - Cluster 2
Indemnity

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend	0.960	
(2)	Credibility	41%	
(3)	Average Pmt Trend Statewide	0.960	
(4)	Credibility Weighted Trend	0.960	
		(Low)	(High)
(5)	Selected Range	0.930	0.960
(6)	Incremental Paid for 2018	186,816	186,816
(7)	Estimated Reserve	2,481,983	4,483,583
(8)	Paid to Date (82 & Prior)	20,061,528	20,061,528
(9)	Est Ult Paid for 1982 & Prior	22,543,511	24,545,110

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	212,158	268,681
(11)	Projected Number of Years	7	7
(12)	Estimated Reserve	1,485,105	1,880,765
(13)	Paid to Date (82 & Prior)	20,061,528	19,874,712
(14)	Est Ult Paid for 1982 & Prior	21,546,633	21,755,477
(14a)	Paid Counts During Fiscal Year	5	5
		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	22,045,072	22,871,330
(16)	Lump Sum Ultimates	666,679	666,679
(17)	Ult Loss Including Lump Sums	**22,711,750**	**23,538,009**
(18)	Implied Tail	1.099	1.140
(19)	Ult Loss Inc Lump Sums @ 6/17	22,798,136	23,860,823

NOTES:

(1) From Section 3, Exhibit 1, Page 6
(2) = (Average of Section 3, Exhibit 1, Page 6, Column 3 / 3,000,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 3, Exhibit 1, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 3, Exhibit 1, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) From Section 3, Exhibit 1, Page 9, Column 13
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2017

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Mental Health - Cluster 2

Indemnity

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	750,775	13.529			
1993	2	716,997	13.483	0.955		
1994	3	790,631	13.581	1.103		
1995	4	675,209	13.423	0.854		
1996	5	721,864	13.490	1.069		
1997	6	762,764	13.545	1.057		
1998	7	718,856	13.485	0.942		
1999	8	630,481	13.354	0.877		
2000	9	625,893	13.347	0.993	n =	27
2001	10	614,002	13.328	0.981	S(x) =	54,135
2002	11	594,569	13.296	0.968	S(x-sq) =	108,542,313
2003	12	551,328	13.220	0.927	S(xy) =	707,544
2004	13	536,825	13.193	0.974	S(y) =	353
2005	14	518,060	13.158	0.965	D =	44,226
2006	15	465,230	13.050	0.898	slope =	-0.048
2007	16	463,442	13.046	0.996	Avg Trend =	0.952
2008	17	390,409	12.875	0.842		
2009	18	394,388	12.885	1.010		
2010	19	396,721	12.891	1.006		
2011	20	371,480	12.825	0.936		
2012	21	370,117	12.822	0.996		
2013	22	354,524	12.779	0.958		
2014	23	352,103	12.772	0.993		
2015	24	356,384	12.784	1.012		
2016	25	251,496	12.435	0.706		
2017	26	198,162	12.197	0.788		
2017	27	186,816	12.138	0.743		
					Selected Trend:	**0.960**

NOTES:

(3) 2017 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2017

(4) LN [(3)]

(5) Eg. 2018: 0.743 = 186816 / 198162

Commonwealth of Massachusetts Workers Compensation
Department of Mental Health - Cluster 2
INDEMNITY
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432
June-83	79,308	192,487	287,043	366,841	453,896	544,549	640,359	749,442	914,819	1,077,281	1,197,004	1,318,238	1,411,761	1,487,347	1,551,200	1,663,300	1,725,578	1,794,915	1,844,320	1,889,378	1,935,146	1,980,854	2,027,803	2,076,694	2,127,762	2,181,186	2,236,941	2,293,398	2,349,618	2,407,755	2,467,791	2,528,627	2,590,871	2,655,332	2,721,515	2,789,944
June-84	140,777	341,678	509,522	651,169	805,697	966,187	1,136,616	1,274,005	1,376,021	1,469,295	1,531,586	1,571,197	1,574,113	1,632,297	1,648,271	1,715,119	1,788,667	1,866,433	1,948,603	2,027,969	2,039,380	2,061,132	2,116,425	2,146,711	2,178,653	2,211,990	2,245,006	2,245,006	2,245,006	2,245,006	2,245,006	2,245,006	2,245,006	2,245,006	2,245,006	
June-85	229,548	557,132	830,815	1,036,782	1,282,444	1,536,673	1,759,380	1,967,113	2,201,587	2,336,765	2,327,938	2,488,898	2,562,953	2,635,303	2,683,281	2,681,236	2,703,322	2,765,472	2,829,392	2,893,225	2,958,066	3,025,906	3,097,014	3,171,404	3,249,041	3,327,655	3,405,939	3,486,893	3,570,488	3,628,593	3,677,977	3,729,119	3,781,629	3,835,920		
June-86	424,946	1,031,378	1,515,527	1,911,756	2,265,456	2,545,075	2,747,857	2,913,298	3,035,997	3,203,939	3,246,126	3,354,664	3,430,712	3,506,894	3,646,690	3,769,482	3,845,436	3,884,426	3,884,426	3,901,838	3,936,022	3,971,963	4,009,622	4,048,163	4,048,163	4,048,163	4,048,163	4,048,163	4,048,163	4,048,163	4,048,163	4,048,163	4,048,163			
June-87	556,509	1,350,692	1,993,369	2,579,183	3,116,291	3,554,448	3,811,881	4,007,455	4,213,271	4,383,210	4,532,492	4,672,974	4,887,827	5,019,452	5,138,398	5,229,397	5,303,153	5,343,074	5,369,509	5,376,022	5,376,022	5,376,022	5,376,022	5,376,022	5,376,022	5,376,022	5,376,022	5,376,022	5,376,022	5,376,022	5,376,022	5,376,022				
June-88	996,188	2,332,317	3,514,867	4,556,262	5,500,101	6,017,634	6,366,291	6,722,900	7,030,156	7,360,513	7,651,811	7,905,775	8,097,655	8,296,173	8,504,343	8,714,431	8,884,786	9,012,909	9,145,701	9,284,112	9,391,001	9,490,888	9,559,720	9,628,264	9,699,144	9,772,337	9,846,507	9,922,648	10,001,236	10,073,519	10,113,632					
June-89	974,368	2,808,156	4,300,397	5,491,438	6,395,798	6,912,277	7,273,583	7,577,849	7,816,082	8,040,709	8,232,999	8,388,997	8,540,736	8,681,850	8,813,773	8,957,148	9,087,424	9,215,619	9,374,489	9,492,897	9,614,904	9,738,023	9,864,181	9,984,126	10,084,005	10,185,647	10,289,641	10,397,339	10,507,914	10,622,240						
June-90	1,353,410	3,008,842	4,338,167	5,277,757	5,970,429	6,408,269	6,735,493	6,970,610	7,237,879	7,548,184	7,808,304	7,989,794	8,127,173	8,265,835	8,400,915	8,532,029	8,676,814	8,783,514	8,912,207	9,013,337	9,115,739	9,217,710	9,323,158	9,432,048	9,542,392	9,655,288	9,772,206	9,892,249	10,016,363							
June-91	1,118,653	2,593,016	3,552,946	4,081,060	4,371,249	4,603,681	4,879,272	5,042,637	5,246,506	5,361,660	5,458,410	5,545,863	5,634,530	5,719,796	5,801,980	5,891,283	5,939,454	5,965,760	5,993,853	6,022,299	6,050,626	6,079,918	6,110,167	6,140,819	6,165,086	6,165,086	6,165,086	6,165,086								
June-92	779,443	1,600,490	2,051,414	2,363,890	2,560,991	2,732,954	2,816,302	2,946,286	2,972,351	3,048,807	3,074,042	3,100,183	3,111,601	3,122,928	3,137,949	3,150,571	3,201,317	3,230,938	3,230,938	3,230,938	3,230,938	3,230,938	3,230,938	3,230,938	3,230,938	3,230,938	3,230,938									
June-93	508,042	1,139,423	1,618,359	1,905,411	2,126,599	2,257,595	2,393,075	2,425,099	2,385,748	2,412,183	2,438,986	2,465,788	2,494,233	2,522,478	2,551,473	2,581,602	2,612,495	2,644,362	2,676,330	2,710,104	2,745,340	2,778,023	2,810,764	2,844,272	2,877,843	2,912,020										
June-94	377,925	709,441	935,174	1,117,965	1,249,550	1,323,162	1,417,563	1,481,985	1,569,098	1,629,814	1,690,715	1,751,099	1,818,321	1,857,805	1,886,745	1,916,420	1,946,311	1,976,077	2,006,857	2,038,037	2,070,230	2,117,149	2,149,444	2,181,690	2,216,620											
June-95	574,439	1,025,079	1,426,023	1,674,484	1,757,816	1,829,216	1,892,841	1,966,438	2,053,313	2,075,609	2,139,480	2,201,203	2,270,427	2,322,083	2,335,644	2,336,631	2,340,671	2,340,974	2,341,126	2,341,429	2,341,429	2,341,581	2,341,581	2,341,581												
June-96	465,550	766,030	964,996	1,197,748	1,382,594	1,418,297	1,422,506	1,435,178	1,435,753	1,438,193	1,438,193	1,438,193	1,438,193	1,438,193	1,438,193	1,438,193	1,438,931	1,440,291	1,440,291	1,440,291	1,440,291	1,440,291	1,440,291													
June-97	368,317	714,320	867,272	851,009	922,681	963,841	1,008,538	1,037,840	1,056,559	1,056,947	1,057,037	1,057,037	1,057,037	1,057,037	1,057,037	1,057,037	1,057,037	1,057,037	1,057,037	1,057,037	1,057,037	1,057,037														
June-98	492,131	922,570	1,176,288	1,346,558	1,538,911	1,686,620	1,733,801	1,756,573	1,858,553	1,897,738	1,938,454	2,001,913	2,059,542	2,101,308	2,101,308	2,101,308	2,101,308	2,101,308	2,101,308	2,101,308	2,101,308															
June-99	519,180	827,646	1,011,258	1,112,460	1,171,394	1,215,503	1,243,288	1,247,060	1,247,060	1,249,270	1,249,270	1,254,410	1,254,410	1,254,410	1,254,410	1,254,410	1,254,410	1,254,410	1,254,530	1,254,530																
June-00	421,812	853,733	1,204,737	1,330,009	1,450,814	1,536,528	1,585,725	1,622,250	1,634,502	1,634,502	1,634,502	1,634,502	1,634,502	1,634,502	1,634,502	1,634,502	1,634,502	1,634,502	1,634,502																	
June-01	729,752	1,342,599	1,726,067	1,967,587	2,098,934	2,195,511	2,276,106	2,353,436	2,394,597	2,417,073	2,440,162	2,469,209	2,492,651	2,503,297	2,503,297	2,503,297	2,503,297	2,503,297																		
June-02	623,060	1,199,282	1,469,081	1,634,403	1,755,795	1,921,999	2,013,718	2,051,869	2,088,811	2,097,298	2,097,298	2,097,298	2,097,298	2,097,298	2,097,298	2,097,298	2,097,298																			
June-03	598,151	1,030,113	1,208,133	1,287,181	1,329,302	1,354,993	1,378,440	1,386,422	1,396,038	1,404,611	1,404,724	1,297,452	1,298,408	1,298,653	1,299,375	1,299,796																				
June-04	770,179	1,494,135	1,959,406	2,261,994	2,448,308	2,553,905	2,614,936	2,661,897	2,661,897	2,661,897	2,662,734	2,662,734	2,662,734	2,662,956	2,662,956																					
June-05	665,795	1,274,934	1,639,401	1,834,908	1,949,257	2,006,584	2,055,842	2,083,828	2,083,828	2,083,828	2,086,593	2,086,593	2,087,143	2,088,646																						
June-06	602,391	1,043,862	1,212,582	1,295,959	1,330,737	1,350,327	1,353,060	1,354,447	1,354,589	1,355,634	1,356,494	1,356,633	1,356,633																							
June-07	589,461	977,401	1,280,907	1,496,099	1,629,703	1,702,117	1,772,404	1,791,061	1,791,061	1,791,061	1,791,061	1,791,061																								
June-08	619,287	959,312	1,100,546	1,186,728	1,222,576	1,245,348	1,259,889	1,293,854	1,303,214	1,303,214	1,303,214																									
June-09	633,064	1,071,264	1,269,944	1,347,802	1,449,944	1,535,542	1,576,741	1,613,034	1,632,115	1,651,196																										
June-10	415,006	709,896	895,282	1,025,770	1,055,921	1,060,427	1,060,427	1,060,427	1,060,427																											
June-11	652,304	1,099,134	1,404,624	1,565,671	1,663,173	1,679,758	1,832,231	1,956,057																												
June-12	603,523	1,201,631	1,349,652	1,421,088	1,451,528	1,474,107	1,493,513																													
June-13	652,867	1,253,353	1,608,152	1,828,578	1,999,158	2,131,582																														
June-14	737,949	1,535,219	1,975,124	2,280,487	2,454,263																															
June-15	1,026,870	1,815,749	2,270,640	2,706,742																																
June-16	1,405,951	2,666,770	3,548,313																																	
June-17	1,172,336	2,323,528																																		
June-18	981,294																																			

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432
June-83	2.427	1.491	1.278	1.237	1.200	1.176	1.170	1.221	1.178	1.111	1.101	1.071	1.054	1.043	1.072	1.037	1.040	1.028	1.024	1.024	1.024	1.024	1.024	1.025	1.025	1.026	1.025	1.025	1.025	1.025	1.025	1.025	1.025	1.025	
June-84	2.427	1.491	1.278	1.237	1.199	1.176	1.121	1.080	1.068	1.042	1.026	1.002	1.037	1.010	1.041	1.043	1.043	1.044	1.041	1.006	1.011	1.027	1.014	1.015	1.015	1.015	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
June-85	2.427	1.491	1.248	1.237	1.198	1.145	1.118	1.119	1.061	0.996	1.069	1.030	1.028	1.018	0.999	1.008	1.023	1.023	1.023	1.022	1.023	1.023	1.024	1.024	1.024	1.024	1.024	1.024	1.016	1.014	1.014	1.014	1.014		
June-86	2.427	1.469	1.261	1.185	1.123	1.080	1.060	1.042	1.055	1.013	1.033	1.023	1.022	1.040	1.034	1.020	1.010	1.000	1.004	1.009	1.009	1.009	1.010	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
June-87	2.427	1.476	1.294	1.208	1.141	1.072	1.051	1.051	1.040	1.034	1.031	1.046	1.027	1.024	1.018	1.014	1.008	1.005	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
June-88	2.341	1.507	1.296	1.207	1.094	1.058	1.056	1.046	1.047	1.040	1.033	1.024	1.025	1.025	1.025	1.020	1.014	1.015	1.015	1.012	1.011	1.007	1.007	1.007	1.008	1.008	1.008	1.008	1.007	1.004					
June-89	2.882	1.531	1.277	1.165	1.081	1.052	1.042	1.031	1.029	1.024	1.019	1.018	1.017	1.015	1.016	1.015	1.014	1.017	1.013	1.013	1.013	1.013	1.012	1.010	1.010	1.010	1.010	1.011	1.011						
June-90	2.223	1.442	1.217	1.131	1.073	1.051	1.035	1.038	1.043	1.034	1.023	1.017	1.017	1.016	1.016	1.017	1.012	1.015	1.011	1.011	1.011	1.011	1.012	1.012	1.012	1.012	1.012	1.013							
June-91	2.318	1.370	1.149	1.071	1.053	1.060	1.033	1.040	1.022	1.018	1.016	1.016	1.015	1.014	1.015	1.008	1.004	1.005	1.005	1.005	1.005	1.005	1.005	1.004	1.000	1.000	1.000								
June-92	2.053	1.282	1.152	1.083	1.067	1.030	1.046	1.009	1.026	1.008	1.009	1.004	1.004	1.005	1.004	1.016	1.009	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000									
June-93	2.243	1.420	1.177	1.116	1.062	1.060	1.013	0.984	1.011	1.011	1.011	1.012	1.011	1.011	1.012	1.012	1.012	1.012	1.013	1.013	1.012	1.012	1.012	1.012	1.012										
June-94	1.877	1.318	1.195	1.118	1.059	1.071	1.045	1.059	1.039	1.037	1.036	1.038	1.022	1.016	1.016	1.016	1.015	1.016	1.016	1.016	1.023	1.015	1.015	1.016											
June-95	1.784	1.391	1.174	1.050	1.041	1.035	1.039	1.044	1.011	1.031	1.029	1.031	1.023	1.006	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
June-96	1.645	1.260	1.241	1.154	1.026	1.003	1.009	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.001	1.000	1.000	1.000	1.000	1.000													
June-97	1.939	1.214	0.981	1.084	1.045	1.046	1.029	1.018	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
June-98	1.875	1.275	1.145	1.143	1.096	1.028	1.013	1.058	1.021	1.021	1.033	1.029	1.020	1.000	1.000	1.000	1.000	1.000	1.000	1.000															
June-99	1.594	1.222	1.100	1.053	1.038	1.023	1.003	1.000	1.002	1.000	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																
June-00	2.024	1.411	1.104	1.091	1.059	1.032	1.023	1.008	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
June-01	1.840	1.286	1.140	1.067	1.046	1.037	1.034	1.017	1.009	1.010	1.012	1.009	1.004	1.000	1.000	1.000	1.000																		
June-02	1.925	1.225	1.113	1.074	1.095	1.048	1.019	1.018	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000																			
June-03	1.722	1.173	1.065	1.033	1.019	1.017	1.006	1.007	1.006	1.000	0.924	1.001	1.000	1.001	1.000																				
June-04	1.940	1.311	1.154	1.082	1.043	1.024	1.018	1.000	1.000	1.000	1.000	1.000	1.000	1.000																					
June-05	1.915	1.286	1.119	1.062	1.029	1.025	1.014	1.000	1.000	1.001	1.000	1.000	1.001																						
June-06	1.733	1.162	1.069	1.027	1.015	1.002	1.001	1.000	1.001	1.001	1.000	1.000																							
June-07	1.658	1.311	1.168	1.089	1.044	1.041	1.011	1.000	1.000	1.000	1.000																								
June-08	1.549	1.147	1.078	1.030	1.019	1.012	1.027	1.007	1.000	1.000																									
June-09	1.692	1.185	1.061	1.076	1.059	1.027	1.023	1.012	1.012																										
June-10	1.711	1.261	1.146	1.029	1.004	1.000	1.000	1.000																											
June-11	1.685	1.278	1.115	1.062	1.010	1.091	1.068																												
June-12	1.991	1.123	1.053	1.021	1.016	1.013																													
June-13	1.920	1.283	1.137	1.093	1.066																														
June-14	2.080	1.287	1.155	1.076																															
June-15	1.768	1.251	1.192																																
June-16	1.897	1.331																																	
June-17	1.982																																		

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	To Ult
Simple Avg																																				
All Yrs	1.998	1.322	1.162	1.106	1.068	1.051	1.039	1.033	1.025	1.017	1.016	1.015	1.014	1.011	1.013	1.011	1.011	1.010	1.010	1.008	1.009	1.011	1.010	1.010	1.010	1.009	1.009	1.010	1.008	1.007	1.008	1.010	1.013	1.012	1.025	
Latest 5	1.929	1.255	1.130	1.057	1.031	1.028	1.026	1.004	1.002	1.000	0.985	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.003	1.007	1.005	1.006	1.009	1.007	1.006	1.006	1.006	1.007	1.004	1.008					
Latest 3	1.882	1.289	1.161	1.064	1.031	1.035	1.030	1.006	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.005	1.009	1.009	1.004	1.004	1.008	1.010	1.006	1.001	1.005	1.005	1.013			
Volume Wtd																																				
All Yrs	2.001	1.335	1.175	1.112	1.069	1.050	1.038	1.032	1.028	1.020	1.020	1.018	1.016	1.014	1.015	1.013	1.011	1.011	1.010	1.009	1.010	1.010	1.009	1.009	1.008	1.008	1.008	1.010	1.008	1.005	1.006	1.009	1.014	1.014	1.025	
Latest 5	1.920	1.269	1.139	1.062	1.034	1.033	1.028	1.004	1.002	1.000	0.988	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.004	1.008	1.005	1.006	1.009	1.008	1.008	1.007	1.008	1.007	1.004	1.006					
Latest 3	1.888	1.295	1.164	1.068	1.034	1.041	1.036	1.007	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.005	1.009	1.008	1.003	1.006	1.009	1.010	1.007	1.002	1.004	1.005	1.014			

Dev Factor Selection																																				
Industry 1	2.946	1.574	1.235	1.110	1.036	1.025	1.016	1.009	1.007	1.006	1.006	1.010	1.003	1.005	1.003	1.004	1.005	1.003																		
Industry 2		1.901	1.354	1.158	1.073	1.026	1.025	1.013	1.006	1.010	1.006	1.014	1.007	1.003	1.003	1.003	1.002	1.006	1.002	1.003																
Prior	*1.898*	*1.247*	*1.123*	*1.080*	*1.033*	*1.034*	*1.026*	*1.017*	*1.015*	*1.020*	*1.017*	*1.006*	*1.005*	*1.004*	*1.004*	*1.004*	*1.004*	*1.004*	*1.004*	*1.005*	*1.008*	*1.009*	*1.010*	*1.008*	*1.006*	*1.008*	*1.009*	*1.008*	*1.005*	*1.007*	*1.007*	*1.010*	*1.010*	*1.010*	*1.013*	
Selected	1.888	1.269	1.139	1.080	1.043	1.028	1.026	1.017	1.015	1.020	1.016	1.005	1.005	1.004	1.004	1.004	1.004	1.003	1.003	1.004	1.005	1.007	1.009	1.009	1.007	1.006	1.008	1.009	1.007	1.004	1.007	1.010	1.010	1.010	1.010	1.013
FacToUlt	4.102	2.173	1.712	1.504	1.392	1.335	1.298	1.264	1.243	1.225	1.201	1.181	1.175	1.169	1.165	1.160	1.155	1.151	1.147	1.144	1.139	1.133	1.125	1.116	1.105	1.098	1.091	1.083	1.073	1.066	1.061	1.054	1.044	1.034	1.023	1.013
Percent of Ult	24.4%	46.0%	58.4%	66.5%	71.8%	74.9%	77.1%	79.1%	80.4%	81.6%	83.3%	84.6%	85.1%	85.5%	85.9%	86.2%	86.5%	86.9%	87.2%	87.4%	87.8%	88.2%	88.9%	89.6%	90.5%	91.1%	91.7%	92.4%	93.2%	93.8%	94.2%	94.8%	95.8%	96.8%	97.7%	98.7%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Mental Health - Cluster 2
Indemnity

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/17		As of 6/18		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	22,798,136	23,860,823	22,711,750	23,538,009	(86,385)	-0.4%	(322,814)	-1.4%
6/30/82-83	2,930,227	3,004,978	2,920,972	2,926,814	(9,255)	-0.3%	(78,164)	-2.6%
6/30/83-84	2,682,184	2,766,884	2,680,970	2,708,050	(1,214)	0.0%	(58,834)	-2.1%
6/30/84-85	4,430,000	4,755,000	4,409,000	4,517,000	(21,000)	-0.5%	(238,000)	-5.0%
6/30/85-86	4,657,000	4,765,000	4,639,000	4,668,000	(18,000)	-0.4%	(97,000)	-2.0%
6/30/86-87	6,239,000	6,434,000	6,215,000	6,254,000	(24,000)	-0.4%	(180,000)	-2.8%
6/30/87-88	12,301,000	12,626,000	12,366,000	12,422,000	65,000	0.5%	(204,000)	-1.6%
6/30/88-89	13,138,308	13,158,000	13,274,396	13,298,000	136,088	1.0%	140,000	1.1%
6/30/89-90	12,606,000	12,650,000	12,736,000	12,790,000	130,000	1.0%	140,000	1.1%
6/30/90-91	7,870,000	7,962,790	7,870,000	7,967,565	0	0.0%	4,775	0.1%
6/30/91-92	4,281,000	4,349,070	4,281,000	4,350,025	0	0.0%	955	0.0%
6/30/92-93	3,948,000	3,954,000	3,986,000	3,993,000	38,000	1.0%	39,000	1.0%
6/30/93-94	2,765,000	2,772,000	2,803,000	2,810,000	38,000	1.4%	38,000	1.4%
6/30/94-95	2,832,000	2,952,860	2,832,000	2,905,540	0	0.0%	(47,320)	-1.6%
6/30/95-96	1,934,000	2,013,140	1,934,000	2,012,185	0	0.0%	(955)	0.0%
6/30/96-97	1,579,000	1,639,735	1,579,000	1,636,870	0	0.0%	(2,865)	-0.2%
6/30/97-98	2,927,000	3,068,415	2,927,000	3,064,595	0	0.0%	(3,820)	-0.1%
6/30/98-99	1,818,880	1,823,780	1,815,940	1,819,860	(2,940)	-0.2%	(3,920)	-0.2%
6/30/99-00	2,428,200	2,489,020	2,422,500	2,482,230	(5,700)	-0.2%	(6,790)	-0.3%
6/30/00-01	3,492,200	3,587,060	3,482,700	3,575,420	(9,500)	-0.3%	(11,640)	-0.3%
6/30/01-02	2,788,250	2,860,530	2,779,700	2,850,830	(8,550)	-0.3%	(9,700)	-0.3%
6/30/02-03	2,018,000	2,018,000	2,013,000	2,014,000	(5,000)	-0.2%	(4,000)	-0.2%
6/30/03-04	3,498,850	3,632,860	3,487,450	3,619,140	(11,400)	-0.3%	(13,720)	-0.4%
6/30/04-05	2,972,000	3,104,000	2,974,000	3,088,000	2,000	0.1%	(16,000)	-0.5%
6/30/05-06	2,124,000	2,147,000	2,108,000	2,146,000	(16,000)	-0.8%	(1,000)	0.0%
6/30/06-07	2,451,000	2,476,650	2,431,050	2,432,950	(19,950)	-0.8%	(43,700)	-1.8%
6/30/07-08	1,862,950	1,976,950	1,823,050	1,952,250	(39,900)	-2.1%	(24,700)	-1.2%
6/30/08-09	2,392,000	2,454,000	2,372,000	2,456,000	(20,000)	-0.8%	2,000	0.1%
6/30/09-10	1,638,000	1,736,000	1,613,000	1,718,000	(25,000)	-1.5%	(18,000)	-1.0%
6/30/10-11	2,634,000	2,734,000	2,822,000	2,917,000	188,000	7.1%	183,000	6.7%
6/30/11-12	2,238,000	2,434,000	2,179,000	2,403,000	(59,000)	-2.6%	(31,000)	-1.3%
6/30/12-13	3,168,000	3,283,000	3,229,000	3,365,000	61,000	1.9%	82,000	2.5%
6/30/13-14	3,921,000	4,064,000	3,880,000	3,993,000	(41,000)	-1.0%	(71,000)	-1.7%
6/30/14-15	4,420,000	4,548,000	4,563,000	4,703,000	143,000	3.2%	155,000	3.4%
6/30/15-16	5,565,000	6,540,000	6,039,000	6,961,000	474,000	8.5%	421,000	6.4%
6/30/16-17	5,049,000	5,557,000	5,462,000	5,982,000	413,000	8.2%	425,000	7.6%
6/30/17-18								
Total	166,397,184	172,198,545	167,661,478	172,340,332	1,264,294	0.8%	141,788	0.1%

NOTES:

(2), (3) From prior Aon analysis as of June 30, 2017

(4), (5) From Section 3, Exhibit 1, Page 1, Columns 6, 7

(6) = (4) - (2)

(7) = (4) / (2) - 1

(8) = (5) - (3)

(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Mental Health - Cluster 2
Indemnity

Calculation of Ultimate Lump Sum Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Accident Year	Paid Loss Excluding Lump Sum	Implied Cumulative LDF	Ult Loss Excluding Lump Sum	Selected Incr Lump Sum % Outstdg	Cumulative Lump Sum % Outstdg	Total Lump Sum Outstdg	Paid Lump Sum to Date	Est Ult Lump Sum - Incr Method	Ultimate Lump Sum Percentage	Lump Sum LDF	Est Ult Lump Sum - Paid Method	Selected Est Ultimate Lump Sums	Prior Est Ultimate Lump Sums
All Prior Yrs	20,061,528	1.119	22,458,201	0.0%	0.0%	0	665,680	665,680	3.0%	1.003	667,677	666,679	666,679
6/30/82-83	2,789,944	1.013	2,826,831	0.0%	0.0%	0	94,000	94,000	3.3%	1.003	94,282	94,141	94,141
6/30/83-84	2,245,006	1.023	2,297,434	0.0%	0.0%	0	410,001	410,001	17.8%	1.003	411,231	410,616	410,616
6/30/84-85	3,835,920	1.034	3,964,757	0.0%	0.0%	0	551,083	551,083	13.9%	1.003	552,736	551,910	551,910
6/30/85-86	4,048,163	1.044	4,225,970	0.0%	0.0%	0	585,928	585,928	13.9%	1.003	587,686	586,807	586,807
6/30/86-87	5,376,022	1.054	5,668,274	0.0%	0.0%	0	832,391	832,391	14.7%	1.003	834,888	833,640	833,640
6/30/87-88	10,113,632	1.061	10,734,726	0.0%	0.0%	0	1,685,022	1,685,022	15.7%	1.003	1,690,077	1,687,550	1,687,550
6/30/88-89	10,622,240	1.066	11,319,416	0.0%	0.0%	0	1,975,642	1,975,642	17.5%	1.003	1,981,569	1,978,605	1,978,605
6/30/89-90	10,016,363	1.073	10,749,764	0.0%	0.0%	0	2,037,640	2,037,640	19.0%	1.003	2,043,753	2,040,696	2,040,696
6/30/90-91	6,165,086	1.083	6,675,021	0.0%	0.0%	0	1,665,464	1,665,464	25.0%	1.003	1,670,460	1,667,962	1,667,962
6/30/91-92	3,230,938	1.091	3,524,431	0.0%	0.0%	0	1,029,141	1,029,141	29.2%	1.003	1,032,228	1,030,685	1,031,201
6/30/92-93	2,912,020	1.098	3,197,096	0.0%	0.0%	0	794,079	794,079	24.8%	1.004	797,258	795,668	796,067
6/30/93-94	2,216,620	1.105	2,450,124	0.0%	0.0%	0	358,584	358,584	14.6%	1.005	360,379	359,482	359,662
6/30/94-95	2,341,581	1.116	2,612,718	0.0%	0.0%	0	476,424	476,424	18.2%	1.006	479,288	477,856	478,096
6/30/95-96	1,440,291	1.125	1,620,859	0.0%	0.0%	0	484,060	484,060	29.9%	1.007	487,457	485,759	486,002
6/30/96-97	1,057,037	1.133	1,197,885	0.0%	0.0%	0	514,500	514,500	43.0%	1.008	518,629	516,564	516,824
6/30/97-98	2,101,308	1.139	2,394,251	0.0%	0.0%	0	810,801	810,801	33.9%	1.009	818,125	814,463	814,872
6/30/98-99	1,254,530	1.144	1,434,808	0.0%	0.0%	0	420,250	420,250	29.3%	1.010	424,470	422,360	422,997
6/30/99-00	1,634,502	1.147	1,875,467	0.0%	0.0%	0	679,200	679,200	36.2%	1.013	688,079	683,639	685,704
6/30/00-01	2,503,297	1.151	2,881,901	0.0%	0.0%	0	796,500	796,500	27.6%	1.019	811,753	804,127	807,592
6/30/01-02	2,097,298	1.155	2,423,283	0.1%	0.1%	1,705	508,906	510,612	21.1%	1.025	521,764	516,188	517,767
6/30/02-03	1,299,796	1.160	1,507,531	0.0%	0.1%	1,061	497,000	498,061	33.0%	1.031	512,614	505,338	505,346
6/30/03-04	2,662,956	1.165	3,101,855	0.0%	0.1%	2,183	581,000	583,183	18.8%	1.031	599,253	591,218	593,252
6/30/04-05	2,088,646	1.169	2,442,115	0.0%	0.1%	1,719	635,000	636,719	26.1%	1.031	654,950	645,834	650,712
6/30/05-06	1,356,633	1.175	1,594,449	0.0%	0.1%	1,122	502,750	503,872	31.6%	1.042	523,730	513,801	520,146
6/30/06-07	1,791,061	1.181	2,116,082	0.0%	0.1%	1,489	430,751	432,240	20.4%	1.063	457,800	445,020	453,050
6/30/07-08	1,303,214	1.201	1,564,876	0.1%	0.2%	3,352	338,290	341,642	21.8%	1.086	367,443	354,542	361,834
6/30/08-09	1,651,196	1.225	2,022,480	0.2%	0.4%	8,377	327,000	335,377	16.6%	1.113	364,059	349,718	359,312
6/30/09-10	1,060,427	1.243	1,318,164	0.2%	0.6%	8,096	171,000	179,096	13.6%	1.151	196,853	187,974	196,551
6/30/10-11	1,956,057	1.264	2,472,685	0.4%	1.0%	25,078	326,130	351,209	14.2%	1.209	394,208	372,708	285,279
6/30/11-12	1,493,513	1.298	1,938,000	1.2%	2.2%	42,911	180,800	223,711	11.5%	1.434	259,246	241,479	255,784
6/30/12-13	2,131,582	1.335	2,844,763	1.3%	3.5%	100,659	267,000	367,659	12.9%	1.501	400,766	384,213	391,179
6/30/13-14	2,454,263	1.392	3,417,307	0.3%	3.8%	130,649	306,416	437,065	12.8%	1.595	488,832	462,948	543,128
6/30/14-15	2,706,742	1.504	4,070,366	2.0%	5.9%	238,972	272,500	511,472	12.6%	1.927	525,158	518,315	611,402
6/30/15-16	3,548,313	1.712	6,076,261	2.3%	8.2%	499,186	237,501	736,687	12.1%	2.917	692,782	714,735	779,480
6/30/16-17	2,323,528	2.173	5,049,217	3.3%	11.6%	583,448	88,500	671,948	13.3%	9.557	845,793	758,871	748,835
6/30/17-18	981,294	4.102	4,025,742	2.6%	14.1%	568,605	15,000	583,605	14.5%	44.679	670,183	626,894	
Total	128,872,548		152,095,110			2,218,614	22,551,934	24,770,548	16.3%		25,427,463	25,099,006	24,690,678

NOTES:

(2) From Section 3, Exhibit 1, Page 2, Column 3

(3) = (4) / (2)

(4) From Section 3, Exhibit 1, Page 2, Column 6

(5) From Section 3, Exhibit 1, Page 11

(6) Downward sum of (5)

(7) = (6) x (4)

(8) From Section 3, Exhibit 1, Page 10

(9) = (7) + (8)

(10) = (9) / (4)

(11) From Section 3, Exhibit 1, Page 12

(12) = (8) x (11)

(13) Selected based on (9) and (12)

(14) From prior Aon analysis as of June 30, 2017

Commonwealth of Massachusetts Workers Compensation
Department of Mental Health - Cluster 2
INDEMNITY
Lump Sum Development
Incremental Lump Sum Payments

Acc Yr Ending	*0-12*	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*
All Prior Yrs	0	0	0	0	0	0	0	0	0	20,000	46,500	35,000	0	73,500	50,000	69,180	0	0	97,000	198,000	0	0	0	26,500	25,000	25,000	0	0	0	0	0	0	0	0	0	0	0
Jun-83	0	0	0	0	0	0	0	15,000	0	20,000	24,000	35,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jun-84	0	0	0	0	0	0	0	42,000	0	70,000	40,000	10,001	48,000	0	50,000	0	0	0	0	0	0	0	0	0	0	0	150,000	0	0	0	0	0	0	0	0	
Jun-85	0	0	0	25,000	0	28,000	0	31,500	45,000	116,583	190,000	25,000	0	0	0	54,500	35,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Jun-86	0	0	22,500	27,000	52,500	10,000	24,428	133,500	166,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150,000	0	0	0	0	0	0	0	0	0				
Jun-87	0	0	14,910	16,000	12,500	60,000	255,275	85,000	106,206	0	27,500	25,000	30,000	90,000	70,000	0	0	40,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
Jun-88	0	17,171	21,420	31,841	231,000	272,884	239,000	113,000	90,000	20,000	53,826	87,507	227,463	0	19,910	0	36,667	25,000	48,333	0	0	150,000	0	0	0	0	0	0	0	0	0						
Jun-89	0	79,840	44,000	188,000	417,491	668,500	334,500	165,000	6,500	16,500	57,811	0	0	52,500	0	0	0	0	20,550	4,450	0	0	0	0	0	0	0	0	0	0							
Jun-90	0	39,218	184,450	480,000	338,500	235,500	155,000	60,000	65,793	0	128,678	106,000	7,500	31,000	31,000	0	0	50,125	124,876	0	0	0	0	0	0	0	0	0	0								
Jun-91	0	23,609	651,500	370,355	182,000	135,000	97,000	6,000	0	75,000	90,000	0	0	0	35,000	0	0	0	0	0	0	0	0	0	0	0	0	0									
Jun-92	0	341,000	83,230	201,910	88,000	23,000	125,000	55,000	75,000	0	0	0	0	0	0	0	0	37,000	1	0	0	0	0	0	0	0	0										
Jun-93	23,000	109,000	142,400	120,500	84,000	161,300	42,879	0	93,000	0	0	0	0	0	0	0	0	18,000	0	0	0	0	0	0	0	0											
Jun-94	5,000	85,000	44,300	28,284	37,000	0	46,000	63,000	0	0	0	0	25,000	25,000	0	0	0	0	0	0	0	0	0	0	0												
Jun-95	12,000	35,000	45,000	142,024	68,400	16,500	40,000	0	50,000	25,000	0	0	0	0	42,500	0	0	0	0	0	0	0	0	0													
Jun-96	0	90,000	144,500	10,000	77,560	27,000	0	100,000	0	15,000	20,000	0	0	0	0	0	0	0	0	0	0	0	0														
Jun-97	0	76,500	124,000	215,000	0	0	0	15,000	0	0	84,000	0	0	0	0	0	0	0	0	0	0	0															
Jun-98	53,300	122,501	318,000	16,000	33,091	127,909	20,000	20,000	0	0	0	0	50,000	50,000	0	0	0	0	0	0	0																
Jun-99	48,000	52,250	115,000	130,000	0	7,459	37,541	30,000	0	0	0	0	0	0	0	0	0	0	0	0																	
Jun-00	20,500	255,500	125,500	82,000	65,200	27,500	62,000	26,000	15,000	0	0	0	0	0	0	0	0	0	0																		
Jun-01	45,000	221,500	170,000	132,500	67,500	77,500	12,500	20,000	50,000	0	0	0	0	0	0	0	0	0																			
Jun-02	0	75,000	68,000	62,100	52,950	32,000	144,721	35,000	20,135	19,000	0	0	0	0	0	0	0																				
Jun-03	20,000	30,000	107,000	142,500	137,500	0	0	0	0	60,000	0	0	0	0	0	0																					
Jun-04	0	28,000	54,000	106,000	132,000	215,000	0	46,000	0	0	0	0	0	0	0																						
Jun-05	0	50,787	151,713	171,500	107,000	25,000	39,000	90,000	0	0	0	0	0	0																							
Jun-06	0	18,000	261,750	170,500	32,500	20,000	0	0	0	0	0	0	0																								
Jun-07	10,000	58,500	66,250	51,001	95,000	0	0	150,000	0	0	0	0																									
Jun-08	17,730	170,000	22,500	34,500	40,000	0	31,000	0	22,560	0	0																										
Jun-09	35,000	85,000	124,500	25,000	0	0	0	37,500	20,000	0																											
Jun-10	0	30,000	6,000	110,000	25,000	0	0	0	0																												
Jun-11	8,500	28,530	28,000	116,100	0	0	35,000	110,000																													
Jun-12	0	5,500	125,300	0	50,000	0	0																														
Jun-13	0	75,000	64,765	52,235	75,000	0																															
Jun-14	0	7,850	167,150	131,416	0																																
Jun-15	0	12,500	205,000	55,000																																	
Jun-16	0	76,001	161,500																																		
Jun-17	0	88,500																																			
Jun-18	15,000																																				

Cumulative Lump Sum Payments

Acc Yr Ending	*12*	*24*	*36*	*48*	*60*	*72*	*84*	*96*	*108*	*120*	*132*	*144*	*156*	*168*	*180*	*192*	*204*	*216*	*228*	*240*	*252*	*264*	*276*	*288*	*300*	*312*	*324*	*336*	*348*	*360*	*372*	*384*	*396*	*408*	*420*	*432*	*444*
All Prior Yrs	0	0	0	0	0	0	0	0	0	20,000	66,500	101,500	101,500	175,000	225,000	294,180	294,180	294,180	391,180	589,180	589,180	589,180	589,180	615,680	640,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680
Jun-83	0	0	0	0	0	0	0	15,000	15,000	35,000	59,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	
Jun-84	0	0	0	0	0	0	0	42,000	42,000	112,000	152,000	162,001	210,001	210,001	260,001	260,001	260,001	260,001	260,001	260,001	260,001	260,001	260,001	260,001	260,001	260,001	410,001	410,001	410,001	410,001	410,001	410,001	410,001	410,001	410,001		
Jun-85	0	0	0	25,000	25,000	53,000	53,000	84,500	129,500	246,083	436,083	461,083	461,083	461,083	461,083	515,583	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083			
Jun-86	0	0	22,500	49,500	102,000	112,000	136,428	269,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	585,928	585,928	585,928	585,928	585,928	585,928	585,928	585,928	585,928	585,928				
Jun-87	0	0	14,910	30,910	43,410	103,410	358,685	443,685	549,891	549,891	577,391	602,391	632,391	722,391	792,391	792,391	792,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391					
Jun-88	0	17,171	38,591	70,432	301,432	574,316	813,316	926,316	1,016,316	1,036,316	1,090,142	1,177,649	1,405,112	1,405,112	1,425,022	1,425,022	1,461,689	1,486,689	1,535,022	1,535,022	1,535,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022						
Jun-89	0	79,840	123,840	231,840	649,331	1,317,831	1,652,331	1,817,331	1,823,831	1,840,331	1,898,142	1,898,142	1,898,142	1,950,642	1,950,642	1,950,642	1,950,642	1,950,642	1,971,192	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642							
Jun-90	0	39,218	223,668	703,668	1,042,168	1,277,668	1,432,668	1,492,668	1,558,461	1,558,461	1,687,139	1,793,139	1,800,639	1,831,639	1,862,639	1,862,639	1,862,639	1,912,764	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640								
Jun-91	0	23,609	675,109	1,045,464	1,227,464	1,362,464	1,459,464	1,465,464	1,465,464	1,540,464	1,630,464	1,630,464	1,630,464	1,630,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464										
Jun-92	0	341,000	424,230	626,140	714,140	737,140	862,140	917,140	992,140	992,140	992,140	992,140	992,140	992,140	992,140	992,140	992,140	1,029,140	1,029,141	1,029,141	1,029,141	1,029,141	1,029,141	1,029,141	1,029,141	1,029,141	1,029,141										
Jun-93	23,000	132,000	274,400	394,900	478,900	640,200	683,079	683,079	776,079	776,079	776,079	776,079	776,079	776,079	776,079	776,079	776,079	794,079	794,079	794,079	794,079	794,079	794,079	794,079	794,079	794,079											
Jun-94	5,000	90,000	134,300	162,584	199,584	199,584	245,584	308,584	308,584	308,584	308,584	308,584	308,584	333,584	358,584	358,584	358,584	358,584	358,584	358,584	358,584	358,584	358,584	358,584	358,584												
Jun-95	12,000	47,000	92,000	234,024	302,424	318,924	358,924	358,924	408,924	433,924	433,924	433,924	433,924	433,924	476,424	476,424	476,424	476,424	476,424	476,424	476,424	476,424	476,424	476,424													
Jun-96	0	90,000	234,500	244,500	322,060	349,060	349,060	449,060	449,060	464,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060														
Jun-97	0	76,500	200,500	415,500	415,500	415,500	415,500	430,500	430,500	430,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500															
Jun-98	53,300	175,801	493,801	509,801	542,892	670,801	690,801	710,801	710,801	710,801	710,801	710,801	760,801	810,801	810,801	810,801	810,801	810,801	810,801	810,801	810,801																
Jun-99	48,000	100,250	215,250	345,250	345,250	352,709	390,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250																	
Jun-00	20,500	276,000	401,500	483,500	548,700	576,200	638,200	664,200	679,200	679,200	679,200	679,200	679,200	679,200	679,200	679,200	679,200	679,200	679,200																		
Jun-01	45,000	266,500	436,500	569,000	636,500	714,000	726,500	746,500	796,500	796,500	796,500	796,500	796,500	796,500	796,500	796,500	796,500	796,500																			
Jun-02	0	75,000	143,000	205,100	258,050	290,050	434,771	469,771	489,906	508,906	508,906	508,906	508,906	508,906	508,906	508,906	508,906																				
Jun-03	20,000	50,000	157,000	299,500	437,000	437,000	437,000	437,000	437,000	497,000	497,000	497,000	497,000	497,000	497,000	497,000																					
Jun-04	0	28,000	82,000	188,000	320,000	535,000	535,000	581,000	581,000	581,000	581,000	581,000	581,000	581,000	581,000																						
Jun-05	0	50,787	202,500	374,000	481,000	506,000	545,000	635,000	635,000	635,000	635,000	635,000	635,000	635,000																							
Jun-06	0	18,000	279,750	450,250	482,750	502,750	502,750	502,750	502,750	502,750	502,750	502,750	502,750																								
Jun-07	10,000	68,500	134,750	185,751	280,751	280,751	280,751	430,751	430,751	430,751	430,751	430,751																									
Jun-08	17,730	187,730	210,230	244,730	284,730	284,730	315,730	315,730	338,290	338,290	338,290																										
Jun-09	35,000	120,000	244,500	269,500	269,500	269,500	269,500	307,000	327,000	327,000																											
Jun-10	0	30,000	36,000	146,000	171,000	171,000	171,000	171,000	171,000																												
Jun-11	8,500	37,030	65,030	181,130	181,130	181,130	216,130	326,130																													
Jun-12	0	5,500	130,800	130,800	180,800	180,800	180,800																														
Jun-13	0	75,000	139,765	192,000	267,000	267,000																															
Jun-14	0	7,850	175,000	306,416	306,416																																
Jun-15	0	12,500	217,500	272,500																																	
Jun-16	0	76,001	237,501																																		
Jun-17	0	88,500																																			
Jun-18	15,000																																				

Commonwealth of Massachusetts Workers Compensation
Department of Mental Health - Cluster 2
INDEMNITY
Lump Sum Development
Incremental Lump Sums as a % of Ultimate Losses Excluding Lump Sums

Acc Yr Ending	0-12	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444
All Prior Yrs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.002	0.000	0.003	0.002	0.003	0.000	0.000	0.004	0.009	0.000	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jun-83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.007	0.008	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Jun-84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.018	0.000	0.030	0.017	0.004	0.021	0.000	0.022	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.065	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Jun-85	0.000	0.000	0.000	0.006	0.000	0.007	0.000	0.008	0.011	0.029	0.048	0.006	0.000	0.000	0.000	0.014	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
Jun-86	0.000	0.000	0.005	0.006	0.012	0.002	0.006	0.032	0.039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.035	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Jun-87	0.000	0.000	0.003	0.003	0.002	0.011	0.045	0.015	0.019	0.000	0.005	0.004	0.005	0.016	0.012	0.000	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
Jun-88	0.000	0.002	0.002	0.003	0.022	0.025	0.022	0.011	0.008	0.002	0.005	0.008	0.021	0.000	0.002	0.000	0.003	0.002	0.005	0.000	0.000	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000						
Jun-89	0.000	0.007	0.004	0.010	0.037	0.059	0.030	0.015	0.001	0.001	0.005	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000							
Jun-90	0.000	0.004	0.017	0.045	0.031	0.022	0.014	0.006	0.006	0.000	0.012	0.010	0.001	0.003	0.003	0.000	0.000	0.005	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000								
Jun-91	0.000	0.004	0.098	0.055	0.027	0.020	0.015	0.001	0.000	0.011	0.013	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000									
Jun-92	0.000	0.097	0.024	0.057	0.025	0.007	0.035	0.016	0.021	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000										
Jun-93	0.007	0.034	0.045	0.038	0.026	0.050	0.013	0.000	0.029	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000											
Jun-94	0.002	0.035	0.018	0.012	0.015	0.000	0.019	0.026	0.000	0.000	0.000	0.000	0.000	0.010	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000												
Jun-95	0.005	0.013	0.017	0.054	0.026	0.006	0.015	0.000	0.019	0.010	0.000	0.000	0.000	0.000	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000													
Jun-96	0.000	0.056	0.089	0.006	0.048	0.017	0.000	0.062	0.000	0.009	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000														
Jun-97	0.000	0.064	0.104	0.179	0.000	0.000	0.000	0.013	0.000	0.000	0.070	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
Jun-98	0.022	0.051	0.133	0.007	0.014	0.053	0.008	0.008	0.000	0.000	0.000	0.000	0.021	0.021	0.000	0.000	0.000	0.000	0.000	0.000	0.000																
Jun-99	0.033	0.036	0.080	0.091	0.000	0.005	0.026	0.021	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																	
Jun-00	0.011	0.136	0.067	0.044	0.035	0.015	0.033	0.014	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																		
Jun-01	0.016	0.077	0.059	0.046	0.023	0.027	0.004	0.007	0.017	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																			
Jun-02	0.000	0.031	0.028	0.026	0.022	0.013	0.060	0.014	0.008	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000																				
Jun-03	0.013	0.020	0.071	0.095	0.091	0.000	0.000	0.000	0.000	0.040	0.000	0.000	0.000	0.000	0.000	0.000																					
Jun-04	0.000	0.009	0.017	0.034	0.043	0.069	0.000	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000																						
Jun-05	0.000	0.021	0.062	0.070	0.044	0.010	0.016	0.037	0.000	0.000	0.000	0.000	0.000	0.000																							
Jun-06	0.000	0.011	0.164	0.107	0.020	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
Jun-07	0.005	0.028	0.031	0.024	0.045	0.000	0.000	0.071	0.000	0.000	0.000	0.000																									
Jun-08	0.011	0.109	0.014	0.022	0.026	0.000	0.020	0.000	0.014	0.000	0.000																										
Jun-09	0.017	0.042	0.062	0.012	0.000	0.000	0.000	0.019	0.010	0.000																											
Jun-10	0.000	0.023	0.005	0.083	0.019	0.000	0.000	0.000	0.000																												
Jun-11	0.003	0.012	0.011	0.047	0.000	0.000	0.014	0.044																													
Jun-12	0.000	0.003	0.065	0.000	0.026	0.000	0.000																														
Jun-13	0.000	0.026	0.023	0.018	0.026	0.000																															
Jun-14	0.000	0.002	0.049	0.038	0.000																																
Jun-15	0.000	0.003	0.050	0.014																																	
Jun-16	0.000	0.013	0.027																																		
Jun-17	0.000	0.018																																			
Jun-18	0.004																																				

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	420-444
Simple Avg																																					
All Yrs (ex P)	0.028	0.042	0.038	0.022	0.014	0.013	0.016	0.008	0.005	0.008	0.002	0.003	0.002	0.003	0.001	0.001	0.002	0.001	0.000	0.000	0.001	0.000	0.003	0.000	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Latest 5	0.012	0.043	0.023	0.014	0.000	0.007	0.027	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000						
Latest 3	0.011	0.042	0.023	0.017	0.000	0.005	0.021	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Olympic Avg																																					
All Yrs (ex P)	0.026	0.040	0.035	0.020	0.013	0.012	0.015	0.007	0.004	0.005	0.001	0.002	0.002	0.002	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
Latest 10	0.017	0.033	0.032	0.020	0.003	0.004	0.016	0.004	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000											
Latest 5	0.011	0.042	0.023	0.015	0.000	0.005	0.021	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000						

Dev Factor Selection																																					
Prior	NA	0.026	0.038	0.035	0.021	0.003	0.013	0.012	0.004	0.002	0.002	0.001	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Selected	NA	0.026	0.033	0.023	0.020	0.003	0.013	0.012	0.004	0.002	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FacToUlt	NA	0.141	0.116	0.082	0.059	0.038	0.035	0.022	0.010	0.006	0.004	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Commonwealth of Massachusetts Workers Compensation
Department of Mental Health - Cluster 2
INDEMNITY
Paid Loss Development
Paid Loss - Lump Sum only

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444
All Prior Yrs	0	0	0	0	0	0	0	0	0	20,000	66,500	101,500	101,500	175,000	225,000	294,180	294,180	294,180	391,180	589,180	589,180	589,180	589,180	615,680	640,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680	665,680
Jun-83	0	0	0	0	0	0	0	15,000	15,000	35,000	59,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	94,000	
Jun-84	0	0	0	0	0	0	0	42,000	42,000	112,000	152,000	162,001	210,001	210,001	260,001	260,001	260,001	260,001	260,001	260,001	260,001	260,001	260,001	260,001	260,001	260,001	410,001	410,001	410,001	410,001	410,001	410,001	410,001	410,001	410,001		
Jun-85	0	0	0	25,000	25,000	53,000	53,000	84,500	129,500	246,083	436,083	461,083	461,083	461,083	461,083	515,583	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083	551,083			
Jun-86	0	0	22,500	49,500	102,000	112,000	136,428	269,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	435,928	585,928	585,928	585,928	585,928	585,928	585,928	585,928	585,928	585,928	585,928				
Jun-87	0	0	14,910	30,910	43,410	103,410	358,685	443,685	549,891	549,891	577,391	602,391	632,391	722,391	792,391	792,391	792,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391	832,391					
Jun-88	0	17,171	38,591	70,432	301,432	574,316	813,316	926,316	1,016,316	1,036,316	1,090,142	1,177,649	1,405,112	1,405,112	1,425,022	1,425,022	1,461,689	1,486,689	1,535,022	1,535,022	1,535,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022	1,685,022						
Jun-89	0	79,840	123,840	231,840	649,331	1,317,831	1,652,331	1,817,331	1,823,831	1,840,331	1,898,142	1,898,142	1,898,142	1,950,642	1,950,642	1,950,642	1,950,642	1,950,642	1,971,192	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642	1,975,642							
Jun-90	0	39,218	223,668	703,668	1,042,168	1,277,668	1,432,668	1,492,668	1,558,461	1,558,461	1,687,139	1,793,139	1,800,639	1,831,639	1,862,639	1,862,639	1,862,639	1,912,764	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640	2,037,640								
Jun-91	0	23,689	675,109	1,045,464	1,227,464	1,362,464	1,459,464	1,465,464	1,465,464	1,540,464	1,630,464	1,630,464	1,630,464	1,630,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464	1,665,464									
Jun-92	0	341,000	424,230	626,140	714,140	737,140	862,140	917,140	992,140	992,140	992,140	992,140	992,140	992,140	992,140	992,140	992,140	1,029,140	1,029,141	1,029,141	1,029,141	1,029,141	1,029,141	1,029,141	1,029,141	1,029,141	1,029,141										
Jun-93	23,000	132,000	274,400	394,900	478,900	640,200	683,079	683,079	776,079	776,079	776,079	776,079	776,079	776,079	776,079	776,079	776,079	794,079	794,079	794,079	794,079	794,079	794,079	794,079	794,079	794,079											
Jun-94	5,000	90,000	134,300	162,584	199,584	199,584	245,584	308,584	308,584	308,584	308,584	308,584	308,584	333,584	358,584	358,584	358,584	358,584	358,584	358,584	358,584	358,584	358,584	358,584	358,584												
Jun-95	12,000	47,000	92,000	234,024	302,424	318,924	358,924	358,924	408,924	433,924	433,924	433,924	433,924	433,924	476,424	476,424	476,424	476,424	476,424	476,424	476,424	476,424	476,424	476,424													
Jun-96	0	90,000	234,500	244,500	322,060	349,060	349,060	449,060	449,060	464,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060	484,060														
Jun-97	0	76,500	200,500	415,500	415,500	415,500	415,500	430,500	430,500	430,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500	514,500															
Jun-98	53,300	175,801	493,801	509,801	542,892	670,801	690,801	710,801	710,801	710,801	710,801	710,801	760,801	810,801	810,801	810,801	810,801	810,801	810,801	810,801	810,801																
Jun-99	48,000	100,250	215,250	345,250	345,250	352,709	390,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250	420,250																	
Jun-00	20,500	276,000	401,500	483,500	548,700	576,200	638,200	664,200	679,200	679,200	679,200	679,200	679,200	679,200	679,200	679,200	679,200	679,200	679,200																		
Jun-01	45,000	266,500	436,500	569,000	636,500	714,000	726,500	746,500	796,500	796,500	796,500	796,500	796,500	796,500	796,500	796,500	796,500	796,500																			
Jun-02	0	75,000	143,000	205,100	258,050	290,050	434,771	469,771	489,906	508,906	508,906	508,906	508,906	508,906	508,906	508,906	508,906																				
Jun-03	20,000	50,000	157,000	299,500	437,000	437,000	437,000	437,000	437,000	497,000	497,000	497,000	497,000	497,000	497,000	497,000																					
Jun-04	0	28,000	82,000	188,000	320,000	535,000	535,000	581,000	581,000	581,000	581,000	581,000	581,000	581,000	581,000																						
Jun-05	0	50,787	202,500	374,000	481,000	506,000	545,000	635,000	635,000	635,000	635,000	635,000	635,000	635,000																							
Jun-06	0	18,000	279,750	450,250	482,750	502,750	502,750	502,750	502,750	502,750	502,750	502,750	502,750																								
Jun-07	10,000	68,500	134,750	185,751	280,751	280,751	280,751	430,751	430,751	430,751	430,751	430,751																									
Jun-08	17,730	187,730	210,230	244,730	284,730	284,730	315,730	315,730	338,290	338,290	338,290																										
Jun-09	35,000	120,000	244,500	269,500	269,500	269,500	269,500	307,000	327,000	327,000																											
Jun-10	0	30,000	36,000	146,000	171,000	171,000	171,000	171,000	171,000																												
Jun-11	8,500	37,030	65,030	181,130	181,130	181,130	216,130	326,130																													
Jun-12	0	5,500	130,800	130,800	180,800	180,800	180,800																														
Jun-13	0	75,000	139,765	192,000	267,000	267,000																															
Jun-14	0	7,850	175,000	306,416	306,416																																
Jun-15	0	12,500	217,500	272,500																																	
Jun-16	0	76,001	237,501																																		
Jun-17	0	88,500																																			
Jun-18	15,000																																				

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	To Ult
All Prior Yrs										3.325	1.526	1.000	1.724	1.286	1.307	1.000	1.000	1.330	1.506	1.000	1.000	1.000	1.045	1.041	1.039	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Jun-83								1.000	2.333	1.686	1.593	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Jun-84								1.000	2.667	1.357	1.066	1.296	1.000	1.238	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.577	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Jun-85			1.000	2.120	1.000	1.594	1.533	1.900	1.772	1.057	1.000	1.000	1.000	1.118	1.069	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
Jun-86			2.200	2.061	1.098	1.218	1.979	1.615	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.344	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Jun-87			2.073	1.404	2.382	3.469	1.237	1.239	1.000	1.050	1.043	1.050	1.142	1.097	1.000	1.000	1.050	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Jun-88		2.247	1.825	4.280	1.905	1.416	1.139	1.097	1.020	1.052	1.080	1.193	1.000	1.014	1.000	1.026	1.017	1.033	1.000	1.000	1.098	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000							
Jun-89		1.551	1.872	2.801	2.030	1.254	1.100	1.004	1.009	1.031	1.000	1.000	1.028	1.000	1.000	1.000	1.000	1.011	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000								
Jun-90		5.703	3.146	1.481	1.226	1.121	1.042	1.044	1.000	1.083	1.063	1.004	1.017	1.017	1.000	1.000	1.027	1.065	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000									
Jun-91		28.595	1.549	1.174	1.110	1.071	1.004	1.000	1.051	1.058	1.000	1.000	1.000	1.021	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000										
Jun-92		1.244	1.476	1.141	1.032	1.170	1.064	1.082	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.037	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000											
Jun-93	5.739	2.079	1.439	1.213	1.337	1.067	1.000	1.136	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.023	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
Jun-94	18.000	1.492	1.211	1.228	1.000	1.230	1.257	1.000	1.000	1.000	1.000	1.000	1.081	1.075	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
Jun-95	3.917	1.957	2.544	1.292	1.055	1.125	1.000	1.139	1.061	1.000	1.000	1.000	1.000	1.098	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
Jun-96		2.606	1.043	1.317	1.084	1.000	1.286	1.000	1.033	1.043	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000															
Jun-97		2.621	2.072	1.000	1.000	1.000	1.036	1.000	1.000	1.195	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																
Jun-98	3.298	2.809	1.032	1.065	1.236	1.030	1.029	1.000	1.000	1.000	1.000	1.070	1.066	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
Jun-99	2.089	2.147	1.604	1.000	1.022	1.106	1.077	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																		
Jun-00	13.463	1.455	1.204	1.135	1.050	1.108	1.041	1.023	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																			
Jun-01	5.922	1.638	1.304	1.119	1.122	1.018	1.028	1.067	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																				
Jun-02		1.907	1.434	1.258	1.124	1.499	1.081	1.043	1.039	1.000	1.000	1.000	1.000	1.000	1.000	1.000																					
Jun-03	2.500	3.140	1.908	1.459	1.000	1.000	1.000	1.000	1.137	1.000	1.000	1.000	1.000	1.000	1.000																						
Jun-04		2.929	2.293	1.702	1.672	1.000	1.086	1.000	1.000	1.000	1.000	1.000	1.000	1.000																							
Jun-05		3.987	1.847	1.286	1.052	1.077	1.165	1.000	1.000	1.000	1.000	1.000	1.000																								
Jun-06		15.542	1.609	1.072	1.041	1.000	1.000	1.000	1.000	1.000	1.000	1.000																									
Jun-07	6.850	1.967	1.378	1.511	1.000	1.000	1.534	1.000	1.000	1.000	1.000																										
Jun-08	10.588	1.120	1.164	1.163	1.000	1.109	1.000	1.071	1.000	1.000																											
Jun-09	3.429	2.038	1.102	1.000	1.000	1.000	1.139	1.065	1.000																												
Jun-10		1.200	4.056	1.171	1.000	1.000	1.000	1.000																													
Jun-11	4.357	1.756	2.785	1.000	1.000	1.193	1.509																														
Jun-12		23.782	1.000	1.382	1.000	1.000																															
Jun-13		1.864	1.374	1.391	1.000																																
Jun-14		22.293	1.751	1.000																																	
Jun-15		17.400	1.253																																		
Jun-16		3.125																																			
Jun-17																																					

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	To Ult
Simple Avg																																					
All Yrs (ex P)	6.679	5.593	1.752	1.404	1.231	1.189	1.164	1.077	1.157	1.090	1.036	1.026	1.015	1.025	1.006	1.005	1.008	1.006	1.000	1.000	1.007	1.000	1.026	1.000	1.000	1.058	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Latest 5		13.693	1.633	1.189	1.000	1.060	1.236	1.027	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Latest 3		14.273	1.459	1.258	1.000	1.064	1.216	1.046	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Volume Wtd																																					
All Yrs (ex P)		2.488	1.541	1.269	1.189	1.130	1.097	1.051	1.026	1.042	1.017	1.021	1.015	1.017	1.003	1.005	1.011	1.013	1.000	1.000	1.011	1.000	1.012	1.000	1.000	1.014	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Latest 5		5.092	1.487	1.157	1.000	1.061	1.237	1.025	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Latest 3		6.539	1.448	1.199	1.000	1.066	1.225	1.054	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					

Dev Factor Selection																																					
Prior	4.675	3.276	1.571	1.230	1.064	1.033	1.143	1.050	1.034	1.025	1.022	1.020	1.010	1.000	1.000	1.006	1.006	1.006	1.003	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.003	
Selected	4.675	3.276	1.514	1.208	1.063	1.047	1.186	1.050	1.034	1.025	1.022	1.020	1.010	1.000	1.000	1.006	1.006	1.006	1.003	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.003
FacToUlt	44.679	9.557	2.917	1.927	1.595	1.501	1.434	1.209	1.151	1.113	1.086	1.063	1.042	1.031	1.031	1.031	1.025	1.019	1.013	1.010	1.009	1.008	1.007	1.006	1.005	1.004	1.003	1.003	1.003	1.003	1.003	1.003	1.003	1.003	1.003	1.003	1.003
Percent of Ult	2.2%	10.5%	34.3%	51.9%	62.7%	66.6%	69.7%	82.7%	86.9%	89.8%	92.1%	94.1%	96.0%	97.0%	97.0%	97.0%	97.5%	98.1%	98.7%	99.0%	99.1%	99.2%	99.3%	99.4%	99.5%	99.6%	99.7%	99.7%	99.7%	99.7%	99.7%	99.7%	99.7%	99.7%	99.7%	99.7%	99.7%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Mental Health - Cluster 2
Indemnity

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
444	100.0%	1.3%	0.0%	0.3%	0.2%	1.000	1.000
432	98.7%	1.0%	1.3%	0.2%	0.1%	0.981	0.971
420	97.7%	1.0%	2.3%	0.3%	0.1%	0.959	0.940
408	96.8%	1.0%	3.2%	0.3%	0.1%	0.940	0.912
396	95.8%	0.9%	4.2%	0.3%	0.1%	0.921	0.886
384	94.8%	0.6%	5.2%	0.2%	0.1%	0.903	0.860
372	94.2%	0.4%	5.8%	0.1%	0.1%	0.881	0.829
360	93.8%	0.7%	6.2%	0.2%	0.1%	0.855	0.794
348	93.2%	0.8%	6.8%	0.3%	0.2%	0.837	0.770
336	92.4%	0.7%	7.6%	0.2%	0.1%	0.824	0.753
324	91.7%	0.6%	8.3%	0.2%	0.1%	0.808	0.732
312	91.1%	0.6%	8.9%	0.2%	0.1%	0.790	0.709
300	90.5%	0.8%	9.5%	0.3%	0.2%	0.774	0.688
288	89.6%	0.8%	10.4%	0.3%	0.2%	0.764	0.676
276	88.9%	0.6%	11.1%	0.3%	0.2%	0.751	0.660
264	88.2%	0.5%	11.8%	0.2%	0.1%	0.736	0.641
252	87.8%	0.3%	12.2%	0.1%	0.1%	0.718	0.619
240	87.4%	0.3%	12.6%	0.1%	0.1%	0.698	0.594
228	87.2%	0.3%	12.8%	0.1%	0.1%	0.678	0.570
216	86.9%	0.3%	13.1%	0.2%	0.1%	0.659	0.547
204	86.5%	0.3%	13.5%	0.2%	0.1%	0.642	0.527
192	86.2%	0.4%	13.8%	0.2%	0.1%	0.626	0.508
180	85.9%	0.3%	14.1%	0.2%	0.1%	0.612	0.492
168	85.5%	0.4%	14.5%	0.3%	0.2%	0.597	0.476
156	85.1%	0.4%	14.9%	0.3%	0.2%	0.586	0.464
144	84.6%	1.4%	15.4%	0.9%	0.7%	0.576	0.453
132	83.3%	1.6%	16.7%	1.1%	0.9%	0.588	0.472
120	81.6%	1.2%	18.4%	0.8%	0.7%	0.603	0.492
108	80.4%	1.3%	19.6%	1.0%	0.8%	0.604	0.495
96	79.1%	2.0%	20.9%	1.5%	1.3%	0.606	0.500
84	77.1%	2.1%	22.9%	1.7%	1.5%	0.618	0.516
72	74.9%	3.1%	25.1%	2.5%	2.3%	0.628	0.528
60	71.8%	5.3%	28.2%	4.5%	4.1%	0.645	0.550
48	66.5%	8.1%	33.5%	7.1%	6.6%	0.677	0.591
36	58.4%	12.4%	41.6%	11.2%	10.7%	0.715	0.638
24	46.0%	21.6%	54.0%	20.4%	19.8%	0.755	0.687
12	24.4%	24.4%	75.6%	23.9%	23.7%	0.799	0.740
Total		100.0%					

NOTES:

(2) = 1 / Section 3, Exhibit 1, Page 2, Column 4

(3) Incremental % based on (2)

(4) = 1 - (2)

(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}

(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}

(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Mental Health - Cluster 2
Indemnity

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	1,984,543	2,810,801		1,735,651	2,458,285
6/30/82-83	37,028	42,870	0.981	36,309	42,037
6/30/83-84	25,963	53,044	0.959	24,899	50,870
6/30/84-85	21,997	129,997	0.940	20,667	122,137
6/30/85-86	4,909	33,909	0.921	4,521	31,229
6/30/86-87	6,587	45,587	0.903	5,948	41,166
6/30/87-88	567,346	623,346	0.881	499,560	548,869
6/30/88-89	676,514	700,118	0.855	578,265	598,442
6/30/89-90	681,997	735,997	0.837	571,054	616,269
6/30/90-91	39,450	137,015	0.824	32,502	112,885
6/30/91-92	20,921	89,946	0.808	16,899	72,655
6/30/92-93	279,901	286,901	0.790	221,168	226,699
6/30/93-94	227,796	234,796	0.774	176,312	181,730
6/30/94-95	13,995	87,535	0.764	10,685	66,835
6/30/95-96	9,649	87,834	0.751	7,246	65,965
6/30/96-97	7,463	65,333	0.736	5,491	48,067
6/30/97-98	14,891	152,486	0.718	10,693	109,497
6/30/98-99	141,160	145,080	0.698	98,538	101,275
6/30/99-00	108,798	168,528	0.678	73,770	114,269
6/30/00-01	182,903	275,623	0.659	120,569	181,689
6/30/01-02	173,496	244,626	0.642	111,377	157,040
6/30/02-03	216,204	217,204	0.626	135,323	135,949
6/30/03-04	243,494	375,184	0.612	148,953	229,511
6/30/04-05	250,355	364,355	0.597	149,460	217,517
6/30/05-06	248,617	286,617	0.586	145,705	167,975
6/30/06-07	209,238	211,138	0.576	120,435	121,528
6/30/07-08	181,546	310,746	0.588	106,789	182,788
6/30/08-09	393,804	477,804	0.603	237,307	287,926
6/30/09-10	381,573	486,573	0.604	230,448	293,862
6/30/10-11	539,813	634,813	0.606	327,327	384,932
6/30/11-12	504,687	728,687	0.618	312,119	450,650
6/30/12-13	830,418	966,418	0.628	521,100	606,442
6/30/13-14	1,119,321	1,232,321	0.645	721,990	794,878
6/30/14-15	1,583,758	1,723,758	0.677	1,072,903	1,167,745
6/30/15-16	2,253,186	3,175,186	0.715	1,612,148	2,271,837
6/30/16-17	3,049,972	3,569,972	0.755	2,302,957	2,695,596
6/30/17-18	3,656,706	4,371,706	0.799	2,921,268	3,492,467
Total	20,889,995	26,283,850		15,428,357	19,449,510
			(7) Total Discount Factor:	0.739	0.740

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	1,984,543	2,810,801
(9) Projected Number of Years:	7	7
(10) Projected Paid Loss per Year:	283,506	401,543
(11) Discounted Value at 4%:	1,735,651	2,458,285

NOTES:

(2), (3) From Section 3, Exhibit 1, Page 1, Columns 8, 9

(4) From Section 3, Exhibit 1, Page 13, Column 7

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Mental Health - Cluster 2
Indemnity

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	1,984,543	2,810,801		1,630,118	2,308,813
6/30/82-83	37,028	42,870	0.971	35,964	41,639
6/30/83-84	25,963	53,044	0.940	24,402	49,853
6/30/84-85	21,997	129,997	0.912	20,058	118,538
6/30/85-86	4,909	33,909	0.886	4,347	30,027
6/30/86-87	6,587	45,587	0.860	5,667	39,223
6/30/87-88	567,346	623,346	0.829	470,367	516,795
6/30/88-89	676,514	700,118	0.794	536,882	555,615
6/30/89-90	681,997	735,997	0.770	525,359	566,957
6/30/90-91	39,450	137,015	0.753	29,701	103,155
6/30/91-92	20,921	89,946	0.732	15,310	65,824
6/30/92-93	279,901	286,901	0.709	198,439	203,402
6/30/93-94	227,796	234,796	0.688	156,793	161,611
6/30/94-95	13,995	87,535	0.676	9,455	59,141
6/30/95-96	9,649	87,834	0.660	6,371	57,992
6/30/96-97	7,463	65,333	0.641	4,785	41,890
6/30/97-98	14,891	152,486	0.619	9,220	94,416
6/30/98-99	141,160	145,080	0.594	83,888	86,218
6/30/99-00	108,798	168,528	0.570	61,983	96,011
6/30/00-01	182,903	275,623	0.547	100,049	150,767
6/30/01-02	173,496	244,626	0.527	91,380	128,844
6/30/02-03	216,204	217,204	0.508	109,867	110,375
6/30/03-04	243,494	375,184	0.492	119,861	184,686
6/30/04-05	250,355	364,355	0.476	119,106	173,341
6/30/05-06	248,617	286,617	0.464	115,427	133,070
6/30/06-07	209,238	211,138	0.453	94,874	95,736
6/30/07-08	181,546	310,746	0.472	85,692	146,676
6/30/08-09	393,804	477,804	0.492	193,829	235,173
6/30/09-10	381,573	486,573	0.495	189,000	241,008
6/30/10-11	539,813	634,813	0.500	269,701	317,165
6/30/11-12	504,687	728,687	0.516	260,342	375,893
6/30/12-13	830,418	966,418	0.528	438,391	510,187
6/30/13-14	1,119,321	1,232,321	0.550	615,944	678,126
6/30/14-15	1,583,758	1,723,758	0.591	935,899	1,018,630
6/30/15-16	2,253,186	3,175,186	0.638	1,437,701	2,026,007
6/30/16-17	3,049,972	3,569,972	0.687	2,094,258	2,451,315
6/30/17-18	3,656,706	4,371,706	0.740	2,707,284	3,236,643
Total	20,889,995	26,283,850		13,807,717	17,410,761
			(7) Total Discount Factor:	0.661	0.662

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	1,984,543	2,810,801
(9) Projected Number of Years:	7	7
(10) Projected Paid Loss per Year:	283,506	401,543
(11) Discounted Value at 6%:	1,630,118	2,308,813

NOTES:

(2), (3) From Section 3, Exhibit 1, Page 1, Columns 8, 9

(4) From Section 3, Exhibit 1, Page 13, Column 8

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Mental Health - Cluster 2
Total Indemnity (Including Lump Sums) + Medical

Calculation of Fiscal Year 7/01/18 - 19 Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
						Cumulative	Incremental Paid		Estimated Payments from		FY 07/01/18 - 06/30/19	
Accident	Est Ult Losses	Est Ult Losses	Paid Losses	Reserves	Reserves	Percent	as a % of	as a % of	07/01/18 - 06/30/19		as a % of Reserves	
Year	(Low)	(High)	to Date	(Low)	(High)	Paid	Ultimates	Reserves	(Low)	(High)	(Low)	(High)
All Prior Yrs	23,537,112	24,365,219	21,543,222	1,993,889	2,821,996				180,493	198,542	9.1%	7.0%
6/30/82-83	3,062,026	3,069,279	3,024,241	37,785	45,038	98.6%	0.5%	37.0%	13,986	16,670	37.0%	37.0%
6/30/83-84	2,890,970	2,918,050	2,864,047	26,923	54,004	98.6%	0.5%	35.9%	9,663	19,382	35.9%	35.9%
6/30/84-85	4,909,000	5,023,010	4,883,803	25,197	139,207	98.3%	0.5%	30.2%	7,611	42,049	30.2%	30.2%
6/30/85-86	4,899,000	4,928,000	4,891,866	7,134	36,134	99.6%	0.3%	56.8%	4,051	20,517	56.8%	56.8%
6/30/86-87	6,924,000	6,964,000	6,911,248	12,752	52,752	99.5%	0.3%	53.0%	6,759	27,961	53.0%	53.0%
6/30/87-88	14,251,000	14,311,000	13,667,706	583,294	643,294	95.7%	0.5%	11.6%	67,912	74,898	11.6%	11.6%
6/30/88-89	15,353,396	15,398,800	14,653,587	699,809	745,213	95.3%	0.5%	10.6%	74,465	79,296	10.6%	10.6%
6/30/89-90	14,715,000	14,774,650	13,993,966	721,034	780,684	94.9%	0.5%	9.8%	70,796	76,653	9.8%	9.8%
6/30/90-91	9,643,000	9,758,295	9,578,058	64,942	180,237	98.7%	0.5%	39.6%	25,695	71,312	39.6%	39.6%
6/30/91-92	5,542,000	5,616,939	5,520,691	21,309	96,249	98.9%	0.5%	47.5%	10,114	45,681	47.5%	47.5%
6/30/92-93	5,156,000	5,174,700	4,852,642	303,358	322,058	93.9%	2.0%	33.0%	100,218	106,396	33.0%	33.0%
6/30/93-94	3,468,000	3,481,650	3,225,121	242,879	256,529	92.8%	2.0%	27.8%	67,597	71,396	27.8%	27.8%
6/30/94-95	3,707,000	3,790,300	3,671,503	35,497	118,797	97.9%	2.0%	97.2%	34,497	115,449	97.2%	97.2%
6/30/95-96	2,766,000	2,853,515	2,732,821	33,179	120,694	97.3%	2.0%	73.0%	24,234	88,156	73.0%	73.0%
6/30/96-97	2,146,000	2,209,540	2,120,780	25,220	88,760	97.4%	2.0%	76.4%	19,275	67,836	76.4%	76.4%
6/30/97-98	3,453,000	3,595,855	3,419,521	33,479	176,334	97.0%	2.0%	67.2%	22,495	118,482	67.2%	67.2%
6/30/98-99	2,701,940	2,707,860	2,526,899	175,041	180,961	93.4%	2.0%	30.4%	53,198	54,998	30.4%	30.4%
6/30/99-00	3,046,200	3,113,230	2,916,057	130,143	197,173	94.7%	2.0%	37.6%	48,981	74,208	37.6%	37.6%
6/30/00-01	4,266,780	4,369,420	4,053,774	213,006	315,646	93.9%	4.0%	65.3%	139,189	206,259	65.3%	65.3%
6/30/01-02	3,433,700	3,512,380	3,225,444	208,256	286,936	92.9%	4.0%	56.1%	116,849	160,995	56.1%	56.1%
6/30/02-03	2,836,680	2,857,350	2,580,495	256,185	276,855	90.6%	4.0%	42.7%	109,465	118,297	42.7%	42.7%
6/30/03-04	4,966,510	5,136,160	4,640,421	326,089	495,739	91.9%	4.0%	49.2%	160,344	243,763	49.2%	49.2%
6/30/04-05	3,934,000	4,090,000	3,645,616	288,384	444,384	90.9%	4.0%	43.8%	126,315	194,645	43.8%	43.8%
6/30/05-06	3,023,000	3,099,000	2,727,106	295,894	371,894	89.1%	4.0%	36.7%	108,505	136,375	36.7%	36.7%
6/30/06-07	3,161,050	3,179,950	2,893,235	267,815	286,715	91.3%	4.0%	45.7%	122,498	131,142	45.7%	45.7%
6/30/07-08	2,558,050	2,700,250	2,305,389	252,661	394,861	87.7%	4.0%	32.5%	82,071	128,261	32.5%	32.5%
6/30/08-09	3,271,000	3,392,000	2,796,304	474,696	595,696	83.9%	4.0%	24.9%	118,196	148,324	24.9%	24.9%
6/30/09-10	2,239,000	2,345,000	1,769,596	469,404	575,404	77.2%	4.0%	17.5%	82,379	100,981	17.5%	17.5%
6/30/10-11	3,718,000	3,867,000	3,083,260	634,740	783,740	81.3%	4.0%	21.4%	135,765	167,635	21.4%	21.4%
6/30/11-12	2,855,000	3,082,000	2,227,908	627,092	854,092	75.1%	4.0%	16.0%	100,542	136,938	16.0%	16.0%
6/30/12-13	3,957,000	4,096,000	2,972,682	984,318	1,123,318	73.8%	4.0%	15.3%	150,438	171,682	15.3%	15.3%
6/30/13-14	4,661,000	4,784,000	3,357,535	1,303,465	1,426,465	71.1%	4.0%	13.8%	180,389	197,411	13.8%	13.8%
6/30/14-15	5,659,000	5,863,000	3,828,883	1,830,117	2,034,117	66.5%	4.6%	13.8%	252,896	281,086	13.8%	13.8%
6/30/15-16	7,328,000	8,408,000	4,763,286	2,564,714	3,644,714	60.5%	5.9%	15.0%	384,911	546,996	15.0%	15.0%
6/30/16-17	6,748,000	7,494,000	3,297,467	3,450,533	4,196,533	46.3%	14.2%	26.5%	914,706	1,112,464	26.5%	26.5%
6/30/17-18	5,734,000	6,612,000	1,335,977	4,398,023	5,276,023	21.6%	24.7%	31.5%	1,384,327	1,660,687	31.5%	31.5%
Total	206,520,413	212,941,402	182,502,156	24,018,257	30,439,246				5,511,821	7,213,823	22.9%	23.7%

NOTES:

(2) Exhibit 1, Page 1, Column (4) + Exhibit 2, Page 1, Column (4)

(3) Exhibit 1, Page 1, Column (5) + Exhibit 2, Page 1, Column (5)

(4) Exhibit 1, Page 1, Column (2) + Exhibit 2, Page 1, Column (2)

(5) = (2) - (4)

(6) = (3) - (4)

(7) = (4) / Average of Columns (2), (3)

(8) = (7) - Prior Year's (7)

(9) = (8) / (1.00 - (7))

(10) = (5) * (9)

(11) = (6) * (9)

(12) = (10) / (5)

(13) = (11) / (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Mental Health - Cluster 2
Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Paid Loss	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		816,015			825,361	827,210	9,347	11,196		
6/30/82-83		140,297	141,055		141,055	142,465	758	2,168		
6/30/83-84		209,040	210,379		210,000	210,000	960	960		
6/30/84-85	142,561	496,801	500,483	500,577	500,000	506,010	3,199	9,209	0.351	0.355
6/30/85-86	153,298	257,775	259,945	259,989	260,000	260,000	2,225	2,225	0.170	0.170
6/30/86-87	176,136	702,835	709,462	709,696	709,000	710,000	6,165	7,165	0.403	0.403
6/30/87-88	206,319	1,869,052	1,888,561	1,884,759	1,885,000	1,889,000	15,948	19,948	0.914	0.916
6/30/88-89	222,806	2,055,705	2,079,240	2,079,613	2,079,000	2,100,800	23,295	45,095	0.933	0.943
6/30/89-90	223,751	1,939,963	1,964,135	1,964,828	1,979,000	1,984,650	39,037	44,687	0.884	0.887
6/30/90-91	210,162	1,747,508	1,772,820	1,772,601	1,773,000	1,790,730	25,492	43,222	0.844	0.852
6/30/91-92	205,241	1,260,611	1,282,708	1,282,349	1,261,000	1,266,914	389	6,303	0.614	0.617
6/30/92-93	176,705	1,146,543	1,170,139	1,169,564	1,170,000	1,181,700	23,457	35,157	0.662	0.669
6/30/93-94	173,075	649,917	665,282	664,878	665,000	671,650	15,083	21,733	0.384	0.388
6/30/94-95	178,317	853,498	876,298	875,481	875,000	884,760	21,502	31,262	0.491	0.496
6/30/95-96	175,996	808,470	832,557	831,564	832,000	841,330	23,530	32,860	0.473	0.478
6/30/96-97	190,083	549,243	567,303	566,708	567,000	572,670	17,757	23,427	0.298	0.301
6/30/97-98	177,278	507,413	526,194	525,532	526,000	531,260	18,587	23,847	0.297	0.300
6/30/98-99	189,080	852,119	888,078	886,043	886,000	888,000	33,881	35,881	0.469	0.470
6/30/99-00	194,494	602,355	630,913	629,668	623,700	631,000	21,345	28,645	0.321	0.324
6/30/00-01	201,568	753,977	793,672	791,686	784,080	794,000	30,103	40,023	0.389	0.394
6/30/01-02	203,105	619,240	655,101	653,828	654,000	661,550	34,760	42,310	0.322	0.326
6/30/02-03	202,515	783,698	834,700	832,373	823,680	843,350	39,982	59,652	0.407	0.416
6/30/03-04	189,588	1,396,465	1,501,799	1,494,475	1,479,060	1,517,020	82,595	120,555	0.780	0.800
6/30/04-05	186,990	921,971	1,002,331	960,357	960,000	1,002,000	38,029	80,029	0.513	0.536
6/30/05-06	193,254	867,723	953,471	914,611	915,000	953,000	47,277	85,277	0.473	0.493
6/30/06-07	203,359	671,423	747,062	729,749	730,000	747,000	58,577	75,577	0.359	0.367
6/30/07-08	212,083	663,885	747,950	734,785	735,000	748,000	71,115	84,115	0.347	0.353
6/30/08-09	204,679	818,107	935,527	898,766	899,000	936,000	80,893	117,893	0.439	0.457
6/30/09-10	184,688	538,169	626,634	626,406	626,000	627,000	87,831	88,831	0.339	0.339
6/30/10-11	169,689	801,073	950,491	895,861	896,000	950,000	94,927	148,927	0.528	0.560
6/30/11-12	177,399	553,595	679,020	675,856	676,000	679,000	122,405	125,405	0.381	0.383
6/30/12-13	189,252	574,100	728,248	731,036	728,000	731,000	153,900	156,900	0.385	0.386
6/30/13-14	199,876	596,857	781,298	790,952	781,000	791,000	184,143	194,143	0.391	0.396
6/30/14-15	213,700	849,640	1,159,649	1,096,389	1,096,000	1,160,000	246,360	310,360	0.513	0.543
6/30/15-16	211,829	977,472	1,446,669	1,289,046	1,289,000	1,447,000	311,528	469,528	0.609	0.683
6/30/16-17	203,085	885,439	1,511,606	1,286,038	1,286,000	1,512,000	400,561	626,561	0.633	0.745
6/30/17-18	203,925	339,683	1,243,904	1,080,870	1,081,000	1,244,000	741,317	904,317	0.530	0.610
Total	6,545,887	31,077,674	34,264,684	33,086,936	34,205,936	35,233,070	3,128,261	4,155,395		
Tot 6/30/84-18	6,545,887	29,912,323	33,913,250	33,086,936	33,029,520	34,053,394	3,117,197	4,141,072	0.505	0.520

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 3, Exhibit 2, Page 2, Column 3

(4) From Section 3, Exhibit 2, Page 2, Column 8

(5) From Section 3, Exhibit 2, Page 3, Column 8

(6), (7) Selected based on (3), (4), and (5)

(8) = (6) - (3)

(9) = (7) - (3)

(10) = (6) / (2) / 10

(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Mental Health - Cluster 2
Medical

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Accident Year	Payroll (000's)	Paid Loss	Paid LDF	Adjustment for Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/16-17	Paid Counts 7/1/17-18	Average Outstanding Claim
All Prior Yrs		816,015							0	4	
6/30/82-83		140,297	1.005	1.000	141,055	N/A	141,055		1	1	758
6/30/83-84		209,040	1.006	1.000	210,379	N/A	210,379		0	0	
6/30/84-85	142,561	496,801	1.007	1.000	500,483	N/A	500,483	0.351	1	2	1,841
6/30/85-86	153,298	257,775	1.008	1.000	259,945	N/A	259,945	0.170	0	0	
6/30/86-87	176,136	702,835	1.009	1.000	709,462	N/A	709,462	0.403	0	0	
6/30/87-88	206,319	1,869,052	1.010	1.000	1,888,561	N/A	1,888,561	0.915	1	1	19,509
6/30/88-89	222,806	2,055,705	1.011	1.000	2,079,240	N/A	2,079,240	0.933	1	3	7,845
6/30/89-90	223,751	1,939,963	1.012	1.000	1,964,135	N/A	1,964,135	0.878	1	0	
6/30/90-91	210,162	1,747,508	1.014	1.000	1,772,820	N/A	1,772,820	0.844	1	1	25,312
6/30/91-92	205,241	1,260,611	1.018	1.000	1,282,708	N/A	1,282,708	0.625	0	0	
6/30/92-93	176,705	1,146,543	1.021	1.000	1,170,139	N/A	1,170,139	0.662	3	2	11,798
6/30/93-94	173,075	649,917	1.024	1.000	665,282	N/A	665,282	0.384	1	1	15,366
6/30/94-95	178,317	853,498	1.027	1.000	876,298	N/A	876,298	0.491	1	1	22,800
6/30/95-96	175,996	808,470	1.030	1.000	832,557	N/A	832,557	0.473	1	1	24,087
6/30/96-97	190,083	549,243	1.033	1.000	567,303	N/A	567,303	0.298	2	2	9,030
6/30/97-98	177,278	507,413	1.037	1.000	526,194	N/A	526,194	0.297	2	1	18,782
6/30/98-99	189,080	852,119	1.042	1.000	888,078	N/A	888,078	0.470	1	1	35,959
6/30/99-00	194,494	602,355	1.047	1.000	630,913	N/A	630,913	0.324	0	0	
6/30/00-01	201,568	753,977	1.053	1.000	793,672	N/A	793,672	0.394	0	0	
6/30/01-02	203,105	619,240	1.058	1.000	655,101	N/A	655,101	0.323	1	0	
6/30/02-03	202,515	783,698	1.065	1.000	834,700	N/A	834,700	0.412	3	3	17,001
6/30/03-04	189,588	1,396,465	1.075	1.000	1,501,799	N/A	1,501,799	0.792	4	4	26,333
6/30/04-05	186,990	921,971	1.087	1.000	1,002,331	N/A	1,002,331	0.536	4	4	20,090
6/30/05-06	193,254	867,723	1.099	1.000	953,471	N/A	953,471	0.493	3	1	85,748
6/30/06-07	203,359	671,423	1.113	1.000	747,062	N/A	747,062	0.367	0	0	
6/30/07-08	212,083	663,885	1.127	1.000	747,950	N/A	747,950	0.353	0	0	
6/30/08-09	204,679	818,107	1.144	1.000	935,527	N/A	935,527	0.457	3	4	29,355
6/30/09-10	184,688	538,169	1.164	1.000	626,634	N/A	626,634	0.339	1	1	88,464
6/30/10-11	169,689	801,073	1.187	1.000	950,491	N/A	950,491	0.560	6	5	29,884
6/30/11-12	177,399	553,595	1.227	1.000	679,020	N/A	679,020	0.383	5	2	62,713
6/30/12-13	189,252	574,100	1.269	1.000	728,248	N/A	728,248	0.385	8	6	25,691
6/30/13-14	199,876	596,857	1.309	1.000	781,298	N/A	781,298	0.391	14	11	16,767
6/30/14-15	213,700	849,640	1.365	1.000	1,159,649	N/A	1,159,649	0.543	30	14	22,143
6/30/15-16	211,829	977,472	1.480	1.000	1,446,669	N/A	1,446,669	0.683	142	44	10,664
6/30/16-17	203,085	885,439	1.707	1.000	1,511,606	N/A	1,511,606	0.744	261	135	4,638
6/30/17-18	203,925	339,683	3.662	1.000	1,243,904	N/A	1,243,904	0.610		280	3,229
Total	6,545,887	31,077,674			34,264,684		34,264,684		502	535	

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3), (4) From Section 3, Exhibit 2, Page 7

(5) Based on information from the MA WCRIB 7/1/16 filing. Consideration for development beyond 252 months made in selection of LDF's.

(6) = (3) x (4) x (5)

(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10), (11) Provided by Commonwealth of Massachusetts

(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Mental Health - Cluster 2
Medical

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	142,561	0.360	496,801	1.007	500,577	N/A	500,577	0.351	0.351
6/30/85-86	153,298	0.173	257,775	1.008	259,989	N/A	259,989	0.170	0.170
6/30/86-87	176,136	0.417	702,835	1.009	709,696	N/A	709,696	0.403	0.403
6/30/87-88	206,319	0.737	1,869,052	1.010	1,884,759	N/A	1,884,759	0.914	0.914
6/30/88-89	222,806	0.948	2,055,705	1.011	2,079,613	N/A	2,079,613	0.933	0.933
6/30/89-90	223,751	0.903	1,939,963	1.012	1,964,828	N/A	1,964,828	0.878	0.878
6/30/90-91	210,162	0.836	1,747,508	1.014	1,772,601	N/A	1,772,601	0.843	0.843
6/30/91-92	205,241	0.615	1,260,611	1.018	1,282,349	N/A	1,282,349	0.625	0.625
6/30/92-93	176,705	0.646	1,146,543	1.021	1,169,564	N/A	1,169,564	0.662	0.662
6/30/93-94	173,075	0.374	649,917	1.024	664,878	N/A	664,878	0.384	0.384
6/30/94-95	178,317	0.474	853,498	1.027	875,481	N/A	875,481	0.491	0.491
6/30/95-96	175,996	0.454	808,470	1.030	831,564	N/A	831,564	0.472	0.472
6/30/96-97	190,083	0.289	549,243	1.033	566,708	N/A	566,708	0.298	0.298
6/30/97-98	177,278	0.286	507,413	1.037	525,532	N/A	525,532	0.296	0.296
6/30/98-99	189,080	0.443	852,119	1.042	886,043	N/A	886,043	0.469	0.469
6/30/99-00	194,494	0.310	602,355	1.047	629,668	N/A	629,668	0.324	0.324
6/30/00-01	201,568	0.374	753,977	1.053	791,686	N/A	791,686	0.393	0.393
6/30/01-02	203,105	0.311	619,240	1.058	653,828	N/A	653,828	0.322	0.322
6/30/02-03	202,515	0.393	783,698	1.065	832,373	N/A	832,373	0.411	0.411
6/30/03-04	189,588	0.737	1,396,465	1.075	1,494,475	N/A	1,494,475	0.788	0.788
6/30/04-05	186,990	0.256	921,971	1.087	960,357	N/A	960,357	0.514	0.514
6/30/05-06	193,254	0.270	867,723	1.099	914,611	N/A	914,611	0.473	0.473
6/30/06-07	203,359	0.283	671,423	1.113	729,749	N/A	729,749	0.359	0.359
6/30/07-08	212,083	0.297	663,885	1.127	734,785	N/A	734,785	0.346	0.346
6/30/08-09	204,679	0.314	818,107	1.144	898,766	N/A	898,766	0.439	0.439
6/30/09-10	184,688	0.338	538,169	1.164	626,406	N/A	626,406	0.339	0.339
6/30/10-11	169,689	0.355	801,073	1.187	895,861	N/A	895,861	0.528	0.528
6/30/11-12	177,399	0.373	553,595	1.227	675,856	N/A	675,856	0.381	0.381
6/30/12-13	189,252	0.392	574,100	1.269	731,036	N/A	731,036	0.386	0.386
6/30/13-14	199,876	0.411	596,857	1.309	790,952	N/A	790,952	0.396	0.396
6/30/14-15	213,700	0.432	849,640	1.365	1,096,389	N/A	1,096,389	0.513	0.513
6/30/15-16	211,829	0.454	977,472	1.480	1,289,046	N/A	1,289,046	0.609	0.609
6/30/16-17	203,085	0.476	885,439	1.707	1,286,038	N/A	1,286,038	0.633	0.633
6/30/17-18	203,925	0.500	339,683	3.662	1,080,870	N/A	1,080,870	0.530	0.530
Total	6,545,887		29,912,323		33,086,936		33,086,936		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 3, Exhibit 2, Page 4, Column 11

(4) From Section 3, Exhibit 2, Page 2, Column 3

(5) From Section 3, Exhibit 2, Page 2, Column 4

(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]

(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Mental Health - Cluster 2
Medical

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Expected Ult Loss	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									0.360	0.360
6/30/85-86									0.173	0.173
6/30/86-87									0.417	0.417
6/30/87-88									0.737	0.737
6/30/88-89									0.948	0.948
6/30/89-90									0.903	0.903
6/30/90-91	210,162	1,772,820	0.844	1.194	1.007	3.920	3.948	0.112	0.839	0.836
6/30/91-92	205,241	1,282,708	0.625	1.189	0.743	3.733	2.773	0.118	0.619	0.615
6/30/92-93	176,705	1,170,139	0.662	1.189	0.787	3.556	2.800	0.124	0.644	0.646
6/30/93-94	173,075	665,282	0.384	1.178	0.453	3.386	1.534	0.132	0.379	0.374
6/30/94-95	178,317	876,298	0.491	1.170	0.575	3.225	1.854	0.139	0.481	0.474
6/30/95-96	175,996	832,557	0.473	1.155	0.547	3.072	1.679	0.148	0.462	0.454
6/30/96-97	190,083	567,303	0.298	1.137	0.339	2.925	0.992	0.158	0.297	0.289
6/30/97-98	177,278	526,194	0.297	1.135	0.337	2.786	0.939	0.166	0.298	0.286
6/30/98-99	189,080	888,078	0.470	1.135	0.533	2.653	1.414	0.174	0.434	0.443
6/30/99-00	194,494	630,913	0.324	1.135	0.368	2.527	0.930	0.183	0.324	0.310
6/30/00-01	201,568	793,672	0.394	1.109	0.437	2.407	1.051	0.197	0.388	0.374
6/30/01-02	203,105	655,101	0.323	1.101	0.355	2.292	0.814	0.208	0.325	0.311
6/30/02-03	202,515	834,700	0.412	1.073	0.442	2.183	0.965	0.224	0.401	0.393
6/30/03-04	189,588	1,501,799	0.792	1.046	0.829	2.079	1.723	0.241	0.741	0.737
6/30/04-05	186,990	1,002,331	0.536	1.036	0.555	1.980	1.099	0.256	0.373	0.256
6/30/05-06	193,254	953,471	0.493	1.032	0.509	1.886	0.960	0.270	0.382	0.270
6/30/06-07	203,359	747,062	0.367	1.032	0.379	1.796	0.681	0.283	0.390	0.283
6/30/07-08	212,083	747,950	0.353	1.032	0.364	1.710	0.622	0.297	0.397	0.297
6/30/08-09	204,679	935,527	0.457	1.027	0.469	1.629	0.764	0.314	0.408	0.314
6/30/09-10	184,688	626,634	0.339	1.000	0.339	1.551	0.526	0.338	0.427	0.338
6/30/10-11	169,689	950,491	0.560	1.000	0.560	1.477	0.828	0.355	0.435	0.355
6/30/11-12	177,399	679,020	0.383	1.000	0.383	1.407	0.539	0.373	0.444	0.373
6/30/12-13	189,252	728,248	0.385	1.000	0.385	1.340	0.516	0.392	0.453	0.392
6/30/13-14	199,876	781,298	0.391	1.000	0.391	1.276	0.499	0.411	0.462	0.411
6/30/14-15	213,700	1,159,649	0.543	1.000	0.543	1.216	0.660	0.432	0.471	0.432
6/30/15-16	211,829	1,446,669	0.683	1.000	0.683	1.158	0.791	0.454	0.481	0.454
6/30/16-17	203,085	1,511,606	0.744	1.000	0.744	1.103	0.821	0.476	0.490	0.476
6/30/17-18	203,925	1,243,904	0.610	1.000	0.610	1.050	0.640	0.500		0.500
Total	5,421,016	26,511,424								

Trend Last 4 (ex 17-18):	24.1%	Avg 3 (ex 17-18):	0.757
Trend Last 8 (ex 17-18):	9.4%	Avg 5 (ex 17-18):	0.657
Trend Last 12 (ex 17-18):	4.0%	Avg 10 (ex 17-18):	0.656
Prior Selected Trend:	2.0%	Prior Sel Avg:	0.500
Selected Trend:	5.0%	Sel. Loss Cost:	0.525

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 3, Exhibit 2, Page 2, Column 6

(4) = (3) / (2) / 10

(5) Based on information from the MA WCIRB

(6) = (4) x (5)

(7) Based on Selected Trend from (6)

(8) = (6) x (7)

(9) = Sel. Loss Cost / [(5) * (7)]

(10) From prior Aon analysis as of June 30, 2017

(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Mental Health - Cluster 2
Medical

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend	0.900	
(2)	Credibility	30%	
(3)	Average Pmt Trend Statewide	0.950	
(4)	Credibility Weighted Trend	0.935	
		(Low)	(High)
(5)	Selected Range	0.926	0.944
(6)	Incremental Paid for 2018	1,278	1,278
(7)	Estimated Reserve	15,886	21,644
(8)	Paid to Date (82 & Prior)	816,015	816,015
(9)	Est Ult Paid for 1982 & Prior	831,900	837,658

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	936	675
(11)	Projected Number of Years	3	3
(12)	Estimated Reserve	2,808	2,025
(13)	Paid to Date (82 & Prior)	816,015	814,737
(14)	Est Ult Paid for 1982 & Prior	818,822	816,762
(14a)	Paid Counts During Fiscal Year	4	0
		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	825,361	827,210
(16)	Lump Sum Ultimates	N/A	N/A
(17)	Ult Loss Including Lump Sums	**825,361**	**827,210**
(18)	Implied Tail	1.011	1.014
(19)	Ult Loss Inc Lump Sums @ 6/17	815,750	817,100

NOTES:

(1) From Section 3, Exhibit 2, Page 6
(2) = (Average of Section 3, Exhibit 2, Page 6, Column 3 / 175,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 3, Exhibit 2, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 3, Exhibit 2, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) Lump Sums are considered in Indemnity analysis (Section 1)
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2017

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Mental Health - Cluster 2
Medical

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	51,889	10.857			
1993	2	26,449	10.183	0.510		
1994	3	19,386	9.872	0.733		
1995	4	14,214	9.562	0.733		
1996	5	30,374	10.321	2.137		
1997	6	29,871	10.305	0.983		
1998	7	19,565	9.881	0.655		
1999	8	34,912	10.461	1.784		
2000	9	33,563	10.421	0.961	n =	23
2001	10	21,898	9.994	0.652	S(x) =	46,079
2002	11	10,530	9.262	0.481	S(x-sq) =	92,317,515
2003	12	13,888	9.539	1.319	S(xy) =	436,790
2004	13	14,770	9.600	1.064	S(y) =	218
2005	14	16,486	9.710	1.116	D =	28,604
2006	15	16,533	9.713	1.003	slope =	-0.118
2007	16	15,051	9.619	0.910	Avg Trend =	0.882
2008	17	15,931	9.676	1.058		
2009	18	15,802	9.668	0.992		
2010	19	17,686	9.781	1.119		
2011	20	7,925	8.978	0.448		
2012	21	0				
2013	22	0				
2014	23	0				
2015	24	495	6.205			
2016	25	1,530	7.333	3.091		
2017	26	0				
2018	27	1,278	7.153			
					Selected Trend:	**0.900**

NOTES:

(3) 2018 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2017

(4) LN [(3)]

(5) Eg. 2016: 3.091 = 1530 / 495

Commonwealth of Massachusetts Workers Compensation
Department of Mental Health - Cluster 2
MEDICAL
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432
June-83	6,910	16,771	25,010	31,963	39,548	47,447	55,206	65,979	79,676	97,881	109,437	118,040	122,472	123,657	124,261	124,960	125,364	127,246	128,435	128,594	128,869	130,242	130,978	131,631	133,115	134,239	135,539	136,526	137,668	137,734	137,833	137,899	138,560	139,442	139,666	140,297
June-84	15,115	36,685	54,706	69,914	86,505	104,208	114,043	135,514	154,763	169,780	196,611	201,984	204,351	205,488	205,929	206,289	207,062	207,303	207,590	207,590	207,590	207,590	207,590	207,590	207,590	209,040	209,040	209,040	209,040	209,040	209,040	209,040	209,040	209,040	209,040	
June-85	45,034	109,301	162,993	208,305	264,045	295,679	375,978	436,398	457,324	469,156	478,993	481,392	482,690	484,957	486,098	486,337	486,602	486,918	487,378	488,092	488,848	489,022	489,458	490,407	490,672	490,804	491,592	491,855	492,053	492,119	492,382	492,808	494,011	496,801		
June-86	31,328	76,036	113,387	149,251	177,640	201,245	224,645	234,675	242,982	244,710	248,077	248,146	248,146	248,464	249,109	249,459	249,459	249,734	249,759	250,509	253,317	253,317	253,317	257,775	257,775	257,775	257,775	257,775	257,775	257,775	257,775	257,775	257,775			
June-87	76,748	186,273	283,696	389,472	457,883	509,794	575,159	621,158	638,516	650,997	655,971	660,694	667,637	681,728	687,346	690,455	693,082	696,366	698,158	699,573	700,478	701,229	701,978	702,712	702,835	702,835	702,835	702,835	702,835	702,835	702,835	702,835				
June-88	178,894	502,531	738,028	895,402	1,063,080	1,183,773	1,248,121	1,279,736	1,298,796	1,310,333	1,339,541	1,367,561	1,385,075	1,399,869	1,424,718	1,427,592	1,445,010	1,498,101	1,524,412	1,550,835	1,609,155	1,632,873	1,663,246	1,690,901	1,720,638	1,733,092	1,753,364	1,848,480	1,853,589	1,866,170	1,869,052					
June-89	179,890	786,968	1,088,315	1,330,240	1,584,004	1,681,826	1,741,013	1,807,955	1,845,172	1,876,501	1,906,158	1,945,202	1,962,565	1,969,371	1,973,430	1,978,126	1,981,710	1,986,429	2,002,120	2,035,745	2,040,920	2,043,319	2,045,069	2,046,563	2,047,864	2,049,094	2,050,041	2,052,689	2,053,852	2,055,705						
June-90	298,701	961,341	1,346,536	1,509,954	1,639,655	1,697,547	1,735,975	1,749,267	1,768,436	1,790,051	1,817,206	1,838,401	1,863,987	1,878,469	1,905,280	1,915,675	1,921,866	1,934,997	1,937,028	1,938,078	1,938,078	1,938,078	1,938,078	1,938,078	1,938,078	1,938,378	1,938,618	1,939,963	1,939,963							
June-91	336,650	1,034,501	1,248,801	1,338,322	1,397,546	1,497,111	1,506,640	1,518,859	1,530,350	1,582,638	1,604,133	1,610,563	1,618,558	1,622,507	1,624,821	1,627,667	1,633,766	1,732,296	1,736,277	1,737,397	1,738,820	1,740,878	1,741,982	1,744,875	1,746,213	1,746,723	1,747,281	1,747,508								
June-92	391,215	804,359	985,930	1,100,607	1,131,087	1,152,839	1,156,897	1,204,770	1,207,427	1,217,326	1,239,794	1,242,292	1,245,829	1,245,829	1,247,305	1,249,031	1,251,673	1,256,737	1,256,737	1,257,214	1,258,829	1,260,461	1,260,611	1,260,611	1,260,611	1,260,611	1,260,611									
June-93	258,020	628,980	745,922	854,118	902,554	912,950	924,291	930,378	935,510	938,871	941,935	946,379	956,312	969,261	977,539	988,688	1,003,269	1,015,451	1,027,786	1,045,649	1,059,121	1,078,986	1,097,266	1,117,124	1,132,491	1,146,543										
June-94	182,635	373,628	418,730	436,391	447,015	469,585	491,352	516,384	534,463	550,753	585,007	594,302	601,406	609,303	615,358	624,226	630,803	638,628	643,805	645,213	646,088	646,088	646,088	648,098	649,917											
June-95	212,717	409,284	509,019	570,032	608,100	631,875	651,359	673,340	687,056	708,855	725,773	748,542	771,912	790,063	800,522	812,267	823,958	831,209	836,947	844,533	849,477	852,296	852,794	853,498												
June-96	161,311	580,474	655,522	690,974	709,369	717,233	722,565	739,256	747,885	753,899	765,449	771,693	782,222	790,224	794,884	796,128	797,390	798,222	801,390	803,766	804,663	807,002	808,470													
June-97	135,202	301,857	352,150	378,182	408,711	433,559	446,704	473,023	486,546	493,154	499,117	502,144	505,108	509,796	517,517	522,815	524,946	533,925	536,788	541,805	545,274	549,243														
June-98	160,545	332,451	383,627	422,681	445,088	461,616	487,824	498,965	499,061	499,770	500,001	503,898	505,757	505,921	506,053	506,185	506,317	506,558	506,783	507,079	507,413															
June-99	177,752	299,718	340,747	360,722	405,072	439,482	477,272	520,347	561,026	584,273	585,114	588,553	606,906	637,239	655,001	683,204	721,085	759,098	807,305	852,119																
June-00	185,350	429,256	483,565	521,929	539,722	558,001	575,939	582,579	584,965	587,880	590,258	592,928	595,238	598,391	601,805	602,355	602,355	602,355	602,355																	
June-01	241,669	433,098	500,398	575,365	598,840	628,934	693,180	725,143	730,102	735,829	737,792	740,203	753,446	753,977	753,977	753,977	753,977																			
June-02	174,410	368,134	462,671	501,999	514,827	521,795	525,972	571,546	580,032	584,275	614,358	616,264	616,631	617,414	619,074	619,240	619,240																			
June-03	106,077	382,205	468,554	496,191	560,019	574,291	585,592	637,875	657,335	673,709	685,713	706,227	728,783	748,904	767,961	783,698																				
June-04	258,429	665,381	856,411	1,022,737	1,071,500	1,113,490	1,161,995	1,192,531	1,222,893	1,246,683	1,275,099	1,309,808	1,343,324	1,369,371	1,396,465																						
June-05	223,896	627,798	728,574	772,233	797,587	811,216	848,381	866,048	884,416	901,770	910,494	916,815	919,419	921,971																						
June-06	251,300	520,856	684,007	715,286	737,612	754,221	768,311	780,173	795,227	811,567	832,733	850,354	867,723																							
June-07	266,977	578,217	638,599	652,141	659,793	664,093	666,803	669,308	669,732	671,423	671,423	671,423																								
June-08	278,965	550,541	604,168	629,658	649,695	656,991	663,910	663,885	663,885	663,885	663,885																									
June-09	302,300	569,565	595,188	605,449	639,872	662,294	692,197	758,051	800,308	818,107																										
June-10	216,046	447,208	465,324	474,345	490,538	503,411	518,661	531,196	538,169																											
June-11	336,085	580,670	657,420	693,645	718,136	745,881	777,559	801,073																												
June-12	227,796	448,648	504,764	520,900	532,545	541,224	553,595																													
June-13	232,201	491,890	540,494	555,003	565,116	574,100																														
June-14	217,605	461,922	538,864	572,808	596,857																															
June-15	336,154	678,363	754,856	849,640																																
June-16	454,022	857,145	977,472																																	
June-17	447,474	885,439																																		
June-18	339,683																																			

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432
June-83	2.427	1.491	1.278	1.237	1.200	1.164	1.195	1.208	1.228	1.118	1.079	1.038	1.010	1.005	1.006	1.003	1.015	1.009	1.001	1.002	1.011	1.006	1.005	1.011	1.008	1.010	1.007	1.008	1.000	1.001	1.000	1.005	1.006	1.002	1.005
June-84	2.427	1.491	1.278	1.237	1.205	1.094	1.188	1.142	1.097	1.158	1.027	1.012	1.006	1.002	1.002	1.004	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.007	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
June-85	2.427	1.491	1.278	1.268	1.120	1.272	1.161	1.048	1.026	1.021	1.005	1.003	1.005	1.002	1.000	1.001	1.001	1.001	1.001	1.002	1.000	1.001	1.002	1.001	1.000	1.002	1.001	1.000	1.000	1.001	1.001	1.002	1.006		
June-86	2.427	1.491	1.316	1.190	1.133	1.116	1.045	1.035	1.007	1.014	1.000	1.000	1.001	1.003	1.001	1.000	1.001	1.000	1.003	1.011	1.000	1.000	1.018	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
June-87	2.427	1.523	1.373	1.176	1.113	1.128	1.080	1.028	1.020	1.008	1.007	1.011	1.021	1.008	1.005	1.004	1.005	1.003	1.002	1.001	1.001	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
June-88	2.809	1.469	1.213	1.187	1.114	1.054	1.025	1.015	1.009	1.022	1.021	1.013	1.011	1.018	1.002	1.012	1.037	1.018	1.017	1.038	1.015	1.019	1.017	1.018	1.007	1.012	1.054	1.003	1.007	1.002					
June-89	4.375	1.383	1.222	1.191	1.062	1.035	1.038	1.021	1.017	1.016	1.020	1.009	1.003	1.002	1.002	1.002	1.002	1.008	1.017	1.003	1.001	1.001	1.001	1.001	1.001	1.000	1.001	1.001	1.001						
June-90	3.218	1.401	1.121	1.086	1.035	1.023	1.008	1.011	1.012	1.015	1.012	1.014	1.008	1.014	1.005	1.003	1.007	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.000							
June-91	3.073	1.207	1.072	1.044	1.071	1.006	1.008	1.008	1.034	1.014	1.004	1.005	1.002	1.001	1.002	1.004	1.060	1.002	1.001	1.001	1.001	1.001	1.002	1.001	1.000	1.000	1.000								
June-92	2.056	1.226	1.116	1.028	1.019	1.004	1.041	1.002	1.008	1.018	1.002	1.003	1.000	1.001	1.001	1.002	1.004	1.000	1.000	1.001	1.001	1.000	1.000	1.000	1.000	1.000									
June-93	2.438	1.186	1.145	1.057	1.012	1.012	1.007	1.006	1.004	1.003	1.005	1.010	1.014	1.009	1.011	1.015	1.012	1.012	1.017	1.013	1.019	1.017	1.018	1.014	1.012										
June-94	2.046	1.121	1.042	1.024	1.050	1.046	1.051	1.035	1.030	1.062	1.016	1.012	1.013	1.010	1.014	1.011	1.012	1.008	1.002	1.001	1.000	1.000	1.003	1.003											
June-95	1.924	1.244	1.120	1.067	1.039	1.031	1.034	1.020	1.032	1.024	1.031	1.031	1.024	1.013	1.015	1.014	1.009	1.007	1.009	1.006	1.003	1.001	1.001												
June-96	3.598	1.129	1.054	1.027	1.011	1.007	1.023	1.012	1.008	1.015	1.008	1.014	1.010	1.006	1.002	1.002	1.001	1.004	1.003	1.001	1.003	1.002													
June-97	2.233	1.167	1.074	1.081	1.061	1.030	1.059	1.029	1.014	1.012	1.006	1.006	1.009	1.015	1.010	1.004	1.017	1.005	1.009	1.006	1.007														
June-98	2.071	1.154	1.102	1.053	1.037	1.057	1.023	1.000	1.001	1.000	1.008	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.001															
June-99	1.686	1.137	1.059	1.123	1.085	1.086	1.090	1.078	1.041	1.001	1.006	1.031	1.050	1.028	1.043	1.055	1.053	1.064	1.056																
June-00	2.316	1.127	1.079	1.034	1.034	1.032	1.012	1.004	1.005	1.004	1.005	1.004	1.005	1.006	1.001	1.000	1.000	1.000																	
June-01	1.792	1.155	1.150	1.041	1.050	1.102	1.046	1.007	1.008	1.003	1.003	1.018	1.001	1.000	1.000	1.000	1.000																		
June-02	2.111	1.257	1.085	1.026	1.014	1.008	1.087	1.015	1.007	1.051	1.003	1.001	1.001	1.003	1.000	1.000																			
June-03	3.603	1.226	1.059	1.129	1.025	1.020	1.089	1.031	1.025	1.018	1.030	1.032	1.028	1.025	1.020																				
June-04	2.575	1.287	1.194	1.048	1.039	1.044	1.026	1.025	1.019	1.023	1.027	1.026	1.019	1.020																					
June-05	2.804	1.161	1.060	1.033	1.017	1.046	1.021	1.021	1.020	1.010	1.007	1.003	1.003																						
June-06	2.073	1.313	1.046	1.031	1.023	1.019	1.015	1.019	1.021	1.026	1.021	1.020																							
June-07	2.166	1.104	1.021	1.012	1.007	1.004	1.004	1.001	1.003	1.000	1.000																								
June-08	1.974	1.097	1.042	1.032	1.011	1.011	1.000	1.000	1.000	1.000																									
June-09	1.884	1.045	1.017	1.057	1.035	1.045	1.095	1.056	1.022																										
June-10	2.070	1.041	1.019	1.034	1.026	1.030	1.024	1.013																											
June-11	1.728	1.132	1.055	1.035	1.039	1.042	1.030																												
June-12	1.970	1.125	1.032	1.022	1.016	1.023																													
June-13	2.118	1.099	1.027	1.018	1.016																														
June-14	2.123	1.167	1.063	1.042																															
June-15	2.018	1.113	1.126																																
June-16	1.888	1.140																																	
June-17	1.979																																		

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	To Ult
Simple Avg																																				
All Yrs	2.367	1.232	1.119	1.083	1.055	1.053	1.053	1.032	1.027	1.025	1.014	1.013	1.011	1.009	1.007	1.007	1.013	1.008	1.008	1.005	1.004	1.003	1.005	1.004	1.003	1.002	1.007	1.002	1.001	1.000	1.000	1.002	1.004	1.001	1.005	
Latest 5	2.025	1.129	1.060	1.030	1.026	1.030	1.031	1.018	1.013	1.012	1.017	1.016	1.010	1.011	1.013	1.011	1.014	1.015	1.015	1.003	1.006	1.004	1.005	1.003	1.003	1.003	1.011	1.001	1.002	1.000	1.000					
Latest 3	1.962	1.140	1.072	1.028	1.024	1.032	1.050	1.023	1.008	1.009	1.009	1.016	1.017	1.016	1.007	1.000	1.018	1.021	1.022	1.003	1.005	1.001	1.007	1.006	1.004	1.000	1.001	1.001	1.003	1.001	1.000	1.001	1.004			
Volume Wtd																																				
All Yrs	2.290	1.205	1.103	1.070	1.043	1.037	1.036	1.020	1.017	1.017	1.013	1.013	1.010	1.009	1.006	1.007	1.016	1.008	1.009	1.006	1.004	1.004	1.005	1.004	1.003	1.002	1.011	1.001	1.003	1.001	1.000	1.002	1.004	1.001	1.005	
Latest 5	2.000	1.129	1.065	1.031	1.027	1.031	1.031	1.019	1.014	1.014	1.018	1.017	1.011	1.013	1.013	1.012	1.015	1.017	1.017	1.003	1.007	1.004	1.005	1.003	1.002	1.003	1.012	1.001	1.003	1.001	1.000					
Latest 3	1.956	1.137	1.078	1.028	1.025	1.033	1.051	1.025	1.009	1.010	1.010	1.017	1.016	1.017	1.007	1.000	1.018	1.026	1.027	1.003	1.004	1.001	1.009	1.006	1.004	1.000	1.001	1.001	1.003	1.001	1.000	1.001	1.004			

Dev Factor Selection

Industry 1	1.952	1.145	1.055	1.025	1.015	1.012	1.012	1.013	1.010	1.009	1.011	1.010	1.009	1.008	1.009	1.007	1.007	1.006																		
Industry 2		1.268	1.086	1.037	1.014	1.010	1.014	1.010	1.007	1.010	1.011	1.009	1.008	1.009	1.010	1.007	1.007	1.009	1.006	1.006																
Prior	*2.156*	*1.153*	*1.072*	*1.043*	*1.033*	*1.032*	*1.032*	*1.020*	*1.018*	*1.015*	*1.013*	*1.012*	*1.011*	*1.010*	*1.007*	*1.007*	*1.005*	*1.005*	*1.005*	*1.005*	*1.004*	*1.003*	*1.003*	*1.003*	*1.003*	*1.003*	*1.003*	*1.002*	*1.001*	*1.001*	*1.001*	*1.001*	*1.001*	*1.001*	*1.006*	
Selected	2.145	1.153	1.084	1.043	1.032	1.034	1.034	1.019	1.018	1.015	1.013	1.013	1.011	1.011	1.010	1.007	1.005	1.005	1.005	1.005	1.004	1.003	1.003	1.003	1.003	1.003	1.003	1.002	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.005
FacToUlt	3.662	1.707	1.480	1.365	1.309	1.269	1.227	1.187	1.164	1.144	1.127	1.113	1.099	1.087	1.075	1.065	1.058	1.053	1.047	1.042	1.037	1.033	1.030	1.027	1.024	1.021	1.018	1.014	1.012	1.011	1.010	1.009	1.008	1.007	1.006	1.005
Percent of Ult	27.3%	58.6%	67.6%	73.3%	76.4%	78.8%	81.5%	84.3%	85.9%	87.4%	88.8%	89.9%	91.0%	92.0%	93.0%	93.9%	94.5%	95.0%	95.5%	96.0%	96.4%	96.8%	97.1%	97.4%	97.7%	98.0%	98.3%	98.6%	98.8%	98.9%	99.0%	99.1%	99.2%	99.3%	99.4%	99.5%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Mental Health - Cluster 2
Medical

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/17		As of 6/18		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	815,750	817,100	825,361	827,210	9,612	1.2%	10,111	1.2%
6/30/82-83	140,439	141,843	141,055	142,465	616	0.4%	622	0.4%
6/30/83-84	210,000	210,000	210,000	210,000	0	0.0%	0	0.0%
6/30/84-85	498,000	502,980	500,000	506,010	2,000	0.4%	3,030	0.6%
6/30/85-86	260,000	260,000	260,000	260,000	0	0.0%	0	0.0%
6/30/86-87	710,000	710,000	709,000	710,000	(1,000)	-0.1%	0	0.0%
6/30/87-88	1,882,000	1,886,000	1,885,000	1,889,000	3,000	0.2%	3,000	0.2%
6/30/88-89	2,078,000	2,098,780	2,079,000	2,100,800	1,000	0.0%	2,020	0.1%
6/30/89-90	1,979,000	1,986,670	1,979,000	1,984,650	0	0.0%	(2,020)	-0.1%
6/30/90-91	1,776,000	1,793,760	1,773,000	1,790,730	(3,000)	-0.2%	(3,030)	-0.2%
6/30/91-92	1,261,000	1,266,914	1,261,000	1,266,914	0	0.0%	0	0.0%
6/30/92-93	1,158,000	1,169,580	1,170,000	1,181,700	12,000	1.0%	12,120	1.0%
6/30/93-94	665,000	671,650	665,000	671,650	0	0.0%	0	0.0%
6/30/94-95	877,000	885,770	875,000	884,760	(2,000)	-0.2%	(1,010)	-0.1%
6/30/95-96	832,000	841,330	832,000	841,330	0	0.0%	0	0.0%
6/30/96-97	565,000	570,650	567,000	572,670	2,000	0.4%	2,020	0.4%
6/30/97-98	528,000	533,280	526,000	531,260	(2,000)	-0.4%	(2,020)	-0.4%
6/30/98-99	844,000	845,000	886,000	888,000	42,000	5.0%	43,000	5.1%
6/30/99-00	626,670	634,000	623,700	631,000	(2,970)	-0.5%	(3,000)	-0.5%
6/30/00-01	788,040	797,000	784,080	794,000	(3,960)	-0.5%	(3,000)	-0.4%
6/30/01-02	659,000	665,590	654,000	661,550	(5,000)	-0.8%	(4,040)	-0.6%
6/30/02-03	814,770	832,240	823,680	843,350	8,910	1.1%	11,110	1.3%
6/30/03-04	1,463,220	1,498,840	1,479,060	1,517,020	15,840	1.1%	18,180	1.2%
6/30/04-05	981,000	1,008,000	960,000	1,002,000	(21,000)	-2.1%	(6,000)	-0.6%
6/30/05-06	923,000	943,000	915,000	953,000	(8,000)	-0.9%	10,000	1.1%
6/30/06-07	755,000	759,000	730,000	747,000	(25,000)	-3.3%	(12,000)	-1.6%
6/30/07-08	757,000	768,000	735,000	748,000	(22,000)	-2.9%	(20,000)	-2.6%
6/30/08-09	916,000	930,000	899,000	936,000	(17,000)	-1.9%	6,000	0.6%
6/30/09-10	630,000	654,000	626,000	627,000	(4,000)	-0.6%	(27,000)	-4.1%
6/30/10-11	912,000	951,000	896,000	950,000	(16,000)	-1.8%	(1,000)	-0.1%
6/30/11-12	683,000	705,000	676,000	679,000	(7,000)	-1.0%	(26,000)	-3.7%
6/30/12-13	737,000	765,000	728,000	731,000	(9,000)	-1.2%	(34,000)	-4.4%
6/30/13-14	780,000	818,000	781,000	791,000	1,000	0.1%	(27,000)	-3.3%
6/30/14-15	1,071,000	1,156,050	1,096,000	1,160,000	25,000	2.3%	3,950	0.3%
6/30/15-16	1,270,000	1,442,000	1,289,000	1,447,000	19,000	1.5%	5,000	0.3%
6/30/16-17	1,226,400	1,541,850	1,286,000	1,512,000	59,600	4.9%	(29,850)	-1.9%
6/30/17-18								
Total	33,072,288	34,059,877	33,124,936	33,989,070	52,647	0.2%	(70,808)	-0.2%

NOTES:

(2), (3) From prior Aon analysis as of June 30, 2017

(4), (5) From Section 3, Exhibit 2, Page 1, Columns 6, 7

(6) = (4) - (2)

(7) = (4) / (2) - 1

(8) = (5) - (3)

(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Mental Health - Cluster 2
Medical

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
444	100.0%	0.5%	0.0%	0.1%	0.1%	1.000	1.000
432	99.5%	0.1%	0.5%	0.0%	0.0%	0.981	0.971
420	99.4%	0.1%	0.6%	0.0%	0.0%	0.949	0.925
408	99.3%	0.1%	0.7%	0.0%	0.0%	0.921	0.886
396	99.2%	0.1%	0.8%	0.0%	0.0%	0.897	0.852
384	99.1%	0.1%	0.9%	0.0%	0.0%	0.875	0.821
372	99.0%	0.1%	1.0%	0.0%	0.0%	0.855	0.794
360	98.9%	0.1%	1.1%	0.0%	0.0%	0.836	0.768
348	98.8%	0.2%	1.2%	0.1%	0.0%	0.818	0.745
336	98.6%	0.3%	1.4%	0.1%	0.1%	0.813	0.740
324	98.3%	0.3%	1.7%	0.1%	0.1%	0.816	0.744
312	98.0%	0.3%	2.0%	0.1%	0.1%	0.813	0.742
300	97.7%	0.3%	2.3%	0.1%	0.1%	0.807	0.734
288	97.4%	0.3%	2.6%	0.1%	0.1%	0.799	0.724
276	97.1%	0.3%	2.9%	0.1%	0.1%	0.790	0.712
264	96.8%	0.4%	3.2%	0.2%	0.1%	0.779	0.699
252	96.4%	0.5%	3.6%	0.2%	0.1%	0.774	0.693
240	96.0%	0.5%	4.0%	0.2%	0.2%	0.773	0.691
228	95.5%	0.5%	4.5%	0.2%	0.2%	0.768	0.686
216	95.0%	0.5%	5.0%	0.2%	0.2%	0.761	0.678
204	94.5%	0.6%	5.5%	0.3%	0.2%	0.754	0.668
192	93.9%	0.9%	6.1%	0.5%	0.4%	0.751	0.666
180	93.0%	1.0%	7.0%	0.6%	0.4%	0.756	0.672
168	92.0%	1.0%	8.0%	0.6%	0.4%	0.758	0.676
156	91.0%	1.1%	9.0%	0.7%	0.5%	0.756	0.674
144	89.9%	1.1%	10.1%	0.7%	0.6%	0.756	0.674
132	88.8%	1.3%	11.2%	0.9%	0.7%	0.752	0.669
120	87.4%	1.6%	12.6%	1.1%	0.9%	0.750	0.667
108	85.9%	1.6%	14.1%	1.1%	1.0%	0.750	0.667
96	84.3%	2.8%	15.7%	2.1%	1.8%	0.747	0.664
84	81.5%	2.7%	18.5%	2.1%	1.8%	0.758	0.678
72	78.8%	2.4%	21.2%	2.0%	1.8%	0.761	0.682
60	76.4%	3.1%	23.6%	2.6%	2.4%	0.757	0.677
48	73.3%	5.7%	26.7%	5.0%	4.6%	0.758	0.678
36	67.6%	9.0%	32.4%	8.2%	7.8%	0.773	0.698
24	58.6%	31.3%	41.4%	29.5%	28.7%	0.795	0.726
12	27.3%	27.3%	72.7%	26.8%	26.5%	0.857	0.808
Total		100.0%					

NOTES:

(2) = 1 / Section 3, Exhibit 2, Page 2, Column 4

(3) Incremental % based on (2)

(4) = 1 - (2)

(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}

(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}

(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Mental Health - Cluster 2
Medical

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	9,347	11,196		8,819	10,563
6/30/82-83	758	2,168	0.981	743	2,126
6/30/83-84	960	960	0.949	911	911
6/30/84-85	3,199	9,209	0.921	2,948	8,486
6/30/85-86	2,225	2,225	0.897	1,996	1,996
6/30/86-87	6,165	7,165	0.875	5,396	6,271
6/30/87-88	15,948	19,948	0.855	13,634	17,054
6/30/88-89	23,295	45,095	0.836	19,472	37,694
6/30/89-90	39,037	44,687	0.818	31,929	36,550
6/30/90-91	25,492	43,222	0.813	20,732	35,151
6/30/91-92	389	6,303	0.816	317	5,143
6/30/92-93	23,457	35,157	0.813	19,075	28,588
6/30/93-94	15,083	21,733	0.807	12,174	17,541
6/30/94-95	21,502	31,262	0.799	17,180	24,979
6/30/95-96	23,530	32,860	0.790	18,581	25,948
6/30/96-97	17,757	23,427	0.779	13,842	18,261
6/30/97-98	18,587	23,847	0.774	14,395	18,469
6/30/98-99	33,881	35,881	0.773	26,178	27,723
6/30/99-00	21,345	28,645	0.768	16,393	21,999
6/30/00-01	30,103	40,023	0.761	22,921	30,475
6/30/01-02	34,760	42,310	0.754	26,195	31,885
6/30/02-03	39,982	59,652	0.751	30,037	44,814
6/30/03-04	82,595	120,555	0.756	62,412	91,096
6/30/04-05	38,029	80,029	0.758	28,840	60,692
6/30/05-06	47,277	85,277	0.756	35,764	64,510
6/30/06-07	58,577	75,577	0.756	44,266	57,112
6/30/07-08	71,115	84,115	0.752	53,465	63,238
6/30/08-09	80,893	117,893	0.750	60,655	88,398
6/30/09-10	87,831	88,831	0.750	65,854	66,603
6/30/10-11	94,927	148,927	0.747	70,950	111,310
6/30/11-12	122,405	125,405	0.758	92,744	95,017
6/30/12-13	153,900	156,900	0.761	117,062	119,344
6/30/13-14	184,143	194,143	0.757	139,422	146,993
6/30/14-15	246,360	310,360	0.758	186,630	235,113
6/30/15-16	311,528	469,528	0.773	240,727	362,819
6/30/16-17	400,561	626,561	0.795	318,276	497,850
6/30/17-18	741,317	904,317	0.857	635,434	775,152
Total	3,128,261	4,155,395		2,476,367	3,287,878
			(7) Total Discount Factor:	0.792	0.791

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	9,347	11,196
(9) Projected Number of Years:	3	3
(10) Projected Paid Loss per Year:	3,116	3,732
(11) Discounted Value at 4%:	8,819	10,563

NOTES:

(2), (3) From Section 3, Exhibit 2, Page 1, Columns 8, 9

(4) From Section 3, Exhibit 2, Page 9, Column 7

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Mental Health - Cluster 2
Medical

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	9,347	11,196		8,578	10,275
6/30/82-83	758	2,168	0.971	736	2,106
6/30/83-84	960	960	0.925	888	888
6/30/84-85	3,199	9,209	0.886	2,834	8,158
6/30/85-86	2,225	2,225	0.852	1,895	1,895
6/30/86-87	6,165	7,165	0.821	5,064	5,885
6/30/87-88	15,948	19,948	0.794	12,658	15,833
6/30/88-89	23,295	45,095	0.768	17,895	34,643
6/30/89-90	39,037	44,687	0.745	29,064	33,270
6/30/90-91	25,492	43,222	0.740	18,852	31,963
6/30/91-92	389	6,303	0.744	289	4,693
6/30/92-93	23,457	35,157	0.742	17,395	26,071
6/30/93-94	15,083	21,733	0.734	11,072	15,953
6/30/94-95	21,502	31,262	0.724	15,563	22,627
6/30/95-96	23,530	32,860	0.712	16,750	23,392
6/30/96-97	17,757	23,427	0.699	12,411	16,374
6/30/97-98	18,587	23,847	0.693	12,882	16,528
6/30/98-99	33,881	35,881	0.691	23,427	24,810
6/30/99-00	21,345	28,645	0.686	14,642	19,649
6/30/00-01	30,103	40,023	0.678	20,407	27,132
6/30/01-02	34,760	42,310	0.668	23,226	28,271
6/30/02-03	39,982	59,652	0.666	26,622	39,719
6/30/03-04	82,595	120,555	0.672	55,535	81,058
6/30/04-05	38,029	80,029	0.676	25,726	54,139
6/30/05-06	47,277	85,277	0.674	31,881	57,506
6/30/06-07	58,577	75,577	0.674	39,459	50,911
6/30/07-08	71,115	84,115	0.669	47,562	56,256
6/30/08-09	80,893	117,893	0.667	53,916	78,577
6/30/09-10	87,831	88,831	0.667	58,564	59,231
6/30/10-11	94,927	148,927	0.664	63,025	98,878
6/30/11-12	122,405	125,405	0.678	82,958	84,991
6/30/12-13	153,900	156,900	0.682	104,904	106,949
6/30/13-14	184,143	194,143	0.677	124,661	131,431
6/30/14-15	246,360	310,360	0.678	166,922	210,286
6/30/15-16	311,528	469,528	0.698	217,311	327,526
6/30/16-17	400,561	626,561	0.726	290,832	454,922
6/30/17-18	741,317	904,317	0.808	599,076	730,800
Total	3,128,261	4,155,395		2,255,482	2,993,595
			(7) Total Discount Factor:	0.721	0.720

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	9,347	11,196
(9) Projected Number of Years:	3	3
(10) Projected Paid Loss per Year:	3,116	3,732
(11) Discounted Value at 6%:	8,578	10,275

NOTES:

(2), (3) From Section 3, Exhibit 2, Page 1, Columns 8, 9

(4) From Section 3, Exhibit 2, Page 9, Column 8

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Corrections - Cluster 3

Indemnity

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		4,302,935			5,015,092	5,578,502	712,157	1,275,566		
6/30/82-83		2,747,816	2,775,335		2,761,458	2,775,000	13,642	27,184		
6/30/83-84		1,405,260	1,491,681		1,476,764	1,492,000	71,504	86,740		
6/30/84-85	115,258	4,153,636	4,204,264	4,190,837	4,155,575	4,198,000	1,939	44,364	3.605	3.642
6/30/85-86	123,937	6,399,508	6,482,975	6,470,059	6,411,752	6,444,615	12,244	45,107	5.173	5.200
6/30/86-87	142,396	3,884,640	3,936,990	3,941,326	3,899,766	3,919,305	15,126	34,665	2.739	2.752
6/30/87-88	166,792	6,097,875	6,182,812	6,193,050	6,126,052	6,157,060	28,176	59,185	3.673	3.691
6/30/88-89	180,117	7,464,955	7,586,798	7,569,978	7,570,000	7,587,000	105,045	122,045	4.203	4.212
6/30/89-90	180,883	9,481,046	9,659,196	9,656,768	9,657,000	9,659,000	175,954	177,954	5.339	5.340
6/30/90-91	169,902	10,592,001	10,822,951	10,821,315	10,821,000	10,843,644	228,999	251,643	6.369	6.382
6/30/91-92	165,926	4,474,549	4,593,415	4,592,428	4,592,000	4,593,000	117,451	118,451	2.767	2.768
6/30/92-93	174,198	3,157,116	3,240,697	3,240,324	3,175,700	3,224,795	18,584	67,679	1.823	1.851
6/30/93-94	185,946	5,110,605	5,287,446	5,284,185	5,284,000	5,287,000	173,395	176,395	2.842	2.843
6/30/94-95	194,051	6,155,200	6,426,894	6,419,383	6,419,000	6,427,000	263,800	271,800	3.308	3.312
6/30/95-96	205,262	5,389,786	5,642,239	5,635,307	5,635,000	5,642,000	245,214	252,214	2.745	2.749
6/30/96-97	234,073	6,031,973	6,402,755	6,391,211	6,391,000	6,403,000	359,027	371,027	2.730	2.735
6/30/97-98	221,865	8,439,699	9,157,832	9,120,033	8,681,986	8,864,830	242,287	425,131	3.913	3.996
6/30/98-99	256,071	7,694,667	8,484,078	8,442,820	8,040,277	8,209,110	345,610	514,443	3.140	3.206
6/30/99-00	268,486	8,170,937	9,039,103	8,989,387	8,563,533	8,653,440	392,596	482,503	3.190	3.223
6/30/00-01	279,182	10,541,308	11,733,425	11,656,885	11,110,397	11,227,200	569,089	685,892	3.980	4.021
6/30/01-02	283,070	8,955,995	10,027,401	9,966,403	9,497,057	10,027,000	541,061	1,071,005	3.355	3.542
6/30/02-03	289,846	8,740,322	9,874,703	9,812,744	9,351,538	9,875,000	611,215	1,134,678	3.226	3.407
6/30/03-04	293,771	7,891,296	8,998,803	8,943,921	8,522,793	8,639,000	631,497	747,704	2.901	2.941
6/30/04-05	291,382	8,277,509	9,538,475	8,876,090	8,746,918	9,157,000	469,409	879,491	3.002	3.143
6/30/05-06	294,709	5,833,869	6,779,123	6,475,903	6,296,137	6,508,000	462,268	674,131	2.136	2.208
6/30/06-07	289,603	5,016,856	5,903,700	5,704,649	5,513,966	5,845,000	497,110	828,144	1.904	2.018
6/30/07-08	354,668	4,885,104	5,790,035	5,759,703	5,775,000	5,796,000	889,896	910,896	1.628	1.634
6/30/08-09	332,413	4,104,438	4,925,321	4,986,445	4,956,000	5,236,000	851,562	1,131,562	1.491	1.575
6/30/09-10	336,338	2,714,183	3,314,016	3,664,875	3,489,000	3,848,000	774,817	1,133,817	1.037	1.144
6/30/10-11	333,783	3,549,827	4,412,043	4,599,782	4,506,000	4,830,000	956,173	1,280,173	1.350	1.447
6/30/11-12	348,187	2,692,529	3,436,787	3,902,479	3,670,000	4,098,000	977,471	1,405,471	1.054	1.177
6/30/12-13	368,022	2,420,180	3,221,394	3,892,437	3,557,000	4,087,000	1,136,820	1,666,820	0.967	1.111
6/30/13-14	390,528	2,990,320	4,182,931	4,791,958	4,487,000	5,032,000	1,496,680	2,041,680	1.149	1.289
6/30/14-15	402,750	3,402,760	5,222,489	5,654,824	5,439,000	5,938,000	2,036,240	2,535,240	1.350	1.474
6/30/15-16	400,013	3,127,080	5,708,493	6,076,869	5,893,000	6,381,000	2,765,920	3,253,920	1.473	1.595
6/30/16-17	352,565	3,357,019	7,890,894	6,929,687	7,410,000	8,285,000	4,052,981	4,927,981	2.102	2.350
6/30/17-18	347,621	1,239,405	6,601,354	6,046,256	6,324,000	6,931,000	5,084,595	5,691,595	1.819	1.994
Total	8,973,614	200,894,206	228,978,848	224,700,323	229,221,762	237,698,501	28,327,556	36,804,295		
Tot 6/30/84-18	8,973,614	192,438,194	224,711,832	224,700,323	219,968,448	227,852,999	27,530,253	35,414,805	2.451	2.539

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) Sum of Section 4, Exhibit 1, Page 2, Column 3 and Section 4, Exhibit 1, Page 9, Column 8

(4) From Section 4, Exhibit 1, Page 2, Column 8

(5) From Section 4, Exhibit 1, Page 3, Column 8

(6), (7) Selected based on (3), (4), and (5)

(8) = (6) - (3)

(9) = (7) - (3)

(10) = (6) / (2) / 10

(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Corrections - Cluster 3
Indemnity

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Accident Year	Payroll (000's)	Paid Loss Excluding Lump Sum	Paid LDF	Adjstmnt for Extra Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/16-17	Paid Counts 7/1/17-18	Average Outstanding Claim	Average Age
All Prior Yrs		4,142,935							2	2		70
6/30/82-83		2,566,735	1.011	1.000	2,594,254	181,081	2,775,335		0	0		
6/30/83-84		1,386,759	1.012	1.050	1,473,180	18,501	1,491,681		0	0		
6/30/84-85	115,258	3,972,786	1.013	1.000	4,023,414	180,850	4,204,264	3.648	1	1	50,628	74
6/30/85-86	123,937	6,067,508	1.014	1.000	6,150,975	332,000	6,482,975	5.231	0	0		
6/30/86-87	142,396	3,544,280	1.015	1.000	3,596,630	340,360	3,936,990	2.765	0	0		
6/30/87-88	166,792	5,380,873	1.016	1.000	5,465,810	717,002	6,182,812	3.707	0	0		
6/30/88-89	180,117	6,838,754	1.018	1.000	6,960,597	626,201	7,586,798	4.212	1	1	121,843	62
6/30/89-90	180,883	8,536,146	1.021	1.000	8,714,296	944,900	9,659,196	5.340	1	1	178,150	76
6/30/90-91	169,902	9,255,233	1.025	1.000	9,486,183	1,336,768	10,822,951	6.370	3	3	76,983	70
6/30/91-92	165,926	4,091,298	1.029	1.000	4,210,164	383,251	4,593,415	2.768	1	2	59,433	70
6/30/92-93	174,198	2,519,814	1.033	1.000	2,603,395	637,302	3,240,697	1.860	0	0		
6/30/93-94	185,946	4,267,930	1.041	1.000	4,444,771	842,675	5,287,446	2.844	2	2	88,421	59
6/30/94-95	194,051	5,422,587	1.050	1.000	5,692,450	734,445	6,426,894	3.312	1	0		
6/30/95-96	205,262	4,737,785	1.053	1.000	4,988,608	653,631	5,642,239	2.749	1	0		
6/30/96-97	234,073	5,237,372	1.070	1.000	5,606,167	796,588	6,402,755	2.735	0	0		
6/30/97-98	221,865	8,007,981	1.090	1.000	8,725,034	432,797	9,157,832	4.128	2	2	358,527	56
6/30/98-99	256,071	7,518,614	1.105	1.000	8,307,585	176,493	8,484,078	3.313	1	1	788,971	75
6/30/99-00	268,486	7,894,835	1.109	1.000	8,757,238	281,865	9,039,103	3.367	0	0		
6/30/00-01	279,182	10,126,025	1.116	1.000	11,303,708	429,717	11,733,425	4.203	0	0		
6/30/01-02	283,070	8,652,114	1.122	1.000	9,706,669	320,732	10,027,401	3.542	1	0		
6/30/02-03	289,846	8,376,819	1.133	1.000	9,489,482	385,222	9,874,703	3.407	1	0		
6/30/03-04	293,771	7,556,865	1.143	1.000	8,640,000	358,803	8,998,803	3.063	0	0		
6/30/04-05	291,382	7,982,459	1.154	1.000	9,213,110	325,365	9,538,475	3.274	0	2	615,326	58
6/30/05-06	294,709	5,571,365	1.165	1.000	6,489,839	289,284	6,779,123	2.300	0	0		
6/30/06-07	289,603	4,809,853	1.175	1.000	5,653,235	250,465	5,903,700	2.039	1	1	843,382	63
6/30/07-08	354,668	4,686,602	1.183	1.000	5,543,702	246,333	5,790,035	1.633	1	1	857,100	59
6/30/08-09	332,413	3,924,421	1.198	1.000	4,700,052	225,269	4,925,321	1.482	3	5	155,126	44
6/30/09-10	336,338	2,613,682	1.217	1.000	3,179,720	134,295	3,314,016	0.985	5	4	141,510	59
6/30/10-11	333,783	3,334,045	1.244	1.000	4,148,028	264,015	4,412,043	1.322	3	0		
6/30/11-12	348,187	2,523,426	1.280	1.000	3,228,788	207,999	3,436,787	0.987	6	4	176,341	46
6/30/12-13	368,022	2,274,867	1.333	1.000	3,033,471	187,923	3,221,394	0.875	6	2	379,302	51
6/30/13-14	390,528	2,827,439	1.399	1.000	3,956,687	226,244	4,182,931	1.071	12	9	125,472	47
6/30/14-15	402,750	3,337,760	1.507	1.000	5,029,351	193,138	5,222,489	1.297	25	14	120,828	47
6/30/15-16	400,013	3,091,580	1.770	1.000	5,473,397	235,097	5,708,493	1.427	59	23	103,557	46
6/30/16-17	352,565	3,082,019	2.361	1.000	7,275,107	615,787	7,890,894	2.238	179	57	73,563	44
6/30/17-18	347,621	1,239,405	5.046	1.000	6,254,220	347,134	6,601,354	1.899		142	35,316	41
Total	8,973,614	187,400,973			214,119,317	14,859,531	228,978,848		318	279		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3), (4) From Section 4, Exhibit 1, Page 7

(5) Based on information from the MA WCRIB

(6) = (3) x (4) x (5)

(7) From Section 4, Exhibit 1, Page 9, Column 13

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10), (11) Provided by Commonwealth of Massachusetts

(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Corrections - Cluster 3
Indemnity

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss Excluding Lump Sum	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	115,258	2.565	3,972,786	1.013	4,009,987	180,850	4,190,837	3.636	3.479
6/30/85-86	123,937	4.195	6,067,508	1.014	6,138,059	332,000	6,470,059	5.220	4.953
6/30/86-87	142,396	2.735	3,544,280	1.015	3,600,966	340,360	3,941,326	2.768	2.529
6/30/87-88	166,792	3.672	5,380,873	1.016	5,476,048	717,002	6,193,050	3.713	3.283
6/30/88-89	180,117	3.331	6,838,754	1.018	6,943,777	626,201	7,569,978	4.203	3.855
6/30/89-90	180,883	4.752	8,536,146	1.021	8,711,868	944,900	9,656,768	5.339	4.816
6/30/90-91	169,902	5.544	9,255,233	1.025	9,484,547	1,336,768	10,821,315	6.369	5.582
6/30/91-92	165,926	2.516	4,091,298	1.029	4,209,177	383,251	4,592,428	2.768	2.537
6/30/92-93	174,198	1.488	2,519,814	1.033	2,603,022	637,302	3,240,324	1.860	1.494
6/30/93-94	185,946	2.346	4,267,930	1.041	4,441,510	842,675	5,284,185	2.842	2.389
6/30/94-95	194,051	2.852	5,422,587	1.050	5,684,939	734,445	6,419,383	3.308	2.930
6/30/95-96	205,262	2.363	4,737,785	1.053	4,981,676	653,631	5,635,307	2.745	2.427
6/30/96-97	234,073	2.320	5,237,372	1.070	5,594,624	796,588	6,391,211	2.730	2.390
6/30/97-98	221,865	3.725	8,007,981	1.090	8,687,236	432,797	9,120,033	4.111	3.916
6/30/98-99	256,071	3.075	7,518,614	1.105	8,266,327	176,493	8,442,820	3.297	3.228
6/30/99-00	268,486	3.074	7,894,835	1.109	8,707,523	281,865	8,989,387	3.348	3.243
6/30/00-01	279,182	3.786	10,126,025	1.116	11,227,168	429,717	11,656,885	4.175	4.021
6/30/01-02	283,070	3.231	8,652,114	1.122	9,645,671	320,732	9,966,403	3.521	3.408
6/30/02-03	289,846	3.092	8,376,819	1.133	9,427,522	385,222	9,812,744	3.386	3.253
6/30/03-04	293,771	2.792	7,556,865	1.143	8,585,118	358,803	8,943,921	3.045	2.922
6/30/04-05	291,382	1.460	7,982,459	1.154	8,550,725	325,365	8,876,090	3.046	2.935
6/30/05-06	294,709	1.475	5,571,365	1.165	6,186,619	289,284	6,475,903	2.197	2.099
6/30/06-07	289,603	1.491	4,809,853	1.175	5,454,184	250,465	5,704,649	1.970	1.883
6/30/07-08	354,668	1.508	4,686,602	1.183	5,513,370	246,333	5,759,703	1.624	1.555
6/30/08-09	332,413	1.525	3,924,421	1.198	4,761,176	225,269	4,986,445	1.500	1.432
6/30/09-10	336,338	1.531	2,613,682	1.217	3,530,580	134,295	3,664,875	1.090	1.050
6/30/10-11	333,783	1.529	3,334,045	1.244	4,335,766	264,015	4,599,782	1.378	1.299
6/30/11-12	348,187	1.540	2,523,426	1.280	3,694,480	207,999	3,902,479	1.121	1.061
6/30/12-13	368,022	1.553	2,274,867	1.333	3,704,514	187,923	3,892,437	1.058	1.007
6/30/13-14	390,528	1.560	2,827,439	1.399	4,565,714	226,244	4,791,958	1.227	1.169
6/30/14-15	402,750	1.568	3,337,760	1.507	5,461,687	193,138	5,654,824	1.404	1.356
6/30/15-16	400,013	1.580	3,091,580	1.770	5,841,772	235,097	6,076,869	1.519	1.460
6/30/16-17	352,565	1.590	3,082,019	2.361	6,313,900	615,787	6,929,687	1.966	1.791
6/30/17-18	347,621	1.600	1,239,405	5.046	5,699,122	347,134	6,046,256	1.739	1.639
Total	8,973,614		179,304,543		210,040,375	14,659,949	224,700,323		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 4, Exhibit 1, Page 4, Column 11

(4) From Section 4, Exhibit 1, Page 2, Column 3

(5) From Section 4, Exhibit 1, Page 2, Column 4

(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]

(7) From Section 4, Exhibit 1, Page 9, Column 13

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Corrections - Cluster 3
Indemnity

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Exp Ult Loss Excluding Lump Sum	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									2.565	2.565
6/30/85-86									4.195	4.195
6/30/86-87									2.735	2.735
6/30/87-88									3.672	3.672
6/30/88-89									3.331	3.331
6/30/89-90									4.752	4.752
6/30/90-91	169,902	9,486,183	5.583	0.983	5.490	1.000	5.490	1.627	6.313	5.544
6/30/91-92	165,926	4,210,164	2.537	1.079	2.737	1.000	2.737	1.483	2.497	2.516
6/30/92-93	174,198	2,603,395	1.495	1.258	1.880	1.000	1.880	1.272	1.506	1.488
6/30/93-94	185,946	4,444,771	2.390	1.242	2.968	1.000	2.968	1.289	2.352	2.346
6/30/94-95	194,051	5,692,450	2.933	1.230	3.609	1.000	3.609	1.301	2.881	2.852
6/30/95-96	205,262	4,988,608	2.430	1.220	2.966	1.000	2.966	1.311	2.424	2.363
6/30/96-97	234,073	5,606,167	2.395	1.208	2.894	1.000	2.894	1.324	2.385	2.320
6/30/97-98	221,865	8,725,034	3.933	1.193	4.691	1.000	4.691	1.341	3.768	3.725
6/30/98-99	256,071	8,307,585	3.244	1.177	3.819	1.000	3.819	1.359	3.110	3.075
6/30/99-00	268,486	8,757,238	3.262	1.158	3.778	1.000	3.778	1.381	3.131	3.074
6/30/00-01	279,182	11,303,708	4.049	1.129	4.570	1.000	4.570	1.417	3.846	3.786
6/30/01-02	283,070	9,706,669	3.429	1.107	3.795	1.000	3.795	1.446	3.304	3.231
6/30/02-03	289,846	9,489,482	3.274	1.103	3.611	1.000	3.611	1.451	3.164	3.092
6/30/03-04	293,771	8,640,000	2.941	1.103	3.243	1.000	3.243	1.451	2.862	2.792
6/30/04-05	291,382	9,213,110	3.162	1.096	3.465	1.000	3.465	1.460	1.744	1.460
6/30/05-06	294,709	6,489,839	2.202	1.085	2.389	1.000	2.389	1.475	1.762	1.475
6/30/06-07	289,603	5,653,235	1.952	1.073	2.094	1.000	2.094	1.491	1.782	1.491
6/30/07-08	354,668	5,543,702	1.563	1.061	1.659	1.000	1.659	1.508	1.801	1.508
6/30/08-09	332,413	4,700,052	1.414	1.049	1.483	1.000	1.483	1.525	1.822	1.525
6/30/09-10	336,338	3,179,720	0.945	1.045	0.988	1.000	0.988	1.531	1.829	1.531
6/30/10-11	333,783	4,148,028	1.243	1.046	1.300	1.000	1.300	1.529	1.827	1.529
6/30/11-12	348,187	3,228,788	0.927	1.039	0.964	1.000	0.964	1.540	1.839	1.540
6/30/12-13	368,022	3,033,471	0.824	1.030	0.849	1.000	0.849	1.553	1.856	1.553
6/30/13-14	390,528	3,956,687	1.013	1.026	1.039	1.000	1.039	1.560	1.863	1.560
6/30/14-15	402,750	5,029,351	1.249	1.020	1.274	1.000	1.274	1.568	1.873	1.568
6/30/15-16	400,013	5,473,397	1.368	1.013	1.386	1.000	1.386	1.580	1.887	1.580
6/30/16-17	352,565	7,275,107	2.063	1.006	2.076	1.000	2.076	1.590	1.900	1.590
6/30/17-18	347,621	6,254,220	1.799	1.000	1.799	1.000	1.799	1.600		1.600
Total	8,064,230	175,140,161								

Trend Last 4 (ex 17-18):	24.1%	Avg 3 (ex 17-18):	1.579
Trend Last 8 (ex 17-18):	8.1%	Avg 5 (ex 17-18):	1.325
Trend Last 12 (ex 17-18):	-3.3%	Avg 10 (ex 17-18):	1.302
Prior Selected Trend:	0.0%	Prior Sel Avg:	1.900
Selected Trend:	0.0%	Sel. Loss Cost:	1.600

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 4, Exhibit 1, Page 2, Column 6

(4) = (3) / (2) / 10

(5) Based on information from the MA WCRIB

(6) = (4) x (5)

(7) Based on Selected Trend from (6)

(8) = (6) x (7)

(9) = Sel. Loss Cost / [(5) * (7)]

(10) From prior Aon analysis as of June 30, 2017

(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Corrections - Cluster 3
Indemnity

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend	1.000	
(2)	Credibility	19%	
(3)	Average Pmt Trend Statewide	0.960	
(4)	Credibility Weighted Trend	0.968	
		(Low)	(High)
(5)	Selected Range	0.948	0.977
(6)	Incremental Paid for 2018	105,321	105,321
(7)	Estimated Reserve	1,929,437	4,527,595
(8)	Paid to Date (82 & Prior)	4,142,935	4,142,935
(9)	Est Ult Paid for 1982 & Prior	6,072,372	8,670,531

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	102,132	98,959
(11)	Projected Number of Years	3	3
(12)	Estimated Reserve	306,397	296,878
(13)	Paid to Date (82 & Prior)	4,142,935	4,037,614
(14)	Est Ult Paid for 1982 & Prior	4,449,332	4,334,492
(14a)	Paid Counts During Fiscal Year	2	2
		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	4,855,092	5,418,502
(16)	Lump Sum Ultimates	160,000	160,000
(17)	Ult Loss Including Lump Sums	**5,015,092**	**5,578,502**
(18)	Implied Tail	1.172	1.308
(19)	Ult Loss Inc Lump Sums @ 6/17	4,886,834	5,433,103

NOTES:

(1) From Section 4, Exhibit 1, Page 6
(2) = (Average of Section 4, Exhibit 1, Page 6, Column 3 / 3,000,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 4, Exhibit 1, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 4, Exhibit 1, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) From Section 4, Exhibit 1, Page 9, Column 13
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2017

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Corrections - Cluster 3

Indemnity

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	188,569	12.147			
1993	2	151,483	11.928	0.803		
1994	3	104,509	11.557	0.690		
1995	4	93,428	11.445	0.894		
1996	5	94,858	11.460	1.015		
1997	6	35,075	10.465	0.370		
1998	7	103,538	11.548	2.952		
1999	8	96,697	11.479	0.934		
2000	9	73,478	11.205	0.760	n =	27
2001	10	66,717	11.108	0.908	S(x) =	54,135
2002	11	70,033	11.157	1.050	S(x-sq) =	108,542,313
2003	12	124,671	11.733	1.780	S(xy) =	624,010
2004	13	92,927	11.440	0.745	S(y) =	311
2005	14	283,599	12.555	3.052	D =	44,226
2006	15	99,838	11.511	0.352	slope =	0.000
2007	16	101,854	11.531	1.020	Avg Trend =	1.000
2008	17	110,209	11.610	1.082		
2009	18	118,086	11.679	1.071		
2010	19	114,911	11.652	0.973		
2011	20	108,994	11.599	0.949		
2012	21	88,958	11.396	0.816		
2013	22	98,227	11.495	1.104		
2014	23	94,260	11.454	0.960		
2015	24	95,801	11.470	1.016		
2016	25	99,212	11.505	1.036		
2017	26	101,864	11.531	1.027		
2017	27	105,321	11.565	1.062		
					Selected Trend:	**1.000**

NOTES:

(3) 2017 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2017

(4) LN [(3)]

(5) Eg. 2018: 1.062 = 105321 / 101864

Commonwealth of Massachusetts Workers Compensation
Department of Corrections - Cluster 3
INDEMNITY
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	*12*	*24*	*36*	*48*	*60*	*72*	*84*	*96*	*108*	*120*	*132*	*144*	*156*	*168*	*180*	*192*	*204*	*216*	*228*	*240*	*252*	*264*	*276*	*288*	*300*	*312*	*324*	*336*	*348*	*360*	*372*	*384*	*396*	*408*	*420*	*432*
June-83	160,888	374,220	534,542	675,661	811,997	954,058	1,116,909	1,304,184	1,471,217	1,635,013	1,757,490	1,859,844	1,949,141	2,029,453	2,148,093	2,178,681	2,205,456	2,235,374	2,318,345	2,353,359	2,388,924	2,424,404	2,461,295	2,499,289	2,538,974	2,566,735	2,566,735	2,566,735	2,566,735	2,566,735	2,566,735	2,566,735	2,566,735	2,566,735	2,566,735
June-84	149,256	331,713	467,188	590,124	701,300	845,012	973,143	1,100,933	1,224,966	1,294,374	1,350,379	1,377,980	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	1,386,759	
June-85	278,562	647,928	925,510	1,158,844	1,390,342	1,636,071	1,810,725	1,948,970	2,082,835	2,178,082	2,319,274	2,402,755	2,445,792	2,537,445	2,628,105	2,728,723	2,834,546	2,914,527	2,998,669	3,082,607	3,169,057	3,258,902	3,352,791	3,451,011	3,510,756	3,557,919	3,604,884	3,653,451	3,703,603	3,754,423	3,806,419	3,860,335	3,915,623	3,972,786	
June-86	597,558	1,389,906	1,985,364	2,475,336	2,928,617	3,253,763	3,464,240	3,764,813	3,935,847	4,097,154	4,211,904	4,374,071	4,479,419	4,611,691	4,746,846	4,891,689	5,026,555	5,162,645	5,288,465	5,417,172	5,551,316	5,691,506	5,810,912	5,922,767	6,004,210	6,066,309	6,067,508	6,067,508	6,067,508	6,067,508	6,067,508	6,067,508	6,067,508		
June-87	463,134	1,057,238	1,522,773	1,934,421	2,261,898	2,491,874	2,659,729	2,799,050	2,901,503	3,021,876	3,103,922	3,271,697	3,314,455	3,410,332	3,452,632	3,495,733	3,527,775	3,544,280	3,544,280	3,544,280	3,544,280	3,544,280	3,544,280	3,544,280	3,544,280	3,544,280	3,544,280	3,544,280	3,544,280	3,544,280	3,544,280	3,544,280			
June-88	759,128	1,737,832	2,686,963	3,506,695	4,220,441	4,682,677	4,893,879	5,026,539	5,141,074	5,203,833	5,239,349	5,242,532	5,243,019	5,243,019	5,260,048	5,288,978	5,318,482	5,326,859	5,355,106	5,361,539	5,362,873	5,362,873	5,362,873	5,380,873	5,380,873	5,380,873	5,380,873	5,380,873	5,380,873	5,380,873	5,380,873				
June-89	680,636	1,738,554	2,435,784	3,057,497	3,492,498	3,784,686	4,070,002	4,251,487	4,490,766	4,687,032	4,846,109	4,998,762	5,152,745	5,318,978	5,453,186	5,596,167	5,742,890	5,832,925	5,929,581	6,031,181	6,137,243	6,244,608	6,352,619	6,475,512	6,535,663	6,603,324	6,662,320	6,723,416	6,786,146	6,838,754					
June-90	1,246,443	2,758,107	3,953,901	4,833,484	5,310,648	5,694,385	6,073,411	6,354,690	6,596,629	6,831,981	7,007,542	7,150,038	7,296,131	7,414,103	7,526,903	7,637,465	7,757,732	7,827,571	7,914,306	7,972,756	8,030,743	8,088,272	8,148,032	8,208,709	8,272,034	8,334,944	8,400,094	8,466,985	8,536,146						
June-91	1,000,517	2,462,230	3,477,661	4,227,150	4,729,807	5,106,814	5,363,266	5,600,518	5,854,394	6,102,795	6,340,515	6,600,177	6,839,938	7,070,212	7,325,430	7,572,623	7,805,418	8,019,651	8,226,001	8,354,608	8,448,679	8,541,379	8,674,427	8,786,248	8,901,535	9,018,207	9,134,303	9,255,233							
June-92	963,115	1,684,344	2,020,505	2,282,563	2,488,454	2,659,321	2,775,749	2,916,157	3,056,759	3,187,754	3,331,193	3,457,174	3,499,791	3,525,037	3,564,269	3,587,669	3,612,762	3,661,736	3,712,392	3,755,041	3,800,723	3,849,408	3,896,141	3,941,701	3,988,884	4,037,328	4,091,298								
June-93	801,947	1,527,666	1,907,058	2,209,630	2,348,676	2,429,818	2,460,521	2,483,853	2,505,893	2,512,506	2,512,506	2,515,387	2,517,666	2,518,289	2,518,289	2,518,289	2,518,289	2,518,289	2,518,289	2,518,289	2,519,814	2,519,814	2,519,814	2,519,814	2,519,814	2,519,814									
June-94	875,165	1,819,302	2,384,278	2,739,772	2,916,720	3,056,071	3,202,146	3,363,364	3,490,849	3,617,239	3,691,543	3,766,820	3,806,934	3,840,602	3,876,771	3,914,626	3,951,801	3,987,674	4,025,425	4,065,927	4,115,667	4,152,871	4,192,115	4,230,146	4,267,930										
June-95	1,066,149	2,306,245	2,941,602	3,493,104	3,941,201	4,297,491	4,665,184	4,944,044	5,062,779	5,143,804	5,226,875	5,309,969	5,385,490	5,413,698	5,413,698	5,413,698	5,415,952	5,416,002	5,416,002	5,417,339	5,417,339	5,419,968	5,422,587	5,422,587											
June-96	1,138,070	2,104,418	2,766,267	3,096,876	3,400,508	3,669,768	3,910,958	4,114,697	4,277,458	4,365,040	4,414,632	4,445,368	4,479,763	4,513,668	4,547,750	4,581,690	4,620,397	4,658,156	4,733,649	4,734,439	4,737,035	4,737,785	4,737,785												
June-97	1,262,694	2,691,990	3,329,480	3,919,297	4,322,162	4,636,666	4,943,217	5,112,087	5,158,225	5,193,663	5,222,438	5,229,461	5,229,461	5,232,465	5,232,465	5,232,660	5,233,422	5,235,361	5,236,556	5,237,372	5,237,372	5,237,372													
June-98	1,638,670	3,196,042	4,206,538	4,955,846	5,569,408	6,119,997	6,488,625	6,735,243	6,883,928	7,016,935	7,118,193	7,210,560	7,304,495	7,390,265	7,484,278	7,569,489	7,657,448	7,743,183	7,832,407	7,919,409	8,007,981														
June-99	1,336,118	2,975,082	4,075,622	4,979,874	5,739,985	6,193,457	6,542,142	6,776,193	6,959,053	7,099,219	7,215,948	7,278,599	7,305,413	7,335,907	7,367,640	7,401,488	7,430,895	7,459,988	7,489,039	7,518,614															
June-00	1,879,439	3,995,519	5,337,812	6,367,281	6,972,119	7,368,789	7,595,232	7,618,785	7,768,614	7,812,460	7,834,124	7,857,055	7,878,617	7,888,220	7,894,835	7,894,835	7,894,835	7,894,835	7,894,835																
June-01	2,226,443	4,927,848	6,754,618	8,128,201	8,912,524	9,501,364	9,916,815	10,090,085	10,093,706	10,098,792	10,102,701	10,107,752	10,115,331	10,122,622	10,123,390	10,126,025	10,126,025	10,126,025																	
June-02	2,224,570	4,640,913	6,255,872	7,251,577	7,851,163	8,205,089	8,352,527	8,442,240	8,504,072	8,548,892	8,597,046	8,636,684	8,638,876	8,651,791	8,651,791	8,652,114	8,652,114																		
June-03	2,532,484	5,029,957	6,520,088	7,358,736	7,963,011	8,162,267	8,271,915	8,286,330	8,290,078	8,307,565	8,336,977	8,361,400	8,374,756	8,374,756	8,376,819	8,376,819																			
June-04	2,147,040	4,500,943	5,865,460	6,696,306	7,139,497	7,374,551	7,518,148	7,544,299	7,548,670	7,549,433	7,552,695	7,553,195	7,556,865	7,556,865	7,556,865																				
June-05	2,241,999	4,614,395	5,992,285	6,941,629	7,354,316	7,648,410	7,859,634	7,944,264	7,956,390	7,960,585	7,974,262	7,980,912	7,980,912	7,982,459																					
June-06	1,249,906	3,009,799	4,221,387	4,926,296	5,233,916	5,403,155	5,520,760	5,558,413	5,563,096	5,568,003	5,571,365	5,571,365	5,571,365																						
June-07	1,380,680	2,815,182	3,556,899	4,026,861	4,280,218	4,409,792	4,495,865	4,564,874	4,629,170	4,689,050	4,748,911	4,809,853																							
June-08	1,238,290	2,624,403	3,322,948	3,832,582	4,162,771	4,361,974	4,466,756	4,535,679	4,586,080	4,636,341	4,686,602																								
June-09	1,050,261	2,223,832	2,862,597	3,295,878	3,498,318	3,641,036	3,754,484	3,840,887	3,874,160	3,924,421																									
June-10	907,606	1,619,359	1,983,041	2,120,199	2,204,203	2,280,502	2,372,902	2,465,671	2,613,682																										
June-11	985,007	2,210,801	2,754,241	3,017,762	3,188,982	3,323,225	3,334,045	3,334,045																											
June-12	628,004	1,365,683	1,786,119	2,155,722	2,398,549	2,483,977	2,523,426																												
June-13	594,769	1,413,063	1,926,676	2,135,503	2,210,610	2,274,867																													
June-14	832,638	1,825,797	2,295,475	2,707,413	2,827,439																														
June-15	1,195,780	2,178,416	2,850,777	3,337,760																															
June-16	1,329,847	2,465,467	3,091,580																																
June-17	1,489,465	3,082,019																																	
June-18	1,239,405																																		

Age-to-Age Factors

Acc Yr Ending	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*
June-83	2.326	1.428	1.264	1.202	1.175	1.171	1.168	1.128	1.111	1.075	1.058	1.048	1.041	1.058	1.014	1.012	1.014	1.037	1.015	1.015	1.015	1.015	1.015	1.016	1.011	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
June-84	2.222	1.408	1.263	1.188	1.205	1.152	1.131	1.113	1.057	1.043	1.020	1.006	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
June-85	2.326	1.428	1.252	1.200	1.177	1.107	1.076	1.069	1.046	1.065	1.036	1.018	1.037	1.036	1.038	1.039	1.028	1.029	1.028	1.028	1.028	1.029	1.029	1.017	1.013	1.013	1.013	1.014	1.014	1.014	1.014	1.014	1.015		
June-86	2.326	1.428	1.247	1.183	1.111	1.065	1.087	1.045	1.041	1.028	1.039	1.024	1.030	1.029	1.031	1.028	1.027	1.024	1.024	1.025	1.025	1.021	1.019	1.014	1.010	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
June-87	2.283	1.440	1.270	1.169	1.102	1.067	1.052	1.037	1.041	1.027	1.054	1.013	1.029	1.012	1.012	1.009	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
June-88	2.289	1.546	1.305	1.204	1.110	1.045	1.027	1.023	1.012	1.007	1.001	1.000	1.000	1.003	1.005	1.006	1.002	1.005	1.001	1.000	1.000	1.000	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
June-89	2.554	1.401	1.255	1.142	1.084	1.075	1.045	1.056	1.044	1.034	1.032	1.031	1.032	1.025	1.026	1.026	1.016	1.017	1.017	1.018	1.017	1.017	1.019	1.009	1.010	1.009	1.009	1.009	1.008						
June-90	2.213	1.434	1.222	1.099	1.072	1.067	1.046	1.038	1.036	1.026	1.020	1.020	1.016	1.015	1.015	1.016	1.009	1.011	1.007	1.007	1.007	1.007	1.007	1.008	1.008	1.008	1.008	1.008							
June-91	2.461	1.412	1.216	1.119	1.080	1.050	1.044	1.045	1.042	1.039	1.041	1.036	1.034	1.036	1.034	1.031	1.027	1.026	1.016	1.011	1.011	1.016	1.013	1.013	1.013	1.013	1.013								
June-92	1.749	1.200	1.130	1.090	1.069	1.044	1.051	1.048	1.043	1.045	1.038	1.012	1.007	1.011	1.007	1.007	1.014	1.014	1.011	1.012	1.013	1.012	1.012	1.012	1.012	1.013									
June-93	1.905	1.248	1.159	1.063	1.035	1.013	1.009	1.009	1.003	1.000	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000										
June-94	2.079	1.311	1.149	1.065	1.048	1.048	1.050	1.038	1.036	1.021	1.020	1.011	1.009	1.009	1.010	1.009	1.009	1.009	1.010	1.012	1.009	1.009	1.009	1.009											
June-95	2.163	1.275	1.187	1.128	1.090	1.086	1.060	1.024	1.016	1.016	1.016	1.014	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
June-96	1.849	1.315	1.120	1.098	1.079	1.066	1.052	1.040	1.020	1.011	1.007	1.008	1.008	1.008	1.007	1.008	1.008	1.016	1.000	1.001	1.000	1.000													
June-97	2.132	1.237	1.177	1.103	1.073	1.066	1.034	1.009	1.007	1.006	1.001	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
June-98	1.950	1.316	1.178	1.124	1.099	1.060	1.038	1.022	1.019	1.014	1.013	1.013	1.012	1.013	1.011	1.012	1.011	1.012	1.011	1.011															
June-99	2.227	1.370	1.222	1.153	1.079	1.056	1.036	1.027	1.020	1.016	1.009	1.004	1.004	1.004	1.005	1.004	1.004	1.004	1.004																
June-00	2.126	1.336	1.193	1.095	1.057	1.031	1.003	1.020	1.006	1.003	1.003	1.003	1.001	1.001	1.000	1.000	1.000	1.000																	
June-01	2.213	1.371	1.203	1.096	1.066	1.044	1.017	1.000	1.001	1.000	1.000	1.001	1.001	1.000	1.000	1.000	1.000																		
June-02	2.086	1.348	1.159	1.083	1.045	1.018	1.011	1.007	1.005	1.006	1.005	1.000	1.001	1.000	1.000	1.000																			
June-03	1.986	1.296	1.129	1.082	1.025	1.013	1.002	1.000	1.002	1.004	1.003	1.002	1.000	1.000	1.000																				
June-04	2.096	1.303	1.142	1.066	1.033	1.019	1.003	1.001	1.000	1.000	1.000	1.000	1.000	1.000																					
June-05	2.058	1.299	1.158	1.059	1.040	1.028	1.011	1.002	1.001	1.002	1.001	1.000	1.000																						
June-06	2.408	1.403	1.167	1.062	1.032	1.022	1.007	1.001	1.001	1.001	1.000	1.000																							
June-07	2.039	1.263	1.132	1.063	1.030	1.020	1.015	1.014	1.013	1.013	1.013																								
June-08	2.119	1.266	1.153	1.086	1.048	1.024	1.015	1.011	1.011	1.011																									
June-09	2.117	1.287	1.151	1.061	1.041	1.031	1.023	1.009	1.013																										
June-10	1.784	1.225	1.069	1.040	1.035	1.041	1.039	1.060																											
June-11	2.244	1.246	1.096	1.057	1.042	1.003	1.000																												
June-12	2.175	1.308	1.207	1.113	1.036	1.016																													
June-13	2.376	1.363	1.108	1.035	1.029																														
June-14	2.193	1.257	1.179	1.044																															
June-15	1.822	1.309	1.171																																
June-16	1.854	1.254																																	
June-17	2.069																																		

Averages	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*To Ult*
Simple Avg																																				
All Yrs	2.138	1.333	1.183	1.105	1.072	1.052	1.040	1.032	1.024	1.020	1.017	1.011	1.012	1.012	1.010	1.010	1.009	1.011	1.009	1.009	1.008	1.009	1.010	1.008	1.007	1.006	1.005	1.004	1.003	1.002	1.003	1.004	1.005	1.000	1.000	
Latest 5	2.063	1.298	1.152	1.058	1.036	1.023	1.019	1.019	1.008	1.005	1.003	1.000	1.000	1.000	1.001	1.003	1.003	1.006	1.003	1.005	1.002	1.004	1.007	1.008	1.009	1.009	1.006	1.003	1.004	1.003	1.003					
Latest 3	1.915	1.273	1.153	1.064	1.036	1.020	1.021	1.027	1.012	1.008	1.005	1.000	1.000	1.000	1.000	1.000	1.001	1.005	1.005	1.004	1.000	1.003	1.003	1.007	1.008	1.011	1.010	1.006	1.003	1.000	1.005	1.005	1.005			
Volume Wtd																																				
All Yrs	2.105	1.325	1.175	1.096	1.062	1.042	1.028	1.022	1.017	1.014	1.013	1.009	1.009	1.009	1.009	1.010	1.009	1.011	1.009	1.009	1.009	1.010	1.011	1.009	1.008	1.007	1.006	1.005	1.004	1.002	1.003	1.004	1.007	1.000	1.000	
Latest 5	2.015	1.292	1.150	1.057	1.037	1.022	1.017	1.014	1.006	1.004	1.003	1.001	1.001	1.000	1.001	1.003	1.003	1.006	1.004	1.005	1.002	1.004	1.008	1.010	1.010	1.009	1.008	1.004	1.004	1.003	1.003					
Latest 3	1.924	1.273	1.157	1.063	1.036	1.018	1.019	1.021	1.012	1.008	1.004	1.000	1.000	1.000	1.000	1.000	1.001	1.005	1.006	1.005	1.000	1.003	1.003	1.008	1.011	1.011	1.010	1.006	1.003	1.000	1.004	1.005	1.007			

Dev Factor Selection																																				
Industry 1	2.946	1.574	1.235	1.110	1.036	1.025	1.016	1.009	1.007	1.006	1.006	1.010	1.003	1.005	1.003	1.004	1.005	1.003																		
Industry 2		1.901	1.354	1.158	1.073	1.026	1.025	1.013	1.006	1.010	1.006	1.014	1.007	1.003	1.003	1.003	1.002	1.006	1.002	1.003																
Prior	*2.140*	*1.336*	*1.175*	*1.079*	*1.052*	*1.043*	*1.029*	*1.023*	*1.015*	*1.012*	*1.005*	*1.009*	*1.010*	*1.010*	*1.010*	*1.011*	*1.005*	*1.006*	*1.005*	*1.014*	*1.018*	*1.017*	*1.007*	*1.008*	*1.008*	*1.004*	*1.004*	*1.004*	*1.003*	*1.002*	*1.001*	*1.001*	*1.001*	*1.001*	*1.011*	
Selected	2.138	1.333	1.175	1.077	1.049	1.042	1.028	1.023	1.016	1.012	1.006	1.009	1.009	1.009	1.009	1.010	1.005	1.006	1.004	1.014	1.018	1.017	1.003	1.008	1.008	1.004	1.004	1.004	1.003	1.002	1.001	1.001	1.001	1.001	1.001	1.011
FacToUlt	5.046	2.361	1.770	1.507	1.399	1.333	1.280	1.244	1.217	1.198	1.183	1.175	1.165	1.154	1.143	1.133	1.122	1.116	1.109	1.105	1.090	1.070	1.053	1.050	1.041	1.033	1.029	1.025	1.021	1.018	1.016	1.015	1.014	1.013	1.012	1.011
Percent of Ult	19.8%	42.4%	56.5%	66.4%	71.5%	75.0%	78.2%	80.4%	82.2%	83.5%	84.5%	85.1%	85.8%	86.6%	87.5%	88.3%	89.1%	89.6%	90.2%	90.5%	91.8%	93.4%	95.0%	95.3%	96.0%	96.8%	97.2%	97.6%	98.0%	98.2%	98.4%	98.5%	98.6%	98.7%	98.8%	98.9%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Corrections - Cluster 3
Indemnity

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/17		As of 6/18		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	4,886,834	5,433,103	5,015,092	5,578,502	128,258	2.6%	145,399	2.7%
6/30/82-83	2,748,040	2,776,000	2,761,458	2,775,000	13,418	0.5%	(1,000)	0.0%
6/30/83-84	1,407,562	1,422,000	1,476,764	1,492,000	69,202	4.9%	70,000	4.9%
6/30/84-85	4,295,559	4,339,000	4,155,575	4,198,000	(139,984)	-3.3%	(141,000)	-3.2%
6/30/85-86	6,412,748	6,445,610	6,411,752	6,444,615	(996)	0.0%	(995)	0.0%
6/30/86-87	3,900,423	3,920,300	3,899,766	3,919,305	(656)	0.0%	(995)	0.0%
6/30/87-88	6,132,748	6,164,025	6,126,052	6,157,060	(6,696)	-0.1%	(6,965)	-0.1%
6/30/88-89	7,530,000	7,894,000	7,570,000	7,587,000	40,000	0.5%	(307,000)	-3.9%
6/30/89-90	9,614,000	9,616,000	9,657,000	9,659,000	43,000	0.4%	43,000	0.4%
6/30/90-91	10,765,000	11,166,960	10,821,000	10,843,644	56,000	0.5%	(323,316)	-2.9%
6/30/91-92	4,550,000	4,551,000	4,592,000	4,593,000	42,000	0.9%	42,000	0.9%
6/30/92-93	3,194,197	3,242,705	3,175,700	3,224,795	(18,497)	-0.6%	(17,910)	-0.6%
6/30/93-94	5,279,000	5,282,000	5,284,000	5,287,000	5,000	0.1%	5,000	0.1%
6/30/94-95	6,454,000	6,462,000	6,419,000	6,427,000	(35,000)	-0.5%	(35,000)	-0.5%
6/30/95-96	5,733,000	5,741,000	5,635,000	5,642,000	(98,000)	-1.7%	(99,000)	-1.7%
6/30/96-97	6,508,000	6,520,000	6,391,000	6,403,000	(117,000)	-1.8%	(117,000)	-1.8%
6/30/97-98	8,730,134	8,914,300	8,681,986	8,864,830	(48,148)	-0.6%	(49,470)	-0.6%
6/30/98-99	8,076,797	8,246,940	8,040,277	8,209,110	(36,520)	-0.5%	(37,830)	-0.5%
6/30/99-00	8,655,584	8,837,670	8,563,533	8,653,440	(92,051)	-1.1%	(184,230)	-2.1%
6/30/00-01	11,213,092	11,448,910	11,110,397	11,227,200	(102,695)	-0.9%	(221,710)	-1.9%
6/30/01-02	9,636,970	10,174,000	9,497,057	10,027,000	(139,913)	-1.5%	(147,000)	-1.4%
6/30/02-03	9,491,511	10,021,000	9,351,538	9,875,000	(139,974)	-1.5%	(146,000)	-1.5%
6/30/03-04	8,658,146	8,957,000	8,522,793	8,639,000	(135,352)	-1.6%	(318,000)	-3.6%
6/30/04-05	8,890,646	9,480,000	8,746,918	9,157,000	(143,728)	-1.6%	(323,000)	-3.4%
6/30/05-06	6,440,197	6,750,000	6,296,137	6,508,000	(144,060)	-2.2%	(242,000)	-3.6%
6/30/06-07	5,573,271	5,847,000	5,513,966	5,845,000	(59,305)	-1.1%	(2,000)	0.0%
6/30/07-08	5,902,000	5,977,000	5,775,000	5,796,000	(127,000)	-2.2%	(181,000)	-3.0%
6/30/08-09	5,073,000	5,453,000	4,956,000	5,236,000	(117,000)	-2.3%	(217,000)	-4.0%
6/30/09-10	3,523,000	4,021,000	3,489,000	3,848,000	(34,000)	-1.0%	(173,000)	-4.3%
6/30/10-11	4,740,000	5,189,000	4,506,000	4,830,000	(234,000)	-4.9%	(359,000)	-6.9%
6/30/11-12	3,936,000	4,543,000	3,670,000	4,098,000	(266,000)	-6.8%	(445,000)	-9.8%
6/30/12-13	3,852,000	4,612,000	3,557,000	4,087,000	(295,000)	-7.7%	(525,000)	-11.4%
6/30/13-14	4,846,000	5,656,000	4,487,000	5,032,000	(359,000)	-7.4%	(624,000)	-11.0%
6/30/14-15	5,861,000	6,720,000	5,439,000	5,938,000	(422,000)	-7.2%	(782,000)	-11.6%
6/30/15-16	6,655,000	7,495,000	5,893,000	6,381,000	(762,000)	-11.5%	(1,114,000)	-14.9%
6/30/16-17	7,650,000	8,418,000	7,410,000	8,285,000	(240,000)	-3.1%	(133,000)	-1.6%
6/30/17-18								
Total	226,815,460	237,736,523	222,897,762	230,767,501	(3,917,698)	-1.7%	(6,969,022)	-2.9%

NOTES:

(2), (3) From prior Aon analysis as of June 30, 2017

(4), (5) From Section 4, Exhibit 1, Page 1, Columns 6, 7

(6) = (4) - (2)

(7) = (4) / (2) - 1

(8) = (5) - (3)

(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Corrections - Cluster 3
Indemnity

Calculation of Ultimate Lump Sum Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Accident Year	Paid Loss Excluding Lump Sum	Implied Cumulative LDF	Ult Loss Excluding Lump Sum	Selected Incr Lump Sum % Outstdg	Cumulative Lump Sum % Outstdg	Total Lump Sum Outstdg	Paid Lump Sum to Date	Est Ult Lump Sum - Incr Method	Ultimate Lump Sum Percentage	Lump Sum LDF	Est Ult Lump Sum - Paid Method	Selected Est Ultimate Lump Sums	Prior Est Ultimate Lump Sums
All Prior Yrs	4,142,935	1.240	5,136,797	0.0%	0.0%	0	160,000	160,000	3.1%	1.000	160,000	160,000	160,000
6/30/82-83	2,566,735	1.011	2,594,254	0.0%	0.0%	0	181,081	181,081	7.0%	1.000	181,081	181,081	181,081
6/30/83-84	1,386,759	1.062	1,473,180	0.0%	0.0%	0	18,501	18,501	1.3%	1.000	18,501	18,501	18,501
6/30/84-85	3,972,786	1.013	4,023,414	0.0%	0.0%	0	180,850	180,850	4.5%	1.000	180,850	180,850	180,850
6/30/85-86	6,067,508	1.014	6,150,975	0.0%	0.0%	0	332,000	332,000	5.4%	1.000	332,000	332,000	332,000
6/30/86-87	3,544,280	1.015	3,596,630	0.0%	0.0%	0	340,360	340,360	9.5%	1.000	340,360	340,360	340,360
6/30/87-88	5,380,873	1.016	5,465,810	0.0%	0.0%	0	717,002	717,002	13.1%	1.000	717,002	717,002	717,002
6/30/88-89	6,838,754	1.018	6,960,597	0.0%	0.0%	0	626,201	626,201	9.0%	1.000	626,201	626,201	626,201
6/30/89-90	8,536,146	1.021	8,714,296	0.0%	0.0%	0	944,900	944,900	10.8%	1.000	944,900	944,900	944,900
6/30/90-91	9,255,233	1.025	9,486,183	0.0%	0.0%	0	1,336,768	1,336,768	14.1%	1.000	1,336,768	1,336,768	1,336,768
6/30/91-92	4,091,298	1.029	4,210,164	0.0%	0.0%	0	383,251	383,251	9.1%	1.000	383,251	383,251	383,251
6/30/92-93	2,519,814	1.033	2,603,395	0.0%	0.0%	0	637,302	637,302	24.5%	1.000	637,302	637,302	637,302
6/30/93-94	4,267,930	1.041	4,444,771	0.0%	0.0%	0	842,675	842,675	19.0%	1.000	842,675	842,675	844,782
6/30/94-95	5,422,587	1.050	5,692,450	0.0%	0.0%	0	732,613	732,613	12.9%	1.005	736,276	734,445	734,445
6/30/95-96	4,737,785	1.053	4,988,608	0.0%	0.0%	0	652,001	652,001	13.1%	1.005	655,261	653,631	653,631
6/30/96-97	5,237,372	1.070	5,606,167	0.0%	0.0%	0	794,601	794,601	14.2%	1.005	798,574	796,588	796,588
6/30/97-98	8,007,981	1.090	8,725,034	0.0%	0.0%	0	431,718	431,718	4.9%	1.005	433,877	432,797	432,797
6/30/98-99	7,518,614	1.105	8,307,585	0.0%	0.0%	0	176,053	176,053	2.1%	1.005	176,933	176,493	181,105
6/30/99-00	7,894,835	1.109	8,757,238	0.1%	0.1%	8,757	276,102	284,859	3.3%	1.010	278,870	281,865	287,031
6/30/00-01	10,126,025	1.116	11,303,708	0.1%	0.2%	22,607	415,283	437,890	3.9%	1.015	421,543	429,717	435,521
6/30/01-02	8,652,114	1.122	9,706,669	0.1%	0.3%	29,120	303,881	333,001	3.4%	1.015	308,462	320,732	325,868
6/30/02-03	8,376,819	1.133	9,489,482	0.1%	0.4%	37,958	363,503	401,461	4.2%	1.015	368,983	385,222	390,606
6/30/03-04	7,556,865	1.143	8,640,000	0.1%	0.5%	43,200	334,431	377,631	4.4%	1.017	339,975	358,803	363,815
6/30/04-05	7,982,459	1.154	9,213,110	0.1%	0.6%	55,279	295,050	350,329	3.8%	1.018	300,401	325,365	314,130
6/30/05-06	5,571,365	1.165	6,489,839	0.1%	0.7%	45,429	262,504	307,933	4.7%	1.031	270,635	289,284	292,843
6/30/06-07	4,809,853	1.175	5,653,235	0.1%	0.8%	43,462	207,003	250,465	4.4%	1.041	215,547	250,465	255,950
6/30/07-08	4,686,602	1.183	5,543,702	0.1%	0.9%	47,831	198,502	246,333	4.4%	1.056	209,665	246,333	252,441
6/30/08-09	3,924,421	1.198	4,700,052	0.1%	1.0%	45,252	180,017	225,269	4.8%	1.066	191,905	225,269	220,484
6/30/09-10	2,613,682	1.217	3,179,720	0.1%	1.1%	33,794	100,501	134,295	4.2%	1.093	109,855	134,295	136,429
6/30/10-11	3,334,045	1.244	4,148,028	0.1%	1.2%	48,233	215,782	264,015	6.4%	1.108	239,119	264,015	252,546
6/30/11-12	2,523,426	1.280	3,228,788	0.0%	1.2%	38,896	169,103	207,999	6.4%	1.141	192,912	207,999	215,974
6/30/12-13	2,274,867	1.333	3,033,471	0.2%	1.4%	42,610	145,313	187,923	6.2%	1.210	175,898	187,923	196,124
6/30/13-14	2,827,439	1.399	3,956,687	0.2%	1.6%	63,363	162,881	226,244	5.7%	1.332	216,989	226,244	184,966
6/30/14-15	3,337,760	1.507	5,029,351	0.9%	2.5%	128,138	65,000	193,138	3.8%	1.737	112,873	193,138	224,912
6/30/15-16	3,091,580	1.770	5,473,397	1.1%	3.6%	199,597	35,500	235,097	4.3%	3.257	115,616	235,097	283,889
6/30/16-17	3,082,019	2.361	7,275,107	1.0%	4.7%	340,787	275,000	615,787	8.5%	11.887	3,268,997	615,787	405,060
6/30/17-18	1,239,405	5.046	6,254,220	0.9%	5.6%	347,134	0	347,134	5.6%	60.625	0	347,134	
Total	187,400,973		219,256,114			1,621,448	13,493,233	15,114,681	6.9%		16,840,056	15,019,531	14,540,154

NOTES:

(2) From Section 4, Exhibit 1, Page 2, Column 3

(3) = (4) / (2)

(4) From Section 4, Exhibit 1, Page 2, Column 6

(5) From Section 4, Exhibit 1, Page 11

(6) Downward sum of (5)

(7) = (6) x (4)

(8) From Section 4, Exhibit 1, Page 10

(9) = (7) + (8)

(10) = (9) / (4)

(11) From Section 4, Exhibit 1, Page 12

(12) = (8) x (11)

(13) Selected based on (9) and (12)

(14) From prior Aon analysis as of June 30, 2017

Commonwealth of Massachusetts Workers Compensation
Department of Corrections - Cluster 3
INDEMNITY
Lump Sum Development
Incremental Lump Sum Payments

Acc Yr Ending	0-12	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444
All Prior Yrs	0	0	0	0	0	0	0	0	15,000	0	0	0	57,500	26,000	0	60,000	0	0	0	0	0	0	1,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-83	0	0	0	0	0	0	0	17,500	0	35,000	41,581	41,000	46,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jun-84	0	0	0	0	0	0	0	0	18,500	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Jun-85	0	0	0	11,000	0	0	20,000	0	69,000	0	42,000	0	38,850	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Jun-86	0	0	0	30,000	68,000	10,000	40,000	27,000	50,000	0	45,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48,000	2,000	12,000	0	0	0	0	0				
Jun-87	0	20,000	25,000	22,500	22,500	27,000	38,250	25,001	11,250	85,000	0	37,000	14,859	0	0	0	0	12,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
Jun-88	0	31,500	17,000	20,000	40,000	191,500	199,000	23,000	102,000	30,000	60,000	0	0	0	0	0	0	3,000	0	1	0	0	0	1	0	0	0	0	0	0	0						
Jun-89	0	5,000	70,500	4,500	125,000	86,200	157,000	70,000	30,000	49,500	0	0	0	0	0	18,500	0	0	0	0	0	0	0	10,000	0	1	0	0	0	0							
Jun-90	0	16,700	104,500	133,000	151,700	139,500	73,000	98,000	40,000	170,000	1,000	0	0	0	0	0	0	0	5,000	12,500	0	0	0	0	0	0	0	0	0								
Jun-91	0	19,996	27,700	321,471	173,500	181,000	68,000	0	40,000	40,000	1	0	0	0	0	100	0	0	10,000	0	0	0	60,000	0	158,000	237,000	0	0									
Jun-92	0	30,500	94,000	95,000	50,000	90,000	0	0	0	0	0	11,250	0	0	12,501	0	0	0	0	0	0	0	0	0	0	0	0										
Jun-93	0	122,600	116,000	160,700	27,000	80,001	119,000	0	0	0	12,000	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0											
Jun-94	52,000	162,000	181,925	221,000	101,000	77,500	7,500	7,500	0	15,750	0	4,500	6,000	0	0	0	6,000	0	0	0	0	0	0	0	0												
Jun-95	18,613	172,000	187,000	82,000	135,000	70,000	10,000	0	0	25,000	0	1,000	0	32,000	0	0	0	0	0	0	0	0	0	0													
Jun-96	0	35,000	32,000	335,000	0	0	0	0	12,000	15,000	23,000	0	0	0	0	0	0	0	71,725	32,069	32,069	64,138	0														
Jun-97	59,500	268,000	190,500	120,000	43,000	24,000	16,000	20,600	0	9,001	0	17,000	0	0	0	0	0	0	0	27,000	0	0															
Jun-98	56,500	160,501	125,715	0	10,000	29,000	20,800	12,201	9,000	8,001	0	0	0	0	0	0	0	0	0	0	0																
Jun-99	0	0	20,000	1	91,750	12,800	20,500	15,000	8,001	0	0	8,001	0	0	0	0	0	0	0	0																	
Jun-00	0	27,501	5,000	85,500	78,101	17,500	28,500	4,500	10,000	0	7,500	0	0	12,000	0	0	0	0	0																		
Jun-01	8,490	1	74,500	89,900	93,000	73,389	33,503	20,500	4,000	18,000	0	0	0	0	0	0	0	0																			
Jun-02	0	10,000	43,880	99,500	47,501	66,000	7,000	0	0	0	3,000	27,000	0	0	0	0	0																				
Jun-03	0	58,500	110,081	81,000	77,501	21,500	10,001	5,000	0	0	0	0	0	0	0	0																					
Jun-04	0	21,923	84,502	80,002	26,003	65,000	35,000	15,000	0	0	1,001	6,000	0	0	0																						
Jun-05	0	12,500	108,002	89,501	37,546	0	12,000	10,001	8,000	0	0	0	0	17,500																							
Jun-06	0	35,001	24,502	113,501	81,500	6,000	0	0	0	0	2,000	0	0																								
Jun-07	0	36,000	69,500	32,500	50,000	19,000	1	2	0	0	0	0																									
Jun-08	0	36,001	37,000	72,000	25,500	10,000	18,000	1	0	0	0																										
Jun-09	0	16,000	42,767	47,000	46,250	10,000	8,000	0	0	10,000																											
Jun-10	0	3,000	56,000	31,500	10,000	0	1	0	0																												
Jun-11	0	11,750	47,631	67,000	29,000	33,000	13,001	15,000																													
Jun-12	0	11,050	19,003	30,050	109,000	0	0																														
Jun-13	4,000	17,312	21,000	73,501	29,500	0																															
Jun-14	0	8,500	53,901	25,000	75,480																																
Jun-15	0	6,000	40,500	18,500																																	
Jun-16	0	16,000	19,500																																		
Jun-17	0	275,000																																			
Jun-18	0																																				

Cumulative Lump Sum Payments

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444
All Prior Yrs	0	0	0	0	0	0	0	0	15,000	15,000	15,000	15,000	72,500	98,500	98,500	158,500	158,500	158,500	158,500	158,500	158,500	158,500	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000
Jun-83	0	0	0	0	0	0	0	17,500	17,500	52,500	94,081	135,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081		
Jun-84	0	0	0	0	0	0	0	0	18,500	18,500	18,500	18,500	18,500	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501		
Jun-85	0	0	0	11,000	11,000	11,000	31,000	31,000	100,000	100,000	142,000	142,000	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850			
Jun-86	0	0	0	30,000	98,000	108,000	148,000	175,000	225,000	225,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	318,000	320,000	332,000	332,000	332,000	332,000	332,000	332,000				
Jun-87	0	20,000	45,000	67,500	90,000	117,000	155,250	180,251	191,501	276,501	276,501	313,501	328,360	328,360	328,360	328,360	328,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360					
Jun-88	0	31,500	48,500	68,500	108,500	300,000	499,000	522,000	624,000	654,000	714,000	714,000	714,000	714,000	714,000	714,000	714,000	717,000	717,000	717,001	717,001	717,001	717,001	717,002	717,002	717,002	717,002	717,002	717,002	717,002	717,002						
Jun-89	0	5,000	75,500	80,000	205,000	291,200	448,200	518,200	548,200	597,700	597,700	597,700	597,700	597,700	597,700	616,200	616,200	616,200	616,200	616,200	616,200	616,200	616,200	626,200	626,200	626,201	626,201	626,201	626,201	626,201							
Jun-90	0	16,700	121,200	254,200	405,900	545,400	618,400	716,400	756,400	926,400	927,400	927,400	927,400	927,400	927,400	927,400	927,400	927,400	932,400	944,900	944,900	944,900	944,900	944,900	944,900	944,900	944,900	944,900	944,900								
Jun-91	0	19,996	47,696	369,167	542,667	723,667	791,667	791,667	831,667	871,667	871,668	871,668	871,668	871,668	871,668	871,768	871,768	871,768	881,768	881,768	881,768	881,768	941,768	941,768	1,099,768	1,336,768	1,336,768	1,336,768									
Jun-92	0	30,500	124,500	219,500	269,500	359,500	359,500	359,500	359,500	359,500	359,500	370,750	370,750	370,750	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251										
Jun-93	0	122,600	238,600	399,300	426,300	506,301	625,301	625,301	625,301	625,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,302	637,302	637,302											
Jun-94	52,000	214,000	395,925	616,925	717,925	795,425	802,925	810,425	810,425	826,175	826,175	830,675	836,675	836,675	836,675	836,675	842,675	842,675	842,675	842,675	842,675	842,675	842,675	842,675	842,675												
Jun-95	18,613	190,613	377,613	459,613	594,613	664,613	674,613	674,613	674,613	699,613	699,613	700,613	700,613	732,613	732,613	732,613	732,613	732,613	732,613	732,613	732,613	732,613	732,613	732,613													
Jun-96	0	35,000	67,000	402,000	402,000	402,000	402,000	402,000	414,000	429,000	452,000	452,000	452,000	452,000	452,000	452,000	452,000	452,000	523,725	555,794	587,863	652,001	652,001														
Jun-97	59,500	327,500	518,000	638,000	681,000	705,000	721,000	741,600	741,600	750,601	750,601	767,601	767,601	767,601	767,601	767,601	767,601	767,601	767,601	794,601	794,601	794,601															
Jun-98	56,500	217,001	342,716	342,716	352,716	381,716	402,516	414,717	423,717	431,718	431,718	431,718	431,718	431,718	431,718	431,718	431,718	431,718	431,718	431,718	431,718																
Jun-99	0	0	20,000	20,001	111,751	124,551	145,051	160,051	168,052	168,052	168,052	176,053	176,053	176,053	176,053	176,053	176,053	176,053	176,053	176,053																	
Jun-00	0	27,501	32,501	118,001	196,102	213,602	242,102	246,602	256,602	256,602	264,102	264,102	264,102	276,102	276,102	276,102	276,102	276,102	276,102																		
Jun-01	8,490	8,491	82,991	172,891	265,891	339,280	372,783	393,283	397,283	415,283	415,283	415,283	415,283	415,283	415,283	415,283	415,283	415,283																			
Jun-02	0	10,000	53,880	153,380	200,881	266,881	273,881	273,881	273,881	273,881	276,881	303,881	303,881	303,881	303,881	303,881	303,881																				
Jun-03	0	58,500	168,501	249,501	327,002	348,502	358,503	363,503	363,503	363,503	363,503	363,503	363,503	363,503	363,503	363,503																					
Jun-04	0	21,923	106,425	186,427	212,430	277,430	312,430	327,430	327,430	327,430	328,431	334,431	334,431	334,431	334,431																						
Jun-05	0	12,500	120,502	210,003	247,549	247,549	259,549	269,550	277,550	277,550	277,550	277,550	277,550	295,050																							
Jun-06	0	35,001	59,503	173,004	254,504	260,504	260,504	260,504	260,504	260,504	262,504	262,504	262,504																								
Jun-07	0	36,000	105,500	138,000	188,000	207,000	207,001	207,003	207,003	207,003	207,003	207,003																									
Jun-08	0	36,001	73,001	145,001	170,501	180,501	198,501	198,502	198,502	198,502	198,502																										
Jun-09	0	16,000	58,767	105,767	152,017	162,017	170,017	170,017	170,017	180,017																											
Jun-10	0	3,000	59,000	90,500	100,500	100,500	100,501	100,501	100,501																												
Jun-11	0	11,750	58,781	125,781	154,781	187,781	200,782	215,782																													
Jun-12	0	11,050	30,053	60,103	169,103	169,103	169,103																														
Jun-13	4,000	21,312	42,312	115,813	145,313	145,313																															
Jun-14	0	8,500	62,401	87,401	162,881																																
Jun-15	0	6,000	46,500	65,000																																	
Jun-16	0	16,000	35,500																																		
Jun-17	0	275,000																																			
Jun-18	0																																				

Commonwealth of Massachusetts Workers Compensation
Department of Corrections - Cluster 3
INDEMNITY
Lump Sum Development
Incremental Lump Sums as a % of Ultimate Losses Excluding Lump Sums

Acc Yr Ending	*0-12*	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*
All Prior Yrs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.011	0.005	0.000	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jun-83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.013	0.016	0.016	0.018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Jun-84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Jun-85	0.000	0.000	0.000	0.003	0.000	0.000	0.005	0.000	0.017	0.000	0.010	0.000	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
Jun-86	0.000	0.000	0.000	0.005	0.011	0.002	0.007	0.004	0.008	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.000	0.002	0.000	0.000	0.000	0.000	0.000				
Jun-87	0.000	0.006	0.007	0.006	0.006	0.008	0.011	0.007	0.003	0.024	0.000	0.010	0.004	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
Jun-88	0.000	0.006	0.003	0.004	0.007	0.035	0.036	0.004	0.019	0.005	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000						
Jun-89	0.000	0.001	0.010	0.001	0.018	0.012	0.023	0.010	0.004	0.007	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000							
Jun-90	0.000	0.002	0.012	0.015	0.017	0.016	0.008	0.011	0.005	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000								
Jun-91	0.000	0.002	0.003	0.034	0.018	0.019	0.007	0.000	0.004	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.006	0.000	0.017	0.025	0.000	0.000									
Jun-92	0.000	0.007	0.022	0.023	0.012	0.021	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000										
Jun-93	0.000	0.047	0.045	0.062	0.010	0.031	0.046	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000											
Jun-94	0.012	0.036	0.041	0.050	0.023	0.017	0.002	0.002	0.000	0.004	0.000	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000												
Jun-95	0.003	0.030	0.033	0.014	0.024	0.012	0.002	0.000	0.000	0.004	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000													
Jun-96	0.000	0.007	0.006	0.067	0.000	0.000	0.000	0.000	0.002	0.003	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.006	0.006	0.013	0.000														
Jun-97	0.011	0.048	0.034	0.021	0.008	0.004	0.003	0.004	0.000	0.002	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000															
Jun-98	0.006	0.018	0.014	0.000	0.001	0.003	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																
Jun-99	0.000	0.000	0.002	0.000	0.011	0.002	0.002	0.002	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																	
Jun-00	0.000	0.003	0.001	0.010	0.009	0.002	0.003	0.001	0.001	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000																		
Jun-01	0.001	0.000	0.007	0.008	0.008	0.006	0.003	0.002	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																			
Jun-02	0.000	0.001	0.005	0.010	0.005	0.007	0.001	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000																				
Jun-03	0.000	0.006	0.012	0.009	0.008	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																					
Jun-04	0.000	0.003	0.010	0.009	0.003	0.008	0.004	0.002	0.000	0.000	0.000	0.001	0.000	0.000	0.000																						
Jun-05	0.000	0.001	0.012	0.010	0.004	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.002																							
Jun-06	0.000	0.005	0.004	0.017	0.013	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
Jun-07	0.000	0.006	0.012	0.006	0.009	0.003	0.000	0.000	0.000	0.000	0.000	0.000																									
Jun-08	0.000	0.006	0.007	0.013	0.005	0.002	0.003	0.000	0.000	0.000	0.000																										
Jun-09	0.000	0.003	0.009	0.010	0.010	0.002	0.002	0.000	0.000	0.002																											
Jun-10	0.000	0.001	0.018	0.010	0.003	0.000	0.000	0.000	0.000																												
Jun-11	0.000	0.003	0.011	0.016	0.007	0.008	0.003	0.004																													
Jun-12	0.000	0.003	0.006	0.009	0.034	0.000	0.000																														
Jun-13	0.001	0.006	0.007	0.024	0.010	0.000																															
Jun-14	0.000	0.002	0.014	0.006	0.019																																
Jun-15	0.000	0.001	0.008	0.004																																	
Jun-16	0.000	0.003	0.004																																		
Jun-17	0.000	0.038																																			
Jun-18	0.000																																				

Averages		*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*
Simple Avg																																					
All Yrs (ex P)	0.001	0.009	0.011	0.014	0.010	0.007	0.006	0.002	0.003	0.003	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.001	0.000	0.000	0.001	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Latest 5	0.000	0.010	0.008	0.012	0.015	0.002	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.002	0.001	0.003	0.000	0.000	0.003	0.005	0.000	0.000	0.000	0.000	0.000	0.000					
Latest 3	0.000	0.014	0.008	0.011	0.021	0.003	0.001	0.001	0.000	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.002	0.002	0.004	0.000	0.000	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
Olympic Avg																																					
All Yrs (ex P)	0.001	0.008	0.010	0.013	0.009	0.007	0.005	0.002	0.002	0.003	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000					
Latest 10	0.000	0.004	0.009	0.011	0.009	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000										
Latest 5	0.000	0.004	0.007	0.011	0.012	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000						

Dev Factor Selection																																					
Prior	*NA*	*0.008*	*0.010*	*0.011*	*0.007*	*0.002*	*0.002*	*0.000*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*		
Selected	NA	0.009	0.010	0.011	0.009	0.002	0.002	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FacToUlt	NA	0.056	0.047	0.036	0.025	0.016	0.014	0.012	0.012	0.011	0.010	0.009	0.008	0.007	0.006	0.005	0.004	0.003	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Commonwealth of Massachusetts Workers Compensation
Department of Corrections - Cluster 3
INDEMNITY
Paid Loss Development
Paid Loss - Lump Sum only

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444
All Prior Yrs	0	0	0	0	0	0	0	0	15,000	15,000	15,000	15,000	72,500	98,500	98,500	158,500	158,500	158,500	158,500	158,500	158,500	158,500	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000	160,000
Jun-83	0	0	0	0	0	0	0	17,500	17,500	52,500	94,081	135,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	181,081	
Jun-84	0	0	0	0	0	0	0	0	18,500	18,500	18,500	18,500	18,500	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501	18,501		
Jun-85	0	0	0	11,000	11,000	11,000	31,000	31,000	100,000	100,000	142,000	142,000	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850	180,850			
Jun-86	0	0	0	30,000	98,000	108,000	148,000	175,000	225,000	225,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	270,000	318,000	320,000	332,000	332,000	332,000	332,000	332,000	332,000				
Jun-87	0	20,000	45,000	67,500	90,000	117,000	155,250	180,251	191,501	276,501	276,501	313,501	328,360	328,360	328,360	328,360	328,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360	340,360					
Jun-88	0	31,500	48,500	68,500	108,500	300,000	499,000	522,000	624,000	654,000	714,000	714,000	714,000	714,000	714,000	714,000	714,000	717,000	717,000	717,001	717,001	717,001	717,001	717,002	717,002	717,002	717,002	717,002	717,002	717,002	717,002						
Jun-89	0	5,000	75,500	80,000	205,000	291,200	448,200	518,200	548,200	597,700	597,700	597,700	597,700	597,700	597,700	616,200	616,200	616,200	616,200	616,200	616,200	616,200	616,200	626,200	626,200	626,201	626,201	626,201	626,201	626,201							
Jun-90	0	16,700	121,200	254,200	405,900	545,400	618,400	716,400	756,400	926,400	927,400	927,400	927,400	927,400	927,400	927,400	927,400	927,400	932,400	944,900	944,900	944,900	944,900	944,900	944,900	944,900	944,900	944,900	944,900								
Jun-91	0	19,996	47,696	369,167	542,667	723,667	791,667	791,667	831,667	871,667	871,668	871,668	871,668	871,668	871,668	871,768	871,768	871,768	881,768	881,768	881,768	881,768	941,768	941,768	1,099,768	1,336,768	1,336,768	1,336,768									
Jun-92	0	30,500	124,500	219,500	269,500	359,500	359,500	359,500	359,500	359,500	359,500	370,750	370,750	370,750	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251	383,251										
Jun-93	0	122,600	238,600	399,300	426,300	506,301	625,301	625,301	625,301	625,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,301	637,302	637,302	637,302											
Jun-94	52,000	214,000	395,925	616,925	717,925	795,425	802,925	810,425	810,425	826,175	826,175	830,675	836,675	836,675	836,675	836,675	842,675	842,675	842,675	842,675	842,675	842,675	842,675	842,675	842,675												
Jun-95	18,613	190,613	377,613	459,613	594,613	664,613	674,613	674,613	674,613	699,613	699,613	700,613	700,613	732,613	732,613	732,613	732,613	732,613	732,613	732,613	732,613	732,613	732,613	732,613													
Jun-96	0	35,000	67,000	402,000	402,000	402,000	402,000	402,000	414,000	429,000	452,000	452,000	452,000	452,000	452,000	452,000	452,000	452,000	523,725	555,794	587,863	652,001	652,001														
Jun-97	59,500	327,500	518,000	638,000	681,000	705,000	721,000	741,600	741,600	750,601	750,601	767,601	767,601	767,601	767,601	767,601	767,601	767,601	767,601	794,601	794,601	794,601															
Jun-98	56,500	217,001	342,716	342,716	352,716	381,716	402,516	414,717	423,717	431,718	431,718	431,718	431,718	431,718	431,718	431,718	431,718	431,718	431,718	431,718	431,718																
Jun-99	0	0	20,000	20,001	111,751	124,551	145,051	160,051	168,052	168,052	168,052	176,053	176,053	176,053	176,053	176,053	176,053	176,053	176,053	176,053																	
Jun-00	0	27,501	32,501	118,001	196,102	213,602	242,102	246,602	256,602	256,602	264,102	264,102	264,102	276,102	276,102	276,102	276,102	276,102	276,102																		
Jun-01	8,490	8,491	82,991	172,891	265,891	339,280	372,783	393,283	397,283	415,283	415,283	415,283	415,283	415,283	415,283	415,283	415,283	415,283																			
Jun-02	0	10,000	53,880	153,380	200,881	266,881	273,881	273,881	273,881	273,881	276,881	303,881	303,881	303,881	303,881	303,881	303,881																				
Jun-03	0	58,500	168,501	249,501	327,002	348,502	358,503	363,503	363,503	363,503	363,503	363,503	363,503	363,503	363,503	363,503																					
Jun-04	0	21,923	106,425	186,427	212,430	277,430	312,430	327,430	327,430	327,430	328,431	334,431	334,431	334,431	334,431																						
Jun-05	0	12,500	120,502	210,003	247,549	247,549	259,549	269,550	277,550	277,550	277,550	277,550	277,550	295,050																							
Jun-06	0	35,001	59,503	173,004	254,504	260,504	260,504	260,504	260,504	260,504	262,504	262,504	262,504																								
Jun-07	0	36,000	105,500	138,000	188,000	207,000	207,001	207,003	207,003	207,003	207,003	207,003																									
Jun-08	0	36,001	73,001	145,001	170,501	180,501	198,501	198,502	198,502	198,502	198,502																										
Jun-09	0	16,000	58,767	105,767	152,017	162,017	170,017	170,017	170,017	180,017																											
Jun-10	0	3,000	59,000	90,500	100,500	100,500	100,501	100,501	100,501																												
Jun-11	0	11,750	58,781	125,781	154,781	187,781	200,782	215,782																													
Jun-12	0	11,050	30,053	60,103	169,103	169,103	169,103																														
Jun-13	4,000	21,312	42,312	115,813	145,313	145,313																															
Jun-14	0	8,500	62,401	87,401	162,881																																
Jun-15	0	6,000	46,500	65,000																																	
Jun-16	0	16,000	35,500																																		
Jun-17	0	275,000																																			
Jun-18	0																																				

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	To Ult
All Prior Yrs									1.000	1.000	1.000	4.833	1.359	1.000	1.609	1.000	1.000	1.000	1.000	1.000	1.000	1.009	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Jun-83								1.000	3.000	1.792	1.436	1.341	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Jun-84									1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Jun-85				1.000	1.000	2.818	1.000	3.226	1.000	1.420	1.000	1.274	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
Jun-86				3.267	1.102	1.370	1.182	1.286	1.000	1.200	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.178	1.006	1.038	1.000	1.000	1.000	1.000	1.000					
Jun-87		2.250	1.500	1.333	1.300	1.327	1.161	1.062	1.444	1.000	1.134	1.047	1.000	1.000	1.000	1.000	1.037	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Jun-88		1.540	1.412	1.584	2.765	1.663	1.046	1.195	1.048	1.092	1.000	1.000	1.000	1.000	1.000	1.000	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000							
Jun-89		15.100	1.060	2.563	1.420	1.539	1.156	1.058	1.090	1.000	1.000	1.000	1.000	1.000	1.031	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.016	1.000	1.000	1.000	1.000	1.000	1.000								
Jun-90		7.257	2.097	1.597	1.344	1.134	1.158	1.056	1.225	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.005	1.013	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000									
Jun-91		2.385	7.740	1.470	1.334	1.094	1.000	1.051	1.048	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.011	1.000	1.000	1.000	1.068	1.000	1.168	1.215	1.000	1.000										
Jun-92		4.082	1.763	1.228	1.334	1.000	1.000	1.000	1.000	1.000	1.031	1.000	1.000	1.034	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000											
Jun-93		1.946	1.674	1.068	1.188	1.235	1.000	1.000	1.000	1.019	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
Jun-94	4.115	1.850	1.558	1.164	1.108	1.009	1.009	1.000	1.019	1.000	1.005	1.007	1.000	1.000	1.000	1.007	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
Jun-95	10.241	1.981	1.217	1.294	1.118	1.015	1.000	1.000	1.037	1.000	1.001	1.000	1.046	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
Jun-96		1.914	6.000	1.000	1.000	1.000	1.000	1.030	1.036	1.054	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.159	1.061	1.058	1.109	1.000															
Jun-97	5.504	1.582	1.232	1.067	1.035	1.023	1.029	1.000	1.012	1.000	1.023	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.035	1.000	1.000																
Jun-98	3.841	1.579	1.000	1.029	1.082	1.054	1.030	1.022	1.019	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
Jun-99			1.000	5.587	1.115	1.165	1.103	1.050	1.000	1.000	1.048	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																		
Jun-00		1.182	3.631	1.662	1.089	1.133	1.019	1.041	1.000	1.029	1.000	1.000	1.045	1.000	1.000	1.000	1.000	1.000																			
Jun-01	1.000	9.774	2.083	1.538	1.276	1.099	1.055	1.010	1.045	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																				
Jun-02		5.388	2.847	1.310	1.329	1.026	1.000	1.000	1.000	1.011	1.098	1.000	1.000	1.000	1.000	1.000																					
Jun-03		2.880	1.481	1.311	1.066	1.029	1.014	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																						
Jun-04		4.854	1.752	1.139	1.306	1.126	1.048	1.000	1.000	1.003	1.018	1.000	1.000	1.000																							
Jun-05		9.640	1.743	1.179	1.000	1.048	1.039	1.030	1.000	1.000	1.000	1.000	1.063																								
Jun-06		1.700	2.907	1.471	1.024	1.000	1.000	1.000	1.000	1.008	1.000	1.000																									
Jun-07		2.931	1.308	1.362	1.101	1.000	1.000	1.000	1.000	1.000	1.000																										
Jun-08		2.028	1.986	1.176	1.059	1.100	1.000	1.000	1.000	1.000																											
Jun-09		3.673	1.800	1.437	1.066	1.049	1.000	1.000	1.059																												
Jun-10		19.667	1.534	1.110	1.000	1.000	1.000	1.000																													
Jun-11		5.003	2.140	1.231	1.213	1.069	1.075																														
Jun-12		2.720	2.000	2.814	1.000	1.000																															
Jun-13	5.328	1.985	2.737	1.255	1.000																																
Jun-14		7.341	1.401	1.864																																	
Jun-15		7.750	1.398																																		
Jun-16		2.219																																			
Jun-17																																					

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	To Ult
Simple Avg																																					
All Yrs (ex P)	5.005	4.628	2.138	1.604	1.199	1.183	1.042	1.115	1.114	1.063	1.032	1.028	1.007	1.002	1.001	1.000	1.002	1.010	1.006	1.004	1.007	1.005	1.001	1.014	1.036	1.001	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Latest 5		4.403	1.935	1.655	1.056	1.044	1.015	1.000	1.012	1.002	1.004	1.000	1.013	1.000	1.000	1.000	1.000	1.032	1.019	1.012	1.022	1.000	1.000	1.034	1.043	1.000	1.000	1.000	1.000	1.000	1.000						
Latest 3		5.770	1.845	1.977	1.071	1.023	1.025	1.000	1.020	1.003	1.000	1.000	1.021	1.000	1.000	1.000	1.000	1.000	1.012	1.019	1.036	1.000	1.000	1.000	1.072	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Volume Wtd																																					
All Yrs (ex P)		2.305	1.723	1.303	1.172	1.106	1.039	1.041	1.050	1.022	1.014	1.010	1.006	1.001	1.002	1.001	1.002	1.010	1.008	1.004	1.008	1.008	1.001	1.026	1.053	1.000	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Latest 5		3.448	1.892	1.527	1.060	1.049	1.017	1.000	1.009	1.002	1.004	1.000	1.010	1.000	1.000	1.000	1.000	1.034	1.022	1.010	1.018	1.000	1.000	1.042	1.064	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Latest 3		4.734	1.774	1.813	1.070	1.028	1.032	1.000	1.017	1.003	1.000	1.000	1.018	1.000	1.000	1.000	1.000	1.000	1.020	1.018	1.030	1.000	1.000	1.000	1.112	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				

Dev Factor Selection																																					
Prior	5.100	3.650	1.977	1.295	1.108	1.067	1.013	1.016	1.017	1.009	1.015	1.010	1.009	1.002	1.002	1.000	1.000	1.005	1.005	1.000	1.000	1.000	1.000	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Selected	5.100	3.650	1.875	1.303	1.101	1.061	1.029	1.014	1.025	1.009	1.014	1.010	1.013	1.002	1.001	1.000	1.000	1.005	1.005	1.000	1.000	1.000	1.000	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
FacToUlt	60.625	11.887	3.257	1.737	1.332	1.210	1.141	1.108	1.093	1.066	1.056	1.041	1.031	1.018	1.017	1.015	1.015	1.015	1.010	1.005	1.005	1.005	1.005	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Percent of Ult	1.6%	8.4%	30.7%	57.6%	75.1%	82.6%	87.7%	90.2%	91.5%	93.8%	94.7%	96.0%	97.0%	98.2%	98.4%	98.5%	98.5%	98.5%	99.0%	99.5%	99.5%	99.5%	99.5%	99.5%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Corrections - Cluster 3
Indemnity

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
444	100.0%	1.1%	0.0%	0.3%	0.1%	1.000	1.000
432	98.9%	0.1%	1.1%	0.0%	0.0%	0.981	0.971
420	98.8%	0.1%	1.2%	0.0%	0.0%	0.946	0.921
408	98.7%	0.1%	1.3%	0.0%	0.0%	0.915	0.877
396	98.6%	0.1%	1.4%	0.0%	0.0%	0.887	0.838
384	98.5%	0.1%	1.5%	0.0%	0.0%	0.862	0.803
372	98.4%	0.2%	1.6%	0.1%	0.0%	0.838	0.771
360	98.2%	0.3%	1.8%	0.1%	0.1%	0.826	0.754
348	98.0%	0.4%	2.0%	0.1%	0.1%	0.821	0.749
336	97.6%	0.4%	2.4%	0.1%	0.1%	0.820	0.749
324	97.2%	0.4%	2.8%	0.1%	0.1%	0.815	0.743
312	96.8%	0.8%	3.2%	0.3%	0.2%	0.807	0.734
300	96.0%	0.8%	4.0%	0.3%	0.2%	0.816	0.746
288	95.3%	0.3%	4.7%	0.1%	0.1%	0.816	0.747
276	95.0%	1.6%	5.0%	0.6%	0.4%	0.796	0.720
264	93.4%	1.6%	6.6%	0.7%	0.5%	0.816	0.748
252	91.8%	1.3%	8.2%	0.6%	0.4%	0.824	0.759
240	90.5%	0.4%	9.5%	0.2%	0.1%	0.817	0.750
228	90.2%	0.6%	9.8%	0.3%	0.2%	0.793	0.717
216	89.6%	0.4%	10.4%	0.2%	0.2%	0.774	0.693
204	89.1%	0.9%	10.9%	0.5%	0.3%	0.754	0.666
192	88.3%	0.8%	11.7%	0.4%	0.3%	0.744	0.654
180	87.5%	0.8%	12.5%	0.5%	0.4%	0.732	0.640
168	86.6%	0.8%	13.4%	0.5%	0.4%	0.721	0.626
156	85.8%	0.8%	14.2%	0.5%	0.4%	0.710	0.612
144	85.1%	0.5%	14.9%	0.3%	0.3%	0.698	0.598
132	84.5%	1.0%	15.5%	0.7%	0.6%	0.682	0.578
120	83.5%	1.3%	16.5%	0.9%	0.7%	0.676	0.572
108	82.2%	1.8%	17.8%	1.3%	1.1%	0.674	0.571
96	80.4%	2.2%	19.6%	1.7%	1.4%	0.679	0.579
84	78.2%	3.2%	21.8%	2.5%	2.2%	0.686	0.590
72	75.0%	3.5%	25.0%	2.8%	2.6%	0.700	0.609
60	71.5%	5.1%	28.5%	4.3%	3.9%	0.712	0.623
48	66.4%	9.9%	33.6%	8.6%	8.1%	0.729	0.646
36	56.5%	14.1%	43.5%	12.8%	12.2%	0.764	0.692
24	42.4%	22.5%	57.6%	21.3%	20.7%	0.795	0.731
12	19.8%	19.8%	80.2%	19.4%	19.2%	0.825	0.769
Total		100.0%					

NOTES:

(2) = 1 / Section 4, Exhibit 1, Page 2, Column 4

(3) Incremental % based on (2)

(4) = 1 - (2)

(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}

(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}

(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Corrections - Cluster 3
Indemnity

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	712,157	1,275,566		671,942	1,203,536
6/30/82-83	13,642	27,184	0.981	13,377	26,656
6/30/83-84	71,504	86,740	0.946	67,649	82,063
6/30/84-85	1,939	44,364	0.915	1,775	40,605
6/30/85-86	12,244	45,107	0.887	10,865	40,026
6/30/86-87	15,126	34,665	0.862	13,037	29,876
6/30/87-88	28,176	59,185	0.838	23,621	49,616
6/30/88-89	105,045	122,045	0.826	86,733	100,769
6/30/89-90	175,954	177,954	0.821	144,413	146,055
6/30/90-91	228,999	251,643	0.820	187,748	206,313
6/30/91-92	117,451	118,451	0.815	95,698	96,513
6/30/92-93	18,584	67,679	0.807	15,002	54,633
6/30/93-94	173,395	176,395	0.816	141,429	143,876
6/30/94-95	263,800	271,800	0.816	215,216	221,743
6/30/95-96	245,214	252,214	0.796	195,106	200,675
6/30/96-97	359,027	371,027	0.816	292,913	302,703
6/30/97-98	242,287	425,131	0.824	199,549	350,140
6/30/98-99	345,610	514,443	0.817	282,477	420,469
6/30/99-00	392,596	482,503	0.793	311,262	382,543
6/30/00-01	569,089	685,892	0.774	440,640	531,079
6/30/01-02	541,061	1,071,005	0.754	408,066	807,746
6/30/02-03	611,215	1,134,678	0.744	454,708	844,133
6/30/03-04	631,497	747,704	0.732	462,565	547,685
6/30/04-05	469,409	879,491	0.721	338,586	634,380
6/30/05-06	462,268	674,131	0.710	328,063	478,418
6/30/06-07	497,110	828,144	0.698	346,833	577,795
6/30/07-08	889,896	910,896	0.682	606,665	620,981
6/30/08-09	851,562	1,131,562	0.676	575,679	764,967
6/30/09-10	774,817	1,133,817	0.674	522,340	764,359
6/30/10-11	956,173	1,280,173	0.679	649,313	869,333
6/30/11-12	977,471	1,405,471	0.686	670,828	964,559
6/30/12-13	1,136,820	1,666,820	0.700	796,273	1,167,505
6/30/13-14	1,496,680	2,041,680	0.712	1,064,897	1,452,668
6/30/14-15	2,036,240	2,535,240	0.729	1,484,497	1,848,287
6/30/15-16	2,765,920	3,253,920	0.764	2,114,510	2,487,580
6/30/16-17	4,052,981	4,927,981	0.795	3,223,037	3,918,860
6/30/17-18	5,084,595	5,691,595	0.825	4,196,628	4,697,622
Total	28,327,556	36,804,295		21,653,939	28,076,768
			(7) Total Discount Factor:	0.764	0.763

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	712,157	1,275,566
(9) Projected Number of Years:	3	3
(10) Projected Paid Loss per Year:	237,386	425,189
(11) Discounted Value at 4%:	671,942	1,203,536

NOTES:

(2), (3) From Section 4, Exhibit 1, Page 1, Columns 8, 9

(4) From Section 4, Exhibit 1, Page 13, Column 7

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Corrections - Cluster 3
Indemnity

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	712,157	1,275,566		653,571	1,170,631
6/30/82-83	13,642	27,184	0.971	13,250	26,403
6/30/83-84	71,504	86,740	0.921	65,855	79,887
6/30/84-85	1,939	44,364	0.877	1,700	38,903
6/30/85-86	12,244	45,107	0.838	10,258	37,788
6/30/86-87	15,126	34,665	0.803	12,140	27,821
6/30/87-88	28,176	59,185	0.771	21,716	45,614
6/30/88-89	105,045	122,045	0.754	79,256	92,082
6/30/89-90	175,954	177,954	0.749	131,805	133,303
6/30/90-91	228,999	251,643	0.749	171,544	188,506
6/30/91-92	117,451	118,451	0.743	87,281	88,024
6/30/92-93	18,584	67,679	0.734	13,634	49,653
6/30/93-94	173,395	176,395	0.746	129,357	131,595
6/30/94-95	263,800	271,800	0.747	197,004	202,978
6/30/95-96	245,214	252,214	0.720	176,495	181,533
6/30/96-97	359,027	371,027	0.748	268,518	277,492
6/30/97-98	242,287	425,131	0.759	183,797	322,501
6/30/98-99	345,610	514,443	0.750	259,232	385,869
6/30/99-00	392,596	482,503	0.717	281,495	345,959
6/30/00-01	569,089	685,892	0.693	394,137	475,031
6/30/01-02	541,061	1,071,005	0.666	360,571	713,733
6/30/02-03	611,215	1,134,678	0.654	399,643	741,909
6/30/03-04	631,497	747,704	0.640	404,014	478,359
6/30/04-05	469,409	879,491	0.626	293,929	550,709
6/30/05-06	462,268	674,131	0.612	282,954	412,635
6/30/06-07	497,110	828,144	0.598	297,111	494,962
6/30/07-08	889,896	910,896	0.578	514,479	526,620
6/30/08-09	851,562	1,131,562	0.572	487,345	647,587
6/30/09-10	774,817	1,133,817	0.571	442,714	647,838
6/30/10-11	956,173	1,280,173	0.579	553,783	741,433
6/30/11-12	977,471	1,405,471	0.590	576,330	828,685
6/30/12-13	1,136,820	1,666,820	0.609	691,999	1,014,617
6/30/13-14	1,496,680	2,041,680	0.623	933,029	1,272,781
6/30/14-15	2,036,240	2,535,240	0.646	1,315,709	1,638,136
6/30/15-16	2,765,920	3,253,920	0.692	1,913,219	2,250,774
6/30/16-17	4,052,981	4,927,981	0.731	2,961,274	3,600,585
6/30/17-18	5,084,595	5,691,595	0.769	3,907,921	4,374,449
Total	28,327,556	36,804,295		19,488,066	25,237,388
			(7) Total Discount Factor:	0.688	0.686

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	712,157	1,275,566
(9) Projected Number of Years:	3	3
(10) Projected Paid Loss per Year:	237,386	425,189
(11) Discounted Value at 6%:	653,571	1,170,631

NOTES:

(2), (3) From Section 4, Exhibit 1, Page 1, Columns 8, 9

(4) From Section 4, Exhibit 1, Page 13, Column 8

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Corrections - Cluster 3
Total Indemnity (Including Lump Sums) + Medical

Calculation of Fiscal Year 7/01/18 - 19 Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
						Cumulative	Incremental Paid		Estimated Payments from		FY 07/01/18 - 06/30/19	
Accident	Est Ult Losses	Est Ult Losses	Paid Losses	Reserves	Reserves	Percent	as a % of	as a % of	07/01/18 - 06/30/19		as a % of Reserves	
Year	(Low)	(High)	to Date	(Low)	(High)	Paid	Ultimates	Reserves	(Low)	(High)	(Low)	(High)
All Prior Yrs	6,612,034	7,367,986	5,407,990	1,204,044	1,959,995				245,362	269,898	20.4%	13.8%
6/30/82-83	2,926,207	2,942,711	2,912,565	13,642	30,146	99.3%	0.5%	67.0%	9,142	20,202	67.0%	67.0%
6/30/83-84	2,207,178	2,237,034	2,135,674	71,504	101,360	96.1%	0.5%	12.9%	9,192	13,029	12.9%	12.9%
6/30/84-85	4,719,575	4,766,000	4,714,755	4,820	51,245	99.4%	0.5%	84.6%	4,077	43,350	84.6%	84.6%
6/30/85-86	6,981,752	7,015,615	6,962,840	18,912	52,775	99.5%	0.3%	48.8%	9,232	25,762	48.8%	48.8%
6/30/86-87	4,558,766	4,579,305	4,532,327	26,439	46,978	99.2%	0.5%	62.2%	16,454	29,236	62.2%	62.2%
6/30/87-88	7,297,052	7,331,060	7,243,858	53,194	87,202	99.0%	0.5%	52.1%	27,712	45,429	52.1%	52.1%
6/30/88-89	8,876,000	8,895,000	8,739,139	136,861	155,861	98.4%	1.0%	60.7%	83,088	94,622	60.7%	60.7%
6/30/89-90	11,575,000	11,578,000	11,343,080	231,920	234,920	98.0%	1.0%	49.6%	115,021	116,509	49.6%	49.6%
6/30/90-91	13,524,000	13,682,844	13,205,929	318,071	476,915	97.1%	1.0%	34.2%	108,854	163,215	34.2%	34.2%
6/30/91-92	6,799,000	6,911,400	6,600,413	198,587	310,987	96.3%	1.0%	26.9%	53,431	83,673	26.9%	26.9%
6/30/92-93	4,591,700	4,641,795	4,516,464	75,237	125,331	97.8%	1.0%	46.0%	34,636	57,698	46.0%	46.0%
6/30/93-94	6,920,000	6,925,000	6,675,170	244,830	249,830	96.4%	1.0%	28.0%	68,525	69,925	28.0%	28.0%
6/30/94-95	7,826,000	7,835,000	7,495,266	330,734	339,734	95.7%	1.0%	23.4%	77,254	79,356	23.4%	23.4%
6/30/95-96	7,196,000	7,206,000	6,870,358	325,642	335,642	95.4%	1.0%	21.8%	70,921	73,099	21.8%	21.8%
6/30/96-97	8,342,000	8,358,000	7,864,616	477,384	493,384	94.2%	1.0%	17.2%	82,124	84,876	17.2%	17.2%
6/30/97-98	11,136,986	11,329,830	10,709,869	427,117	619,961	95.3%	1.0%	21.5%	91,645	133,023	21.5%	21.5%
6/30/98-99	10,138,277	10,316,110	9,605,232	533,045	710,878	93.9%	1.0%	16.4%	87,651	116,893	16.4%	16.4%
6/30/99-00	10,906,533	11,009,440	10,279,574	626,959	729,866	93.8%	1.0%	16.2%	101,269	117,891	16.2%	16.2%
6/30/00-01	14,425,397	14,568,200	13,491,637	933,760	1,076,563	93.1%	1.0%	14.4%	134,670	155,266	14.4%	14.4%
6/30/01-02	11,639,057	12,181,000	10,841,361	797,695	1,339,639	91.0%	1.0%	11.1%	88,901	149,299	11.1%	11.1%
6/30/02-03	11,975,538	12,517,000	11,021,277	954,261	1,495,723	90.0%	1.0%	10.0%	95,398	149,528	10.0%	10.0%
6/30/03-04	10,975,793	11,109,000	9,995,529	980,265	1,113,471	90.5%	1.0%	10.5%	103,399	117,449	10.5%	10.5%
6/30/04-05	11,706,918	12,353,000	10,964,912	742,006	1,388,088	91.1%	1.0%	11.3%	83,811	156,788	11.3%	11.3%
6/30/05-06	8,626,137	9,089,000	7,977,542	648,596	1,111,458	90.1%	2.5%	25.2%	163,205	279,674	25.2%	25.2%
6/30/06-07	7,439,966	8,042,650	6,738,960	701,006	1,303,690	87.1%	2.5%	19.3%	135,350	251,716	19.3%	19.3%
6/30/07-08	7,520,000	7,759,500	6,401,662	1,118,338	1,357,838	83.8%	5.0%	30.9%	345,041	418,934	30.9%	30.9%
6/30/08-09	6,742,000	7,281,400	5,660,515	1,081,485	1,620,885	80.7%	5.0%	25.9%	280,607	420,563	25.9%	25.9%
6/30/09-10	4,646,000	5,234,000	3,670,949	975,051	1,563,051	74.3%	5.0%	19.5%	189,778	304,222	19.5%	19.5%
6/30/10-11	5,898,000	6,423,900	4,681,363	1,216,637	1,742,537	76.0%	5.0%	20.8%	253,302	362,793	20.8%	20.8%
6/30/11-12	4,892,000	5,485,050	3,563,619	1,328,381	1,921,431	68.7%	5.0%	16.0%	212,084	306,768	16.0%	16.0%
6/30/12-13	4,763,000	5,516,050	3,247,426	1,515,574	2,268,624	63.2%	5.0%	13.6%	205,838	308,114	13.6%	13.6%
6/30/13-14	5,804,000	6,611,200	3,847,454	1,956,546	2,763,746	62.0%	5.0%	13.2%	257,303	363,457	13.2%	13.2%
6/30/14-15	7,245,000	7,959,250	4,543,193	2,701,807	3,416,057	59.8%	5.0%	12.4%	335,730	424,483	12.4%	12.4%
6/30/15-16	7,629,000	8,386,500	4,104,584	3,524,416	4,281,916	51.3%	8.5%	17.4%	614,935	747,103	17.4%	17.4%
6/30/16-17	9,464,000	10,640,150	4,362,990	5,101,010	6,277,160	43.4%	7.9%	13.9%	707,861	871,074	13.9%	13.9%
6/30/17-18	8,278,000	9,264,100	1,653,442	6,624,558	7,610,658	18.9%	10.0%	12.3%	816,346	937,864	12.3%	12.3%
Total	292,803,867	305,349,080	254,583,536	38,220,331	50,765,544				6,319,148	8,362,781	16.5%	16.5%

NOTES:

(2) Exhibit 1, Page 1, Column (4) + Exhibit 2, Page 1, Column (4)

(3) Exhibit 1, Page 1, Column (5) + Exhibit 2, Page 1, Column (5)

(4) Exhibit 1, Page 1, Column (2) + Exhibit 2, Page 1, Column (2)

(5) = (2) - (4)

(6) = (3) - (4)

(7) = (4) / Average of Columns (2), (3)

(8) = (7) - Prior Year's (7)

(9) = (8) / (1.00 - (7))

(10) = (5) * (9)

(11) = (6) * (9)

(12) = (10) / (5)

(13) = (11) / (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Corrections - Cluster 3
Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Paid Loss	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		1,105,055			1,596,942	1,789,484	491,887	684,429		
6/30/82-83		164,749	166,051		164,749	167,711	0	2,962		
6/30/83-84		730,414	737,657		730,414	745,034	0	14,620		
6/30/84-85	115,258	561,119	567,817	564,260	564,000	568,000	2,881	6,881	0.489	0.493
6/30/85-86	123,937	563,332	571,197	569,817	570,000	571,000	6,668	7,668	0.460	0.461
6/30/86-87	142,396	647,687	659,356	659,985	659,000	660,000	11,313	12,313	0.463	0.463
6/30/87-88	166,792	1,145,983	1,171,296	1,173,702	1,171,000	1,174,000	25,017	28,017	0.702	0.704
6/30/88-89	180,117	1,274,184	1,307,538	1,306,255	1,306,000	1,308,000	31,816	33,816	0.725	0.726
6/30/89-90	180,883	1,862,034	1,918,419	1,918,653	1,918,000	1,919,000	55,966	56,966	1.060	1.061
6/30/90-91	169,902	2,613,928	2,703,854	2,703,151	2,703,000	2,839,200	89,072	225,272	1.591	1.671
6/30/91-92	165,926	2,125,864	2,207,795	2,206,592	2,207,000	2,318,400	81,136	192,536	1.330	1.397
6/30/92-93	174,198	1,359,348	1,417,384	1,416,407	1,416,000	1,417,000	56,652	57,652	0.813	0.813
6/30/93-94	185,946	1,564,566	1,637,889	1,636,168	1,636,000	1,638,000	71,434	73,434	0.880	0.881
6/30/94-95	194,051	1,340,065	1,408,479	1,406,803	1,407,000	1,408,000	66,935	67,935	0.725	0.726
6/30/95-96	205,262	1,480,572	1,563,940	1,561,423	1,561,000	1,564,000	80,428	83,428	0.760	0.762
6/30/96-97	234,073	1,832,642	1,955,193	1,950,606	1,951,000	1,955,000	118,358	122,358	0.834	0.835
6/30/97-98	221,865	2,270,169	2,464,662	2,454,610	2,455,000	2,465,000	184,831	194,831	1.107	1.111
6/30/98-99	256,071	1,910,565	2,107,435	2,098,267	2,098,000	2,107,000	187,435	196,435	0.819	0.823
6/30/99-00	268,486	2,108,637	2,356,247	2,342,803	2,343,000	2,356,000	234,363	247,363	0.873	0.878
6/30/00-01	279,182	2,950,328	3,340,827	3,315,305	3,315,000	3,341,000	364,672	390,672	1.187	1.197
6/30/01-02	283,070	1,885,366	2,154,388	2,142,398	2,142,000	2,154,000	256,634	268,634	0.757	0.761
6/30/02-03	289,846	2,280,955	2,642,434	2,623,619	2,624,000	2,642,000	343,045	361,045	0.905	0.912
6/30/03-04	293,771	2,104,233	2,469,803	2,452,932	2,453,000	2,470,000	348,767	365,767	0.835	0.841
6/30/04-05	291,382	2,687,403	3,195,570	2,901,496	2,960,000	3,196,000	272,597	508,597	1.016	1.097
6/30/05-06	294,709	2,143,673	2,581,047	2,377,533	2,330,000	2,581,000	186,327	437,327	0.791	0.876
6/30/06-07	289,603	1,722,104	2,093,120	1,964,892	1,926,000	2,197,650	203,896	475,546	0.665	0.759
6/30/07-08	354,668	1,516,558	1,869,875	1,836,685	1,745,000	1,963,500	228,442	446,942	0.492	0.554
6/30/08-09	332,413	1,556,077	1,947,959	1,880,441	1,786,000	2,045,400	229,923	489,323	0.537	0.615
6/30/09-10	336,338	956,766	1,218,159	1,319,707	1,157,000	1,386,000	200,234	429,234	0.344	0.412
6/30/10-11	333,783	1,131,537	1,465,787	1,518,132	1,392,000	1,593,900	260,463	462,363	0.417	0.478
6/30/11-12	348,187	871,090	1,164,174	1,320,766	1,222,000	1,387,050	350,910	515,960	0.351	0.398
6/30/12-13	368,022	827,247	1,148,772	1,360,937	1,206,000	1,429,050	378,753	601,803	0.328	0.388
6/30/13-14	390,528	857,134	1,253,836	1,503,727	1,317,000	1,579,200	459,866	722,066	0.337	0.404
6/30/14-15	402,750	1,140,433	1,806,283	1,925,133	1,806,000	2,021,250	665,567	880,817	0.448	0.502
6/30/15-16	400,013	977,505	1,735,837	1,910,379	1,736,000	2,005,500	758,495	1,027,995	0.434	0.501
6/30/16-17	352,565	1,005,971	2,243,319	2,054,450	2,054,000	2,355,150	1,048,029	1,349,179	0.583	0.668
6/30/17-18	347,621	414,037	2,221,817	1,954,262	1,954,000	2,333,100	1,539,963	1,919,063	0.562	0.671
Total	8,973,614	53,689,330	63,475,215	62,332,294	63,582,105	67,650,579	9,892,775	13,961,249		
Tot 6/30/84-18	8,973,614	51,689,112	62,571,507	62,332,294	61,090,000	64,948,350	9,400,888	13,259,238	0.681	0.724

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 4, Exhibit 2, Page 2, Column 3

(4) From Section 4, Exhibit 2, Page 2, Column 8

(5) From Section 4, Exhibit 2, Page 3, Column 8

(6), (7) Selected based on (3), (4), and (5)

(8) = (6) - (3)

(9) = (7) - (3)

(10) = (6) / (2) / 10

(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Corrections - Cluster 3
Medical

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Accident Year	Payroll (000's)	Paid Loss	Paid LDF	Adjustment for Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/16-17	Paid Counts 7/1/17-18	Average Outstanding Claim
All Prior Yrs		1,105,055							1	1	
6/30/82-83		164,749	1.008	1.000	166,051	N/A	166,051		0	0	
6/30/83-84		730,414	1.010	1.000	737,657	N/A	737,657		0	0	
6/30/84-85	115,258	561,119	1.012	1.000	567,817	N/A	567,817	0.493	1	1	6,698
6/30/85-86	123,937	563,332	1.014	1.000	571,197	N/A	571,197	0.461	0	0	
6/30/86-87	142,396	647,687	1.018	1.000	659,356	N/A	659,356	0.463	0	0	
6/30/87-88	166,792	1,145,983	1.022	1.000	1,171,296	N/A	1,171,296	0.702	0	0	
6/30/88-89	180,117	1,274,184	1.026	1.000	1,307,538	N/A	1,307,538	0.726	1	0	
6/30/89-90	180,883	1,862,034	1.030	1.000	1,918,419	N/A	1,918,419	1.061	2	1	56,385
6/30/90-91	169,902	2,613,928	1.034	1.000	2,703,854	N/A	2,703,854	1.591	4	6	14,988
6/30/91-92	165,926	2,125,864	1.039	1.000	2,207,795	N/A	2,207,795	1.331	3	3	27,310
6/30/92-93	174,198	1,359,348	1.043	1.000	1,417,384	N/A	1,417,384	0.814	1	0	
6/30/93-94	185,946	1,564,566	1.047	1.000	1,637,889	N/A	1,637,889	0.881	5	3	24,441
6/30/94-95	194,051	1,340,065	1.051	1.000	1,408,479	N/A	1,408,479	0.726	3	2	34,207
6/30/95-96	205,262	1,480,572	1.056	1.000	1,563,940	N/A	1,563,940	0.762	1	1	83,368
6/30/96-97	234,073	1,832,642	1.067	1.000	1,955,193	N/A	1,955,193	0.835	2	2	61,275
6/30/97-98	221,865	2,270,169	1.086	1.000	2,464,662	N/A	2,464,662	1.111	2	2	97,246
6/30/98-99	256,071	1,910,565	1.103	1.000	2,107,435	N/A	2,107,435	0.823	7	4	49,218
6/30/99-00	268,486	2,108,637	1.117	1.000	2,356,247	N/A	2,356,247	0.878	4	4	61,903
6/30/00-01	279,182	2,950,328	1.132	1.000	3,340,827	N/A	3,340,827	1.197	4	1	390,499
6/30/01-02	283,070	1,885,366	1.143	1.000	2,154,388	N/A	2,154,388	0.761	4	1	269,022
6/30/02-03	289,846	2,280,955	1.158	1.000	2,642,434	N/A	2,642,434	0.912	4	1	361,479
6/30/03-04	293,771	2,104,233	1.174	1.000	2,469,803	N/A	2,469,803	0.841	6	4	91,393
6/30/04-05	291,382	2,687,403	1.189	1.000	3,195,570	N/A	3,195,570	1.097	6	6	84,695
6/30/05-06	294,709	2,143,673	1.204	1.000	2,581,047	N/A	2,581,047	0.876	3	2	218,687
6/30/06-07	289,603	1,722,104	1.215	1.000	2,093,120	N/A	2,093,120	0.723	7	7	53,002
6/30/07-08	354,668	1,516,558	1.233	1.000	1,869,875	N/A	1,869,875	0.527	2	2	176,658
6/30/08-09	332,413	1,556,077	1.252	1.000	1,947,959	N/A	1,947,959	0.586	8	7	55,983
6/30/09-10	336,338	956,766	1.273	1.000	1,218,159	N/A	1,218,159	0.362	9	9	29,044
6/30/10-11	333,783	1,131,537	1.295	1.000	1,465,787	N/A	1,465,787	0.439	10	5	66,850
6/30/11-12	348,187	871,090	1.336	1.000	1,164,174	N/A	1,164,174	0.334	9	4	73,271
6/30/12-13	368,022	827,247	1.389	1.000	1,148,772	N/A	1,148,772	0.312	7	3	107,175
6/30/13-14	390,528	857,134	1.463	1.000	1,253,836	N/A	1,253,836	0.321	19	10	39,670
6/30/14-15	402,750	1,140,433	1.584	1.000	1,806,283	N/A	1,806,283	0.448	36	17	39,168
6/30/15-16	400,013	977,505	1.776	1.000	1,735,837	N/A	1,735,837	0.434	155	41	18,496
6/30/16-17	352,565	1,005,971	2.230	1.000	2,243,319	N/A	2,243,319	0.636	236	144	8,593
6/30/17-18	347,621	414,037	5.366	1.000	2,221,817	N/A	2,221,817	0.639		213	8,487
Total	8,973,614	53,689,330			63,475,215		63,475,215		562	507	

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3), (4) From Section 4, Exhibit 2, Page 7

(5) Based on information from the MA WCRIB 7/1/16 filing. Consideration for development beyond 252 months made in selection of LDF's.

(6) = (3) x (4) x (5)

(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10), (11) Provided by Commonwealth of Massachusetts

(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Corrections - Cluster 3
Medical

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	115,258	0.231	561,119	1.012	564,260	N/A	564,260	0.490	0.490
6/30/85-86	123,937	0.380	563,332	1.014	569,817	N/A	569,817	0.460	0.460
6/30/86-87	142,396	0.488	647,687	1.018	659,985	N/A	659,985	0.463	0.463
6/30/87-88	166,792	0.769	1,145,983	1.022	1,173,702	N/A	1,173,702	0.704	0.704
6/30/88-89	180,117	0.698	1,274,184	1.026	1,306,255	N/A	1,306,255	0.725	0.725
6/30/89-90	180,883	1.065	1,862,034	1.030	1,918,653	N/A	1,918,653	1.061	1.061
6/30/90-91	169,902	1.579	2,613,928	1.034	2,703,151	N/A	2,703,151	1.591	1.591
6/30/91-92	165,926	1.311	2,125,864	1.039	2,206,592	N/A	2,206,592	1.330	1.330
6/30/92-93	174,198	0.800	1,359,348	1.043	1,416,407	N/A	1,416,407	0.813	0.813
6/30/93-94	185,946	0.860	1,564,566	1.047	1,636,168	N/A	1,636,168	0.880	0.880
6/30/94-95	194,051	0.708	1,340,065	1.051	1,406,803	N/A	1,406,803	0.725	0.725
6/30/95-96	205,262	0.739	1,480,572	1.056	1,561,423	N/A	1,561,423	0.761	0.761
6/30/96-97	234,073	0.804	1,832,642	1.067	1,950,606	N/A	1,950,606	0.833	0.833
6/30/97-98	221,865	1.053	2,270,169	1.086	2,454,610	N/A	2,454,610	1.106	1.106
6/30/98-99	256,071	0.785	1,910,565	1.103	2,098,267	N/A	2,098,267	0.819	0.819
6/30/99-00	268,486	0.830	2,108,637	1.117	2,342,803	N/A	2,342,803	0.873	0.873
6/30/00-01	279,182	1.118	2,950,328	1.132	3,315,305	N/A	3,315,305	1.188	1.188
6/30/01-02	283,070	0.727	1,885,366	1.143	2,142,398	N/A	2,142,398	0.757	0.757
6/30/02-03	289,846	0.864	2,280,955	1.158	2,623,619	N/A	2,623,619	0.905	0.905
6/30/03-04	293,771	0.802	2,104,233	1.174	2,452,932	N/A	2,452,932	0.835	0.835
6/30/04-05	291,382	0.462	2,687,403	1.189	2,901,496	N/A	2,901,496	0.996	0.996
6/30/05-06	294,709	0.468	2,143,673	1.204	2,377,533	N/A	2,377,533	0.807	0.807
6/30/06-07	289,603	0.473	1,722,104	1.215	1,964,892	N/A	1,964,892	0.678	0.678
6/30/07-08	354,668	0.478	1,516,558	1.233	1,836,685	N/A	1,836,685	0.518	0.518
6/30/08-09	332,413	0.485	1,556,077	1.252	1,880,441	N/A	1,880,441	0.566	0.566
6/30/09-10	336,338	0.503	956,766	1.273	1,319,707	N/A	1,319,707	0.392	0.392
6/30/10-11	333,783	0.508	1,131,537	1.295	1,518,132	N/A	1,518,132	0.455	0.455
6/30/11-12	348,187	0.513	871,090	1.336	1,320,766	N/A	1,320,766	0.379	0.379
6/30/12-13	368,022	0.518	827,247	1.389	1,360,937	N/A	1,360,937	0.370	0.370
6/30/13-14	390,528	0.523	857,134	1.463	1,503,727	N/A	1,503,727	0.385	0.385
6/30/14-15	402,750	0.529	1,140,433	1.584	1,925,133	N/A	1,925,133	0.478	0.478
6/30/15-16	400,013	0.534	977,505	1.776	1,910,379	N/A	1,910,379	0.478	0.478
6/30/16-17	352,565	0.539	1,005,971	2.230	2,054,450	N/A	2,054,450	0.583	0.583
6/30/17-18	347,621	0.545	414,037	5.366	1,954,262	N/A	1,954,262	0.562	0.562
Total	8,973,614		51,689,112		62,332,294		62,332,294		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 4, Exhibit 2, Page 4, Column 11

(4) From Section 4, Exhibit 2, Page 2, Column 3

(5) From Section 4, Exhibit 2, Page 2, Column 4

(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]

(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Corrections - Cluster 3
Medical

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Expected Ult Loss	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									0.231	0.231
6/30/85-86									0.380	0.380
6/30/86-87									0.488	0.488
6/30/87-88									0.769	0.769
6/30/88-89									0.698	0.698
6/30/89-90									1.065	1.065
6/30/90-91	169,902	2,703,854	1.591	1.194	1.900	1.321	2.510	0.349	1.548	1.579
6/30/91-92	165,926	2,207,795	1.331	1.189	1.581	1.308	2.069	0.354	1.305	1.311
6/30/92-93	174,198	1,417,384	0.814	1.189	0.968	1.295	1.253	0.357	0.803	0.800
6/30/93-94	185,946	1,637,889	0.881	1.178	1.038	1.282	1.331	0.364	0.857	0.860
6/30/94-95	194,051	1,408,479	0.726	1.170	0.849	1.270	1.078	0.370	0.711	0.708
6/30/95-96	205,262	1,563,940	0.762	1.155	0.880	1.257	1.107	0.379	0.746	0.739
6/30/96-97	234,073	1,955,193	0.835	1.137	0.949	1.245	1.182	0.389	0.819	0.804
6/30/97-98	221,865	2,464,662	1.111	1.135	1.261	1.232	1.554	0.393	1.051	1.053
6/30/98-99	256,071	2,107,435	0.823	1.135	0.934	1.220	1.140	0.397	0.797	0.785
6/30/99-00	268,486	2,356,247	0.878	1.135	0.996	1.208	1.203	0.401	0.840	0.830
6/30/00-01	279,182	3,340,827	1.197	1.109	1.327	1.196	1.588	0.415	1.135	1.118
6/30/01-02	283,070	2,154,388	0.761	1.101	0.838	1.184	0.992	0.422	0.743	0.727
6/30/02-03	289,846	2,642,434	0.912	1.073	0.978	1.173	1.147	0.437	0.882	0.864
6/30/03-04	293,771	2,469,803	0.841	1.046	0.880	1.161	1.021	0.453	0.811	0.802
6/30/04-05	291,382	3,195,570	1.097	1.036	1.136	1.149	1.305	0.462	0.509	0.462
6/30/05-06	294,709	2,581,047	0.876	1.032	0.904	1.138	1.029	0.468	0.516	0.468
6/30/06-07	289,603	2,093,120	0.723	1.032	0.746	1.127	0.840	0.473	0.521	0.473
6/30/07-08	354,668	1,869,875	0.527	1.032	0.544	1.116	0.607	0.478	0.526	0.478
6/30/08-09	332,413	1,947,959	0.586	1.027	0.602	1.105	0.664	0.485	0.534	0.485
6/30/09-10	336,338	1,218,159	0.362	1.000	0.362	1.094	0.396	0.503	0.554	0.503
6/30/10-11	333,783	1,465,787	0.439	1.000	0.439	1.083	0.476	0.508	0.560	0.508
6/30/11-12	348,187	1,164,174	0.334	1.000	0.334	1.072	0.358	0.513	0.565	0.513
6/30/12-13	368,022	1,148,772	0.312	1.000	0.312	1.062	0.331	0.518	0.571	0.518
6/30/13-14	390,528	1,253,836	0.321	1.000	0.321	1.051	0.337	0.523	0.577	0.523
6/30/14-15	402,750	1,806,283	0.448	1.000	0.448	1.041	0.467	0.529	0.582	0.529
6/30/15-16	400,013	1,735,837	0.434	1.000	0.434	1.030	0.447	0.534	0.588	0.534
6/30/16-17	352,565	2,243,319	0.636	1.000	0.636	1.020	0.649	0.539	0.594	0.539
6/30/17-18	347,621	2,221,817	0.639	1.000	0.639	1.010	0.646	0.545		0.545
Total	8,064,230	56,375,884								

Trend Last 4 (ex 17-18):	22.4%	Avg 3 (ex 17-18):	0.521
Trend Last 8 (ex 17-18):	5.9%	Avg 5 (ex 17-18):	0.446
Trend Last 12 (ex 17-18):	-4.8%	Avg 10 (ex 17-18):	0.473
Prior Selected Trend:	1.0%	Prior Sel Avg:	0.600
Selected Trend:	1.00%	Sel. Loss Cost:	0.550

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 4, Exhibit 2, Page 2, Column 6

(4) = (3) / (2) / 10

(5) Based on information from the MA WCIRB

(6) = (4) x (5)

(7) Based on Selected Trend from (6)

(8) = (6) x (7)

(9) = Sel. Loss Cost / [(5) * (7)]

(10) From prior Aon analysis as of June 30, 2017

(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Corrections - Cluster 3
Medical

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend	0.900	
(2)	Credibility	46%	
(3)	Average Pmt Trend Statewide	0.950	
(4)	Credibility Weighted Trend	0.927	
		(Low)	(High)
(5)	Selected Range	0.834	0.880
(6)	Incremental Paid for 2018	155,601	155,601
(7)	Estimated Reserve	782,235	1,145,662
(8)	Paid to Date (82 & Prior)	1,105,055	1,105,055
(9)	Est Ult Paid for 1982 & Prior	1,887,290	2,250,717

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	100,770	75,760
(11)	Projected Number of Years	2	5
(12)	Estimated Reserve	201,539	378,798
(13)	Paid to Date (82 & Prior)	1,105,055	949,454
(14)	Est Ult Paid for 1982 & Prior	1,306,594	1,328,251
(14a)	Paid Counts During Fiscal Year	1	1
		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	1,596,942	1,789,484
(16)	Lump Sum Ultimates	N/A	N/A
(17)	Ult Loss Including Lump Sums	**1,596,942**	**1,789,484**
(18)	Implied Tail	1.445	1.619
(19)	Ult Loss Inc Lump Sums @ 6/17	1,495,606	1,798,340

NOTES:

(1) From Section 4, Exhibit 2, Page 6
(2) = (Average of Section 4, Exhibit 2, Page 6, Column 3 / 175,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 4, Exhibit 2, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 4, Exhibit 2, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) Lump Sums are considered in Indemnity analysis (Section 1)
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2017

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Corrections - Cluster 3
Medical

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	24,180	10.093			
1993	2	4,649	8.444	0.192		
1994	3	4,226	8.349	0.909		
1995	4	2,463	7.809	0.583		
1996	5	3,867	8.260	1.570		
1997	6	12,692	9.449	3.282		
1998	7	3,736	8.226	0.294		
1999	8	1,455	7.283	0.389		
2000	9	13,993	9.546	9.617	n =	27
2001	10	18,860	9.845	1.348	S(x) =	54,135
2002	11	1,907	7.553	0.101	S(x-sq) =	108,542,313
2003	12	725	6.586	0.380	S(xy) =	515,873
2004	13	1,808	7.500	2.494	S(y) =	257
2005	14	2,687	7.896	1.486	D =	44,226
2006	15	3,792	8.241	1.411	slope =	0.145
2007	16	10,343	9.244	2.728	Avg Trend =	1.145
2008	17	8,983	9.103	0.869		
2009	18	100,501	11.518	11.187		
2010	19	110,847	11.616	1.103		
2011	20	91,392	11.423	0.824		
2012	21	74,810	11.223	0.819		
2013	22	71,853	11.182	0.960		
2014	23	68,052	11.128	0.947		
2015	24	80,571	11.297	1.184		
2016	25	71,803	11.182	0.891		
2017	26	74,905	11.224	1.043		
2018	27	155,601	11.955	2.077		
					Selected Trend:	**0.900**

NOTES:

(3) 2018 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2017

(4) LN [(3)]

(5) Eg. 2017: 2.077 = 155601 / 74905

Commonwealth of Massachusetts Workers Compensation
Department of Corrections - Cluster 3
MEDICAL
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432
June-83	11,197	26,045	37,203	47,025	56,514	66,401	72,814	83,440	107,442	118,641	128,866	135,800	137,783	138,069	140,735	141,596	141,596	141,914	142,318	142,318	142,318	142,748	144,456	154,891	160,448	164,749	164,749	164,749	164,749	164,749	164,749	164,749	164,749	164,749	164,749	164,749
June-84	52,670	137,962	203,703	257,882	317,818	352,402	422,888	501,855	591,716	647,521	689,358	721,711	724,550	728,685	728,693	728,709	728,709	728,709	729,143	729,143	729,143	730,066	730,414	730,414	730,414	730,414	730,414	730,414	730,414	730,414	730,414	730,414	730,414	730,414	730,414	
June-85	24,581	57,175	81,670	103,231	128,616	150,557	165,276	184,340	192,621	201,787	208,269	211,465	217,592	220,213	229,343	238,016	247,437	257,231	266,584	280,985	298,608	318,573	337,983	352,978	369,873	394,344	415,317	434,308	451,747	470,326	495,794	521,039	546,412	561,119		
June-86	48,446	112,684	160,960	207,617	233,762	263,664	302,247	319,414	339,302	351,896	365,470	378,302	387,035	413,763	422,216	433,663	460,852	480,856	494,886	512,562	523,474	541,163	550,005	554,546	557,077	558,277	559,768	562,871	563,332	563,332	563,332	563,332	563,332			
June-87	77,936	181,278	229,911	293,653	369,221	440,930	473,706	485,578	509,980	540,282	563,925	581,583	602,759	614,805	618,094	621,890	624,842	627,889	633,482	636,887	638,336	639,623	640,749	642,212	643,694	648,271	647,521	647,687	647,687	647,687	647,687	647,687				
June-88	139,053	319,817	519,537	680,966	823,361	912,703	998,546	1,039,983	1,059,846	1,072,337	1,112,168	1,116,550	1,122,900	1,125,982	1,127,653	1,131,576	1,136,086	1,139,881	1,139,671	1,140,874	1,141,510	1,142,078	1,144,288	1,145,006	1,145,741	1,145,836	1,145,900	1,145,983	1,145,983	1,145,983	1,145,983					
June-89	131,654	415,398	576,800	731,889	811,584	895,533	936,684	955,349	999,849	1,017,126	1,032,040	1,060,186	1,074,102	1,089,934	1,108,376	1,126,235	1,147,403	1,157,458	1,164,985	1,178,930	1,193,712	1,206,048	1,216,929	1,227,147	1,246,391	1,260,610	1,269,507	1,273,848	1,274,184	1,274,184						
June-90	233,608	695,685	1,052,182	1,224,162	1,354,697	1,427,692	1,488,096	1,536,324	1,567,188	1,604,683	1,637,523	1,658,777	1,680,547	1,714,885	1,752,807	1,778,979	1,821,497	1,836,851	1,849,519	1,851,871	1,853,225	1,854,022	1,856,452	1,857,840	1,861,177	1,861,474	1,861,705	1,861,935	1,862,034							
June-91	236,602	942,522	1,192,208	1,419,689	1,530,020	1,581,521	1,621,661	1,644,367	1,676,462	1,699,513	1,748,257	1,799,332	1,845,064	1,889,995	1,951,997	2,058,075	2,109,105	2,138,832	2,230,499	2,269,406	2,337,283	2,427,731	2,454,390	2,467,892	2,474,842	2,480,194	2,556,786	2,613,928								
June-92	391,819	811,780	1,023,022	1,084,480	1,141,810	1,171,673	1,196,735	1,319,302	1,369,241	1,426,734	1,445,752	1,475,976	1,501,400	1,542,584	1,553,065	1,562,833	1,573,916	1,589,949	1,615,152	1,692,813	1,819,909	1,945,315	1,977,667	2,060,792	2,086,626	2,110,139	2,125,864										
June-93	344,830	901,476	1,061,794	1,155,998	1,198,560	1,220,287	1,266,026	1,272,695	1,293,165	1,297,361	1,300,910	1,301,951	1,307,475	1,311,803	1,319,110	1,321,122	1,322,034	1,323,404	1,323,509	1,323,675	1,327,602	1,358,187	1,359,273	1,359,273	1,359,348	1,359,348										
June-94	431,268	816,076	959,344	1,052,996	1,141,756	1,231,287	1,271,524	1,296,482	1,314,355	1,335,010	1,357,475	1,376,074	1,390,533	1,402,752	1,413,794	1,423,336	1,430,519	1,446,576	1,458,508	1,476,979	1,496,298	1,505,910	1,542,406	1,552,299	1,564,566											
June-95	351,310	722,998	906,028	985,528	1,057,961	1,106,846	1,136,019	1,186,110	1,209,822	1,232,732	1,266,835	1,285,546	1,294,524	1,301,613	1,305,920	1,312,490	1,318,475	1,323,435	1,325,511	1,329,061	1,329,847	1,333,586	1,337,649	1,340,065												
June-96	344,486	709,731	859,884	962,823	1,085,060	1,150,008	1,181,678	1,213,854	1,256,984	1,305,951	1,334,696	1,371,532	1,394,601	1,418,259	1,433,202	1,445,908	1,456,275	1,465,439	1,469,259	1,471,403	1,475,398	1,477,482	1,480,572												
June-97	404,402	880,944	1,029,045	1,129,661	1,192,806	1,242,248	1,291,581	1,332,755	1,404,699	1,468,293	1,534,845	1,608,334	1,629,854	1,671,824	1,708,017	1,745,451	1,758,270	1,766,104	1,811,375	1,823,449	1,828,896	1,832,642														
June-98	352,321	850,419	1,071,815	1,188,934	1,283,207	1,349,964	1,408,091	1,486,280	1,529,830	1,572,573	1,615,592	1,716,755	1,772,391	1,838,516	1,900,110	1,958,286	2,022,922	2,088,450	2,150,537	2,224,037	2,270,169															
June-99	335,840	780,685	1,009,719	1,120,546	1,237,603	1,345,867	1,452,103	1,561,531	1,613,648	1,654,503	1,683,574	1,743,457	1,791,004	1,820,118	1,838,665	1,854,418	1,895,185	1,899,790	1,906,892	1,910,565																
June-00	496,994	1,118,525	1,328,041	1,481,979	1,601,386	1,717,688	1,766,903	1,812,535	1,852,179	1,901,468	1,931,755	1,967,861	2,003,457	2,029,359	2,049,264	2,065,241	2,080,606	2,093,612	2,108,637																	
June-01	553,191	1,161,108	1,486,434	1,729,264	2,113,882	2,296,440	2,415,155	2,501,361	2,567,715	2,697,204	2,775,225	2,860,089	2,886,161	2,906,989	2,914,059	2,940,185	2,950,055	2,950,328																		
June-02	441,054	954,595	1,190,752	1,457,269	1,628,226	1,698,307	1,736,904	1,769,478	1,813,443	1,830,775	1,851,171	1,867,504	1,871,731	1,874,225	1,877,525	1,885,121	1,885,366																			
June-03	268,200	928,702	1,552,091	1,775,257	1,904,289	1,988,413	2,045,138	2,103,051	2,147,004	2,184,461	2,214,085	2,218,226	2,249,009	2,272,377	2,280,804	2,280,955																				
June-04	152,994	1,174,712	1,612,636	1,744,790	1,811,022	1,896,424	1,965,029	1,975,226	1,988,740	1,997,998	2,012,411	2,028,809	2,040,566	2,081,524	2,104,233																					
June-05	504,986	1,476,366	1,809,319	2,048,757	2,193,956	2,297,784	2,392,936	2,464,260	2,513,823	2,554,231	2,596,472	2,639,159	2,662,069	2,687,403																						
June-06	456,471	1,195,789	1,564,242	1,729,098	1,847,555	1,939,187	2,044,654	2,084,339	2,092,454	2,102,214	2,114,071	2,129,368	2,143,673																							
June-07	537,825	1,000,141	1,218,822	1,380,770	1,450,003	1,505,529	1,543,801	1,601,192	1,634,367	1,665,318	1,698,398	1,722,104																								
June-08	539,208	1,080,479	1,291,808	1,419,250	1,474,245	1,483,165	1,498,179	1,503,319	1,508,305	1,514,151	1,516,558																									
June-09	508,581	995,354	1,230,224	1,338,898	1,369,306	1,446,964	1,482,021	1,508,983	1,522,744	1,556,077																										
June-10	391,950	706,776	789,348	818,015	852,862	886,332	920,529	942,614	956,766																											
June-11	496,567	863,714	960,779	1,031,286	1,110,947	1,122,566	1,127,995	1,131,537																												
June-12	293,489	638,905	723,823	781,875	824,519	860,213	871,090																													
June-13	286,539	659,431	752,139	788,982	809,275	827,247																														
June-14	290,720	674,005	774,112	827,240	857,134																															
June-15	468,795	894,585	1,082,884	1,140,433																																
June-16	502,405	850,852	977,505																																	
June-17	474,788	1,005,971																																		
June-18	414,037																																			

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432
June-83	2.326	1.428	1.264	1.202	1.175	1.097	1.146	1.288	1.104	1.086	1.054	1.015	1.002	1.019	1.006	1.000	1.002	1.003	1.000	1.000	1.003	1.012	1.072	1.036	1.027	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
June-84	2.619	1.477	1.266	1.232	1.109	1.200	1.187	1.179	1.094	1.065	1.047	1.004	1.006	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
June-85	2.326	1.428	1.264	1.246	1.171	1.098	1.115	1.045	1.048	1.032	1.015	1.029	1.012	1.041	1.038	1.040	1.040	1.036	1.054	1.063	1.067	1.061	1.044	1.048	1.066	1.053	1.046	1.040	1.041	1.054	1.051	1.049	1.027		
June-86	2.326	1.428	1.290	1.126	1.128	1.146	1.057	1.062	1.037	1.039	1.035	1.023	1.069	1.020	1.027	1.063	1.043	1.029	1.036	1.021	1.034	1.016	1.008	1.005	1.002	1.003	1.006	1.001	1.000	1.000	1.000	1.000			
June-87	2.326	1.268	1.277	1.257	1.194	1.074	1.025	1.050	1.059	1.044	1.031	1.036	1.020	1.005	1.006	1.005	1.005	1.009	1.005	1.002	1.002	1.002	1.002	1.002	1.007	0.999	1.000	1.000	1.000	1.000	1.000				
June-88	2.300	1.624	1.311	1.209	1.109	1.094	1.041	1.019	1.012	1.037	1.004	1.006	1.003	1.001	1.003	1.004	1.003	1.000	1.001	1.001	1.000	1.002	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000					
June-89	3.155	1.389	1.269	1.109	1.103	1.046	1.020	1.047	1.017	1.015	1.027	1.013	1.015	1.017	1.016	1.019	1.009	1.007	1.012	1.013	1.010	1.009	1.008	1.016	1.011	1.007	1.003	1.000	1.000						
June-90	2.978	1.512	1.163	1.107	1.054	1.042	1.032	1.020	1.024	1.020	1.013	1.013	1.020	1.022	1.015	1.024	1.008	1.007	1.001	1.001	1.000	1.001	1.001	1.002	1.000	1.000	1.000	1.000							
June-91	3.984	1.265	1.191	1.078	1.034	1.025	1.014	1.020	1.014	1.029	1.029	1.025	1.024	1.033	1.054	1.025	1.014	1.043	1.017	1.030	1.039	1.011	1.006	1.003	1.002	1.031	1.022								
June-92	2.072	1.260	1.060	1.053	1.026	1.021	1.102	1.038	1.042	1.013	1.021	1.017	1.027	1.007	1.006	1.007	1.010	1.016	1.048	1.075	1.069	1.017	1.042	1.013	1.011	1.007									
June-93	2.614	1.178	1.089	1.037	1.018	1.037	1.005	1.016	1.003	1.003	1.001	1.004	1.003	1.006	1.002	1.001	1.001	1.000	1.000	1.003	1.023	1.001	1.000	1.000	1.000										
June-94	1.892	1.176	1.098	1.084	1.078	1.033	1.020	1.014	1.016	1.017	1.014	1.011	1.009	1.008	1.007	1.005	1.011	1.008	1.013	1.013	1.006	1.024	1.006	1.008											
June-95	2.058	1.253	1.088	1.073	1.046	1.026	1.044	1.020	1.019	1.028	1.015	1.007	1.005	1.003	1.005	1.005	1.004	1.002	1.003	1.001	1.003	1.003	1.002												
June-96	2.060	1.212	1.120	1.127	1.060	1.028	1.027	1.036	1.039	1.022	1.028	1.017	1.017	1.011	1.009	1.007	1.006	1.003	1.001	1.003	1.001	1.002													
June-97	2.178	1.168	1.098	1.056	1.041	1.040	1.032	1.054	1.045	1.045	1.048	1.013	1.026	1.022	1.022	1.007	1.004	1.026	1.007	1.003	1.002														
June-98	2.414	1.260	1.109	1.079	1.052	1.043	1.056	1.029	1.028	1.027	1.063	1.032	1.037	1.034	1.031	1.033	1.032	1.030	1.034	1.021															
June-99	2.325	1.293	1.110	1.104	1.087	1.079	1.075	1.033	1.025	1.018	1.036	1.027	1.016	1.010	1.009	1.022	1.002	1.004	1.002																
June-00	2.251	1.187	1.116	1.081	1.073	1.029	1.026	1.022	1.027	1.016	1.019	1.018	1.013	1.010	1.008	1.007	1.006	1.007																	
June-01	2.099	1.280	1.163	1.222	1.086	1.052	1.036	1.027	1.050	1.029	1.031	1.009	1.007	1.002	1.009	1.003	1.000																		
June-02	2.164	1.247	1.224	1.117	1.043	1.023	1.019	1.025	1.010	1.011	1.009	1.002	1.001	1.002	1.004	1.000																			
June-03	3.463	1.671	1.144	1.073	1.044	1.029	1.028	1.021	1.017	1.014	1.002	1.014	1.010	1.004	1.000																				
June-04	7.678	1.373	1.082	1.038	1.047	1.036	1.005	1.007	1.005	1.007	1.008	1.006	1.020	1.011																					
June-05	2.924	1.226	1.132	1.071	1.047	1.041	1.030	1.020	1.016	1.017	1.016	1.009	1.010																						
June-06	2.620	1.308	1.105	1.069	1.050	1.054	1.019	1.004	1.005	1.006	1.007	1.007																							
June-07	1.860	1.219	1.133	1.050	1.038	1.025	1.037	1.021	1.019	1.020	1.014																								
June-08	2.004	1.196	1.099	1.039	1.006	1.010	1.003	1.003	1.004	1.002																									
June-09	1.957	1.236	1.088	1.023	1.057	1.024	1.018	1.009	1.022																										
June-10	1.803	1.117	1.036	1.043	1.039	1.039	1.024	1.015																											
June-11	1.739	1.112	1.073	1.077	1.010	1.005	1.003																												
June-12	2.177	1.133	1.080	1.055	1.043	1.013																													
June-13	2.301	1.141	1.049	1.026	1.022																														
June-14	2.318	1.149	1.069	1.036																															
June-15	1.908	1.210	1.053																																
June-16	1.694	1.149																																	
June-17	2.119																																		

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	To Ult
Simple Avg																																				
All Yrs	2.487	1.282	1.143	1.100	1.067	1.050	1.043	1.041	1.030	1.025	1.023	1.015	1.016	1.013	1.013	1.014	1.011	1.013	1.014	1.016	1.017	1.012	1.015	1.011	1.012	1.010	1.009	1.005	1.006	1.009	1.010	1.012	1.009	1.000	1.000	
Latest 5	2.068	1.156	1.065	1.047	1.034	1.018	1.017	1.010	1.013	1.010	1.010	1.007	1.010	1.006	1.006	1.013	1.009	1.014	1.009	1.008	1.007	1.009	1.011	1.005	1.005	1.009	1.005	1.000	1.008	1.011	1.010					
Latest 3	1.907	1.169	1.057	1.039	1.025	1.019	1.015	1.009	1.015	1.009	1.013	1.007	1.013	1.005	1.004	1.004	1.003	1.014	1.014	1.009	1.002	1.010	1.003	1.007	1.004	1.013	1.009	1.000	1.000	1.000	1.017	1.016	1.009			
Volume Wtd																																				
All Yrs	2.310	1.256	1.121	1.083	1.053	1.039	1.032	1.025	1.023	1.020	1.021	1.014	1.015	1.012	1.013	1.012	1.009	1.013	1.013	1.016	1.018	1.009	1.010	1.007	1.006	1.011	1.009	1.003	1.004	1.007	1.010	1.013	1.010	1.000	1.000	
Latest 5	2.019	1.159	1.064	1.049	1.036	1.017	1.018	1.010	1.013	1.011	1.010	1.008	1.010	1.006	1.006	1.012	1.009	1.014	1.011	1.009	1.007	1.010	1.013	1.005	1.005	1.011	1.008	1.000	1.005	1.007	1.010					
Latest 3	1.903	1.172	1.057	1.039	1.024	1.018	1.015	1.008	1.015	1.009	1.013	1.007	1.013	1.006	1.005	1.004	1.003	1.014	1.015	1.010	1.002	1.010	1.003	1.008	1.005	1.014	1.011	1.000	1.000	1.000	1.015	1.014	1.010			

Dev Factor Selection																																				
Industry 1	1.952	1.145	1.055	1.025	1.015	1.012	1.012	1.013	1.010	1.009	1.011	1.010	1.009	1.008	1.009	1.007	1.007	1.006																		
Industry 2		1.268	1.086	1.037	1.014	1.010	1.014	1.010	1.007	1.010	1.011	1.009	1.008	1.009	1.010	1.007	1.007	1.009	1.006	1.006																
Prior	2.422	1.259	1.124	1.084	1.054	1.040	1.033	1.019	1.014	1.017	1.014	1.011	1.012	1.013	1.014	1.015	1.010	1.014	1.014	1.015	1.019	1.010	1.005	1.004	1.004	1.004	1.004	1.004	1.004	1.004	1.004	1.004	1.002	1.002	1.008	
Selected	2.406	1.256	1.121	1.083	1.053	1.039	1.032	1.017	1.017	1.015	1.014	1.009	1.013	1.013	1.013	1.014	1.009	1.013	1.013	1.016	1.018	1.010	1.005	1.004	1.004	1.004	1.004	1.004	1.004	1.004	1.004	1.004	1.002	1.002	1.002	1.008
FacToUlt	5.366	2.230	1.776	1.584	1.463	1.389	1.336	1.295	1.273	1.252	1.233	1.215	1.204	1.189	1.174	1.158	1.143	1.132	1.117	1.103	1.086	1.067	1.056	1.051	1.047	1.043	1.039	1.034	1.030	1.026	1.022	1.018	1.014	1.012	1.010	1.008
Percent of Ult	18.6%	44.8%	56.3%	63.1%	68.4%	72.0%	74.8%	77.2%	78.5%	79.9%	81.1%	82.3%	83.1%	84.1%	85.2%	86.3%	87.5%	88.3%	89.5%	90.7%	92.1%	93.7%	94.7%	95.1%	95.5%	95.9%	96.3%	96.7%	97.1%	97.4%	97.8%	98.2%	98.6%	98.8%	99.0%	99.2%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Corrections - Cluster 3
Medical

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/17		As of 6/18		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	1,495,606	1,798,340	1,596,942	1,789,484	101,336	6.8%	(8,856)	-0.5%
6/30/82-83	164,749	167,733	164,749	167,711	0	0.0%	(22)	0.0%
6/30/83-84	730,414	745,133	730,414	745,034	0	0.0%	(99)	0.0%
6/30/84-85	550,000	553,000	564,000	568,000	14,000	2.5%	15,000	2.7%
6/30/85-86	571,000	572,000	570,000	571,000	(1,000)	-0.2%	(1,000)	-0.2%
6/30/86-87	661,000	661,000	659,000	660,000	(2,000)	-0.3%	(1,000)	-0.2%
6/30/87-88	1,174,000	1,176,000	1,171,000	1,174,000	(3,000)	-0.3%	(2,000)	-0.2%
6/30/88-89	1,309,000	1,310,000	1,306,000	1,308,000	(3,000)	-0.2%	(2,000)	-0.2%
6/30/89-90	1,922,000	1,923,000	1,918,000	1,919,000	(4,000)	-0.2%	(4,000)	-0.2%
6/30/90-91	2,650,000	2,650,000	2,703,000	2,839,200	53,000	2.0%	189,200	7.1%
6/30/91-92	2,195,000	2,196,000	2,207,000	2,318,400	12,000	0.5%	122,400	5.6%
6/30/92-93	1,419,000	1,420,000	1,416,000	1,417,000	(3,000)	-0.2%	(3,000)	-0.2%
6/30/93-94	1,627,000	1,629,000	1,636,000	1,638,000	9,000	0.6%	9,000	0.6%
6/30/94-95	1,409,000	1,410,000	1,407,000	1,408,000	(2,000)	-0.1%	(2,000)	-0.1%
6/30/95-96	1,571,000	1,573,000	1,561,000	1,564,000	(10,000)	-0.6%	(9,000)	-0.6%
6/30/96-97	1,980,000	1,985,000	1,951,000	1,955,000	(29,000)	-1.5%	(30,000)	-1.5%
6/30/97-98	2,440,000	2,451,000	2,455,000	2,465,000	15,000	0.6%	14,000	0.6%
6/30/98-99	2,122,000	2,132,000	2,098,000	2,107,000	(24,000)	-1.1%	(25,000)	-1.2%
6/30/99-00	2,359,000	2,373,000	2,343,000	2,356,000	(16,000)	-0.7%	(17,000)	-0.7%
6/30/00-01	3,352,000	3,378,000	3,315,000	3,341,000	(37,000)	-1.1%	(37,000)	-1.1%
6/30/01-02	2,178,000	2,190,000	2,142,000	2,154,000	(36,000)	-1.7%	(36,000)	-1.6%
6/30/02-03	2,667,000	2,686,000	2,624,000	2,642,000	(43,000)	-1.6%	(44,000)	-1.6%
6/30/03-04	2,468,000	2,484,000	2,453,000	2,470,000	(15,000)	-0.6%	(14,000)	-0.6%
6/30/04-05	2,976,000	3,216,000	2,960,000	3,196,000	(16,000)	-0.5%	(20,000)	-0.6%
6/30/05-06	2,356,000	2,599,000	2,330,000	2,581,000	(26,000)	-1.1%	(18,000)	-0.7%
6/30/06-07	1,948,000	2,207,100	1,926,000	2,197,650	(22,000)	-1.1%	(9,450)	-0.4%
6/30/07-08	1,802,000	2,000,250	1,745,000	1,963,500	(57,000)	-3.2%	(36,750)	-1.8%
6/30/08-09	1,811,000	2,040,150	1,786,000	2,045,400	(25,000)	-1.4%	5,250	0.3%
6/30/09-10	1,164,000	1,440,600	1,157,000	1,386,000	(7,000)	-0.6%	(54,600)	-3.8%
6/30/10-11	1,438,000	1,684,200	1,392,000	1,593,900	(46,000)	-3.2%	(90,300)	-5.4%
6/30/11-12	1,260,000	1,488,900	1,222,000	1,387,050	(38,000)	-3.0%	(101,850)	-6.8%
6/30/12-13	1,250,000	1,556,100	1,206,000	1,429,050	(44,000)	-3.5%	(127,050)	-8.2%
6/30/13-14	1,385,000	1,749,300	1,317,000	1,579,200	(68,000)	-4.9%	(170,100)	-9.7%
6/30/14-15	1,940,000	2,224,950	1,806,000	2,021,250	(134,000)	-6.9%	(203,700)	-9.2%
6/30/15-16	1,919,000	2,269,050	1,736,000	2,005,500	(183,000)	-9.5%	(263,550)	-11.6%
6/30/16-17	2,186,000	2,724,750	2,054,000	2,355,150	(132,000)	-6.0%	(369,600)	-13.6%
6/30/17-18								
Total	62,449,769	66,663,556	61,628,105	65,317,479	(821,664)	-1.3%	(1,346,077)	-2.0%

NOTES:

(2), (3) From prior Aon analysis as of June 30, 2017

(4), (5) From Section 4, Exhibit 2, Page 1, Columns 6, 7

(6) = (4) - (2)

(7) = (4) / (2) - 1

(8) = (5) - (3)

(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Corrections - Cluster 3
Medical

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
444	100.0%	0.8%	0.0%	0.2%	0.1%	1.000	1.000
432	99.2%	0.2%	0.8%	0.0%	0.0%	0.981	0.971
420	99.0%	0.2%	1.0%	0.1%	0.0%	0.950	0.927
408	98.8%	0.2%	1.2%	0.1%	0.0%	0.925	0.891
396	98.6%	0.4%	1.4%	0.1%	0.1%	0.903	0.859
384	98.2%	0.4%	1.8%	0.1%	0.1%	0.893	0.846
372	97.8%	0.4%	2.2%	0.1%	0.1%	0.881	0.830
360	97.4%	0.4%	2.6%	0.1%	0.1%	0.867	0.812
348	97.1%	0.4%	2.9%	0.1%	0.1%	0.853	0.793
336	96.7%	0.4%	3.3%	0.1%	0.1%	0.839	0.774
324	96.3%	0.4%	3.7%	0.1%	0.1%	0.825	0.755
312	95.9%	0.4%	4.1%	0.1%	0.1%	0.811	0.737
300	95.5%	0.4%	4.5%	0.1%	0.1%	0.797	0.719
288	95.1%	0.5%	4.9%	0.2%	0.1%	0.783	0.701
276	94.7%	0.9%	5.3%	0.4%	0.3%	0.773	0.689
264	93.7%	1.6%	6.3%	0.7%	0.5%	0.779	0.698
252	92.1%	1.5%	7.9%	0.6%	0.4%	0.796	0.723
240	90.7%	1.2%	9.3%	0.5%	0.4%	0.799	0.727
228	89.5%	1.2%	10.5%	0.6%	0.4%	0.792	0.717
216	88.3%	0.8%	11.7%	0.4%	0.3%	0.784	0.706
204	87.5%	1.2%	12.5%	0.6%	0.5%	0.768	0.686
192	86.3%	1.1%	13.7%	0.6%	0.5%	0.760	0.675
180	85.2%	1.1%	14.8%	0.6%	0.5%	0.749	0.662
168	84.1%	1.0%	15.9%	0.6%	0.5%	0.739	0.649
156	83.1%	0.8%	16.9%	0.5%	0.4%	0.727	0.634
144	82.3%	1.2%	17.7%	0.7%	0.6%	0.711	0.615
132	81.1%	1.2%	18.9%	0.8%	0.7%	0.702	0.604
120	79.9%	1.3%	20.1%	0.9%	0.8%	0.694	0.594
108	78.5%	1.3%	21.5%	1.0%	0.8%	0.687	0.586
96	77.2%	2.4%	22.8%	1.8%	1.5%	0.679	0.578
84	74.8%	2.8%	25.2%	2.2%	1.9%	0.684	0.585
72	72.0%	3.7%	28.0%	2.9%	2.6%	0.690	0.594
60	68.4%	5.2%	31.6%	4.4%	4.0%	0.700	0.608
48	63.1%	6.8%	36.9%	5.9%	5.6%	0.717	0.630
36	56.3%	11.5%	43.7%	10.4%	9.9%	0.735	0.653
24	44.8%	26.2%	55.2%	24.7%	24.0%	0.763	0.690
12	18.6%	18.6%	81.4%	18.3%	18.1%	0.813	0.754
Total		100.0%					

NOTES:

(2) = 1 / Section 4, Exhibit 2, Page 2, Column 4

(3) Incremental % based on (2)

(4) = 1 - (2)

(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}

(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}

(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Corrections - Cluster 3
Medical

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	491,887	684,429		473,150	658,358
6/30/82-83	0	2,962	0.981	0	2,905
6/30/83-84	0	14,620	0.950	0	13,896
6/30/84-85	2,881	6,881	0.925	2,665	6,365
6/30/85-86	6,668	7,668	0.903	6,018	6,920
6/30/86-87	11,313	12,313	0.893	10,101	10,994
6/30/87-88	25,017	28,017	0.881	22,031	24,673
6/30/88-89	31,816	33,816	0.867	27,591	29,325
6/30/89-90	55,966	56,966	0.853	47,752	48,606
6/30/90-91	89,072	225,272	0.839	74,735	189,013
6/30/91-92	81,136	192,536	0.825	66,922	158,806
6/30/92-93	56,652	57,652	0.811	45,925	46,736
6/30/93-94	71,434	73,434	0.797	56,908	58,501
6/30/94-95	66,935	67,935	0.783	52,397	53,180
6/30/95-96	80,428	83,428	0.773	62,166	64,485
6/30/96-97	118,358	122,358	0.779	92,166	95,281
6/30/97-98	184,831	194,831	0.796	147,207	155,172
6/30/98-99	187,435	196,435	0.799	149,790	156,983
6/30/99-00	234,363	247,363	0.792	185,612	195,907
6/30/00-01	364,672	390,672	0.784	285,770	306,144
6/30/01-02	256,634	268,634	0.768	197,099	206,316
6/30/02-03	343,045	361,045	0.760	260,572	274,244
6/30/03-04	348,767	365,767	0.749	261,343	274,082
6/30/04-05	272,597	508,597	0.739	201,316	375,605
6/30/05-06	186,327	437,327	0.727	135,416	317,833
6/30/06-07	203,896	475,546	0.711	145,012	338,211
6/30/07-08	228,442	446,942	0.702	160,417	313,852
6/30/08-09	229,923	489,323	0.694	159,513	339,476
6/30/09-10	200,234	429,234	0.687	137,494	294,741
6/30/10-11	260,463	462,363	0.679	176,895	314,017
6/30/11-12	350,910	515,960	0.684	239,985	352,862
6/30/12-13	378,753	601,803	0.690	261,361	415,278
6/30/13-14	459,866	722,066	0.700	321,951	505,517
6/30/14-15	665,567	880,817	0.717	477,035	631,313
6/30/15-16	758,495	1,027,995	0.735	557,257	755,255
6/30/16-17	1,048,029	1,349,179	0.763	800,108	1,030,018
6/30/17-18	1,539,963	1,919,063	0.813	1,252,725	1,561,114
Total	9,892,775	13,961,249		7,554,406	10,581,983
			(7) Total Discount Factor:	0.764	0.758

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	491,887	684,429
(9) Projected Number of Years:	2	2
(10) Projected Paid Loss per Year:	245,944	342,214
(11) Discounted Value at 4%:	473,150	658,358

NOTES:

(2), (3) From Section 4, Exhibit 2, Page 1, Columns 8, 9

(4) From Section 4, Exhibit 2, Page 9, Column 7

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Department of Corrections - Cluster 3
Medical

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	491,887	684,429		464,439	646,236
6/30/82-83	0	2,962	0.971	0	2,877
6/30/83-84	0	14,620	0.927	0	13,558
6/30/84-85	2,881	6,881	0.891	2,567	6,131
6/30/85-86	6,668	7,668	0.859	5,730	6,589
6/30/86-87	11,313	12,313	0.846	9,575	10,421
6/30/87-88	25,017	28,017	0.830	20,758	23,247
6/30/88-89	31,816	33,816	0.812	25,821	27,444
6/30/89-90	55,966	56,966	0.793	44,370	45,163
6/30/90-91	89,072	225,272	0.774	68,933	174,338
6/30/91-92	81,136	192,536	0.755	61,268	145,389
6/30/92-93	56,652	57,652	0.737	41,732	42,469
6/30/93-94	71,434	73,434	0.719	51,328	52,765
6/30/94-95	66,935	67,935	0.701	46,911	47,612
6/30/95-96	80,428	83,428	0.689	55,392	57,458
6/30/96-97	118,358	122,358	0.698	82,592	85,383
6/30/97-98	184,831	194,831	0.723	133,577	140,804
6/30/98-99	187,435	196,435	0.727	136,217	142,757
6/30/99-00	234,363	247,363	0.717	168,116	177,441
6/30/00-01	364,672	390,672	0.706	257,627	275,995
6/30/01-02	256,634	268,634	0.686	176,042	184,273
6/30/02-03	343,045	361,045	0.675	231,691	243,849
6/30/03-04	348,767	365,767	0.662	231,055	242,317
6/30/04-05	272,597	508,597	0.649	176,904	330,058
6/30/05-06	186,327	437,327	0.634	118,194	277,411
6/30/06-07	203,896	475,546	0.615	125,361	292,380
6/30/07-08	228,442	446,942	0.604	138,036	270,065
6/30/08-09	229,923	489,323	0.594	136,672	290,867
6/30/09-10	200,234	429,234	0.586	117,422	251,713
6/30/10-11	260,463	462,363	0.578	150,521	267,198
6/30/11-12	350,910	515,960	0.585	205,398	302,006
6/30/12-13	378,753	601,803	0.594	225,101	357,665
6/30/13-14	459,866	722,066	0.608	279,624	439,056
6/30/14-15	665,567	880,817	0.630	419,300	554,906
6/30/15-16	758,495	1,027,995	0.653	495,457	671,497
6/30/16-17	1,048,029	1,349,179	0.690	723,214	931,028
6/30/17-18	1,539,963	1,919,063	0.754	1,161,397	1,447,303
Total	9,892,775	13,961,249		6,788,340	9,477,672
			(7) Total Discount Factor:	0.686	0.679

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	491,887	684,429
(9) Projected Number of Years:	2	2
(10) Projected Paid Loss per Year:	245,944	342,214
(11) Discounted Value at 6%:	464,439	646,236

NOTES:

(2), (3) From Section 4, Exhibit 2, Page 1, Columns 8, 9

(4) From Section 4, Exhibit 2, Page 9, Column 8

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Amherst) - Cluster 4

Indemnity

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		2,313,975			2,600,496	2,703,565	286,521	389,591		
6/30/82-83		134,406	136,183		138,000	140,000	3,594	5,594		
6/30/83-84		188,031	198,628		192,000	196,000	3,969	7,969		
6/30/84-85	176,924	1,942,197	1,974,994	1,968,761	1,969,000	1,975,000	26,803	32,803	1.113	1.116
6/30/85-86	188,662	1,624,227	1,651,539	1,646,603	1,657,000	1,690,000	32,773	65,773	0.878	0.896
6/30/86-87	212,277	2,536,801	2,583,450	2,573,545	2,574,000	2,583,000	37,199	46,199	1.213	1.217
6/30/87-88	243,118	2,413,960	2,464,853	2,458,476	2,458,000	2,465,000	44,040	51,040	1.011	1.014
6/30/88-89	248,990	2,014,686	2,074,723	2,069,365	2,069,000	2,075,000	54,314	60,314	0.831	0.833
6/30/89-90	250,404	522,038	537,550	543,415	533,000	543,000	10,962	20,962	0.213	0.217
6/30/90-91	235,170	2,447,024	2,525,301	2,524,715	2,525,000	2,525,000	77,976	77,976	1.074	1.074
6/30/91-92	235,607	2,560,908	2,646,536	2,645,223	2,645,000	2,647,000	84,092	86,092	1.123	1.123
6/30/92-93	241,161	450,365	461,800	461,717	455,000	473,000	4,635	22,635	0.189	0.196
6/30/93-94	254,321	710,933	734,850	734,347	719,000	747,000	8,067	36,067	0.283	0.294
6/30/94-95	256,665	761,806	790,785	789,992	770,000	800,000	8,194	38,194	0.300	0.312
6/30/95-96	265,739	591,722	616,283	615,660	598,000	622,000	6,278	30,278	0.225	0.234
6/30/96-97	296,336	512,528	539,408	538,740	518,000	539,000	5,473	26,473	0.175	0.182
6/30/97-98	296,982	463,804	483,718	483,605	469,000	487,000	5,196	23,196	0.158	0.164
6/30/98-99	299,530	670,684	702,885	701,934	678,000	705,000	7,316	34,316	0.226	0.235
6/30/99-00	323,627	1,216,150	1,291,638	1,286,966	1,229,000	1,277,000	12,850	60,850	0.380	0.395
6/30/00-01	338,348	1,457,179	1,553,124	1,546,919	1,547,000	1,553,000	89,821	95,821	0.457	0.459
6/30/01-02	329,555	775,348	824,059	822,439	822,000	824,000	46,652	48,652	0.249	0.250
6/30/02-03	329,179	893,733	950,132	948,030	948,000	950,000	54,267	56,267	0.288	0.289
6/30/03-04	344,547	268,295	292,016	293,972	292,000	294,000	23,705	25,705	0.085	0.085
6/30/04-05	325,530	624,705	679,845	671,838	672,000	680,000	47,295	55,295	0.206	0.209
6/30/05-06	403,750	353,027	388,214	412,974	388,000	413,000	34,973	59,973	0.096	0.102
6/30/06-07	420,219	442,769	485,689	509,016	486,000	509,000	43,231	66,231	0.116	0.121
6/30/07-08	425,998	519,052	579,305	597,752	579,000	598,000	59,948	78,948	0.136	0.140
6/30/08-09	420,566	896,558	1,014,548	988,926	989,000	1,015,000	92,442	118,442	0.235	0.241
6/30/09-10	433,206	635,342	719,061	737,039	719,000	737,000	83,658	101,658	0.166	0.170
6/30/10-11	444,673	962,795	1,134,629	1,080,723	1,081,000	1,135,000	118,205	172,205	0.243	0.255
6/30/11-12	467,753	959,557	1,145,653	1,112,802	1,113,000	1,146,000	153,443	186,443	0.238	0.245
6/30/12-13	495,398	582,881	746,446	767,923	746,000	768,000	163,119	185,119	0.151	0.155
6/30/13-14	518,391	498,762	611,131	746,441	611,000	746,000	112,239	247,239	0.118	0.144
6/30/14-15	539,631	782,803	1,280,916	1,216,846	1,217,000	1,409,100	434,197	626,297	0.226	0.261
6/30/15-16	585,875	735,829	1,485,271	1,382,468	1,382,000	1,633,500	646,171	897,671	0.236	0.279
6/30/16-17	594,787	615,205	1,501,719	1,438,356	1,438,000	1,652,200	822,795	1,036,995	0.242	0.278
6/30/17-18	607,484	268,137	1,596,791	1,455,833	1,456,000	1,597,000	1,187,863	1,328,863	0.240	0.263
Total	12,050,403	36,348,221	39,403,670	38,773,359	41,282,496	42,852,365	4,934,275	6,504,144		
Tot 6/30/84-18	12,050,403	33,711,809	39,068,859	38,773,359	38,352,000	39,812,800	4,640,191	6,100,991	0.318	0.330

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) Sum of Section 5, Exhibit 1, Page 2, Column 3 and Section 5, Exhibit 1, Page 9, Column 8

(4) From Section 5, Exhibit 1, Page 2, Column 8

(5) From Section 5, Exhibit 1, Page 3, Column 8

(6), (7) Selected based on (3), (4), and (5)

(8) = (6) - (3)

(9) = (7) - (3)

(10) = (6) / (2) / 10

(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Amherst) - Cluster 4
Indemnity

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Accident Year	Payroll (000's)	Paid Loss Excluding Lump Sum	Paid LDF	Adjstmnt for Extra Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/16-17	Paid Counts 7/1/17-18	Average Outstanding Claim	Average Age
All Prior Yrs		2,225,935							1	1		83
6/30/82-83		134,406	1.013	1.000	136,183	0	136,183		0	0		
6/30/83-84		160,531	1.015	1.050	171,128	27,500	198,628		0	0		
6/30/84-85	176,924	1,898,197	1.017	1.000	1,930,994	44,000	1,974,994	1.116	0	0		
6/30/85-86	188,662	1,414,227	1.019	1.000	1,441,539	210,000	1,651,539	0.875	0	0		
6/30/86-87	212,277	2,184,801	1.021	1.000	2,231,450	352,000	2,583,450	1.217	1	0		
6/30/87-88	243,118	2,175,460	1.023	1.000	2,226,353	238,500	2,464,853	1.014	1	1	50,893	68
6/30/88-89	248,990	1,946,686	1.025	1.000	1,996,211	78,511	2,074,723	0.833	1	1	49,525	69
6/30/89-90	250,404	471,448	1.027	1.000	484,409	53,141	537,550	0.215	0	0		
6/30/90-91	235,170	2,238,524	1.030	1.000	2,304,666	220,636	2,525,301	1.074	1	1	66,141	79
6/30/91-92	235,607	2,311,908	1.032	1.000	2,384,977	261,558	2,646,536	1.123	1	1	73,070	77
6/30/92-93	241,161	292,355	1.034	1.000	302,198	159,601	461,800	0.191	0	0		
6/30/93-94	254,321	580,633	1.036	1.000	601,383	133,467	734,850	0.289	0	0		
6/30/94-95	256,665	624,606	1.041	1.000	650,162	140,624	790,785	0.308	0	0		
6/30/95-96	265,739	475,722	1.046	1.000	497,662	118,621	616,283	0.232	0	0		
6/30/96-97	296,336	472,528	1.051	1.000	496,792	42,616	539,408	0.182	0	0		
6/30/97-98	296,982	320,304	1.057	1.000	338,435	145,282	483,718	0.163	0	0		
6/30/98-99	299,530	477,184	1.062	1.000	506,717	196,168	702,885	0.235	0	1	29,533	69
6/30/99-00	323,627	1,036,650	1.067	1.000	1,106,312	185,325	1,291,638	0.399	0	0		
6/30/00-01	338,348	1,227,179	1.073	1.000	1,316,193	236,931	1,553,124	0.459	1	0		
6/30/01-02	329,555	582,848	1.078	1.000	628,251	195,808	824,059	0.250	0	0		
6/30/02-03	329,179	633,761	1.083	1.000	686,545	263,587	950,132	0.289	1	1	52,784	55
6/30/03-04	344,547	212,295	1.105	1.000	234,501	57,515	292,016	0.085	0	0		
6/30/04-05	325,530	457,755	1.110	1.000	508,287	171,558	679,845	0.209	0	0		
6/30/05-06	403,750	276,027	1.116	1.000	307,963	80,250	388,214	0.096	0	0		
6/30/06-07	420,219	324,328	1.116	1.000	361,853	123,837	485,689	0.116	0	0		
6/30/07-08	425,998	401,552	1.131	1.000	454,146	125,159	579,305	0.136	1	1	52,594	57
6/30/08-09	420,566	733,058	1.139	1.000	834,931	179,617	1,014,548	0.241	1	0		
6/30/09-10	433,206	452,751	1.148	1.000	519,778	199,283	719,061	0.166	1	0		
6/30/10-11	444,673	932,795	1.159	1.000	1,081,439	53,190	1,134,629	0.255	3	3	49,548	62
6/30/11-12	467,753	808,557	1.183	1.000	956,660	188,994	1,145,653	0.245	3	5	29,620	51
6/30/12-13	495,398	564,083	1.245	1.000	702,392	44,054	746,446	0.151	3	2	69,155	58
6/30/13-14	518,391	249,734	1.338	1.000	334,202	276,929	611,131	0.118	3	1	84,468	58
6/30/14-15	539,631	740,167	1.510	1.000	1,117,849	163,067	1,280,916	0.237	6	5	75,536	57
6/30/15-16	585,875	715,829	1.776	1.000	1,271,126	214,145	1,485,271	0.254	20	8	69,412	58
6/30/16-17	594,787	520,205	2.292	1.000	1,192,151	309,568	1,501,719	0.252	66	16	41,997	52
6/30/17-18	607,484	268,137	4.881	1.000	1,308,862	287,929	1,596,791	0.263		76	13,694	48
Total	12,050,403	31,543,166			33,624,700	5,778,970	39,403,670		115	124		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3), (4) From Section 5, Exhibit 1, Page 7

(5) Based on information from the MA WCRIB

(6) = (3) x (4) x (5)

(7) From Section 5, Exhibit 1, Page 9, Column 13

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10), (11) Provided by Commonwealth of Massachusetts

(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Amherst) - Cluster 4
Indemnity

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss Excluding Lump Sum	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	176,924	0.884	1,898,197	1.017	1,924,761	44,000	1,968,761	1.113	1.088
6/30/85-86	188,662	0.626	1,414,227	1.019	1,436,603	210,000	1,646,603	0.873	0.761
6/30/86-87	212,277	0.828	2,184,801	1.021	2,221,545	352,000	2,573,545	1.212	1.047
6/30/87-88	243,118	0.801	2,175,460	1.023	2,219,976	238,500	2,458,476	1.011	0.913
6/30/88-89	248,990	0.715	1,946,686	1.025	1,990,854	78,511	2,069,365	0.831	0.800
6/30/89-90	250,404	0.281	471,448	1.027	490,275	53,141	543,415	0.217	0.196
6/30/90-91	235,170	0.971	2,238,524	1.030	2,304,079	220,636	2,524,715	1.074	0.980
6/30/91-92	235,607	0.994	2,311,908	1.032	2,383,665	261,558	2,645,223	1.123	1.012
6/30/92-93	241,161	0.124	292,355	1.034	302,116	159,601	461,717	0.191	0.125
6/30/93-94	254,321	0.231	580,633	1.036	600,881	133,467	734,347	0.289	0.236
6/30/94-95	256,665	0.245	624,606	1.041	649,368	140,624	789,992	0.308	0.253
6/30/95-96	265,739	0.182	475,722	1.046	497,040	118,621	615,660	0.232	0.187
6/30/96-97	296,336	0.163	472,528	1.051	496,124	42,616	538,740	0.182	0.167
6/30/97-98	296,982	0.113	320,304	1.057	338,323	145,282	483,605	0.163	0.114
6/30/98-99	299,530	0.164	477,184	1.062	505,766	196,168	701,934	0.234	0.169
6/30/99-00	323,627	0.319	1,036,650	1.067	1,101,641	185,325	1,286,966	0.398	0.340
6/30/00-01	338,348	0.362	1,227,179	1.073	1,309,988	236,931	1,546,919	0.457	0.387
6/30/01-02	329,555	0.184	582,848	1.078	626,630	195,808	822,439	0.250	0.190
6/30/02-03	329,179	0.200	633,761	1.083	684,443	263,587	948,030	0.288	0.208
6/30/03-04	344,547	0.074	212,295	1.105	236,457	57,515	293,972	0.085	0.069
6/30/04-05	325,530	0.131	457,755	1.110	500,280	171,558	671,838	0.206	0.154
6/30/05-06	403,750	0.135	276,027	1.116	332,723	80,250	412,974	0.102	0.082
6/30/06-07	420,219	0.140	324,328	1.116	385,179	123,837	509,016	0.121	0.092
6/30/07-08	425,998	0.144	401,552	1.131	472,593	125,159	597,752	0.140	0.111
6/30/08-09	420,566	0.149	733,058	1.139	809,308	179,617	988,926	0.235	0.192
6/30/09-10	433,206	0.152	452,751	1.148	537,756	199,283	737,039	0.170	0.124
6/30/10-11	444,673	0.155	932,795	1.159	1,027,533	53,190	1,080,723	0.243	0.231
6/30/11-12	467,753	0.159	808,557	1.183	923,809	188,994	1,112,802	0.238	0.197
6/30/12-13	495,398	0.164	564,083	1.245	723,869	44,054	767,923	0.155	0.146
6/30/13-14	518,391	0.168	249,734	1.338	469,511	276,929	746,441	0.144	0.091
6/30/14-15	539,631	0.172	740,167	1.510	1,053,779	163,067	1,216,846	0.225	0.195
6/30/15-16	585,875	0.177	715,829	1.776	1,168,323	214,145	1,382,468	0.236	0.199
6/30/16-17	594,787	0.182	520,205	2.292	1,128,788	309,568	1,438,356	0.242	0.190
6/30/17-18	607,484	0.186	268,137	4.881	1,167,904	287,929	1,455,833	0.240	0.192
Total	12,050,403		29,022,294		33,021,889	5,751,470	38,773,359		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 5, Exhibit 1, Page 4, Column 11

(4) From Section 5, Exhibit 1, Page 2, Column 3

(5) From Section 5, Exhibit 1, Page 2, Column 4

(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]

(7) From Section 5, Exhibit 1, Page 9, Column 13

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Amherst) - Cluster 4
Indemnity

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Exp Ult Loss Excluding Lump Sum	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									0.884	0.884
6/30/85-86									0.626	0.626
6/30/86-87									0.828	0.828
6/30/87-88									0.801	0.801
6/30/88-89									0.715	0.715
6/30/89-90									0.281	0.281
6/30/90-91	235,170	2,304,666	0.980	0.983	0.964	1.741	1.678	0.111	1.004	0.971
6/30/91-92	235,607	2,384,977	1.012	1.079	1.092	1.707	1.864	0.103	1.029	0.994
6/30/92-93	241,161	302,198	0.125	1.258	0.158	1.673	0.264	0.090	0.125	0.124
6/30/93-94	254,321	601,383	0.236	1.242	0.294	1.641	0.482	0.093	0.233	0.231
6/30/94-95	256,665	650,162	0.253	1.230	0.312	1.608	0.501	0.096	0.248	0.245
6/30/95-96	265,739	497,662	0.187	1.220	0.229	1.577	0.360	0.099	0.184	0.182
6/30/96-97	296,336	496,792	0.168	1.208	0.203	1.546	0.313	0.102	0.165	0.163
6/30/97-98	296,982	338,435	0.114	1.193	0.136	1.516	0.206	0.105	0.116	0.113
6/30/98-99	299,530	506,717	0.169	1.177	0.199	1.486	0.296	0.109	0.167	0.164
6/30/99-00	323,627	1,106,312	0.342	1.158	0.396	1.457	0.577	0.113	0.322	0.319
6/30/00-01	338,348	1,316,193	0.389	1.129	0.439	1.428	0.627	0.118	0.366	0.362
6/30/01-02	329,555	628,251	0.191	1.107	0.211	1.400	0.295	0.123	0.187	0.184
6/30/02-03	329,179	686,545	0.209	1.103	0.230	1.373	0.316	0.126	0.205	0.200
6/30/03-04	344,547	234,501	0.068	1.103	0.075	1.346	0.101	0.128	0.077	0.074
6/30/04-05	325,530	508,287	0.156	1.096	0.171	1.319	0.226	0.131	0.153	0.131
6/30/05-06	403,750	307,963	0.076	1.085	0.083	1.294	0.107	0.135	0.156	0.135
6/30/06-07	420,219	361,853	0.086	1.073	0.092	1.268	0.117	0.140	0.160	0.140
6/30/07-08	425,998	454,146	0.107	1.061	0.113	1.243	0.141	0.144	0.163	0.144
6/30/08-09	420,566	834,931	0.199	1.049	0.208	1.219	0.254	0.149	0.167	0.149
6/30/09-10	433,206	519,778	0.120	1.045	0.125	1.195	0.150	0.152	0.169	0.152
6/30/10-11	444,673	1,081,439	0.243	1.046	0.254	1.172	0.298	0.155	0.170	0.155
6/30/11-12	467,753	956,660	0.205	1.039	0.213	1.149	0.244	0.159	0.173	0.159
6/30/12-13	495,398	702,392	0.142	1.030	0.146	1.126	0.164	0.164	0.177	0.164
6/30/13-14	518,391	334,202	0.064	1.026	0.066	1.104	0.073	0.168	0.179	0.168
6/30/14-15	539,631	1,117,849	0.207	1.020	0.211	1.082	0.229	0.172	0.182	0.172
6/30/15-16	585,875	1,271,126	0.217	1.013	0.220	1.061	0.233	0.177	0.185	0.177
6/30/16-17	594,787	1,192,151	0.200	1.006	0.202	1.040	0.210	0.182	0.188	0.182
6/30/17-18	607,484	1,308,862	0.215	1.000	0.215	1.020	0.220	0.186		0.186
Total	10,730,028	23,006,433								

Trend Last 4 (ex 17-18):	40.3%	Avg 3 (ex 17-18):	0.224
Trend Last 8 (ex 17-18):	2.1%	Avg 5 (ex 17-18):	0.182
Trend Last 12 (ex 17-18):	5.9%	Avg 10 (ex 17-18):	0.200
Prior Selected Trend:	1.0%	Prior Sel Avg:	0.190
Selected Trend:	2.0%	Sel. Loss Cost:	0.190

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 5, Exhibit 1, Page 2, Column 6

(4) = (3) / (2) / 10

(5) Based on information from the MA WCRIB

(6) = (4) x (5)

(7) Based on Selected Trend from (6)

(8) = (6) x (7)

(9) = Sel. Loss Cost / [(5) * (7)]

(10) From prior Aon analysis as of June 30, 2017

(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Amherst) - Cluster 4
Indemnity

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend	0.940	
(2)	Credibility	14%	
(3)	Average Pmt Trend Statewide	0.960	
(4)	Credibility Weighted Trend	0.957	
		(Low)	(High)
(5)	Selected Range	0.909	0.958
(6)	Incremental Paid for 2018	38,515	38,515
(7)	Estimated Reserve	386,296	881,860
(8)	Paid to Date (82 & Prior)	2,225,935	2,225,935
(9)	Est Ult Paid for 1982 & Prior	2,612,230	3,107,794

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	37,349	36,189
(11)	Projected Number of Years	5	6
(12)	Estimated Reserve	186,747	217,134
(13)	Paid to Date (82 & Prior)	2,225,935	2,187,419
(14)	Est Ult Paid for 1982 & Prior	2,412,681	2,404,553
(14a)	Paid Counts During Fiscal Year	1	1

		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	2,512,456	2,615,525
(16)	Lump Sum Ultimates	88,040	88,040
(17)	Ult Loss Including Lump Sums	**2,600,496**	**2,703,565**
(18)	Implied Tail	1.129	1.175
(19)	Ult Loss Inc Lump Sums @ 6/17	2,570,794	2,652,919

NOTES:

(1) From Section 5, Exhibit 1, Page 6
(2) = (Average of Section 5, Exhibit 1, Page 6, Column 3 / 3,000,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 5, Exhibit 1, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 5, Exhibit 1, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) From Section 5, Exhibit 1, Page 9, Column 13
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2017

Commonwealth of Massachusetts

Workers Compensation

Reserve Analysis at June 30, 2018

University of Massachusetts (Amherst) - Cluster 4

Indemnity

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	105,743	11.569			
1993	2	106,772	11.578	1.010		
1994	3	104,490	11.557	0.979		
1995	4	93,231	11.443	0.892		
1996	5	83,819	11.336	0.899		
1997	6	71,966	11.184	0.859		
1998	7	75,700	11.235	1.052		
1999	8	69,564	11.150	0.919		
2000	9	65,140	11.084	0.936	n =	27
2001	10	69,462	11.149	1.066	S(x) =	54,135
2002	11	72,621	11.193	1.045	S(x-sq) =	108,542,313
2003	12	73,534	11.206	1.013	S(xy) =	589,256
2004	13	73,411	11.204	0.998	S(y) =	294
2005	14	77,899	11.263	1.061	D =	44,226
2006	15	44,021	10.692	0.565	slope =	-0.051
2007	16	28,745	10.266	0.653	Avg Trend =	0.949
2008	17	31,541	10.359	1.097		
2009	18	31,382	10.354	0.995		
2010	19	34,140	10.438	1.088		
2011	20	31,644	10.362	0.927		
2012	21	32,723	10.396	1.034		
2013	22	33,791	10.428	1.033		
2014	23	34,242	10.441	1.013		
2015	24	35,034	10.464	1.023		
2016	25	36,282	10.499	1.036		
2017	26	37,251	10.525	1.027		
2018	27	38,515	10.559	1.062		
					Selected Trend:	**0.940**

NOTES:

(3) 2018 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2017

(4) LN [(3)]

(5) Eg. 2018: 1.062 = 38515 / 37251

Commonwealth of Massachusetts Workers Compensation
University of Massachusetts (Amherst) - Cluster 4
INDEMNITY
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	*12*	*24*	*36*	*48*	*60*	*72*	*84*	*96*	*108*	*120*	*132*	*144*	*156*	*168*	*180*	*192*	*204*	*216*	*228*	*240*	*252*	*264*	*276*	*288*	*300*	*312*	*324*	*336*	*348*	*360*	*372*	*384*	*396*	*408*	*420*	*432*
June-83	9,901	27,199	38,094	47,389	62,514	76,567	110,541	128,600	128,600	128,600	128,600	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406	134,406
June-84	12,002	32,972	46,180	57,447	75,782	92,840	110,643	140,015	147,985	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	160,531	
June-85	96,162	264,176	369,998	460,278	608,898	675,356	769,715	839,890	909,635	972,316	1,027,903	1,068,427	1,096,448	1,126,464	1,157,182	1,193,170	1,230,415	1,270,584	1,311,388	1,352,093	1,394,014	1,437,567	1,483,096	1,530,726	1,581,634	1,636,270	1,687,070	1,738,901	1,792,424	1,846,661	1,902,943	1,898,197	1,898,197	1,898,197		
June-86	62,242	170,991	239,486	289,205	386,115	436,793	545,340	637,721	703,230	742,718	771,694	801,514	833,158	865,475	902,795	941,906	984,064	1,026,987	1,069,806	1,113,907	1,159,474	1,207,370	1,257,125	1,309,416	1,362,366	1,414,227	1,414,227	1,414,227	1,414,227	1,414,227	1,414,227	1,414,227	1,414,227			
June-87	114,930	315,736	434,426	540,241	638,550	728,426	816,220	883,030	959,990	1,087,438	1,157,085	1,228,783	1,294,957	1,353,217	1,408,627	1,466,232	1,524,982	1,583,672	1,643,019	1,705,167	1,769,184	1,838,793	1,908,370	1,966,226	1,996,908	2,028,636	2,061,400	2,094,601	2,128,570	2,165,721	2,184,801	2,184,801				
June-88	145,512	388,262	580,167	742,458	913,661	1,023,389	1,122,499	1,187,899	1,243,915	1,301,898	1,363,345	1,426,364	1,496,845	1,538,376	1,582,716	1,627,788	1,673,942	1,720,105	1,757,371	1,788,805	1,821,696	1,856,017	1,892,584	1,933,305	1,969,091	2,006,043	2,043,490	2,081,803	2,121,480	2,163,997	2,175,460					
June-89	149,323	412,040	585,718	734,611	862,714	940,958	1,000,308	1,091,299	1,155,714	1,209,050	1,258,035	1,312,045	1,364,494	1,425,132	1,470,732	1,496,093	1,522,212	1,550,498	1,578,865	1,608,540	1,639,511	1,670,871	1,702,101	1,734,395	1,767,742	1,801,535	1,836,109	1,871,914	1,908,677	1,946,686						
June-90	147,842	316,313	418,270	483,765	493,004	500,207	470,618	470,618	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448	471,448							
June-91	221,834	616,722	912,374	1,121,784	1,264,030	1,316,233	1,389,392	1,447,121	1,486,680	1,550,949	1,590,832	1,657,948	1,707,507	1,756,977	1,801,084	1,841,720	1,882,581	1,912,600	1,943,013	1,973,183	2,003,226	2,034,294	2,066,375	2,098,884	2,132,145	2,166,591	2,201,958	2,238,524								
June-92	172,146	475,588	707,613	916,461	996,673	1,097,913	1,173,097	1,245,955	1,399,954	1,481,116	1,564,487	1,649,535	1,732,053	1,809,950	1,869,935	1,921,123	1,976,310	2,034,348	2,068,242	2,095,831	2,124,362	2,153,822	2,183,675	2,214,219	2,245,851	2,278,329	2,311,908									
June-93	81,038	222,727	276,572	310,192	330,479	348,662	351,823	276,708	276,708	292,355	292,355	292,355	292,355	292,355	292,355	292,355	292,355	292,355	292,355	292,355	292,355	292,355	292,355	292,355	292,355	292,355										
June-94	106,895	214,659	321,406	344,959	362,159	373,504	398,819	422,133	440,603	460,274	479,091	498,642	518,380	538,584	559,634	580,633	580,633	580,633	580,633	580,633	580,633	580,633	580,633	580,633	580,633											
June-95	150,379	381,117	506,335	558,037	585,924	605,733	622,315	624,606	624,606	624,606	624,606	624,606	624,606	624,606	624,606	624,606	624,606	624,606	624,606	624,606	624,606	624,606	624,606	624,606												
June-96	188,667	308,485	416,852	435,702	459,899	469,932	470,598	475,072	475,222	475,722	475,722	475,722	475,722	475,722	475,722	475,722	475,722	475,722	475,722	475,722	475,722	475,722	475,722													
June-97	106,252	219,810	296,841	353,903	388,354	412,255	429,409	446,564	464,289	472,427	472,427	472,427	472,427	472,427	472,427	472,528	472,528	472,528	472,528	472,528	472,528	472,528														
June-98	89,150	206,061	269,266	292,631	307,643	318,681	318,681	318,681	319,304	320,304	320,304	320,304	320,304	320,304	320,304	320,304	320,304	320,304	320,304	320,304	320,304															
June-99	79,713	235,741	363,483	410,110	440,701	457,432	467,619	476,062	476,685	476,775	476,815	476,815	476,815	477,169	477,169	477,169	477,169	477,169	477,169	477,184																
June-00	199,557	423,727	611,687	721,978	842,583	936,681	993,407	1,021,874	1,036,650	1,036,650	1,036,650	1,036,650	1,036,650	1,036,650	1,036,650	1,036,650	1,036,650	1,036,650	1,036,650																	
June-01	195,155	433,892	620,127	728,970	802,692	874,675	926,705	967,811	1,019,057	1,061,416	1,087,275	1,114,014	1,141,100	1,168,374	1,195,971	1,224,026	1,227,179	1,227,179																		
June-02	134,258	318,384	436,848	510,454	554,485	576,982	577,623	579,568	581,568	581,568	582,625	582,625	582,625	582,625	582,848	582,848	582,848																			
June-03	110,118	229,192	295,970	379,354	446,784	478,317	500,756	523,384	546,666	569,968	589,299	629,649	629,649	629,649	631,034	633,761																				
June-04	119,754	192,578	206,484	211,562	212,295	212,295	212,295	212,295	212,295	212,295	212,295	212,295	212,295	212,295	212,295																					
June-05	118,177	251,133	297,710	349,273	395,191	448,261	457,017	457,755	457,755	457,755	457,755	457,755	457,755	457,755																						
June-06	109,288	227,014	271,354	276,027	276,027	276,027	276,027	276,027	276,027	276,027	276,027	276,027	276,027																							
June-07	130,909	212,144	272,353	307,382	318,762	324,328	324,328	324,328	324,328	324,328	324,328	324,328																								
June-08	136,833	207,607	263,568	288,690	304,525	321,451	336,306	358,096	372,992	387,848	401,552																									
June-09	157,647	372,637	490,926	555,124	656,285	711,812	727,480	727,480	733,058	733,058																										
June-10	84,674	225,140	286,244	344,751	390,834	422,920	446,862	452,751	452,751																											
June-11	203,344	361,140	445,050	584,777	786,089	854,141	910,279	932,795																												
June-12	198,403	427,078	566,988	683,266	722,953	754,568	808,557																													
June-13	283,404	453,488	474,086	499,184	521,030	564,083																														
June-14	158,266	231,996	273,338	249,706	249,734																															
June-15	292,324	484,207	612,308	740,167																																
June-16	271,286	532,156	715,829																																	
June-17	288,081	520,205																																		
June-18	268,137																																			

Age-to-Age Factors

Acc Yr Ending	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*
June-83	2.747	1.401	1.244	1.319	1.225	1.444	1.163	1.000	1.000	1.000	1.045	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
June-84	2.747	1.401	1.244	1.319	1.225	1.192	1.265	1.057	1.085	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
June-85	2.747	1.401	1.244	1.323	1.109	1.140	1.091	1.083	1.069	1.057	1.039	1.026	1.027	1.027	1.031	1.031	1.033	1.032	1.031	1.031	1.031	1.032	1.032	1.033	1.035	1.031	1.031	1.031	1.030	1.030	0.998	1.000	1.000	1.000	
June-86	2.747	1.401	1.208	1.335	1.131	1.249	1.169	1.103	1.056	1.039	1.039	1.039	1.039	1.043	1.043	1.045	1.044	1.042	1.041	1.041	1.041	1.041	1.042	1.040	1.038	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
June-87	2.747	1.376	1.244	1.182	1.141	1.121	1.082	1.087	1.133	1.064	1.062	1.054	1.045	1.041	1.041	1.040	1.038	1.037	1.038	1.038	1.039	1.038	1.030	1.016	1.016	1.016	1.016	1.016	1.017	1.009	1.000				
June-88	2.668	1.494	1.280	1.231	1.120	1.097	1.058	1.047	1.047	1.047	1.046	1.049	1.028	1.029	1.028	1.028	1.028	1.022	1.018	1.018	1.019	1.020	1.022	1.019	1.019	1.019	1.019	1.019	1.020	1.005					
June-89	2.759	1.422	1.254	1.174	1.091	1.063	1.091	1.059	1.046	1.041	1.043	1.040	1.044	1.032	1.017	1.017	1.019	1.018	1.019	1.019	1.019	1.019	1.019	1.019	1.019	1.019	1.020	1.020	1.020						
June-90	2.140	1.322	1.157	1.019	1.015	0.941	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000							
June-91	2.780	1.479	1.230	1.127	1.041	1.056	1.042	1.027	1.043	1.026	1.042	1.030	1.029	1.025	1.023	1.022	1.016	1.016	1.016	1.015	1.016	1.016	1.016	1.016	1.016	1.016	1.017								
June-92	2.763	1.488	1.295	1.088	1.102	1.068	1.062	1.124	1.058	1.056	1.054	1.050	1.045	1.033	1.027	1.029	1.029	1.017	1.013	1.014	1.014	1.014	1.014	1.014	1.014	1.015									
June-93	2.748	1.242	1.122	1.065	1.055	1.009	0.786	1.000	1.057	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000										
June-94	2.008	1.497	1.073	1.050	1.031	1.068	1.058	1.044	1.045	1.041	1.041	1.040	1.039	1.039	1.038	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000											
June-95	2.534	1.329	1.102	1.050	1.034	1.027	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
June-96	1.635	1.351	1.045	1.056	1.022	1.001	1.010	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
June-97	2.069	1.350	1.192	1.097	1.062	1.042	1.040	1.040	1.018	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
June-98	2.311	1.307	1.087	1.051	1.036	1.000	1.000	1.002	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000															
June-99	2.957	1.542	1.128	1.075	1.038	1.022	1.018	1.001	1.000	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000																
June-00	2.123	1.444	1.180	1.167	1.112	1.061	1.029	1.014	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
June-01	2.223	1.429	1.176	1.101	1.090	1.059	1.044	1.053	1.042	1.024	1.025	1.024	1.024	1.024	1.023	1.003	1.000																		
June-02	2.371	1.372	1.168	1.086	1.041	1.001	1.003	1.003	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000																			
June-03	2.081	1.291	1.282	1.178	1.071	1.047	1.045	1.044	1.043	1.034	1.068	1.000	1.000	1.002	1.004																				
June-04	1.608	1.072	1.025	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																					
June-05	2.125	1.185	1.173	1.131	1.134	1.020	1.002	1.000	1.000	1.000	1.000	1.000	1.000																						
June-06	2.077	1.195	1.017	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																							
June-07	1.621	1.284	1.129	1.037	1.017	1.000	1.000	1.000	1.000	1.000	1.000																								
June-08	1.517	1.270	1.095	1.055	1.056	1.046	1.065	1.042	1.040	1.035																									
June-09	2.364	1.317	1.131	1.182	1.085	1.022	1.000	1.008	1.000																										
June-10	2.659	1.271	1.204	1.134	1.082	1.057	1.013	1.000																											
June-11	1.776	1.232	1.314	1.344	1.087	1.066	1.025																												
June-12	2.153	1.328	1.205	1.058	1.044	1.072																													
June-13	1.600	1.045	1.053	1.044	1.083																														
June-14	1.466	1.178	0.914	1.000																															
June-15	1.656	1.265	1.209																																
June-16	1.962	1.345																																	
June-17	1.806																																		

Averages	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*To Ult*
Simple Avg																																				
All Yrs	2.237	1.333	1.164	1.128	1.077	1.066	1.040	1.030	1.029	1.018	1.020	1.015	1.014	1.013	1.013	1.011	1.011	1.010	1.010	1.011	1.012	1.013	1.013	1.013	1.014	1.012	1.011	1.011	1.013	1.007	1.000	1.000	1.000	1.000	1.000	
Latest 5	1.698	1.232	1.139	1.116	1.076	1.052	1.021	1.010	1.008	1.007	1.014	1.000	1.005	1.005	1.006	1.001	1.000	1.000	1.000	1.000	1.000	1.003	1.006	1.006	1.010	1.014	1.014	1.011	1.018	1.009	1.000					
Latest 3	1.808	1.263	1.058	1.034	1.071	1.065	1.013	1.016	1.013	1.012	1.000	1.000	1.000	1.001	1.009	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.005	1.010	1.010	1.012	1.013	1.019	1.005	0.999	1.000	1.000			
Volume Wtd																																				
All Yrs	2.129	1.340	1.176	1.126	1.075	1.058	1.040	1.040	1.036	1.027	1.029	1.025	1.023	1.021	1.020	1.018	1.018	1.017	1.017	1.018	1.019	1.020	1.020	1.019	1.020	1.016	1.016	1.016	1.018	1.011	0.999	1.000	1.000	1.000	1.000	
Latest 5	1.718	1.241	1.162	1.131	1.075	1.054	1.018	1.010	1.007	1.008	1.022	1.000	1.009	1.008	1.008	1.001	1.000	1.000	1.000	1.000	1.000	1.007	1.011	1.011	1.015	1.016	1.017	1.014	1.018	1.011	0.999					
Latest 3	1.804	1.283	1.095	1.043	1.070	1.066	1.014	1.013	1.010	1.014	1.000	1.000	1.000	1.001	1.013	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.010	1.014	1.014	1.016	1.017	1.019	1.005	0.999	1.000	1.000			

Dev Factor Selection																																				
Industry 1	2.946	1.574	1.235	1.110	1.036	1.025	1.016	1.009	1.007	1.006	1.006	1.010	1.003	1.005	1.003	1.004	1.005	1.003																		
Industry 2		1.901	1.354	1.158	1.073	1.026	1.025	1.013	1.006	1.010	1.006	1.014	1.007	1.003	1.003	1.003	1.002	1.006	1.002	1.003																
Prior	*2.130*	*1.275*	*1.174*	*1.141*	*1.073*	*1.038*	*1.016*	*1.010*	*1.008*	*1.007*	*1.014*	*1.005*	*1.005*	*1.005*	*1.020*	*1.005*	*1.005*	*1.005*	*1.005*	*1.005*	*1.005*	*1.005*	*1.005*	*1.005*	*1.002*	*1.002*	*1.002*	*1.002*	*1.002*	*1.002*	*1.002*	*1.002*	*1.002*	*1.002*	*1.013*	
Selected	2.130	1.291	1.176	1.129	1.075	1.052	1.021	1.010	1.008	1.007	1.014	1.000	1.005	1.005	1.020	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.002	1.013	
FacToUlt	4.881	2.292	1.776	1.510	1.338	1.245	1.183	1.159	1.148	1.139	1.131	1.116	1.116	1.110	1.105	1.083	1.078	1.073	1.067	1.062	1.057	1.051	1.046	1.041	1.036	1.034	1.032	1.030	1.027	1.025	1.023	1.021	1.019	1.017	1.015	1.013
Percent of Ult	20.5%	43.6%	56.3%	66.2%	74.7%	80.3%	84.5%	86.3%	87.1%	87.8%	88.4%	89.6%	89.6%	90.1%	90.5%	92.3%	92.8%	93.2%	93.7%	94.2%	94.6%	95.1%	95.6%	96.1%	96.5%	96.7%	96.9%	97.1%	97.3%	97.5%	97.7%	97.9%	98.1%	98.3%	98.5%	98.7%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Amherst) - Cluster 4
Indemnity

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/17		As of 6/18		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	2,570,794	2,652,919	2,600,496	2,703,565	29,702	1.2%	50,646	1.9%
6/30/82-83	138,000	140,000	138,000	140,000	0	0.0%	0	0.0%
6/30/83-84	192,000	196,000	192,000	196,000	0	0.0%	0	0.0%
6/30/84-85	1,969,000	2,265,000	1,969,000	1,975,000	0	0.0%	(290,000)	-12.8%
6/30/85-86	1,657,000	1,690,000	1,657,000	1,690,000	0	0.0%	0	0.0%
6/30/86-87	2,574,000	2,919,000	2,574,000	2,583,000	0	0.0%	(336,000)	-11.5%
6/30/87-88	2,297,000	2,414,000	2,458,000	2,465,000	161,000	7.0%	51,000	2.1%
6/30/88-89	2,021,000	2,123,000	2,069,000	2,075,000	48,000	2.4%	(48,000)	-2.3%
6/30/89-90	533,000	543,000	533,000	543,000	0	0.0%	0	0.0%
6/30/90-91	2,479,000	2,589,000	2,525,000	2,525,000	46,000	1.9%	(64,000)	-2.5%
6/30/91-92	2,602,000	2,717,000	2,645,000	2,647,000	43,000	1.7%	(70,000)	-2.6%
6/30/92-93	455,000	473,000	455,000	473,000	0	0.0%	0	0.0%
6/30/93-94	719,000	747,000	719,000	747,000	0	0.0%	0	0.0%
6/30/94-95	770,000	800,000	770,000	800,000	0	0.0%	0	0.0%
6/30/95-96	598,000	622,000	598,000	622,000	0	0.0%	0	0.0%
6/30/96-97	518,000	539,000	518,000	539,000	0	0.0%	0	0.0%
6/30/97-98	469,000	487,000	469,000	487,000	0	0.0%	0	0.0%
6/30/98-99	678,000	705,000	678,000	705,000	0	0.0%	0	0.0%
6/30/99-00	1,229,000	1,277,000	1,229,000	1,277,000	0	0.0%	0	0.0%
6/30/00-01	1,544,000	1,550,000	1,547,000	1,553,000	3,000	0.2%	3,000	0.2%
6/30/01-02	822,000	823,000	822,000	824,000	0	0.0%	1,000	0.1%
6/30/02-03	956,000	957,000	948,000	950,000	(8,000)	-0.8%	(7,000)	-0.7%
6/30/03-04	292,000	295,000	292,000	294,000	0	0.0%	(1,000)	-0.3%
6/30/04-05	679,000	680,000	672,000	680,000	(7,000)	-1.0%	0	0.0%
6/30/05-06	389,000	423,000	388,000	413,000	(1,000)	-0.3%	(10,000)	-2.4%
6/30/06-07	491,000	527,000	486,000	509,000	(5,000)	-1.0%	(18,000)	-3.4%
6/30/07-08	511,000	543,000	579,000	598,000	68,000	13.3%	55,000	10.1%
6/30/08-09	1,006,000	1,025,000	989,000	1,015,000	(17,000)	-1.7%	(10,000)	-1.0%
6/30/09-10	728,000	757,000	719,000	737,000	(9,000)	-1.2%	(20,000)	-2.6%
6/30/10-11	1,080,000	1,128,000	1,081,000	1,135,000	1,000	0.1%	7,000	0.6%
6/30/11-12	1,116,000	1,137,000	1,113,000	1,146,000	(3,000)	-0.3%	9,000	0.8%
6/30/12-13	738,000	783,000	746,000	768,000	8,000	1.1%	(15,000)	-1.9%
6/30/13-14	645,000	830,000	611,000	746,000	(34,000)	-5.3%	(84,000)	-10.1%
6/30/14-15	1,233,000	1,402,500	1,217,000	1,409,100	(16,000)	-1.3%	6,600	0.5%
6/30/15-16	1,336,000	1,538,900	1,382,000	1,633,500	46,000	3.4%	94,600	6.1%
6/30/16-17	1,462,000	1,668,000	1,438,000	1,652,200	(24,000)	-1.6%	(15,800)	-0.9%
6/30/17-18								
Total	39,496,794	41,966,319	39,826,496	41,255,365	329,702	0.8%	(710,954)	-1.7%

NOTES:

(2), (3) From prior Aon analysis as of June 30, 2017

(4), (5) From Section 5, Exhibit 1, Page 1, Columns 6, 7

(6) = (4) - (2)

(7) = (4) / (2) - 1

(8) = (5) - (3)

(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Amherst) - Cluster 4
Indemnity

Calculation of Ultimate Lump Sum Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Accident Year	Paid Loss Excluding Lump Sum	Implied Cumulative LDF	Ult Loss Excluding Lump Sum	Selected Incr Lump Sum % Outstdg	Cumulative Lump Sum % Outstdg	Total Lump Sum Outstdg	Paid Lump Sum to Date	Est Ult Lump Sum - Incr Method	Ultimate Lump Sum Percentage	Lump Sum LDF	Est Ult Lump Sum - Paid Method	Selected Est Ultimate Lump Sums	Prior Est Ultimate Lump Sums
All Prior Yrs	2,225,935	1.152	2,563,991	0.0%	0.0%	0	88,040	88,040	3.4%	1.000	88,040	88,040	88,040
6/30/82-83	134,406	1.013	136,183	0.0%	0.0%	0	0	0	0.0%	1.000	0	0	0
6/30/83-84	160,531	1.066	171,128	0.0%	0.0%	0	27,500	27,500	16.1%	1.000	27,500	27,500	27,500
6/30/84-85	1,898,197	1.017	1,930,994	0.0%	0.0%	0	44,000	44,000	2.3%	1.000	44,000	44,000	44,000
6/30/85-86	1,414,227	1.019	1,441,539	0.0%	0.0%	0	210,000	210,000	14.6%	1.000	210,000	210,000	210,000
6/30/86-87	2,184,801	1.021	2,231,450	0.0%	0.0%	0	352,000	352,000	15.8%	1.000	352,000	352,000	352,000
6/30/87-88	2,175,460	1.023	2,226,353	0.0%	0.0%	0	238,500	238,500	10.7%	1.000	238,500	238,500	88,500
6/30/88-89	1,946,686	1.025	1,996,211	1.1%	1.1%	21,023	68,000	89,023	4.5%	1.000	68,000	78,511	68,000
6/30/89-90	471,448	1.027	484,409	0.0%	1.1%	5,101	50,590	55,691	11.5%	1.000	50,590	53,141	50,590
6/30/90-91	2,238,524	1.030	2,304,666	0.0%	1.1%	24,271	208,500	232,771	10.1%	1.000	208,500	220,636	208,500
6/30/91-92	2,311,908	1.032	2,384,977	0.0%	1.1%	25,117	249,000	274,117	11.5%	1.000	249,000	261,558	249,000
6/30/92-93	292,355	1.034	302,198	0.0%	1.1%	3,183	158,010	161,193	53.3%	1.000	158,010	159,601	158,010
6/30/93-94	580,633	1.036	601,383	0.0%	1.1%	6,333	130,300	136,633	22.7%	1.000	130,300	133,467	130,300
6/30/94-95	624,606	1.041	650,162	0.0%	1.1%	6,847	137,200	144,047	22.2%	1.000	137,200	140,624	137,200
6/30/95-96	475,722	1.046	497,662	0.0%	1.1%	5,241	116,000	121,241	24.4%	1.000	116,000	118,621	116,000
6/30/96-97	472,528	1.051	496,792	0.0%	1.1%	5,232	40,000	45,232	9.1%	1.000	40,000	42,616	40,000
6/30/97-98	320,304	1.057	338,435	0.0%	1.1%	3,564	143,500	147,064	43.5%	1.000	143,500	145,282	143,500
6/30/98-99	477,184	1.062	506,717	0.0%	1.1%	5,336	193,500	198,836	39.2%	1.000	193,500	196,168	193,500
6/30/99-00	1,036,650	1.067	1,106,312	0.0%	1.1%	11,651	179,500	191,151	17.3%	1.000	179,500	185,325	179,500
6/30/00-01	1,227,179	1.073	1,316,193	0.0%	1.1%	13,861	230,000	243,861	18.5%	1.000	230,000	236,931	230,000
6/30/01-02	582,848	1.078	628,251	0.0%	1.1%	6,616	192,500	199,116	31.7%	1.000	192,500	195,808	192,500
6/30/02-03	633,761	1.083	686,545	0.0%	1.1%	7,230	259,972	267,202	38.9%	1.000	259,972	263,587	261,272
6/30/03-04	212,295	1.105	234,501	0.0%	1.1%	2,470	56,000	58,470	24.9%	1.010	56,560	57,515	56,681
6/30/04-05	457,755	1.110	508,287	0.1%	1.2%	5,861	166,950	172,811	34.0%	1.020	170,306	171,558	170,244
6/30/05-06	276,027	1.116	307,963	0.2%	1.4%	4,167	77,000	81,167	26.4%	1.030	79,333	80,250	79,490
6/30/06-07	324,328	1.116	361,853	0.3%	1.7%	5,982	118,441	124,423	34.4%	1.041	123,250	123,837	123,303
6/30/07-08	401,552	1.131	454,146	0.4%	2.1%	9,324	117,500	126,824	27.9%	1.051	123,494	125,159	67,911
6/30/08-09	733,058	1.139	834,931	0.5%	2.6%	21,317	163,500	184,817	22.1%	1.067	174,418	179,617	180,286
6/30/09-10	452,751	1.148	519,778	0.7%	3.3%	16,909	182,591	199,500	38.4%	1.090	199,067	199,283	201,562
6/30/10-11	932,795	1.159	1,081,439	0.7%	4.0%	42,751	30,000	72,751	6.7%	1.121	33,629	53,190	52,991
6/30/11-12	808,557	1.183	956,660	0.8%	4.8%	45,471	151,000	196,471	20.5%	1.202	181,516	188,994	211,624
6/30/12-13	564,083	1.245	702,392	1.1%	5.8%	41,067	18,798	59,865	8.5%	1.502	28,243	44,054	52,291
6/30/13-14	249,734	1.338	334,202	2.5%	8.3%	27,902	249,027	276,929	82.9%	1.872	466,158	276,929	270,337
6/30/14-15	740,167	1.510	1,117,849	2.4%	10.8%	120,431	42,636	163,067	14.6%	3.243	138,285	163,067	195,753
6/30/15-16	715,829	1.776	1,271,126	4.5%	15.3%	194,145	20,000	214,145	16.8%	5.819	116,382	214,145	202,337
6/30/16-17	520,205	2.292	1,192,151	2.7%	18.0%	214,568	95,000	309,568	26.0%	15.544	1,476,648	309,568	288,497
6/30/17-18	268,137	4.881	1,308,862	4.0%	22.0%	287,929	0	287,929	22.0%	15.544	0	287,929	
Total	31,543,166		36,188,690			1,190,900	4,805,055	5,995,955	16.6%		6,683,900	5,867,010	5,321,219

NOTES:

(2) From Section 5, Exhibit 1, Page 2, Column 3

(3) = (4) / (2)

(4) From Section 5, Exhibit 1, Page 2, Column 6

(5) From Section 5, Exhibit 1, Page 11

(6) Downward sum of (5)

(7) = (6) x (4)

(8) From Section 5, Exhibit 1, Page 10

(9) = (7) + (8)

(10) = (9) / (4)

(11) From Section 5, Exhibit 1, Page 12

(12) = (8) x (11)

(13) Selected based on (9) and (12)

(14) From prior Aon analysis as of June 30, 2017

Commonwealth of Massachusetts Workers Compensation
University of Massachusetts (Amherst) - Cluster 4
INDEMNITY
Lump Sum Development
Incremental Lump Sum Payments

Acc Yr Ending	0-12	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444
All Prior Yrs	0	0	0	0	0	0	0	0	7,000	0	0	0	0	0	54,000	0	0	0	0	0	0	0	0	0	27,040	0	0	0	0	0	0	0	0	0	0	0	0
Jun-83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jun-84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Jun-85	0	0	0	0	0	16,500	0	0	0	0	0	27,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Jun-86	0	0	0	0	0	0	0	0	50,000	0	10,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150,000	0	0	0	0	0	0	0				
Jun-87	0	0	0	0	0	10,000	37,500	0	10,000	0	0	0	19,000	46,500	0	0	0	0	0	0	0	0	0	135,000	0	0	0	0	0	0	94,000	0					
Jun-88	0	0	0	12,500	12,500	0	43,500	0	0	0	0	0	0	0	0	0	0	0	20,000	0	0	0	0	0	0	0	0	0	0	0	150,000						
Jun-89	0	0	0	0	14,000	0	0	9,000	45,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
Jun-90	0	0	0	33,000	8,000	9,590	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								
Jun-91	0	0	0	30,000	20,000	60,000	46,500	0	27,000	0	0	0	0	0	25,000	0	0	0	0	0	0	0	0	0	0	0	0	0									
Jun-92	0	5,000	0	100,500	0	0	0	27,500	0	0	0	0	0	36,000	0	0	0	0	80,000	0	0	0	0	0	0	0	0										
Jun-93	0	20,010	43,000	10,000	0	10,000	0	75,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0											
Jun-94	0	0	0	0	0	0	0	0	0	10,300	0	0	0	0	0	120,000	0	0	0	0	0	0	0	0	0												
Jun-95	0	37,200	35,000	40,000	25,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0													
Jun-96	0	0	16,000	0	25,000	37,500	37,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0														
Jun-97	0	0	0	0	0	0	0	0	0	40,000	0	0	0	0	0	0	0	0	0	0	0	0															
Jun-98	0	0	88,500	0	30,000	25,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																
Jun-99	0	40,000	93,500	27,500	0	22,500	0	0	0	10,000	0	0	0	0	0	0	0	0	0	0																	
Jun-00	0	0	23,000	27,500	75,000	0	24,000	0	30,000	0	0	0	0	0	0	0	0	0	0																		
Jun-01	0	17,500	72,500	50,000	0	30,000	0	0	0	0	0	0	0	0	0	0	60,000	0																			
Jun-02	0	24,000	18,000	52,500	63,000	35,000	0	0	0	0	0	0	0	0	0	0	0																				
Jun-03	0	9,000	26,500	32,000	30,000	92,472	0	0	0	0	70,000	0	0	0	0	0																					
Jun-04	0	6,000	0	0	50,000	0	0	0	0	0	0	0	0	0	0																						
Jun-05	0	24,450	18,500	0	35,000	12,000	65,000	12,000	0	0	0	0	0	0																							
Jun-06	0	35,000	28,000	14,000	0	0	0	0	0	0	0	0	0																								
Jun-07	0	0	0	60,000	40,000	15,000	3,441	0	0	0	0	0																									
Jun-08	0	0	17,500	45,000	0	0	0	0	0	0	55,000																										
Jun-09	0	62,500	30,000	0	0	40,000	31,000	0	0	0																											
Jun-10	0	62,591	25,000	0	30,000	0	0	65,000	0																												
Jun-11	0	0	0	0	20,000	10,000	0	0																													
Jun-12	0	0	51,000	35,000	0	65,000	0																														
Jun-13	0	0	3,798	15,000	0	0																															
Jun-14	0	234,027	0	0	15,000																																
Jun-15	0	30,000	12,636	0																																	
Jun-16	0	0	20,000																																		
Jun-17	0	95,000																																			
Jun-18	0																																				

Cumulative Lump Sum Payments

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444
All Prior Yrs	0	0	0	0	0	0	0	0	7,000	7,000	7,000	7,000	7,000	7,000	61,000	61,000	61,000	61,000	61,000	61,000	61,000	61,000	61,000	61,000	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040
Jun-83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jun-84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500		
Jun-85	0	0	0	0	0	16,500	16,500	16,500	16,500	16,500	16,500	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000			
Jun-86	0	0	0	0	0	0	0	0	50,000	50,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	210,000	210,000	210,000	210,000	210,000	210,000	210,000	210,000				
Jun-87	0	0	0	0	0	10,000	47,500	47,500	57,500	57,500	57,500	57,500	76,500	123,000	123,000	123,000	123,000	123,000	123,000	123,000	123,000	123,000	123,000	258,000	258,000	258,000	258,000	258,000	258,000	258,000	352,000	352,000					
Jun-88	0	0	0	12,500	25,000	25,000	68,500	68,500	68,500	68,500	68,500	68,500	68,500	68,500	68,500	68,500	68,500	68,500	88,500	88,500	88,500	88,500	88,500	88,500	88,500	88,500	88,500	88,500	88,500	238,500							
Jun-89	0	0	0	0	14,000	14,000	14,000	23,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000							
Jun-90	0	0	0	33,000	41,000	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590								
Jun-91	0	0	0	30,000	50,000	110,000	156,500	156,500	183,500	183,500	183,500	183,500	183,500	183,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500									
Jun-92	0	5,000	5,000	105,500	105,500	105,500	105,500	133,000	133,000	133,000	133,000	133,000	133,000	169,000	169,000	169,000	169,000	169,000	249,000	249,000	249,000	249,000	249,000	249,000	249,000	249,000	249,000										
Jun-93	0	20,010	63,010	73,010	73,010	83,010	83,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010											
Jun-94	0	0	0	0	0	0	0	0	0	10,300	10,300	10,300	10,300	10,300	10,300	130,300	130,300	130,300	130,300	130,300	130,300	130,300	130,300	130,300	130,300												
Jun-95	0	37,200	72,200	112,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200													
Jun-96	0	0	16,000	16,000	41,000	78,500	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000														
Jun-97	0	0	0	0	0	0	0	0	0	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000															
Jun-98	0	0	88,500	88,500	118,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500																
Jun-99	0	40,000	133,500	161,000	161,000	183,500	183,500	183,500	183,500	193,500	193,500	193,500	193,500	193,500	193,500	193,500	193,500	193,500	193,500	193,500																	
Jun-00	0	0	23,000	50,500	125,500	125,500	149,500	149,500	179,500	179,500	179,500	179,500	179,500	179,500	179,500	179,500	179,500	179,500	179,500																		
Jun-01	0	17,500	90,000	140,000	140,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	230,000	230,000																			
Jun-02	0	24,000	42,000	94,500	157,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500																				
Jun-03	0	9,000	35,500	67,500	97,500	189,972	189,972	189,972	189,972	189,972	259,972	259,972	259,972	259,972	259,972	259,972																					
Jun-04	0	6,000	6,000	6,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000																						
Jun-05	0	24,450	42,950	42,950	77,950	89,950	154,950	166,950	166,950	166,950	166,950	166,950	166,950	166,950																							
Jun-06	0	35,000	63,000	77,000	77,000	77,000	77,000	77,000	77,000	77,000	77,000	77,000	77,000																								
Jun-07	0	0	0	60,000	100,000	115,000	118,441	118,441	118,441	118,441	118,441	118,441																									
Jun-08	0	0	17,500	62,500	62,500	62,500	62,500	62,500	62,500	62,500	117,500																										
Jun-09	0	62,500	92,500	92,500	92,500	132,500	163,500	163,500	163,500	163,500																											
Jun-10	0	62,591	87,591	87,591	117,591	117,591	117,591	182,591	182,591																												
Jun-11	0	0	0	0	20,000	30,000	30,000	30,000																													
Jun-12	0	0	51,000	86,000	86,000	151,000	151,000																														
Jun-13	0	0	3,798	18,798	18,798	18,798																															
Jun-14	0	234,027	234,027	234,027	249,027																																
Jun-15	0	30,000	42,636	42,636																																	
Jun-16	0	0	20,000																																		
Jun-17	0	95,000																																			
Jun-18	0																																				

Commonwealth of Massachusetts Workers Compensation
University of Massachusetts (Amherst) - Cluster 4
INDEMNITY
Lump Sum Development
Incremental Lump Sums as a % of Ultimate Losses Excluding Lump Sums

Acc Yr Ending	0-12	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444
All Prior Yrs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.000	0.021	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jun-83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Jun-84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.161	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Jun-85	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.000	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
Jun-86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.035	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.104	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Jun-87	0.000	0.000	0.000	0.000	0.000	0.004	0.017	0.000	0.004	0.000	0.000	0.000	0.009	0.021	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.060	0.000	0.000	0.000	0.000	0.000	0.000	0.042	0.000					
Jun-88	0.000	0.000	0.000	0.006	0.006	0.000	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.067						
Jun-89	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.005	0.023	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000							
Jun-90	0.000	0.000	0.000	0.068	0.017	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000								
Jun-91	0.000	0.000	0.000	0.013	0.009	0.026	0.020	0.000	0.012	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000									
Jun-92	0.000	0.002	0.000	0.042	0.000	0.000	0.000	0.012	0.000	0.000	0.000	0.000	0.000	0.015	0.000	0.000	0.000	0.000	0.034	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000										
Jun-93	0.000	0.066	0.142	0.033	0.000	0.033	0.000	0.248	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000											
Jun-94	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.017	0.000	0.000	0.000	0.000	0.000	0.200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000												
Jun-95	0.000	0.057	0.054	0.062	0.038	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000													
Jun-96	0.000	0.000	0.032	0.000	0.050	0.075	0.075	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000														
Jun-97	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.081	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
Jun-98	0.000	0.000	0.261	0.000	0.089	0.074	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																
Jun-99	0.000	0.079	0.185	0.054	0.000	0.044	0.000	0.000	0.000	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																	
Jun-00	0.000	0.000	0.021	0.025	0.068	0.000	0.022	0.000	0.027	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																		
Jun-01	0.000	0.013	0.055	0.038	0.000	0.023	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.046	0.000																			
Jun-02	0.000	0.038	0.029	0.084	0.100	0.056	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																				
Jun-03	0.000	0.013	0.039	0.047	0.044	0.135	0.000	0.000	0.000	0.000	0.102	0.000	0.000	0.000	0.000	0.000																					
Jun-04	0.000	0.026	0.000	0.000	0.213	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																						
Jun-05	0.000	0.048	0.036	0.000	0.069	0.024	0.128	0.024	0.000	0.000	0.000	0.000	0.000	0.000																							
Jun-06	0.000	0.114	0.091	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
Jun-07	0.000	0.000	0.000	0.166	0.111	0.041	0.010	0.000	0.000	0.000	0.000	0.000																									
Jun-08	0.000	0.000	0.039	0.099	0.000	0.000	0.000	0.000	0.000	0.000	0.121																										
Jun-09	0.000	0.075	0.036	0.000	0.000	0.048	0.037	0.000	0.000	0.000																											
Jun-10	0.000	0.120	0.048	0.000	0.058	0.000	0.000	0.125	0.000																												
Jun-11	0.000	0.000	0.000	0.000	0.018	0.009	0.000	0.000																													
Jun-12	0.000	0.000	0.053	0.037	0.000	0.068	0.000																														
Jun-13	0.000	0.000	0.005	0.021	0.000	0.000																															
Jun-14	0.000	0.700	0.000	0.000	0.045																																
Jun-15	0.000	0.027	0.011	0.000																																	
Jun-16	0.000	0.000	0.016																																		
Jun-17	0.000	0.080																																			
Jun-18	0.000																																				

Averages		12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444
Simple Avg																																					
All Yrs (ex P)	0.000	0.042	0.034	0.025	0.029	0.022	0.011	0.014	0.004	0.004	0.009	0.001	0.000	0.002	0.000	0.010	0.010	0.000	0.002	0.000	0.000	0.000	0.000	0.005	0.000	0.009	0.000	0.000	0.000	0.018	0.000	0.000	0.000	0.000	0.000		
Latest 5	0.000	0.161	0.017	0.012	0.024	0.025	0.007	0.025	0.000	0.000	0.024	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.000					
Latest 3	0.000	0.036	0.009	0.007	0.015	0.026	0.000	0.042	0.000	0.000	0.040	0.000	0.000	0.000	0.000	0.000	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.036	0.000	0.000	0.000			
Olympic Avg																																					
All Yrs (ex P)	0.000	0.023	0.028	0.022	0.024	0.019	0.007	0.006	0.003	0.001	0.005	0.000	0.000	0.001	0.000	0.000	0.003	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.000				
Latest 10	0.000	0.038	0.019	0.025	0.024	0.015	0.006	0.003	0.000	0.000	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000										
Latest 5	0.000	0.036	0.011	0.007	0.021	0.019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.000					

Dev Factor Selection																																					
Prior	NA	0.040	0.027	0.045	0.023	0.025	0.011	0.008	0.007	0.007	0.005	0.004	0.003	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Selected	NA	0.040	0.027	0.045	0.024	0.025	0.011	0.008	0.007	0.007	0.005	0.004	0.003	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.000
FacToUlt	NA	0.220	0.180	0.153	0.108	0.083	0.058	0.048	0.040	0.033	0.026	0.021	0.017	0.014	0.012	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.000	0.000	0.000	0.000	0.000	0.000

Commonwealth of Massachusetts Workers Compensation
University of Massachusetts (Amherst) - Cluster 4
INDEMNITY
Paid Loss Development
Paid Loss - Lump Sum only

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444
All Prior Yrs	0	0	0	0	0	0	0	0	7,000	7,000	7,000	7,000	7,000	7,000	61,000	61,000	61,000	61,000	61,000	61,000	61,000	61,000	61,000	61,000	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040	88,040
Jun-83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jun-84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500			
Jun-85	0	0	0	0	0	16,500	16,500	16,500	16,500	16,500	16,500	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000	44,000				
Jun-86	0	0	0	0	0	0	0	0	50,000	50,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	210,000	210,000	210,000	210,000	210,000	210,000	210,000	210,000				
Jun-87	0	0	0	0	0	10,000	47,500	47,500	57,500	57,500	57,500	57,500	76,500	123,000	123,000	123,000	123,000	123,000	123,000	123,000	123,000	123,000	123,000	258,000	258,000	258,000	258,000	258,000	258,000	258,000	352,000	352,000					
Jun-88	0	0	0	12,500	25,000	25,000	68,500	68,500	68,500	68,500	68,500	68,500	68,500	68,500	68,500	68,500	68,500	68,500	88,500	88,500	88,500	88,500	88,500	88,500	88,500	88,500	88,500	88,500	88,500	88,500	238,500						
Jun-89	0	0	0	0	14,000	14,000	14,000	23,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000	68,000							
Jun-90	0	0	0	33,000	41,000	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590	50,590								
Jun-91	0	0	0	30,000	50,000	110,000	156,500	156,500	183,500	183,500	183,500	183,500	183,500	183,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500	208,500									
Jun-92	0	5,000	5,000	105,500	105,500	105,500	105,500	133,000	133,000	133,000	133,000	133,000	133,000	169,000	169,000	169,000	169,000	169,000	249,000	249,000	249,000	249,000	249,000	249,000	249,000	249,000	249,000										
Jun-93	0	20,010	63,010	73,010	73,010	83,010	83,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010	158,010											
Jun-94	0	0	0	0	0	0	0	0	0	10,300	10,300	10,300	10,300	10,300	10,300	130,300	130,300	130,300	130,300	130,300	130,300	130,300	130,300	130,300	130,300												
Jun-95	0	37,200	72,200	112,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200	137,200													
Jun-96	0	0	16,000	16,000	41,000	78,500	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000	116,000														
Jun-97	0	0	0	0	0	0	0	0	0	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000															
Jun-98	0	0	88,500	88,500	118,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500	143,500																
Jun-99	0	40,000	133,500	161,000	161,000	183,500	183,500	183,500	183,500	193,500	193,500	193,500	193,500	193,500	193,500	193,500	193,500	193,500	193,500	193,500																	
Jun-00	0	0	23,000	50,500	125,500	125,500	149,500	149,500	179,500	179,500	179,500	179,500	179,500	179,500	179,500	179,500	179,500	179,500	179,500																		
Jun-01	0	17,500	90,000	140,000	140,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	170,000	230,000	230,000																			
Jun-02	0	24,000	42,000	94,500	157,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500	192,500																				
Jun-03	0	9,000	35,500	67,500	97,500	189,972	189,972	189,972	189,972	189,972	259,972	259,972	259,972	259,972	259,972	259,972																					
Jun-04	0	6,000	6,000	6,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000	56,000																						
Jun-05	0	24,450	42,950	42,950	77,950	89,950	154,950	166,950	166,950	166,950	166,950	166,950	166,950	166,950																							
Jun-06	0	35,000	63,000	77,000	77,000	77,000	77,000	77,000	77,000	77,000	77,000	77,000	77,000																								
Jun-07	0	0	0	60,000	100,000	115,000	118,441	118,441	118,441	118,441	118,441	118,441																									
Jun-08	0	0	17,500	62,500	62,500	62,500	62,500	62,500	62,500	62,500	117,500																										
Jun-09	0	62,500	92,500	92,500	92,500	132,500	163,500	163,500	163,500	163,500																											
Jun-10	0	62,591	87,591	87,591	117,591	117,591	117,591	182,591	182,591																												
Jun-11	0	0	0	0	20,000	30,000	30,000	30,000																													
Jun-12	0	0	51,000	86,000	86,000	151,000	151,000																														
Jun-13	0	0	3,798	18,798	18,798	18,798																															
Jun-14	0	234,027	234,027	234,027	249,027																																
Jun-15	0	30,000	42,636	42,636																																	
Jun-16	0	0	20,000																																		
Jun-17	0	95,000																																			
Jun-18	0																																				

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	To Ult
All Prior Yrs									1.000	1.000	1.000	1.000	1.000	8.714	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.443	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Jun-83																																					
Jun-84																	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Jun-85						1.000	1.000	1.000	1.000	1.000	2.667	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
Jun-86									1.000	1.200	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	3.500	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Jun-87						4.750	1.000	1.211	1.000	1.000	1.000	1.330	1.608	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	2.098	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.364	1.000						
Jun-88				2.000	1.000	2.740	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.292	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	2.695							
Jun-89					1.000	1.000	1.643	2.957	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000								
Jun-90				1.242	1.234	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000									
Jun-91				1.667	2.200	1.423	1.000	1.173	1.000	1.000	1.000	1.000	1.000	1.136	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000									
Jun-92		1.000	21.100	1.000	1.000	1.000	1.261	1.000	1.000	1.000	1.000	1.000	1.271	1.000	1.000	1.000	1.000	1.473	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000											
Jun-93		3.149	1.159	1.000	1.137	1.000	1.904	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
Jun-94										1.000	1.000	1.000	1.000	1.000	12.650	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
Jun-95		1.941	1.554	1.223	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
Jun-96			1.000	2.563	1.915	1.478	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000															
Jun-97										1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																
Jun-98			1.000	1.339	1.211	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
Jun-99		3.338	1.206	1.000	1.140	1.000	1.000	1.000	1.054	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																		
Jun-00			2.196	2.485	1.000	1.191	1.000	1.201	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																			
Jun-01		5.143	1.556	1.000	1.214	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.353	1.000																				
Jun-02		1.750	2.250	1.667	1.222	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																					
Jun-03		3.944	1.901	1.444	1.948	1.000	1.000	1.000	1.000	1.368	1.000	1.000	1.000	1.000	1.000																						
Jun-04		1.000	1.000	9.333	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																							
Jun-05		1.757	1.000	1.815	1.154	1.723	1.077	1.000	1.000	1.000	1.000	1.000	1.000																								
Jun-06		1.800	1.222	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																									
Jun-07				1.667	1.150	1.030	1.000	1.000	1.000	1.000	1.000																										
Jun-08			3.571	1.000	1.000	1.000	1.000	1.000	1.000	1.880																											
Jun-09		1.480	1.000	1.000	1.432	1.234	1.000	1.000	1.000																												
Jun-10		1.399	1.000	1.343	1.000	1.000	1.553	1.000																													
Jun-11					1.500	1.000	1.000																														
Jun-12			1.686	1.000	1.756	1.000																															
Jun-13			4.950	1.000	1.000																																
Jun-14		1.000	1.000	1.064																																	
Jun-15		1.421	1.000																																		
Jun-16																																					
Jun-17																																					

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	To Ult
Simple Avg																																					
All Yrs (ex P)		2.152	2.618	1.733	1.259	1.303	1.102	1.110	1.002	1.060	1.072	1.015	1.042	1.007	1.613	1.020	1.000	1.045	1.000	1.000	1.000	1.000	1.091	1.000	1.250	1.000	1.000	1.000	1.000	1.412	1.000	1.000	1.000	1.000			
Latest 5		1.211	2.159	1.102	1.338	1.047	1.111	1.000	1.000	1.176	1.000	1.000	1.000	1.000	1.000	1.071	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.412	1.000						
Latest 3		1.211	2.317	1.021	1.419	1.000	1.184	1.000	1.000	1.293	1.000	1.000	1.000	1.000	1.000	1.118	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.686	1.000	1.000	1.000				
Volume Wtd																																					
All Yrs (ex P)		2.025	1.483	1.281	1.246	1.117	1.072	1.059	1.022	1.051	1.010	1.007	1.033	1.010	1.050	1.039	1.000	1.052	1.000	1.000	1.000	1.000	1.100	1.000	1.124	1.000	1.000	1.000	1.000	1.389	1.000	1.000	1.000	1.000			
Latest 5		1.331	1.151	1.152	1.343	1.063	1.132	1.000	1.000	1.114	1.000	1.000	1.000	1.000	1.000	1.068	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.389	1.000	1.000					
Latest 3		1.124	1.053	1.044	1.601	1.000	1.209	1.000	1.000	1.213	1.000	1.000	1.000	1.000	1.000	1.111	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.438	1.000	1.000	1.000				

Dev Factor Selection																																					
Prior	1.000	2.671	1.794	1.763	1.248	1.250	1.073	1.030	1.023	1.015	1.010	1.010	1.010	1.010	1.010	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Selected	1.000	2.671	1.794	1.733	1.246	1.250	1.072	1.028	1.022	1.015	1.010	1.010	1.010	1.010	1.010	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
FacToUlt	15.544	15.544	5.819	3.243	1.872	1.502	1.202	1.121	1.090	1.067	1.051	1.041	1.030	1.020	1.010	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Percent of Ult	6.4%	6.4%	17.2%	30.8%	53.4%	66.6%	83.2%	89.2%	91.7%	93.7%	95.1%	96.1%	97.1%	98.0%	99.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Amherst) - Cluster 4
Indemnity

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
444	100.0%	1.3%	0.0%	0.3%	0.2%	1.000	1.000
432	98.7%	0.2%	1.3%	0.0%	0.0%	0.981	0.971
420	98.5%	0.2%	1.5%	0.1%	0.0%	0.948	0.924
408	98.3%	0.2%	1.7%	0.1%	0.0%	0.919	0.883
396	98.1%	0.2%	1.9%	0.1%	0.0%	0.894	0.847
384	97.9%	0.2%	2.1%	0.1%	0.0%	0.871	0.815
372	97.7%	0.2%	2.3%	0.1%	0.0%	0.850	0.786
360	97.5%	0.2%	2.5%	0.1%	0.0%	0.830	0.760
348	97.3%	0.2%	2.7%	0.1%	0.0%	0.811	0.735
336	97.1%	0.2%	2.9%	0.1%	0.0%	0.794	0.713
324	96.9%	0.2%	3.1%	0.1%	0.0%	0.777	0.691
312	96.7%	0.2%	3.3%	0.1%	0.0%	0.761	0.671
300	96.5%	0.5%	3.5%	0.2%	0.1%	0.746	0.652
288	96.1%	0.5%	3.9%	0.2%	0.1%	0.749	0.659
276	95.6%	0.5%	4.4%	0.2%	0.1%	0.748	0.659
264	95.1%	0.5%	4.9%	0.2%	0.1%	0.745	0.656
252	94.6%	0.5%	5.4%	0.2%	0.1%	0.740	0.650
240	94.2%	0.5%	5.8%	0.2%	0.2%	0.733	0.642
228	93.7%	0.5%	6.3%	0.2%	0.2%	0.725	0.633
216	93.2%	0.5%	6.8%	0.2%	0.2%	0.717	0.623
204	92.8%	0.5%	7.2%	0.2%	0.2%	0.708	0.612
192	92.3%	1.8%	7.7%	1.0%	0.7%	0.699	0.601
180	90.5%	0.5%	9.5%	0.3%	0.2%	0.730	0.643
168	90.1%	0.4%	9.9%	0.3%	0.2%	0.715	0.624
156	89.6%	0.0%	10.4%	0.0%	0.0%	0.700	0.605
144	89.6%	1.2%	10.4%	0.8%	0.6%	0.673	0.570
132	88.4%	0.6%	11.6%	0.4%	0.3%	0.682	0.583
120	87.8%	0.7%	12.2%	0.5%	0.4%	0.672	0.572
108	87.1%	0.8%	12.9%	0.6%	0.5%	0.664	0.563
96	86.3%	1.7%	13.7%	1.3%	1.1%	0.660	0.558
84	84.5%	4.2%	15.5%	3.3%	2.9%	0.673	0.576
72	80.3%	5.6%	19.7%	4.5%	4.1%	0.719	0.635
60	74.7%	8.5%	25.3%	7.1%	6.5%	0.755	0.681
48	66.2%	9.9%	33.8%	8.6%	8.1%	0.790	0.726
36	56.3%	12.7%	43.7%	11.5%	11.0%	0.810	0.749
24	43.6%	23.1%	56.4%	21.8%	21.2%	0.824	0.766
12	20.5%	20.5%	79.5%	20.1%	19.9%	0.847	0.795
Total		100.0%					

NOTES:

(2) = 1 / Section 5, Exhibit 1, Page 2, Column 4

(3) Incremental % based on (2)

(4) = 1 - (2)

(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}

(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}

(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Amherst) - Cluster 4
Indemnity

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	286,521	389,591		260,210	353,815
6/30/82-83	3,594	5,594	0.981	3,524	5,485
6/30/83-84	3,969	7,969	0.948	3,762	7,553
6/30/84-85	26,803	32,803	0.919	24,642	30,159
6/30/85-86	32,773	65,773	0.894	29,300	58,802
6/30/86-87	37,199	46,199	0.871	32,399	40,237
6/30/87-88	44,040	51,040	0.850	37,420	43,368
6/30/88-89	54,314	60,314	0.830	45,074	50,053
6/30/89-90	10,962	20,962	0.811	8,893	17,005
6/30/90-91	77,976	77,976	0.794	61,882	61,882
6/30/91-92	84,092	86,092	0.777	65,327	66,881
6/30/92-93	4,635	22,635	0.761	3,527	17,222
6/30/93-94	8,067	36,067	0.746	6,014	26,888
6/30/94-95	8,194	38,194	0.749	6,138	28,610
6/30/95-96	6,278	30,278	0.748	4,699	22,663
6/30/96-97	5,473	26,473	0.745	4,078	19,725
6/30/97-98	5,196	23,196	0.740	3,844	17,160
6/30/98-99	7,316	34,316	0.733	5,363	25,156
6/30/99-00	12,850	60,850	0.725	9,321	44,140
6/30/00-01	89,821	95,821	0.717	64,402	68,704
6/30/01-02	46,652	48,652	0.708	33,035	34,451
6/30/02-03	54,267	56,267	0.699	37,926	39,324
6/30/03-04	23,705	25,705	0.730	17,306	18,766
6/30/04-05	47,295	55,295	0.715	33,825	39,546
6/30/05-06	34,973	59,973	0.700	24,473	41,968
6/30/06-07	43,231	66,231	0.673	29,088	44,564
6/30/07-08	59,948	78,948	0.682	40,877	53,832
6/30/08-09	92,442	118,442	0.672	62,136	79,612
6/30/09-10	83,658	101,658	0.664	55,574	67,531
6/30/10-11	118,205	172,205	0.660	78,002	113,635
6/30/11-12	153,443	186,443	0.673	103,315	125,535
6/30/12-13	163,119	185,119	0.719	117,225	133,036
6/30/13-14	112,239	247,239	0.755	84,738	186,659
6/30/14-15	434,197	626,297	0.790	343,056	494,832
6/30/15-16	646,171	897,671	0.810	523,239	726,892
6/30/16-17	822,795	1,036,995	0.824	678,017	854,527
6/30/17-18	1,187,863	1,328,863	0.847	1,006,297	1,125,745
Total	4,934,275	6,504,144		3,947,948	5,185,967
			(7) Total Discount Factor:	0.800	0.797

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	286,521	389,591
(9) Projected Number of Years:	5	5
(10) Projected Paid Loss per Year:	57,304	77,918
(11) Discounted Value at 4%:	260,210	353,815

NOTES:

(2), (3) From Section 5, Exhibit 1, Page 1, Columns 8, 9

(4) From Section 5, Exhibit 1, Page 13, Column 7

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Amherst) - Cluster 4
Indemnity

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	286,521	389,591		248,628	338,066
6/30/82-83	3,594	5,594	0.971	3,491	5,433
6/30/83-84	3,969	7,969	0.924	3,665	7,360
6/30/84-85	26,803	32,803	0.883	23,663	28,960
6/30/85-86	32,773	65,773	0.847	27,765	55,722
6/30/86-87	37,199	46,199	0.815	30,330	37,668
6/30/87-88	44,040	51,040	0.786	34,636	40,142
6/30/88-89	54,314	60,314	0.760	41,278	45,838
6/30/89-90	10,962	20,962	0.735	8,062	15,417
6/30/90-91	77,976	77,976	0.713	55,567	55,567
6/30/91-92	84,092	86,092	0.691	58,125	59,507
6/30/92-93	4,635	22,635	0.671	3,110	15,189
6/30/93-94	8,067	36,067	0.652	5,259	23,515
6/30/94-95	8,194	38,194	0.659	5,397	25,155
6/30/95-96	6,278	30,278	0.659	4,139	19,961
6/30/96-97	5,473	26,473	0.656	3,590	17,365
6/30/97-98	5,196	23,196	0.650	3,377	15,077
6/30/98-99	7,316	34,316	0.642	4,697	22,034
6/30/99-00	12,850	60,850	0.633	8,134	38,516
6/30/00-01	89,821	95,821	0.623	55,952	59,689
6/30/01-02	46,652	48,652	0.612	28,564	29,789
6/30/02-03	54,267	56,267	0.601	32,629	33,831
6/30/03-04	23,705	25,705	0.643	15,248	16,535
6/30/04-05	47,295	55,295	0.624	29,518	34,511
6/30/05-06	34,973	59,973	0.605	21,144	36,259
6/30/06-07	43,231	66,231	0.570	24,658	37,776
6/30/07-08	59,948	78,948	0.583	34,973	46,057
6/30/08-09	92,442	118,442	0.572	52,855	67,721
6/30/09-10	83,658	101,658	0.563	47,069	57,197
6/30/10-11	118,205	172,205	0.558	65,962	96,096
6/30/11-12	153,443	186,443	0.576	88,434	107,452
6/30/12-13	163,119	185,119	0.635	103,601	117,574
6/30/13-14	112,239	247,239	0.681	76,477	168,462
6/30/14-15	434,197	626,297	0.726	315,037	454,417
6/30/15-16	646,171	897,671	0.749	484,291	672,785
6/30/16-17	822,795	1,036,995	0.766	630,666	794,849
6/30/17-18	1,187,863	1,328,863	0.795	944,779	1,056,925
Total	4,934,275	6,504,144		3,624,771	4,754,419
			(7) Total Discount Factor:	0.735	0.731

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	286,521	389,591
(9) Projected Number of Years:	5	5
(10) Projected Paid Loss per Year:	57,304	77,918
(11) Discounted Value at 6%:	248,628	338,066

NOTES:

(2), (3) From Section 5, Exhibit 1, Page 1, Columns 8, 9

(4) From Section 5, Exhibit 1, Page 13, Column 8

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Amherst) - Cluster 4
Total Indemnity (Including Lump Sums) + Medical

Calculation of Fiscal Year 7/01/18 - 19 Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
						Cumulative	Incremental Paid		Estimated Payments from		FY 07/01/18 - 06/30/19	
Accident	Est Ult Losses	Est Ult Losses	Paid Losses	Reserves	Reserves	Percent	as a % of	as a % of	07/01/18 - 06/30/19		as a % of Reserves	
Year	(Low)	(High)	to Date	(Low)	(High)	Paid	Ultimates	Reserves	(Low)	(High)	(Low)	(High)
All Prior Yrs	5,200,992	5,407,131	4,627,949	573,042	779,182				36,204	39,825	6.3%	5.1%
6/30/82-83	276,000	280,000	268,812	7,188	11,188	96.7%	0.3%	9.1%	652	1,016	9.1%	9.1%
6/30/83-84	384,000	392,000	376,062	7,938	15,938	96.9%	0.3%	9.8%	774	1,554	9.8%	9.8%
6/30/84-85	3,938,000	3,950,000	3,884,393	53,607	65,607	98.5%	0.5%	33.1%	17,735	21,705	33.1%	33.1%
6/30/85-86	3,314,000	3,380,000	3,248,453	65,547	131,547	97.1%	0.5%	17.0%	11,131	22,339	17.0%	17.0%
6/30/86-87	5,148,000	5,166,000	5,073,602	74,398	92,398	98.4%	0.5%	30.9%	23,002	28,568	30.9%	30.9%
6/30/87-88	4,916,000	4,930,000	4,827,920	88,080	102,080	98.1%	0.5%	25.9%	22,803	26,427	25.9%	25.9%
6/30/88-89	4,138,000	4,150,000	4,029,372	108,628	120,628	97.2%	0.5%	18.1%	19,635	21,805	18.1%	18.1%
6/30/89-90	1,066,000	1,086,000	1,044,076	21,924	41,924	97.0%	0.5%	16.9%	3,695	7,065	16.9%	16.9%
6/30/90-91	5,050,000	5,050,000	4,894,049	155,951	155,951	96.9%	0.5%	16.2%	25,250	25,250	16.2%	16.2%
6/30/91-92	5,290,000	5,294,000	5,121,815	168,185	172,185	96.8%	0.5%	15.5%	26,149	26,771	15.5%	15.5%
6/30/92-93	910,000	946,000	900,730	9,270	45,270	97.1%	0.5%	17.0%	1,577	7,703	17.0%	17.0%
6/30/93-94	1,438,000	1,494,000	1,421,867	16,133	72,133	97.0%	0.5%	16.6%	2,680	11,980	16.6%	16.6%
6/30/94-95	1,540,000	1,600,000	1,523,612	16,388	76,388	97.0%	0.5%	16.9%	2,773	12,927	16.9%	16.9%
6/30/95-96	1,196,000	1,244,000	1,183,444	12,556	60,556	97.0%	0.5%	16.7%	2,095	10,105	16.7%	16.7%
6/30/96-97	1,036,000	1,078,000	1,025,055	10,945	52,945	97.0%	0.5%	16.5%	1,811	8,759	16.5%	16.5%
6/30/97-98	938,000	974,000	927,608	10,392	46,392	97.0%	0.5%	16.8%	1,750	7,810	16.8%	16.8%
6/30/98-99	1,356,000	1,410,000	1,341,369	14,631	68,631	97.0%	0.5%	16.6%	2,430	11,400	16.6%	16.6%
6/30/99-00	2,458,000	2,554,000	2,432,300	25,700	121,700	97.1%	0.5%	17.0%	4,369	20,691	17.0%	17.0%
6/30/00-01	3,094,000	3,106,000	2,914,358	179,642	191,642	94.0%	1.0%	16.7%	29,998	32,002	16.7%	16.7%
6/30/01-02	1,644,000	1,648,000	1,550,696	93,304	97,304	94.2%	1.0%	17.3%	16,115	16,805	17.3%	17.3%
6/30/02-03	1,896,000	1,900,000	1,787,465	108,535	112,535	94.2%	2.0%	34.3%	37,273	38,647	34.3%	34.3%
6/30/03-04	584,000	588,000	536,589	47,411	51,411	91.6%	2.0%	23.7%	11,246	12,194	23.7%	23.7%
6/30/04-05	1,344,000	1,360,000	1,249,410	94,590	110,590	92.4%	2.0%	26.4%	24,931	29,149	26.4%	26.4%
6/30/05-06	776,000	826,000	706,055	69,945	119,945	88.1%	2.0%	16.9%	11,802	20,238	16.9%	16.9%
6/30/06-07	972,000	1,018,000	885,539	86,461	132,461	89.0%	2.0%	18.2%	15,719	24,081	18.2%	18.2%
6/30/07-08	1,158,000	1,196,000	1,038,103	119,897	157,897	88.2%	2.0%	16.9%	20,320	26,760	16.9%	16.9%
6/30/08-09	1,978,000	2,030,000	1,793,116	184,884	236,884	89.5%	2.0%	19.0%	35,139	45,021	19.0%	19.0%
6/30/09-10	1,438,000	1,474,000	1,270,685	167,315	203,315	87.3%	3.0%	23.6%	39,437	47,923	23.6%	23.6%
6/30/10-11	2,162,000	2,270,000	1,925,589	236,411	344,411	86.9%	3.0%	22.9%	54,118	78,842	22.9%	22.9%
6/30/11-12	2,226,000	2,292,000	1,919,115	306,885	372,885	85.0%	3.0%	19.9%	61,190	74,350	19.9%	19.9%
6/30/12-13	1,492,000	1,536,000	1,165,762	326,238	370,238	77.0%	5.0%	21.7%	70,918	80,482	21.7%	21.7%
6/30/13-14	1,222,000	1,492,000	997,523	224,477	494,477	73.5%	8.0%	30.2%	67,791	149,329	30.2%	30.2%
6/30/14-15	2,434,000	2,818,200	1,565,606	868,394	1,252,594	59.6%	8.0%	19.8%	172,032	248,144	19.8%	19.8%
6/30/15-16	2,764,000	3,267,000	1,471,658	1,292,342	1,795,342	48.8%	8.0%	15.6%	201,941	280,539	15.6%	15.6%
6/30/16-17	2,876,000	3,304,400	1,230,409	1,645,591	2,073,991	39.8%	10.0%	16.6%	273,429	344,611	16.6%	16.6%
6/30/17-18	2,912,000	3,194,000	536,275	2,375,725	2,657,725	17.6%	15.0%	18.2%	432,293	483,607	18.2%	18.2%
Total	82,564,992	85,704,731	72,696,442	9,868,550	13,008,289				1,782,207	2,346,424	18.1%	18.0%

NOTES:

(2) Exhibit 1, Page 1, Column (4) + Exhibit 2, Page 1, Column (4)

(3) Exhibit 1, Page 1, Column (5) + Exhibit 2, Page 1, Column (5)

(4) Exhibit 1, Page 1, Column (2) + Exhibit 2, Page 1, Column (2)

(5) = (2) - (4)

(6) = (3) - (4)

(7) = (4) / Average of Columns (2), (3)

(8) = (7) - Prior Year's (7)

(9) = (8) / (1.00 - (7))

(10) = (5) * (9)

(11) = (6) * (9)

(12) = (10) / (5)

(13) = (11) / (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Amherst) - Cluster 4
Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Paid Loss	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		110,316			110,710	110,710	394	394		
6/30/82-83		91,124	91,343		91,124	92,256	0	1,132		
6/30/83-84		32,907	33,019		32,907	34,010	0	1,103		
6/30/84-85	176,924	75,201	75,532	75,597	75,953	77,043	752	1,842	0.043	0.044
6/30/85-86	188,662	52,218	52,501	52,574	52,741	53,263	522	1,044	0.028	0.028
6/30/86-87	212,277	201,665	202,959	202,924	203,000	203,000	1,335	1,335	0.096	0.096
6/30/87-88	243,118	235,802	237,552	237,450	237,000	238,000	1,198	2,198	0.097	0.098
6/30/88-89	248,990	298,555	301,072	301,573	301,000	302,000	2,445	3,445	0.121	0.121
6/30/89-90	250,404	157,317	158,802	159,284	159,000	159,000	1,683	1,683	0.063	0.063
6/30/90-91	235,170	511,918	517,266	517,226	517,000	517,000	5,082	5,082	0.220	0.220
6/30/91-92	235,607	555,103	561,464	561,365	561,000	561,000	5,897	5,897	0.238	0.238
6/30/92-93	241,161	262,075	265,343	265,294	264,696	267,317	2,621	5,242	0.110	0.111
6/30/93-94	254,321	540,506	547,794	547,580	548,000	548,000	7,494	7,494	0.215	0.215
6/30/94-95	256,665	305,369	309,796	309,683	308,423	311,476	3,054	6,107	0.120	0.121
6/30/95-96	265,739	243,985	247,769	247,692	246,425	248,865	2,440	4,880	0.093	0.094
6/30/96-97	296,336	187,967	191,455	191,452	189,847	191,726	1,880	3,759	0.064	0.065
6/30/97-98	296,982	188,043	192,107	192,112	192,000	192,000	3,957	3,957	0.065	0.065
6/30/98-99	299,530	256,033	262,875	262,730	263,000	268,260	6,967	12,227	0.088	0.090
6/30/99-00	323,627	360,854	372,349	371,887	372,000	372,000	11,146	11,146	0.115	0.115
6/30/00-01	338,348	396,643	411,324	410,729	411,000	411,000	14,357	14,357	0.121	0.121
6/30/01-02	329,555	555,820	579,275	577,925	578,000	579,000	22,180	23,180	0.175	0.176
6/30/02-03	329,179	313,391	328,249	327,932	328,000	328,000	14,609	14,609	0.100	0.100
6/30/03-04	344,547	146,045	156,267	157,103	156,000	157,000	9,955	10,955	0.045	0.046
6/30/04-05	325,530	287,625	311,660	309,071	309,000	312,000	21,375	24,375	0.095	0.096
6/30/05-06	403,750	287,295	314,997	318,493	315,000	318,000	27,705	30,705	0.078	0.079
6/30/06-07	420,219	214,870	238,509	252,379	239,000	252,000	24,130	37,130	0.057	0.060
6/30/07-08	425,998	458,453	513,978	500,936	501,000	514,000	42,547	55,547	0.118	0.121
6/30/08-09	420,566	571,863	647,535	618,616	619,000	648,000	47,137	76,137	0.147	0.154
6/30/09-10	433,206	360,460	414,870	417,326	415,000	437,850	54,540	77,390	0.096	0.101
6/30/10-11	444,673	372,561	437,470	440,249	437,000	462,000	64,439	89,439	0.098	0.104
6/30/11-12	467,753	477,927	578,614	563,522	564,000	579,000	86,073	101,073	0.121	0.124
6/30/12-13	495,398	363,432	457,046	472,803	457,000	496,650	93,568	133,218	0.092	0.100
6/30/13-14	518,391	340,181	444,521	474,614	445,000	498,750	104,819	158,569	0.086	0.096
6/30/14-15	539,631	491,979	665,493	651,311	651,000	698,250	159,021	206,271	0.121	0.129
6/30/15-16	585,875	399,651	623,482	643,792	623,000	676,200	223,349	276,549	0.106	0.115
6/30/16-17	594,787	321,627	607,822	654,830	608,000	687,750	286,373	366,123	0.102	0.116
6/30/17-18	607,484	153,865	564,200	692,663	564,000	727,650	410,135	573,785	0.093	0.120
Total	12,050,403	11,180,647	12,916,307	12,980,717	12,945,824	13,530,025	1,765,177	2,349,378		
Tot 6/30/84-18	12,050,403	10,946,300	12,791,946	12,980,717	12,711,083	13,293,050	1,764,783	2,346,749	0.105	0.110

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 5, Exhibit 2, Page 2, Column 3

(4) From Section 5, Exhibit 2, Page 2, Column 8

(5) From Section 5, Exhibit 2, Page 3, Column 8

(6), (7) Selected based on (3), (4), and (5)

(8) = (6) - (3)

(9) = (7) - (3)

(10) = (6) / (2) / 10

(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Amherst) - Cluster 4
Medical

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Accident Year	Payroll (000's)	Paid Loss	Paid LDF	Adjustment for Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/16-17	Paid Counts 7/1/17-18	Average Outstanding Claim
All Prior Yrs		110,316							1	0	
6/30/82-83		91,124	1.002	1.000	91,343	N/A	91,343		0	0	
6/30/83-84		32,907	1.003	1.000	33,019	N/A	33,019		0	0	
6/30/84-85	176,924	75,201	1.004	1.000	75,532	N/A	75,532	0.043	0	0	
6/30/85-86	188,662	52,218	1.005	1.000	52,501	N/A	52,501	0.028	0	0	
6/30/86-87	212,277	201,665	1.006	1.000	202,959	N/A	202,959	0.096	1	1	1,294
6/30/87-88	243,118	235,802	1.007	1.000	237,552	N/A	237,552	0.098	2	1	1,750
6/30/88-89	248,990	298,555	1.008	1.000	301,072	N/A	301,072	0.121	1	1	2,517
6/30/89-90	250,404	157,317	1.009	1.000	158,802	N/A	158,802	0.063	0	0	
6/30/90-91	235,170	511,918	1.010	1.000	517,266	N/A	517,266	0.220	1	1	5,349
6/30/91-92	235,607	555,103	1.011	1.000	561,464	N/A	561,464	0.238	1	1	6,361
6/30/92-93	241,161	262,075	1.012	1.000	265,343	N/A	265,343	0.110	0	0	
6/30/93-94	254,321	540,506	1.013	1.000	547,794	N/A	547,794	0.215	1	1	7,287
6/30/94-95	256,665	305,369	1.014	1.000	309,796	N/A	309,796	0.121	0	0	
6/30/95-96	265,739	243,985	1.016	1.000	247,769	N/A	247,769	0.093	0	0	
6/30/96-97	296,336	187,967	1.019	1.000	191,455	N/A	191,455	0.065	0	0	
6/30/97-98	296,982	188,043	1.022	1.000	192,107	N/A	192,107	0.065	0	0	
6/30/98-99	299,530	256,033	1.027	1.000	262,875	N/A	262,875	0.088	1	1	6,841
6/30/99-00	323,627	360,854	1.032	1.000	372,349	N/A	372,349	0.115	0	0	
6/30/00-01	338,348	396,643	1.037	1.000	411,324	N/A	411,324	0.122	1	0	
6/30/01-02	329,555	555,820	1.042	1.000	579,275	N/A	579,275	0.176	2	2	11,727
6/30/02-03	329,179	313,391	1.047	1.000	328,249	N/A	328,249	0.100	1	1	14,858
6/30/03-04	344,547	146,045	1.070	1.000	156,267	N/A	156,267	0.045	0	0	
6/30/04-05	325,530	287,625	1.084	1.000	311,660	N/A	311,660	0.096	0	0	
6/30/05-06	403,750	287,295	1.096	1.000	314,997	N/A	314,997	0.078	0	0	
6/30/06-07	420,219	214,870	1.110	1.000	238,509	N/A	238,509	0.057	1	1	23,639
6/30/07-08	425,998	458,453	1.121	1.000	513,978	N/A	513,978	0.121	3	2	27,762
6/30/08-09	420,566	571,863	1.132	1.000	647,535	N/A	647,535	0.154	3	3	25,224
6/30/09-10	433,206	360,460	1.151	1.000	414,870	N/A	414,870	0.096	3	3	18,137
6/30/10-11	444,673	372,561	1.174	1.000	437,470	N/A	437,470	0.098	3	3	21,636
6/30/11-12	467,753	477,927	1.211	1.000	578,614	N/A	578,614	0.124	4	4	25,172
6/30/12-13	495,398	363,432	1.258	1.000	457,046	N/A	457,046	0.092	5	3	31,205
6/30/13-14	518,391	340,181	1.307	1.000	444,521	N/A	444,521	0.086	5	3	34,780
6/30/14-15	539,631	491,979	1.353	1.000	665,493	N/A	665,493	0.123	23	10	17,351
6/30/15-16	585,875	399,651	1.560	1.000	623,482	N/A	623,482	0.106	114	27	8,290
6/30/16-17	594,787	321,627	1.890	1.000	607,822	N/A	607,822	0.102	214	87	3,290
6/30/17-18	607,484	153,865	3.667	1.000	564,200	N/A	564,200	0.093		188	2,183
Total	12,050,403	11,180,647			12,916,307		12,916,307		391	344	

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3), (4) From Section 5, Exhibit 2, Page 7

(5) Based on information from the MA WCRIB 7/1/16 filing. Consideration for development beyond 252 months made in selection of LDF's.

(6) = (3) x (4) x (5)

(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10), (11) Provided by Commonwealth of Massachusetts

(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Amherst) - Cluster 4
Medical

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	176,924	0.051	75,201	1.004	75,597	N/A	75,597	0.043	0.043
6/30/85-86	188,662	0.035	52,218	1.005	52,574	N/A	52,574	0.028	0.028
6/30/86-87	212,277	0.093	201,665	1.006	202,924	N/A	202,924	0.096	0.096
6/30/87-88	243,118	0.092	235,802	1.007	237,450	N/A	237,450	0.098	0.098
6/30/88-89	248,990	0.145	298,555	1.008	301,573	N/A	301,573	0.121	0.121
6/30/89-90	250,404	0.084	157,317	1.009	159,284	N/A	159,284	0.064	0.064
6/30/90-91	235,170	0.218	511,918	1.010	517,226	N/A	517,226	0.220	0.220
6/30/91-92	235,607	0.235	555,103	1.011	561,365	N/A	561,365	0.238	0.238
6/30/92-93	241,161	0.108	262,075	1.012	265,294	N/A	265,294	0.110	0.110
6/30/93-94	254,321	0.209	540,506	1.013	547,580	N/A	547,580	0.215	0.215
6/30/94-95	256,665	0.118	305,369	1.014	309,683	N/A	309,683	0.121	0.121
6/30/95-96	265,739	0.091	243,985	1.016	247,692	N/A	247,692	0.093	0.093
6/30/96-97	296,336	0.065	187,967	1.019	191,452	N/A	191,452	0.065	0.065
6/30/97-98	296,982	0.065	188,043	1.022	192,112	N/A	192,112	0.065	0.065
6/30/98-99	299,530	0.086	256,033	1.027	262,730	N/A	262,730	0.088	0.088
6/30/99-00	323,627	0.110	360,854	1.032	371,887	N/A	371,887	0.115	0.115
6/30/00-01	338,348	0.117	396,643	1.037	410,729	N/A	410,729	0.121	0.121
6/30/01-02	329,555	0.166	555,820	1.042	577,925	N/A	577,925	0.175	0.175
6/30/02-03	329,179	0.098	313,391	1.047	327,932	N/A	327,932	0.100	0.100
6/30/03-04	344,547	0.049	146,045	1.070	157,103	N/A	157,103	0.046	0.046
6/30/04-05	325,530	0.085	287,625	1.084	309,071	N/A	309,071	0.095	0.095
6/30/05-06	403,750	0.088	287,295	1.096	318,493	N/A	318,493	0.079	0.079
6/30/06-07	420,219	0.090	214,870	1.110	252,379	N/A	252,379	0.060	0.060
6/30/07-08	425,998	0.092	458,453	1.121	500,936	N/A	500,936	0.118	0.118
6/30/08-09	420,566	0.095	571,863	1.132	618,616	N/A	618,616	0.147	0.147
6/30/09-10	433,206	0.100	360,460	1.151	417,326	N/A	417,326	0.096	0.096
6/30/10-11	444,673	0.103	372,561	1.174	440,249	N/A	440,249	0.099	0.099
6/30/11-12	467,753	0.105	477,927	1.211	563,522	N/A	563,522	0.120	0.120
6/30/12-13	495,398	0.108	363,432	1.258	472,803	N/A	472,803	0.095	0.095
6/30/13-14	518,391	0.110	340,181	1.307	474,614	N/A	474,614	0.092	0.092
6/30/14-15	539,631	0.113	491,979	1.353	651,311	N/A	651,311	0.121	0.121
6/30/15-16	585,875	0.116	399,651	1.560	643,792	N/A	643,792	0.110	0.110
6/30/16-17	594,787	0.119	321,627	1.890	654,830	N/A	654,830	0.110	0.110
6/30/17-18	607,484	0.122	153,865	3.667	692,663	N/A	692,663	0.114	0.114
Total	12,050,403		10,946,300		12,980,717		12,980,717		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 5, Exhibit 2, Page 4, Column 11

(4) From Section 5, Exhibit 2, Page 2, Column 3

(5) From Section 5, Exhibit 2, Page 2, Column 4

(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]

(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Amherst) - Cluster 4
Medical

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Expected Ult Loss	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									0.051	0.051
6/30/85-86									0.035	0.035
6/30/86-87									0.093	0.093
6/30/87-88									0.092	0.092
6/30/88-89									0.145	0.145
6/30/89-90									0.084	0.084
6/30/90-91	235,170	517,266	0.220	1.194	0.263	1.996	0.524	0.052	0.217	0.218
6/30/91-92	235,607	561,464	0.238	1.189	0.283	1.948	0.552	0.054	0.234	0.235
6/30/92-93	241,161	265,343	0.110	1.189	0.131	1.900	0.249	0.055	0.108	0.108
6/30/93-94	254,321	547,794	0.215	1.178	0.254	1.854	0.471	0.057	0.208	0.209
6/30/94-95	256,665	309,796	0.121	1.170	0.141	1.809	0.255	0.059	0.117	0.118
6/30/95-96	265,739	247,769	0.093	1.155	0.108	1.765	0.190	0.061	0.091	0.091
6/30/96-97	296,336	191,455	0.065	1.137	0.073	1.722	0.126	0.064	0.064	0.065
6/30/97-98	296,982	192,107	0.065	1.135	0.073	1.680	0.123	0.066	0.065	0.065
6/30/98-99	299,530	262,875	0.088	1.135	0.100	1.639	0.163	0.067	0.086	0.086
6/30/99-00	323,627	372,349	0.115	1.135	0.131	1.599	0.209	0.069	0.110	0.110
6/30/00-01	338,348	411,324	0.122	1.109	0.135	1.560	0.210	0.072	0.117	0.117
6/30/01-02	329,555	579,275	0.176	1.101	0.194	1.522	0.294	0.075	0.160	0.166
6/30/02-03	329,179	328,249	0.100	1.073	0.107	1.485	0.159	0.078	0.096	0.098
6/30/03-04	344,547	156,267	0.045	1.046	0.047	1.448	0.069	0.082	0.049	0.049
6/30/04-05	325,530	311,660	0.096	1.036	0.099	1.413	0.140	0.085	0.082	0.085
6/30/05-06	403,750	314,997	0.078	1.032	0.081	1.379	0.111	0.088	0.085	0.088
6/30/06-07	420,219	238,509	0.057	1.032	0.059	1.345	0.079	0.090	0.088	0.090
6/30/07-08	425,998	513,978	0.121	1.032	0.125	1.312	0.163	0.092	0.090	0.092
6/30/08-09	420,566	647,535	0.154	1.027	0.158	1.280	0.202	0.095	0.093	0.095
6/30/09-10	433,206	414,870	0.096	1.000	0.096	1.249	0.120	0.100	0.099	0.100
6/30/10-11	444,673	437,470	0.098	1.000	0.098	1.218	0.120	0.103	0.102	0.103
6/30/11-12	467,753	578,614	0.124	1.000	0.124	1.189	0.147	0.105	0.105	0.105
6/30/12-13	495,398	457,046	0.092	1.000	0.092	1.160	0.107	0.108	0.108	0.108
6/30/13-14	518,391	444,521	0.086	1.000	0.086	1.131	0.097	0.110	0.111	0.110
6/30/14-15	539,631	665,493	0.123	1.000	0.123	1.104	0.136	0.113	0.114	0.113
6/30/15-16	585,875	623,482	0.106	1.000	0.106	1.077	0.115	0.116	0.118	0.116
6/30/16-17	594,787	607,822	0.102	1.000	0.102	1.051	0.107	0.119	0.121	0.119
6/30/17-18	607,484	564,200	0.093	1.000	0.093	1.025	0.095	0.122		0.122
Total	10,730,028	11,763,527								

Trend Last 4 (ex 17-18):	3.9%	Avg 3 (ex 17-18):	0.119
Trend Last 8 (ex 17-18):	0.9%	Avg 5 (ex 17-18):	0.112
Trend Last 12 (ex 17-18):	1.8%	Avg 10 (ex 17-18):	0.131
Prior Selected Trend:	3.0%	Prior Sel Avg:	0.125
Selected Trend:	2.5%	Sel. Loss Cost:	0.125

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 5, Exhibit 2, Page 2, Column 6

(4) = (3) / (2) / 10

(5) Based on information from the MA WCIRB

(6) = (4) x (5)

(7) Based on Selected Trend from (6)

(8) = (6) x (7)

(9) = Sel. Loss Cost / [(5) * (7)]

(10) From prior Aon analysis as of June 30, 2017

(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Amherst) - Cluster 4
Medical

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend	0.950	
(2)	Credibility	10%	
(3)	Average Pmt Trend Statewide	0.950	
(4)	Credibility Weighted Trend	0.950	
		(Low)	(High)
(5)	Selected Range	0.941	0.960
(6)	Incremental Paid for 2018	0	0
(7)	Estimated Reserve	0	0
(8)	Paid to Date (82 & Prior)	110,316	110,316
(9)	Est Ult Paid for 1982 & Prior	110,316	110,316

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	394	394
(11)	Projected Number of Years	2	2
(12)	Estimated Reserve	788	788
(13)	Paid to Date (82 & Prior)	110,316	110,316
(14)	Est Ult Paid for 1982 & Prior	111,104	111,104
(14a)	Paid Counts During Fiscal Year	0	1
		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	110,710	110,710
(16)	Lump Sum Ultimates	N/A	N/A
(17)	Ult Loss Including Lump Sums	**110,710**	**110,710**
(18)	Implied Tail	1.004	1.004
(19)	Ult Loss Inc Lump Sums @ 6/17	118,678	121,813

NOTES:

(1) From Section 5, Exhibit 2, Page 6
(2) = (Average of Section 5, Exhibit 2, Page 6, Column 3 / 175,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 5, Exhibit 2, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 5, Exhibit 2, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) Lump Sums are considered in Indemnity analysis (Section 1)
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2017

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Amherst) - Cluster 4
Medical

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	9,975	9.208			
1993	2	1,394	7.240	0.140		
1994	3	30,337	10.320	21.763		
1995	4	-7,026		-0.232		
1996	5	2,087	7.643	-0.297		
1997	6	418	6.035	0.200		
1998	7	0				
1999	8	390	5.966			
2000	9	1,546	7.343	3.964	n =	16
2001	10	0			S(x) =	32,061
2002	11	0			S(x-sq) =	64,245,235
2003	12	0			S(xy) =	230,289
2004	13	1,400	7.244		S(y) =	115
2005	14	0			D =	16,039
2006	15	424	6.050		slope =	0
2007	16	284	5.649	0.670	Avg Trend =	0.924
2008	17	1,845	7.520	6.499		
2009	18	3,150	8.055	1.707		
2010	19	3,080	8.033	0.978		
2011	20	0				
2012	21	0				
2013	22	720	6.579			
2014	23	0				
2015	24	0				
2016	25	174	5.161			
2017	26	1,008	6.916	5.783		
2018	27	0				
					Selected Trend:	**0.950**

NOTES:

(3) 2018 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2017

(4) LN [(3)]

(5) Eg. 2017: 5.783 = 1008 / 174

Commonwealth of Massachusetts Workers Compensation
University of Massachusetts (Amherst) - Cluster 4
MEDICAL
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432
June-83	7,015	19,272	26,992	33,578	44,296	54,254	69,123	86,430	87,691	89,009	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124	91,124
June-84	2,065	5,673	7,945	9,884	13,039	15,948	22,112	25,109	27,259	27,620	27,620	29,236	29,236	29,236	29,774	29,774	33,170	32,907	32,907	32,907	32,907	32,907	32,907	32,907	32,907	32,907	32,907	32,907	32,907	32,907	32,907	32,907	32,907	32,907	32,907	
June-85	5,341	14,673	20,551	25,565	32,019	36,080	42,108	45,751	51,440	65,690	69,695	65,951	67,047	67,047	67,068	67,485	69,103	70,526	70,577	71,427	71,777	71,777	71,777	73,027	73,027	73,027	74,065	74,065	74,065	74,201	75,051	75,201	75,201	75,201		
June-86	4,254	11,686	16,367	29,076	33,757	37,603	39,971	43,583	45,896	47,123	47,123	47,123	47,123	47,123	48,153	48,153	48,153	48,153	48,503	49,375	49,375	49,375	50,070	50,670	50,670	52,218	52,218	52,218	52,218	52,218	52,218	52,218	52,218			
June-87	17,332	47,614	74,474	96,432	115,240	124,178	130,253	135,326	138,193	142,828	144,778	146,075	148,983	150,159	151,984	152,431	153,300	154,154	156,424	159,661	167,912	175,836	182,412	189,688	194,323	195,870	195,870	196,094	196,321	200,006	201,656	201,665				
June-88	21,776	71,312	105,389	144,783	150,052	156,889	162,436	164,340	165,770	169,300	170,433	171,904	172,900	173,563	174,460	176,155	179,540	184,256	189,906	193,501	195,901	201,522	207,981	215,719	220,354	223,356	225,509	230,109	231,967	233,979	235,802					
June-89	31,748	113,449	180,690	213,618	227,584	232,537	247,318	252,055	260,621	266,739	270,947	278,041	284,182	288,891	291,536	292,751	293,625	293,975	294,069	294,094	295,364	295,364	296,430	296,430	296,430	296,430	296,430	296,430	297,380	298,555						
June-90	19,060	117,509	146,705	152,013	155,556	157,028	157,217	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317	157,317							
June-91	49,629	201,675	266,883	315,231	324,767	338,441	344,037	344,920	345,667	349,590	353,310	355,602	356,167	359,042	361,717	364,813	366,594	376,706	462,325	499,976	507,147	507,299	507,299	507,399	507,483	507,961	508,968	511,918								
June-92	93,121	216,421	309,712	382,754	413,527	441,551	469,869	498,257	502,052	506,299	508,720	511,219	517,091	518,976	521,249	523,045	528,030	532,841	536,465	544,719	549,635	550,127	550,346	551,403	551,403	553,253	555,103									
June-93	81,970	229,344	254,404	256,957	260,901	261,422	261,544	261,544	261,544	262,036	262,075	262,075	262,075	262,075	262,075	262,075	262,075	262,075	262,075	262,075	262,075	262,075	262,075	262,075	262,075	262,075										
June-94	77,508	161,802	222,213	282,819	289,168	318,109	326,227	327,931	339,521	345,752	357,217	392,989	403,792	437,920	445,327	454,454	462,395	472,317	484,855	493,591	497,802	502,382	534,763	536,976	540,506											
June-95	86,716	239,689	284,148	295,763	301,706	303,344	303,490	305,369	305,369	305,369	305,369	305,369	305,369	305,369	305,369	305,369	305,369	305,369	305,369	305,369	305,369	305,369	305,369	305,369												
June-96	81,054	187,654	205,831	215,693	219,869	225,627	237,068	241,239	242,923	243,938	243,985	243,985	243,985	243,985	243,985	243,985	243,985	243,985	243,985	243,985	243,985	243,985	243,985													
June-97	61,666	103,895	129,694	181,008	185,516	187,189	187,267	187,617	187,617	187,967	187,967	187,967	187,967	187,967	187,967	187,967	187,967	187,967	187,967	187,967	187,967	187,967														
June-98	40,014	98,284	119,324	134,344	139,107	141,779	147,819	148,338	149,621	183,281	184,542	185,346	186,264	187,193	188,013	188,043	188,043	188,043	188,043	188,043	188,043															
June-99	57,055	145,931	161,873	165,175	173,370	179,001	181,785	183,278	186,735	189,893	194,365	198,821	204,465	208,778	214,267	223,056	234,647	247,484	255,257	256,033																
June-00	78,904	144,101	178,359	211,117	245,711	260,589	272,440	284,728	298,320	311,888	326,984	344,501	356,294	360,812	360,854	360,854	360,854	360,854	360,854																	
June-01	78,435	185,081	235,180	264,482	271,555	289,614	313,258	334,076	349,005	361,767	371,025	374,808	383,719	389,538	393,015	396,630	396,643	396,643																		
June-02	42,493	107,557	182,137	222,791	235,866	244,961	262,574	293,121	350,090	378,624	404,630	431,685	458,566	489,061	520,323	536,271	555,820																			
June-03	25,041	124,452	162,035	187,240	223,402	231,574	235,669	238,598	245,618	250,270	253,237	278,177	288,992	297,086	305,180	313,391																				
June-04	58,014	123,410	131,529	133,995	134,242	145,534	145,992	146,045	146,045	146,045	146,045	146,045	146,045	146,045	146,045																					
June-05	90,145	204,953	256,853	271,491	281,203	284,263	285,428	287,625	287,625	287,625	287,625	287,625	287,625	287,625																						
June-06	104,747	269,295	283,925	286,559	286,907	286,907	287,115	287,115	287,115	287,295	287,295	287,295	287,295																							
June-07	90,114	168,280	184,018	193,167	200,918	206,920	207,690	208,341	209,581	212,260	213,725	214,870																								
June-08	174,365	329,758	353,009	367,373	382,156	389,416	393,780	428,915	439,771	457,987	458,453																									
June-09	175,201	332,994	476,353	502,636	515,594	547,517	553,032	564,035	568,971	571,863																										
June-10	71,728	205,753	256,446	286,005	301,536	322,879	343,231	353,434	360,460																											
June-11	188,496	302,104	334,423	349,891	353,820	364,981	367,695	372,561																												
June-12	156,195	356,432	391,171	447,380	449,827	460,179	477,927																													
June-13	144,944	280,644	335,988	348,994	358,760	363,432																														
June-14	132,938	226,821	336,151	339,610	340,181																															
June-15	218,511	402,056	463,526	491,979																																
June-16	182,684	360,160	399,651																																	
June-17	193,279	321,627																																		
June-18	153,865																																			

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432
June-83	2.747	1.401	1.244	1.319	1.225	1.274	1.250	1.015	1.015	1.024	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
June-84	2.747	1.400	1.244	1.319	1.223	1.387	1.136	1.086	1.013	1.000	1.059	1.000	1.000	1.018	1.000	1.114	0.992	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
June-85	2.747	1.401	1.244	1.252	1.127	1.167	1.087	1.124	1.277	1.061	0.946	1.017	1.000	1.000	1.006	1.024	1.021	1.001	1.012	1.005	1.000	1.000	1.017	1.000	1.000	1.014	1.000	1.000	1.002	1.011	1.002	1.000	1.000		
June-86	2.747	1.401	1.777	1.161	1.114	1.063	1.090	1.053	1.027	1.000	1.000	1.000	1.000	1.022	1.000	1.000	1.000	1.007	1.018	1.000	1.000	1.014	1.012	1.000	1.031	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
June-87	2.747	1.564	1.295	1.195	1.078	1.049	1.039	1.021	1.034	1.014	1.009	1.020	1.008	1.012	1.003	1.006	1.006	1.015	1.021	1.052	1.047	1.037	1.040	1.024	1.008	1.000	1.001	1.001	1.019	1.008	1.000				
June-88	3.275	1.478	1.374	1.036	1.046	1.035	1.012	1.009	1.021	1.007	1.009	1.006	1.004	1.005	1.010	1.019	1.026	1.031	1.019	1.012	1.029	1.032	1.037	1.021	1.014	1.010	1.020	1.008	1.009	1.008					
June-89	3.573	1.593	1.182	1.065	1.022	1.064	1.019	1.034	1.023	1.016	1.026	1.022	1.017	1.009	1.004	1.003	1.001	1.000	1.000	1.004	1.000	1.004	1.000	1.000	1.000	1.000	1.000	1.003	1.004						
June-90	6.165	1.248	1.036	1.023	1.009	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000							
June-91	4.064	1.323	1.181	1.030	1.042	1.017	1.003	1.002	1.011	1.011	1.006	1.002	1.008	1.007	1.009	1.005	1.028	1.227	1.081	1.014	1.000	1.000	1.000	1.000	1.001	1.002	1.006								
June-92	2.324	1.431	1.236	1.080	1.068	1.064	1.060	1.008	1.008	1.005	1.005	1.011	1.004	1.004	1.003	1.010	1.009	1.007	1.015	1.009	1.001	1.000	1.002	1.000	1.003	1.003									
June-93	2.798	1.109	1.010	1.015	1.002	1.000	1.000	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000										
June-94	2.088	1.373	1.273	1.022	1.100	1.026	1.005	1.035	1.018	1.033	1.100	1.027	1.085	1.017	1.020	1.017	1.021	1.027	1.018	1.009	1.009	1.064	1.004	1.007											
June-95	2.764	1.185	1.041	1.020	1.005	1.000	1.006	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
June-96	2.315	1.097	1.048	1.019	1.026	1.051	1.018	1.007	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
June-97	1.685	1.248	1.396	1.025	1.009	1.000	1.002	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
June-98	2.456	1.214	1.126	1.035	1.019	1.043	1.004	1.009	1.225	1.007	1.004	1.005	1.005	1.004	1.000	1.000	1.000	1.000	1.000	1.000															
June-99	2.558	1.109	1.020	1.050	1.032	1.016	1.008	1.019	1.017	1.024	1.023	1.028	1.021	1.026	1.041	1.052	1.055	1.031	1.003																
June-00	1.826	1.238	1.184	1.164	1.061	1.045	1.045	1.048	1.045	1.048	1.054	1.034	1.013	1.000	1.000	1.000	1.000	1.000																	
June-01	2.360	1.271	1.125	1.027	1.067	1.082	1.066	1.045	1.037	1.026	1.010	1.024	1.015	1.009	1.009	1.000	1.000																		
June-02	2.531	1.693	1.223	1.059	1.039	1.072	1.116	1.194	1.082	1.069	1.067	1.062	1.067	1.064	1.031	1.036																			
June-03	4.970	1.302	1.156	1.193	1.037	1.018	1.012	1.029	1.019	1.012	1.098	1.039	1.028	1.027	1.027																				
June-04	2.127	1.066	1.019	1.002	1.084	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																					
June-05	2.274	1.253	1.057	1.036	1.011	1.004	1.008	1.000	1.000	1.000	1.000	1.000	1.000																						
June-06	2.571	1.054	1.009	1.001	1.000	1.001	1.000	1.000	1.001	1.000	1.000	1.000																							
June-07	1.867	1.094	1.050	1.040	1.030	1.004	1.003	1.006	1.013	1.007	1.005																								
June-08	1.891	1.071	1.041	1.040	1.019	1.011	1.089	1.025	1.041	1.001																									
June-09	1.901	1.431	1.055	1.026	1.062	1.010	1.020	1.009	1.005																										
June-10	2.869	1.246	1.115	1.054	1.071	1.063	1.030	1.020																											
June-11	1.603	1.107	1.046	1.011	1.032	1.007	1.013																												
June-12	2.282	1.097	1.144	1.005	1.023	1.039																													
June-13	1.936	1.197	1.039	1.028	1.013																														
June-14	1.706	1.482	1.010	1.002																															
June-15	1.840	1.153	1.061																																
June-16	1.971	1.110																																	
June-17	1.664																																		

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	To Ult
Simple Avg																																				
All Yrs	2.571	1.278	1.153	1.074	1.055	1.054	1.039	1.028	1.035	1.014	1.017	1.012	1.012	1.010	1.008	1.014	1.008	1.019	1.011	1.007	1.006	1.011	1.009	1.004	1.005	1.003	1.003	1.002	1.005	1.005	1.000	1.000	1.000	1.000	1.000	
Latest 5	1.824	1.208	1.060	1.020	1.040	1.026	1.031	1.012	1.012	1.002	1.021	1.020	1.022	1.020	1.022	1.018	1.011	1.006	1.001	1.002	1.002	1.013	1.001	1.001	1.001	1.003	1.005	1.002	1.007	1.005	1.000					
Latest 3	1.825	1.248	1.037	1.012	1.023	1.036	1.021	1.018	1.020	1.003	1.002	1.000	1.009	1.030	1.022	1.012	1.018	1.010	1.001	1.000	1.000	1.021	1.001	1.002	1.001	1.002	1.002	1.004	1.010	1.005	1.001	1.000	1.000			
Volume Wtd																																				
All Yrs	2.185	1.227	1.105	1.043	1.039	1.032	1.030	1.024	1.025	1.015	1.022	1.016	1.018	1.013	1.010	1.011	1.010	1.028	1.016	1.008	1.005	1.014	1.006	1.004	1.003	1.003	1.005	1.003	1.007	1.006	1.000	1.000	1.000	1.000	1.000	
Latest 5	1.824	1.185	1.063	1.018	1.040	1.024	1.033	1.013	1.013	1.001	1.022	1.026	1.028	1.025	1.020	1.018	1.009	1.006	1.001	1.003	1.003	1.017	1.002	1.002	1.001	1.003	1.006	1.003	1.008	1.007	1.000					
Latest 3	1.823	1.213	1.040	1.011	1.023	1.036	1.021	1.017	1.020	1.002	1.001	1.000	1.011	1.042	1.023	1.015	1.013	1.010	1.001	1.000	1.000	1.031	1.002	1.003	1.002	1.002	1.003	1.004	1.009	1.007	1.000	1.000	1.000			

Dev Factor Selection																																				
Industry 1	1.952	1.145	1.055	1.025	1.015	1.012	1.012	1.013	1.010	1.009	1.011	1.010	1.009	1.008	1.009	1.007	1.007	1.006																		
Industry 2		1.268	1.086	1.037	1.014	1.010	1.014	1.010	1.007	1.010	1.011	1.009	1.008	1.009	1.010	1.007	1.007	1.009	1.006	1.006																
Prior	*1.940*	*1.222*	*1.156*	*1.039*	*1.046*	*1.033*	*1.028*	*1.018*	*1.019*	*1.010*	*1.010*	*1.013*	*1.012*	*1.013*	*1.016*	*1.005*	*1.005*	*1.005*	*1.005*	*1.005*	*1.003*	*1.003*	*1.001*	*1.001*	*1.001*	*1.001*	*1.001*	*1.001*	*1.001*	*1.001*	*1.001*	*1.001*	*1.001*	*1.001*	*1.003*	
Selected	1.940	1.211	1.153	1.035	1.039	1.039	1.031	1.020	1.016	1.010	1.010	1.012	1.012	1.013	1.022	1.005	1.005	1.005	1.005	1.005	1.003	1.003	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.002
FacToUlt	3.667	1.890	1.560	1.353	1.307	1.258	1.211	1.174	1.151	1.132	1.121	1.110	1.096	1.084	1.070	1.047	1.042	1.037	1.032	1.027	1.022	1.019	1.016	1.014	1.013	1.012	1.011	1.010	1.009	1.008	1.007	1.006	1.005	1.004	1.003	1.002
Percent of Ult	27.3%	52.9%	64.1%	73.9%	76.5%	79.5%	82.6%	85.2%	86.9%	88.3%	89.2%	90.1%	91.2%	92.3%	93.5%	95.5%	96.0%	96.4%	96.9%	97.4%	97.9%	98.2%	98.5%	98.6%	98.7%	98.8%	98.9%	99.0%	99.1%	99.2%	99.3%	99.4%	99.5%	99.6%	99.7%	99.8%

Commonwealth of Massachusetts
Workers Compensation
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University of Massachusetts (Amherst) - Cluster 4
Medical

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/17		As of 6/18		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	118,678	121,813	110,710	110,710	(7,969)	-6.7%	(11,103)	-9.1%
6/30/82-83	91,124	92,269	91,124	92,256	0	0.0%	(12)	0.0%
6/30/83-84	32,907	34,014	32,907	34,010	0	0.0%	(5)	0.0%
6/30/84-85	75,953	77,053	75,953	77,043	0	0.0%	(10)	0.0%
6/30/85-86	52,741	53,263	52,741	53,263	0	0.0%	0	0.0%
6/30/86-87	203,000	203,000	203,000	203,000	0	0.0%	0	0.0%
6/30/87-88	236,000	236,000	237,000	238,000	1,000	0.4%	2,000	0.8%
6/30/88-89	300,000	300,000	301,000	302,000	1,000	0.3%	2,000	0.7%
6/30/89-90	159,000	159,000	159,000	159,000	0	0.0%	0	0.0%
6/30/90-91	514,000	514,000	517,000	517,000	3,000	0.6%	3,000	0.6%
6/30/91-92	560,000	560,000	561,000	561,000	1,000	0.2%	1,000	0.2%
6/30/92-93	264,696	267,317	264,696	267,317	0	0.0%	0	0.0%
6/30/93-94	544,000	544,000	548,000	548,000	4,000	0.7%	4,000	0.7%
6/30/94-95	308,423	311,476	308,423	311,476	0	0.0%	0	0.0%
6/30/95-96	246,425	248,865	246,425	248,865	0	0.0%	0	0.0%
6/30/96-97	189,847	191,726	189,847	191,726	0	0.0%	0	0.0%
6/30/97-98	193,000	193,000	192,000	192,000	(1,000)	-0.5%	(1,000)	-0.5%
6/30/98-99	263,000	268,260	263,000	268,260	0	0.0%	0	0.0%
6/30/99-00	373,000	374,000	372,000	372,000	(1,000)	-0.3%	(2,000)	-0.5%
6/30/00-01	412,000	413,000	411,000	411,000	(1,000)	-0.2%	(2,000)	-0.5%
6/30/01-02	560,000	561,000	578,000	579,000	18,000	3.2%	18,000	3.2%
6/30/02-03	324,000	325,000	328,000	328,000	4,000	1.2%	3,000	0.9%
6/30/03-04	157,000	158,000	156,000	157,000	(1,000)	-0.6%	(1,000)	-0.6%
6/30/04-05	310,000	314,000	309,000	312,000	(1,000)	-0.3%	(2,000)	-0.6%
6/30/05-06	317,000	320,000	315,000	318,000	(2,000)	-0.6%	(2,000)	-0.6%
6/30/06-07	238,000	252,000	239,000	252,000	1,000	0.4%	0	0.0%
6/30/07-08	501,000	516,000	501,000	514,000	0	0.0%	(2,000)	-0.4%
6/30/08-09	620,000	653,000	619,000	648,000	(1,000)	-0.2%	(5,000)	-0.8%
6/30/09-10	413,000	435,750	415,000	437,850	2,000	0.5%	2,100	0.5%
6/30/10-11	442,000	466,200	437,000	462,000	(5,000)	-1.1%	(4,200)	-0.9%
6/30/11-12	556,000	572,000	564,000	579,000	8,000	1.4%	7,000	1.2%
6/30/12-13	467,000	506,100	457,000	496,650	(10,000)	-2.1%	(9,450)	-1.9%
6/30/13-14	459,000	513,450	445,000	498,750	(14,000)	-3.1%	(14,700)	-2.9%
6/30/14-15	686,000	760,200	651,000	698,250	(35,000)	-5.1%	(61,950)	-8.1%
6/30/15-16	687,000	723,450	623,000	676,200	(64,000)	-9.3%	(47,250)	-6.5%
6/30/16-17	715,000	756,000	608,000	687,750	(107,000)	-15.0%	(68,250)	-9.0%
6/30/17-18								
Total	12,589,793	12,994,205	12,381,824	12,802,375	(207,969)	-1.7%	(191,830)	-1.5%

NOTES:

(2), (3) From prior Aon analysis as of June 30, 2017

(4), (5) From Section 5, Exhibit 2, Page 1, Columns 6, 7

(6) = (4) - (2)

(7) = (4) / (2) - 1

(8) = (5) - (3)

(9) = (5) / (3) - 1

Commonwealth of Massachusetts
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University of Massachusetts (Amherst) - Cluster 4
Medical

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
444	100.0%	0.2%	0.0%	0.1%	0.0%	1.000	1.000
432	99.8%	0.1%	0.2%	0.0%	0.0%	0.981	0.971
420	99.7%	0.1%	0.3%	0.0%	0.0%	0.954	0.932
408	99.6%	0.1%	0.4%	0.0%	0.0%	0.932	0.900
396	99.5%	0.1%	0.5%	0.0%	0.0%	0.911	0.872
384	99.4%	0.1%	0.6%	0.0%	0.0%	0.893	0.846
372	99.3%	0.1%	0.7%	0.0%	0.0%	0.875	0.821
360	99.2%	0.1%	0.8%	0.0%	0.0%	0.858	0.798
348	99.1%	0.1%	0.9%	0.0%	0.0%	0.841	0.776
336	99.0%	0.1%	1.0%	0.0%	0.0%	0.825	0.755
324	98.9%	0.1%	1.1%	0.0%	0.0%	0.810	0.735
312	98.8%	0.1%	1.2%	0.0%	0.0%	0.795	0.716
300	98.7%	0.1%	1.3%	0.0%	0.0%	0.780	0.697
288	98.6%	0.1%	1.4%	0.0%	0.0%	0.766	0.679
276	98.5%	0.3%	1.5%	0.1%	0.1%	0.752	0.662
264	98.2%	0.3%	1.8%	0.1%	0.1%	0.765	0.681
252	97.9%	0.5%	2.1%	0.2%	0.1%	0.770	0.688
240	97.4%	0.5%	2.6%	0.2%	0.2%	0.785	0.709
228	96.9%	0.5%	3.1%	0.2%	0.2%	0.790	0.717
216	96.4%	0.5%	3.6%	0.2%	0.2%	0.790	0.716
204	96.0%	0.5%	4.0%	0.2%	0.2%	0.786	0.710
192	95.5%	2.0%	4.5%	1.1%	0.8%	0.779	0.702
180	93.5%	1.2%	6.5%	0.7%	0.5%	0.820	0.757
168	92.3%	1.1%	7.7%	0.6%	0.5%	0.818	0.754
156	91.2%	1.1%	8.8%	0.7%	0.5%	0.810	0.743
144	90.1%	0.9%	9.9%	0.6%	0.5%	0.802	0.731
132	89.2%	0.9%	10.8%	0.6%	0.5%	0.788	0.713
120	88.3%	1.4%	11.7%	1.0%	0.8%	0.775	0.695
108	86.9%	1.7%	13.1%	1.2%	1.0%	0.771	0.690
96	85.2%	2.6%	14.8%	1.9%	1.7%	0.769	0.688
84	82.6%	3.1%	17.4%	2.4%	2.1%	0.775	0.697
72	79.5%	3.0%	20.5%	2.4%	2.2%	0.780	0.705
60	76.5%	2.6%	23.5%	2.2%	2.0%	0.780	0.704
48	73.9%	9.8%	26.1%	8.6%	8.0%	0.773	0.695
36	64.1%	11.2%	35.9%	10.1%	9.7%	0.808	0.742
24	52.9%	25.6%	47.1%	24.2%	23.5%	0.825	0.764
12	27.3%	27.3%	72.7%	26.7%	26.5%	0.860	0.809
Total		100.0%					

NOTES:

(2) = 1 / Section 5, Exhibit 2, Page 2, Column 4

(3) Incremental % based on (2)

(4) = 1 - (2)

(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}

(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}

(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
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University of Massachusetts (Amherst) - Cluster 4
Medical

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	394	394		379	379
6/30/82-83	0	1,132	0.981	0	1,110
6/30/83-84	0	1,103	0.954	0	1,052
6/30/84-85	752	1,842	0.932	701	1,716
6/30/85-86	522	1,044	0.911	476	952
6/30/86-87	1,335	1,335	0.893	1,192	1,192
6/30/87-88	1,198	2,198	0.875	1,048	1,923
6/30/88-89	2,445	3,445	0.858	2,097	2,955
6/30/89-90	1,683	1,683	0.841	1,416	1,416
6/30/90-91	5,082	5,082	0.825	4,194	4,194
6/30/91-92	5,897	5,897	0.810	4,776	4,776
6/30/92-93	2,621	5,242	0.795	2,083	4,167
6/30/93-94	7,494	7,494	0.780	5,848	5,848
6/30/94-95	3,054	6,107	0.766	2,340	4,680
6/30/95-96	2,440	4,880	0.752	1,836	3,672
6/30/96-97	1,880	3,759	0.765	1,438	2,876
6/30/97-98	3,957	3,957	0.770	3,045	3,045
6/30/98-99	6,967	12,227	0.785	5,469	9,599
6/30/99-00	11,146	11,146	0.790	8,809	8,809
6/30/00-01	14,357	14,357	0.790	11,338	11,338
6/30/01-02	22,180	23,180	0.786	17,424	18,209
6/30/02-03	14,609	14,609	0.779	11,382	11,382
6/30/03-04	9,955	10,955	0.820	8,167	8,987
6/30/04-05	21,375	24,375	0.818	17,484	19,938
6/30/05-06	27,705	30,705	0.810	22,452	24,884
6/30/06-07	24,130	37,130	0.802	19,350	29,775
6/30/07-08	42,547	55,547	0.788	33,543	43,792
6/30/08-09	47,137	76,137	0.775	36,525	58,996
6/30/09-10	54,540	77,390	0.771	42,035	59,646
6/30/10-11	64,439	89,439	0.769	49,546	68,768
6/30/11-12	86,073	101,073	0.775	66,694	78,317
6/30/12-13	93,568	133,218	0.780	73,029	103,975
6/30/13-14	104,819	158,569	0.780	81,735	123,649
6/30/14-15	159,021	206,271	0.773	122,892	159,408
6/30/15-16	223,349	276,549	0.808	180,487	223,478
6/30/16-17	286,373	366,123	0.825	236,365	302,188
6/30/17-18	410,135	573,785	0.860	352,529	493,194
Total	1,765,177	2,349,378		1,430,125	1,904,283
			(7) Total Discount Factor:	0.810	0.811

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	394	394
(9) Projected Number of Years:	2	2
(10) Projected Paid Loss per Year:	197	197
(11) Discounted Value at 4%:	379	379

NOTES:

(2), (3) From Section 5, Exhibit 2, Page 1, Columns 8, 9

(4) From Section 5, Exhibit 2, Page 9, Column 7

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

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Workers Compensation
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Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	394	394		372	372
6/30/82-83	0	1,132	0.971	0	1,100
6/30/83-84	0	1,103	0.932	0	1,028
6/30/84-85	752	1,842	0.900	677	1,659
6/30/85-86	522	1,044	0.872	455	911
6/30/86-87	1,335	1,335	0.846	1,129	1,129
6/30/87-88	1,198	2,198	0.821	984	1,805
6/30/88-89	2,445	3,445	0.798	1,951	2,750
6/30/89-90	1,683	1,683	0.776	1,306	1,306
6/30/90-91	5,082	5,082	0.755	3,837	3,837
6/30/91-92	5,897	5,897	0.735	4,334	4,334
6/30/92-93	2,621	5,242	0.716	1,875	3,751
6/30/93-94	7,494	7,494	0.697	5,223	5,223
6/30/94-95	3,054	6,107	0.679	2,074	4,148
6/30/95-96	2,440	4,880	0.662	1,615	3,231
6/30/96-97	1,880	3,759	0.681	1,279	2,559
6/30/97-98	3,957	3,957	0.688	2,721	2,721
6/30/98-99	6,967	12,227	0.709	4,941	8,671
6/30/99-00	11,146	11,146	0.717	7,986	7,986
6/30/00-01	14,357	14,357	0.716	10,277	10,277
6/30/01-02	22,180	23,180	0.710	15,757	16,467
6/30/02-03	14,609	14,609	0.702	10,255	10,255
6/30/03-04	9,955	10,955	0.757	7,540	8,297
6/30/04-05	21,375	24,375	0.754	16,106	18,367
6/30/05-06	27,705	30,705	0.743	20,583	22,812
6/30/06-07	24,130	37,130	0.731	17,647	27,154
6/30/07-08	42,547	55,547	0.713	30,343	39,614
6/30/08-09	47,137	76,137	0.695	32,777	52,942
6/30/09-10	54,540	77,390	0.690	37,652	53,426
6/30/10-11	64,439	89,439	0.688	44,361	61,572
6/30/11-12	86,073	101,073	0.697	59,982	70,435
6/30/12-13	93,568	133,218	0.705	65,932	93,871
6/30/13-14	104,819	158,569	0.704	73,771	111,601
6/30/14-15	159,021	206,271	0.695	110,458	143,279
6/30/15-16	223,349	276,549	0.742	165,679	205,143
6/30/16-17	286,373	366,123	0.764	218,874	279,827
6/30/17-18	410,135	573,785	0.809	331,910	464,347
Total	1,765,177	2,349,378		1,312,667	1,748,207
			(7) Total Discount Factor:	0.744	0.744

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	394	394
(9) Projected Number of Years:	2	2
(10) Projected Paid Loss per Year:	197	197
(11) Discounted Value at 6%:	372	372

NOTES:

(2), (3) From Section 5, Exhibit 2, Page 1, Columns 8, 9

(4) From Section 5, Exhibit 2, Page 9, Column 8

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Medical Center) - Cluster 4

Indemnity

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		1,329,412			1,329,412	1,329,412	0	0		
6/30/82-83		306,340	306,536		306,340	313,999	0	7,659		
6/30/83-84		1,443,839	1,505,758		1,445,283	1,451,058	1,444	7,219		
6/30/84-85	116,303	852,745	853,349	853,577	853,598	857,009	853	4,264	0.734	0.737
6/30/85-86	123,981	2,517,941	2,519,687	2,520,081	2,520,000	2,520,000	2,059	2,059	2.033	2.033
6/30/86-87	139,388	3,380,019	3,382,234	3,382,191	3,382,000	3,396,919	1,981	16,900	2.426	2.437
6/30/87-88	159,499	3,025,877	3,027,768	3,027,690	3,028,000	3,041,006	2,123	15,129	1.898	1.907
6/30/88-89	180,644	2,623,646	2,625,266	2,625,898	2,626,270	2,636,764	2,624	13,118	1.454	1.460
6/30/89-90	142,494	3,243,583	3,245,624	3,246,425	3,246,827	3,259,801	3,244	16,218	2.279	2.288
6/30/90-91	143,694	1,101,823	1,103,352	1,103,340	1,102,925	1,107,332	1,102	5,509	0.768	0.771
6/30/91-92	155,170	1,518,304	1,521,473	1,521,421	1,519,822	1,525,896	1,518	7,592	0.979	0.983
6/30/92-93	163,283	638,167	639,515	639,489	638,805	641,358	638	3,191	0.391	0.393
6/30/93-94	177,184	1,917,607	1,921,709	1,921,567	1,922,000	1,965,547	4,393	47,940	1.085	1.109
6/30/94-95	188,391	521,127	523,240	523,217	521,648	523,733	521	2,606	0.277	0.278
6/30/95-96	201,751	491,723	495,476	495,453	496,640	501,557	4,917	9,834	0.246	0.249
6/30/96-97	231,872	422,390	424,992	425,231	426,614	430,838	4,224	8,448	0.184	0.186
6/30/97-98	232,237	545,727	560,481	560,000	551,184	556,642	5,457	10,915	0.237	0.240
6/30/98-99	232,075	631,601	644,200	644,101	637,917	644,233	6,316	12,632	0.275	0.278
6/30/99-00	211,819	687,583	713,952	712,624	694,459	701,335	6,876	13,752	0.328	0.331
6/30/00-01	215,099	737,973	761,256	760,292	745,353	752,733	7,380	14,759	0.347	0.350
6/30/01-02	227,797	341,709	354,981	355,127	345,126	348,543	3,417	6,834	0.152	0.153
6/30/02-03	242,008	1,105,119	1,159,223	1,155,384	1,155,000	1,216,950	49,881	111,831	0.477	0.503
6/30/03-04	276,758	962,971	1,002,042	1,000,169	1,000,000	1,002,000	37,029	39,029	0.361	0.362
6/30/04-05	260,378	201,102	211,006	223,980	211,000	224,000	9,898	22,898	0.081	0.086
6/30/05-06	317,741	778,823	830,404	817,813	818,000	830,000	39,177	51,177	0.257	0.261
6/30/06-07	325,922	368,698	396,754	412,779	397,000	413,000	28,302	44,302	0.122	0.127
6/30/07-08	354,130	1,180,035	1,267,277	1,241,464	1,241,000	1,267,000	60,965	86,965	0.350	0.358
6/30/08-09	362,309	503,460	556,901	564,473	557,000	564,000	53,540	60,540	0.154	0.156
6/30/09-10	383,298	529,870	590,989	605,639	591,000	606,000	61,130	76,130	0.154	0.158
6/30/10-11	394,924	695,094	815,215	787,607	788,000	847,600	92,906	152,506	0.200	0.215
6/30/11-12	381,943	917,216	1,074,319	1,020,958	1,021,000	1,074,000	103,784	156,784	0.267	0.281
6/30/12-13	384,763	406,699	485,307	517,497	485,000	517,000	78,301	110,301	0.126	0.134
6/30/13-14	364,582	657,099	825,767	796,591	797,000	826,000	139,901	168,901	0.219	0.227
6/30/14-15	370,543	257,327	379,938	422,255	380,000	422,000	122,673	164,673	0.103	0.114
6/30/15-16	382,602	320,856	593,061	589,278	589,000	593,000	268,144	272,144	0.154	0.155
6/30/16-17	395,324	113,090	304,274	467,426	304,000	467,000	190,910	353,910	0.077	0.118
6/30/17-18	398,722	64,657	366,252	560,570	366,000	561,000	301,343	496,343	0.092	0.141
Total	8,838,630	37,341,250	37,989,579	36,501,607	39,040,222	39,936,262	1,698,972	2,595,012		
Tot 6/30/84-18	8,838,630	34,261,659	36,177,286	36,501,607	35,959,187	36,841,793	1,697,528	2,580,134	0.407	0.417

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) Sum of Section 6, Exhibit 1, Page 2, Column 3 and Section 6, Exhibit 1, Page 9, Column 8

(4) From Section 6, Exhibit 1, Page 2, Column 8

(5) From Section 6, Exhibit 1, Page 3, Column 8

(6), (7) Selected based on (3), (4), and (5)

(8) = (6) - (3)

(9) = (7) - (3)

(10) = (6) / (2) / 10

(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Medical Center) - Cluster 4
Indemnity

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Accident Year	Payroll (000's)	Paid Loss Excluding Lump Sum	Paid LDF	Adjstmnt for Extra Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/16-17	Paid Counts 7/1/17-18	Average Outstanding Claim	Average Age
All Prior Yrs		1,242,912							0	0		
6/30/82-83		271,340	1.001	1.000	271,536	35,000	306,536		0	0		
6/30/83-84		1,219,902	1.001	1.050	1,281,821	223,937	1,505,758		0	0		
6/30/84-85	116,303	837,745	1.001	1.000	838,349	15,000	853,349	0.734	0	0		
6/30/85-86	123,981	2,421,446	1.001	1.000	2,423,192	96,495	2,519,687	2.032	0	0		
6/30/86-87	139,388	3,072,101	1.001	1.000	3,074,316	307,918	3,382,234	2.426	0	0		
6/30/87-88	159,499	2,621,395	1.001	1.000	2,623,286	404,482	3,027,768	1.898	0	0		
6/30/88-89	180,644	2,245,396	1.001	1.000	2,247,016	378,250	2,625,266	1.453	0	0		
6/30/89-90	142,494	2,830,333	1.001	1.000	2,832,374	413,250	3,245,624	2.278	0	0		
6/30/90-91	143,694	887,647	1.002	1.000	889,176	214,176	1,103,352	0.768	0	0		
6/30/91-92	155,170	1,163,553	1.003	1.000	1,166,722	354,751	1,521,473	0.981	0	0		
6/30/92-93	163,283	494,916	1.003	1.000	496,264	143,251	639,515	0.392	0	0		
6/30/93-94	177,184	1,506,355	1.003	1.000	1,510,457	411,252	1,921,709	1.085	1	1	4,103	76
6/30/94-95	188,391	273,127	1.008	1.000	275,240	248,000	523,240	0.278	0	0		
6/30/95-96	201,751	253,697	1.015	1.000	257,450	238,026	495,476	0.246	0	0		
6/30/96-97	231,872	113,590	1.023	1.000	116,192	308,800	424,992	0.183	0	0		
6/30/97-98	232,237	445,227	1.033	1.000	459,981	100,500	560,481	0.241	0	0		
6/30/98-99	232,075	289,851	1.043	1.000	302,450	341,750	644,200	0.278	0	0		
6/30/99-00	211,819	489,166	1.054	1.000	515,535	198,417	713,952	0.337	0	0		
6/30/00-01	215,099	431,926	1.054	1.000	455,209	306,047	761,256	0.354	0	0		
6/30/01-02	227,797	246,210	1.054	1.000	259,482	95,499	354,981	0.156	0	0		
6/30/02-03	242,008	1,003,703	1.054	1.000	1,057,807	101,416	1,159,223	0.479	1	1	54,105	57
6/30/03-04	276,758	635,971	1.061	1.000	675,042	327,000	1,002,042	0.362	0	0		
6/30/04-05	260,378	134,102	1.074	1.000	144,006	67,000	211,006	0.081	0	0		
6/30/05-06	317,741	498,323	1.100	1.000	548,286	282,118	830,404	0.261	0	0		
6/30/06-07	325,922	238,698	1.111	1.000	265,256	131,497	396,754	0.122	0	0		
6/30/07-08	354,130	620,035	1.126	1.000	698,080	569,197	1,267,277	0.358	1	1	78,045	50
6/30/08-09	362,309	369,959	1.135	1.000	419,924	136,977	556,901	0.154	1	1	49,966	47
6/30/09-10	383,298	350,870	1.158	1.000	406,404	184,585	590,989	0.154	1	1	55,534	43
6/30/10-11	394,924	582,594	1.196	1.000	696,857	118,358	815,215	0.206	1	1	114,264	63
6/30/11-12	381,943	676,716	1.212	1.000	819,962	254,356	1,074,319	0.281	2	2	71,623	55
6/30/12-13	384,763	286,699	1.236	1.000	354,335	130,972	485,307	0.126	1	0		
6/30/13-14	364,582	507,849	1.259	1.000	639,364	186,404	825,767	0.226	3	2	65,757	56
6/30/14-15	370,543	257,327	1.403	1.000	360,964	18,973	379,938	0.103	3	2	51,819	54
6/30/15-16	382,602	320,856	1.678	1.000	538,290	54,771	593,061	0.155	8	4	54,358	56
6/30/16-17	395,324	113,090	2.366	1.000	267,537	36,737	304,274	0.077	21	5	30,889	51
6/30/17-18	398,722	64,657	4.847	1.000	313,378	52,874	366,252	0.092		23	10,814	46
Total	8,838,630	30,019,282			30,501,543	7,488,037	37,989,579		44	44		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3), (4) From Section 6, Exhibit 1, Page 7

(5) Based on information from the MA WCRIB

(6) = (3) x (4) x (5)

(7) From Section 6, Exhibit 1, Page 9, Column 13

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10), (11) Provided by Commonwealth of Massachusetts

(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Medical Center) - Cluster 4
Indemnity

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss Excluding Lump Sum	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	116,303	0.992	837,745	1.001	838,577	15,000	853,577	0.734	0.721
6/30/85-86	123,981	2.395	2,421,446	1.001	2,423,586	96,495	2,520,081	2.033	1.955
6/30/86-87	139,388	2.162	3,072,101	1.001	3,074,273	307,918	3,382,191	2.426	2.206
6/30/87-88	159,499	1.577	2,621,395	1.001	2,623,208	404,482	3,027,690	1.898	1.645
6/30/88-89	180,644	1.730	2,245,396	1.001	2,247,648	378,250	2,625,898	1.454	1.244
6/30/89-90	142,494	2.767	2,830,333	1.001	2,833,175	413,250	3,246,425	2.278	1.988
6/30/90-91	143,694	0.614	887,647	1.002	889,164	214,176	1,103,340	0.768	0.619
6/30/91-92	155,170	0.739	1,163,553	1.003	1,166,670	354,751	1,521,421	0.980	0.752
6/30/92-93	163,283	0.298	494,916	1.003	496,238	143,251	639,489	0.392	0.304
6/30/93-94	177,184	0.823	1,506,355	1.003	1,510,315	411,252	1,921,567	1.085	0.852
6/30/94-95	188,391	0.144	273,127	1.008	275,217	248,000	523,217	0.278	0.146
6/30/95-96	201,751	0.127	253,697	1.015	257,427	238,026	495,453	0.246	0.128
6/30/96-97	231,872	0.055	113,590	1.023	116,431	308,800	425,231	0.183	0.050
6/30/97-98	232,237	0.192	445,227	1.033	459,500	100,500	560,000	0.241	0.198
6/30/98-99	232,075	0.129	289,851	1.043	302,351	341,750	644,101	0.278	0.130
6/30/99-00	211,819	0.231	489,166	1.054	514,207	198,417	712,624	0.336	0.243
6/30/00-01	215,099	0.203	431,926	1.054	454,245	306,047	760,292	0.353	0.211
6/30/01-02	227,797	0.115	246,210	1.054	259,628	95,499	355,127	0.156	0.114
6/30/02-03	242,008	0.406	1,003,703	1.054	1,053,968	101,416	1,155,384	0.477	0.436
6/30/03-04	276,758	0.232	635,971	1.061	673,169	327,000	1,000,169	0.361	0.243
6/30/04-05	260,378	0.128	134,102	1.074	156,980	67,000	223,980	0.086	0.060
6/30/05-06	317,741	0.129	498,323	1.100	535,695	282,118	817,813	0.257	0.169
6/30/06-07	325,922	0.130	238,698	1.111	281,281	131,497	412,779	0.127	0.086
6/30/07-08	354,130	0.132	620,035	1.126	672,267	569,197	1,241,464	0.351	0.190
6/30/08-09	362,309	0.133	369,959	1.135	427,497	136,977	564,473	0.156	0.118
6/30/09-10	383,298	0.134	350,870	1.158	421,053	184,585	605,639	0.158	0.110
6/30/10-11	394,924	0.134	582,594	1.196	669,249	118,358	787,607	0.199	0.169
6/30/11-12	381,943	0.135	676,716	1.212	766,601	254,356	1,020,958	0.267	0.201
6/30/12-13	384,763	0.136	286,699	1.236	386,525	130,972	517,497	0.134	0.100
6/30/13-14	364,582	0.136	507,849	1.259	610,188	186,404	796,591	0.218	0.167
6/30/14-15	370,543	0.137	257,327	1.403	403,282	18,973	422,255	0.114	0.109
6/30/15-16	382,602	0.138	320,856	1.678	534,507	54,771	589,278	0.154	0.140
6/30/16-17	395,324	0.139	113,090	2.366	430,689	36,737	467,426	0.118	0.109
6/30/17-18	398,722	0.140	64,657	4.847	507,696	52,874	560,570	0.141	0.127
Total	8,838,630		27,285,128		29,272,507	7,229,100	36,501,607		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 6, Exhibit 1, Page 4, Column 11

(4) From Section 6, Exhibit 1, Page 2, Column 3

(5) From Section 6, Exhibit 1, Page 2, Column 4

(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]

(7) From Section 6, Exhibit 1, Page 9, Column 13

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Medical Center) - Cluster 4

Indemnity

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Exp Ult Loss Excluding Lump Sum	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									0.992	0.992
6/30/85-86									2.395	2.395
6/30/86-87									2.162	2.162
6/30/87-88									1.577	1.577
6/30/88-89									1.730	1.730
6/30/89-90									2.767	2.767
6/30/90-91	143,694	889,176	0.619	0.983	0.608	1.000	0.608	0.142	0.615	0.614
6/30/91-92	155,170	1,166,722	0.752	1.079	0.811	1.000	0.811	0.130	0.740	0.739
6/30/92-93	163,283	496,264	0.304	1.258	0.382	1.000	0.382	0.111	0.298	0.298
6/30/93-94	177,184	1,510,457	0.852	1.242	1.059	1.000	1.059	0.113	0.816	0.823
6/30/94-95	188,391	275,240	0.146	1.230	0.180	1.000	0.180	0.114	0.146	0.144
6/30/95-96	201,751	257,450	0.128	1.220	0.156	1.000	0.156	0.115	0.128	0.127
6/30/96-97	231,872	116,192	0.050	1.208	0.061	1.000	0.061	0.116	0.055	0.055
6/30/97-98	232,237	459,981	0.198	1.193	0.236	1.000	0.236	0.117	0.194	0.192
6/30/98-99	232,075	302,450	0.130	1.177	0.153	1.000	0.153	0.119	0.131	0.129
6/30/99-00	211,819	515,535	0.243	1.158	0.282	1.000	0.282	0.121	0.231	0.231
6/30/00-01	215,099	455,209	0.212	1.129	0.239	1.000	0.239	0.124	0.203	0.203
6/30/01-02	227,797	259,482	0.114	1.107	0.126	1.000	0.126	0.126	0.115	0.115
6/30/02-03	242,008	1,057,807	0.437	1.103	0.482	1.000	0.482	0.127	0.399	0.406
6/30/03-04	276,758	675,042	0.244	1.103	0.269	1.000	0.269	0.127	0.234	0.232
6/30/04-05	260,378	144,006	0.055	1.096	0.061	1.000	0.061	0.128	0.129	0.128
6/30/05-06	317,741	548,286	0.173	1.085	0.187	1.000	0.187	0.129	0.130	0.129
6/30/06-07	325,922	265,256	0.081	1.073	0.087	1.000	0.087	0.130	0.131	0.130
6/30/07-08	354,130	698,080	0.197	1.061	0.209	1.000	0.209	0.132	0.133	0.132
6/30/08-09	362,309	419,924	0.116	1.049	0.122	1.000	0.122	0.133	0.134	0.133
6/30/09-10	383,298	406,404	0.106	1.045	0.111	1.000	0.111	0.134	0.135	0.134
6/30/10-11	394,924	696,857	0.176	1.046	0.185	1.000	0.185	0.134	0.135	0.134
6/30/11-12	381,943	819,962	0.215	1.039	0.223	1.000	0.223	0.135	0.136	0.135
6/30/12-13	384,763	354,335	0.092	1.030	0.095	1.000	0.095	0.136	0.137	0.136
6/30/13-14	364,582	639,364	0.175	1.026	0.180	1.000	0.180	0.136	0.137	0.136
6/30/14-15	370,543	360,964	0.097	1.020	0.099	1.000	0.099	0.137	0.138	0.137
6/30/15-16	382,602	538,290	0.141	1.013	0.142	1.000	0.142	0.138	0.139	0.138
6/30/16-17	395,324	267,537	0.068	1.006	0.068	1.000	0.068	0.139	0.140	0.139
6/30/17-18	398,722	313,378	0.079	1.000	0.079	1.000	0.079	0.140		0.140
Total	7,976,321	14,909,652								

Trend Last 4 (ex 17-18):	-22.5%	Avg 3 (ex 17-18):	0.103
Trend Last 8 (ex 17-18):	-7.4%	Avg 5 (ex 17-18):	0.117
Trend Last 12 (ex 17-18):	-3.5%	Avg 10 (ex 17-18):	0.143
Prior Selected Trend:	0.0%	Prior Sel Avg:	0.140
Selected Trend:	0.0%	Sel. Loss Cost:	0.140

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 6, Exhibit 1, Page 2, Column 6

(4) = (3) / (2) / 10

(5) Based on information from the MA WCRIB

(6) = (4) x (5)

(7) Based on Selected Trend from (6)

(8) = (6) x (7)

(9) = Sel. Loss Cost / [(5) * (7)]

(10) From prior Aon analysis as of June 30, 2017

(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Medical Center) - Cluster 4
Indemnity

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend	0.860	
(2)	Credibility	9%	
(3)	Average Pmt Trend Statewide	0.960	
(4)	Credibility Weighted Trend	0.951	
		(Low)	(High)
(5)	Selected Range	0.941	0.970
(6)	Incremental Paid for 2018	0	0
(7)	Estimated Reserve	0	0
(8)	Paid to Date (82 & Prior)	1,242,912	1,242,912
(9)	Est Ult Paid for 1982 & Prior	1,242,912	1,242,912

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	0	0
(11)	Projected Number of Years	1	1
(12)	Estimated Reserve	0	0
(13)	Paid to Date (82 & Prior)	1,242,912	1,242,912
(14)	Est Ult Paid for 1982 & Prior	1,242,912	1,242,912
(14a)	Paid Counts During Fiscal Year	0	0

		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	1,242,912	1,242,912
(16)	Lump Sum Ultimates	86,500	86,500
(17)	Ult Loss Including Lump Sums	**1,329,412**	**1,329,412**
(18)	Implied Tail	1.000	1.000
(19)	Ult Loss Inc Lump Sums @ 6/17	1,329,412	1,329,412

NOTES:

(1) From Section 6, Exhibit 1, Page 6
(2) = (Average of Section 6, Exhibit 1, Page 6, Column 3 / 3,000,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 6, Exhibit 1, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 6, Exhibit 1, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) From Section 6, Exhibit 1, Page 9, Column 13
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2017

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Medical Center) - Cluster 4
Indemnity

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	92,878	11.439			
1993	2	83,290	11.330	0.897		
1994	3	82,744	11.324	0.993		
1995	4	76,872	11.250	0.929		
1996	5	73,496	11.205	0.956		
1997	6	42,425	10.655	0.577		
1998	7	43,683	10.685	1.030		
1999	8	44,262	10.698	1.013		
2000	9	49,469	10.809	1.118	n =	12
2001	10	47,733	10.773	0.965	S(x) =	23,970
2002	11	28,782	10.268	0.603	S(x-sq) =	47,880,218
2003	12	12,543	9.437	0.436	S(xy) =	259,401
2004	13	0			S(y) =	130
2005	14	0			D =	1,716
2006	15	0			slope =	-0.137
2007	16	0			Avg Trend =	0.863
2008	17	0				
2009	18	0				
2010	19	0				
2011	20	0				
2012	21	0				
2013	22	0				
2014	23	0				
2015	24	0				
2016	25	0				
2017	26	0				
2018	27	0				
					Selected Trend:	**0.860**

NOTES:

(3) 2018 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2017

(4) LN [(3)]

(5) Eg. 2003: 0.436 = 12543 / 28782

Commonwealth of Massachusetts Workers Compensation
University of Massachusetts (Medical Center) - Cluster 4
INDEMNITY
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432
June-83	20,333	51,116	80,072	103,773	130,398	141,779	176,965	199,729	221,812	232,715	258,415	258,415	263,521	253,827	259,034	264,240	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340	271,340
June-84	57,600	144,806	226,837	293,981	343,659	432,433	537,475	627,523	702,624	756,969	803,646	836,058	882,478	912,918	944,937	977,381	1,013,642	1,052,979	1,095,405	1,138,804	1,183,544	1,219,902	1,219,902	1,219,902	1,219,902	1,219,902	1,219,902	1,219,902	1,219,902	1,219,902	1,219,902	1,219,902	1,219,902	1,219,902	1,219,902	
June-85	63,759	160,290	251,092	325,415	403,737	509,752	570,921	613,784	663,935	693,110	702,075	726,654	753,001	779,914	809,196	840,064	837,165	837,745	837,745	837,745	837,745	837,745	837,745	837,745	837,745	837,745	837,745	837,745	837,745	837,745	837,745	837,745	837,745	837,745		
June-86	154,113	387,438	606,915	783,976	961,962	1,132,149	1,274,833	1,393,763	1,502,381	1,636,065	1,751,114	1,854,218	1,962,657	2,114,127	2,191,041	2,271,411	2,297,923	2,325,043	2,352,163	2,379,342	2,408,086	2,421,446	2,421,446	2,421,446	2,421,446	2,421,446	2,421,446	2,421,446	2,421,446	2,421,446	2,421,446	2,421,446	2,421,446		
June-87	166,736	419,172	641,668	854,284	1,072,274	1,249,198	1,388,337	1,542,716	1,758,390	1,875,672	1,986,394	2,093,920	2,135,258	2,199,362	2,260,862	2,284,043	2,302,892	2,321,741	2,340,539	2,359,336	2,708,676	2,762,266	2,818,196	2,874,830	2,931,224	2,989,542	3,049,764	3,072,101	3,072,101	3,072,101	3,072,101	3,072,101			
June-88	174,358	435,032	660,480	866,856	1,054,956	1,195,356	1,302,385	1,395,569	1,488,786	1,568,531	1,652,757	1,723,638	1,803,152	1,884,392	1,957,379	2,019,197	2,082,510	2,146,026	2,212,010	2,280,936	2,353,096	2,428,406	2,506,612	2,583,636	2,620,881	2,621,395	2,621,395	2,621,395	2,621,395	2,621,395	2,621,395				
June-89	244,759	583,650	955,229	1,207,778	1,405,394	1,580,598	1,710,863	1,867,443	1,974,910	2,078,269	2,163,384	2,208,386	2,233,112	2,239,652	2,239,652	2,245,396	2,245,396	2,245,396	2,245,396	2,245,396	2,245,396	2,245,396	2,245,396	2,245,396	2,245,396	2,245,396	2,245,396	2,245,396	2,245,396						
June-90	351,648	811,854	1,353,747	1,739,540	2,053,362	2,300,598	2,503,649	2,605,537	2,726,706	2,654,988	2,740,214	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333	2,830,333						
June-91	156,076	357,539	517,757	630,387	728,239	832,901	871,395	947,686	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647	887,647							
June-92	261,100	669,245	900,334	1,044,793	1,152,142	1,241,017	1,237,974	1,112,699	1,137,295	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553	1,163,553								
June-93	206,631	396,390	480,534	554,071	597,393	614,181	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916	494,916										
June-94	247,518	643,612	941,958	1,088,319	1,200,112	1,123,946	1,143,130	1,179,142	1,181,321	1,181,499	1,181,499	1,246,051	1,265,620	1,286,180	1,304,675	1,323,640	1,345,114	1,364,136	1,383,838	1,403,763	1,423,826	1,444,130	1,464,767	1,485,375	1,506,355											
June-95	205,179	254,027	345,287	415,297	285,940	285,940	285,940	286,111	286,111	286,111	286,111	273,127	273,127	273,127	273,127	273,127	273,127	273,127	273,127	273,127	273,127	273,127	273,127	273,127												
June-96	155,417	406,013	576,300	245,663	246,118	246,118	246,697	246,697	253,697	253,697	253,697	253,697	253,697	253,697	253,697	253,697	253,697	253,697	253,697	253,697	253,697	253,697	253,697													
June-97	97,433	256,318	57,502	85,876	119,079	124,761	113,590	113,590	113,590	113,590	113,590	113,590	113,590	113,590	113,590	113,590	113,590	113,590	113,590	113,590	113,590	113,590														
June-98	240,727	143,983	232,600	419,169	444,399	445,227	445,227	445,227	445,227	445,227	445,227	445,227	445,227	445,227	445,227	445,227	445,227	445,227	445,227	445,227	445,227															
June-99	58,149	198,506	223,119	274,795	288,604	286,087	287,457	287,658	287,796	287,796	287,796	287,796	289,251	289,251	289,851	289,851	289,851	289,851	289,851	289,851																
June-00	139,725	319,021	396,283	425,910	459,317	480,109	487,559	487,559	487,559	487,559	487,559	487,559	489,166	489,166	489,166	489,166	489,166	489,166	489,166																	
June-01	103,272	231,200	298,053	357,230	397,007	413,694	429,139	431,926	431,926	431,926	431,926	431,926	431,926	431,926	431,926	431,926	431,926	431,926																		
June-02	111,843	169,158	211,386	237,447	244,070	244,070	244,070	244,070	246,210	246,210	246,210	246,210	246,210	246,210	246,210	246,210	246,210																			
June-03	103,346	214,476	266,732	299,619	422,566	501,970	559,245	599,400	671,238	720,943	771,432	822,132	873,438	930,527	982,602	1,003,703																				
June-04	158,939	366,873	493,674	593,313	624,409	635,971	635,971	635,971	635,971	635,971	635,971	635,971	635,971	635,971	635,971																					
June-05	66,383	103,442	111,589	111,589	111,589	111,589	111,589	125,745	134,102	134,102	134,102	134,102	134,102	134,102																						
June-06	148,922	299,710	423,237	498,323	498,323	498,323	498,323	498,323	498,323	498,323	498,323	498,323	498,323																							
June-07	129,667	222,028	238,698	238,698	238,698	238,698	238,698	238,698	238,698	238,698	238,698	238,698																								
June-08	199,585	456,548	645,562	768,096	799,003	692,172	609,450	614,827	614,827	614,857	620,035																									
June-09	126,394	222,250	303,425	345,595	337,031	345,960	348,059	348,059	358,262	369,959																										
June-10	173,596	323,966	367,986	373,360	374,510	374,510	349,231	350,070	350,870																											
June-11	204,108	361,900	447,595	503,639	528,963	548,763	568,457	582,594																												
June-12	169,232	317,366	416,322	526,284	584,656	637,971	676,716																													
June-13	159,666	227,306	265,791	285,810	286,699	286,699																														
June-14	86,121	261,428	375,084	466,071	507,849																															
June-15	49,642	100,069	188,369	257,327																																
June-16	101,585	204,682	320,856																																	
June-17	54,297	113,090																																		
June-18	64,657																																			

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432
June-83	2.514	1.566	1.296	1.257	1.087	1.248	1.129	1.111	1.049	1.110	1.000	1.020	0.963	1.021	1.020	1.027	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
June-84	2.514	1.566	1.296	1.169	1.258	1.243	1.168	1.120	1.077	1.062	1.040	1.056	1.034	1.035	1.034	1.037	1.039	1.040	1.040	1.039	1.031	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
June-85	2.514	1.566	1.296	1.241	1.263	1.120	1.075	1.082	1.044	1.013	1.035	1.036	1.036	1.038	1.038	0.997	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
June-86	2.514	1.566	1.292	1.227	1.177	1.126	1.093	1.078	1.089	1.070	1.059	1.058	1.077	1.036	1.037	1.012	1.012	1.012	1.012	1.012	1.006	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
June-87	2.514	1.531	1.331	1.255	1.165	1.111	1.111	1.140	1.067	1.059	1.054	1.020	1.030	1.028	1.010	1.008	1.008	1.008	1.008	1.148	1.020	1.020	1.020	1.020	1.020	1.020	1.007	1.000	1.000	1.000	1.000				
June-88	2.495	1.518	1.312	1.217	1.133	1.090	1.072	1.067	1.054	1.054	1.043	1.046	1.045	1.039	1.032	1.031	1.030	1.031	1.031	1.032	1.032	1.032	1.031	1.014	1.000	1.000	1.000	1.000	1.000	1.000					
June-89	2.385	1.637	1.264	1.164	1.125	1.082	1.092	1.058	1.052	1.041	1.021	1.011	1.003	1.000	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
June-90	2.309	1.667	1.285	1.180	1.120	1.088	1.041	1.047	0.974	1.032	1.033	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000							
June-91	2.291	1.448	1.218	1.155	1.144	1.046	1.088	0.937	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000								
June-92	2.563	1.345	1.160	1.103	1.077	0.998	0.899	1.022	1.023	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000									
June-93	1.918	1.212	1.153	1.078	1.028	0.806	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000										
June-94	2.600	1.464	1.155	1.103	0.937	1.017	1.032	1.002	1.000	1.000	1.055	1.016	1.016	1.014	1.015	1.016	1.014	1.014	1.014	1.014	1.014	1.014	1.014	1.014											
June-95	1.238	1.359	1.203	0.689	1.000	1.000	1.001	1.000	1.000	1.000	0.955	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
June-96	2.612	1.419	0.426	1.002	1.000	1.002	1.000	1.028	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
June-97	2.631	0.224	1.493	1.387	1.048	0.910	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
June-98	0.598	1.615	1.802	1.060	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000															
June-99	3.414	1.124	1.232	1.050	0.991	1.005	1.001	1.000	1.000	1.000	1.000	1.005	1.000	1.002	1.000	1.000	1.000	1.000	1.000																
June-00	2.283	1.242	1.075	1.078	1.045	1.016	1.000	1.000	1.000	1.000	1.000	1.003	1.000	1.000	1.000	1.000	1.000	1.000																	
June-01	2.239	1.289	1.199	1.111	1.042	1.037	1.006	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																		
June-02	1.512	1.250	1.123	1.028	1.000	1.000	1.000	1.009	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																			
June-03	2.075	1.244	1.123	1.410	1.188	1.114	1.072	1.120	1.074	1.070	1.066	1.062	1.065	1.056	1.021																				
June-04	2.308	1.346	1.202	1.052	1.019	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																					
June-05	1.558	1.079	1.000	1.000	1.000	1.000	1.127	1.066	1.000	1.000	1.000	1.000	1.000																						
June-06	2.013	1.412	1.177	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																							
June-07	1.712	1.075	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																								
June-08	2.287	1.414	1.190	1.040	0.866	0.880	1.009	1.000	1.000	1.008																									
June-09	1.758	1.365	1.139	0.975	1.026	1.006	1.000	1.029	1.033																										
June-10	1.866	1.136	1.015	1.003	1.000	0.933	1.002	1.002																											
June-11	1.773	1.237	1.125	1.050	1.037	1.036	1.025																												
June-12	1.875	1.312	1.264	1.111	1.091	1.061																													
June-13	1.424	1.169	1.075	1.003	1.000																														
June-14	3.036	1.435	1.243	1.090																															
June-15	2.016	1.882	1.366																																
June-16	2.015	1.568																																	
June-17	2.083																																		

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	To Ult
Simple Avg																																				
All Yrs	2.156	1.361	1.198	1.103	1.060	1.033	1.036	1.033	1.020	1.020	1.014	1.014	1.012	1.012	1.010	1.006	1.005	1.006	1.006	1.015	1.007	1.005	1.005	1.004	1.002	1.002	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Latest 5	2.115	1.473	1.215	1.051	1.031	0.983	1.007	1.006	1.007	1.002	1.013	1.012	1.013	1.011	1.004	1.000	1.000	1.000	1.000	1.003	1.003	1.003	1.003	1.003	1.000	1.000	1.001	1.000	1.000	1.000	1.000					
Latest 3	2.038	1.628	1.228	1.068	1.043	1.010	1.009	1.011	1.011	1.003	1.000	1.000	1.022	1.019	1.007	1.000	1.000	1.000	1.000	1.000	1.000	1.005	1.005	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Volume Wtd																																				
All Yrs	2.104	1.383	1.188	1.114	1.074	1.045	1.043	1.043	1.027	1.030	1.028	1.019	1.021	1.017	1.013	1.008	1.008	1.009	1.009	1.027	1.010	1.008	1.008	1.006	1.003	1.003	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Latest 5	2.009	1.410	1.204	1.059	1.039	0.982	1.010	1.005	1.006	1.002	1.022	1.022	1.025	1.019	1.009	1.000	1.000	1.000	1.000	1.008	1.008	1.006	1.005	1.003	1.000	1.000	1.002	1.000	1.000	1.000	1.000					
Latest 3	2.033	1.562	1.217	1.079	1.052	1.021	1.012	1.008	1.010	1.004	1.000	1.000	1.035	1.029	1.013	1.000	1.000	1.000	1.000	1.000	1.000	1.010	1.009	1.007	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			

Dev Factor Selection																																				
Industry 1	2.946	1.574	1.235	1.110	1.036	1.025	1.016	1.009	1.007	1.006	1.006	1.010	1.003	1.005	1.003	1.004	1.005	1.003																		
Industry 2		1.901	1.354	1.158	1.073	1.026	1.025	1.013	1.006	1.010	1.006	1.014	1.007	1.003	1.003	1.003	1.002	1.006	1.002	1.003																
Prior	*2.033*	*1.335*	*1.168*	*1.115*	*1.019*	*1.020*	*1.013*	*1.033*	*1.020*	*1.011*	*1.013*	*1.010*	*1.021*	*1.012*	*1.003*	*1.000*	*1.000*	*1.000*	*1.010*	*1.010*	*1.010*	*1.008*	*1.007*	*1.005*	*1.000*	*1.000*	*1.001*	*1.001*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.001*	
Selected	2.049	1.410	1.196	1.114	1.019	1.020	1.013	1.033	1.020	1.008	1.013	1.010	1.025	1.012	1.007	1.000	1.000	1.000	1.010	1.010	1.010	1.008	1.007	1.005	1.000	1.000	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.001
FacToUlt	4.847	2.366	1.678	1.403	1.259	1.236	1.212	1.196	1.158	1.135	1.126	1.111	1.100	1.074	1.061	1.054	1.054	1.054	1.054	1.043	1.033	1.023	1.015	1.008	1.003	1.003	1.003	1.002	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001
Percent of Ult	20.6%	42.3%	59.6%	71.3%	79.4%	80.9%	82.5%	83.6%	86.3%	88.1%	88.8%	90.0%	90.9%	93.1%	94.2%	94.9%	94.9%	94.9%	94.9%	95.8%	96.8%	97.8%	98.5%	99.2%	99.7%	99.7%	99.7%	99.8%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Medical Center) - Cluster 4

Indemnity

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/17		As of 6/18		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	1,329,412	1,329,412	1,329,412	1,329,412	0	0.0%	0	0.0%
6/30/82-83	306,340	313,999	306,340	313,999	0	0.0%	0	0.0%
6/30/83-84	1,445,283	1,451,058	1,445,283	1,451,058	0	0.0%	0	0.0%
6/30/84-85	853,598	857,009	853,598	857,009	0	0.0%	0	0.0%
6/30/85-86	2,520,000	2,521,000	2,520,000	2,520,000	0	0.0%	(1,000)	0.0%
6/30/86-87	3,383,000	3,396,919	3,382,000	3,396,919	(1,000)	0.0%	0	0.0%
6/30/87-88	3,028,000	3,041,006	3,028,000	3,041,006	0	0.0%	0	0.0%
6/30/88-89	2,626,270	2,636,764	2,626,270	2,636,764	0	0.0%	0	0.0%
6/30/89-90	3,246,827	3,259,801	3,246,827	3,259,801	0	0.0%	0	0.0%
6/30/90-91	1,102,925	1,107,332	1,102,925	1,107,332	0	0.0%	0	0.0%
6/30/91-92	1,519,822	1,525,896	1,519,822	1,525,896	0	0.0%	0	0.0%
6/30/92-93	638,805	641,358	638,805	641,358	0	0.0%	0	0.0%
6/30/93-94	1,908,000	1,944,042	1,922,000	1,965,547	14,000	0.7%	21,505	1.1%
6/30/94-95	521,648	523,733	521,648	523,733	0	0.0%	0	0.0%
6/30/95-96	496,640	501,557	496,640	501,557	0	0.0%	0	0.0%
6/30/96-97	426,614	430,838	426,614	430,838	0	0.0%	0	0.0%
6/30/97-98	551,184	556,642	551,184	556,642	0	0.0%	0	0.0%
6/30/98-99	637,917	644,233	637,917	644,233	0	0.0%	0	0.0%
6/30/99-00	694,459	701,335	694,459	701,335	0	0.0%	0	0.0%
6/30/00-01	745,353	752,733	745,353	752,733	0	0.0%	0	0.0%
6/30/01-02	345,126	348,543	345,126	348,543	0	0.0%	0	0.0%
6/30/02-03	1,136,000	1,197,000	1,155,000	1,216,950	19,000	1.7%	19,950	1.7%
6/30/03-04	1,006,000	1,008,000	1,000,000	1,002,000	(6,000)	-0.6%	(6,000)	-0.6%
6/30/04-05	214,000	230,000	211,000	224,000	(3,000)	-1.4%	(6,000)	-2.6%
6/30/05-06	821,000	834,000	818,000	830,000	(3,000)	-0.4%	(4,000)	-0.5%
6/30/06-07	399,000	416,000	397,000	413,000	(2,000)	-0.5%	(3,000)	-0.7%
6/30/07-08	1,242,000	1,268,000	1,241,000	1,267,000	(1,000)	-0.1%	(1,000)	-0.1%
6/30/08-09	552,000	561,000	557,000	564,000	5,000	0.9%	3,000	0.5%
6/30/09-10	552,000	568,000	591,000	606,000	39,000	7.1%	38,000	6.7%
6/30/10-11	781,000	839,280	788,000	847,600	7,000	0.9%	8,320	1.0%
6/30/11-12	962,000	1,012,000	1,021,000	1,074,000	59,000	6.1%	62,000	6.1%
6/30/12-13	505,000	539,000	485,000	517,000	(20,000)	-4.0%	(22,000)	-4.1%
6/30/13-14	704,000	747,000	797,000	826,000	93,000	13.2%	79,000	10.6%
6/30/14-15	345,000	424,000	380,000	422,000	35,000	10.1%	(2,000)	-0.5%
6/30/15-16	517,000	563,000	589,000	593,000	72,000	13.9%	30,000	5.3%
6/30/16-17	333,000	575,000	304,000	467,000	(29,000)	-8.7%	(108,000)	-18.8%
6/30/17-18								
Total	38,396,222	39,266,488	38,674,222	39,375,262	278,000	0.7%	108,775	0.3%

NOTES:

(2), (3) From prior Aon analysis as of June 30, 2017

(4), (5) From Section 6, Exhibit 1, Page 1, Columns 6, 7

(6) = (4) - (2)

(7) = (4) / (2) - 1

(8) = (5) - (3)

(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Medical Center) - Cluster 4
Indemnity

Calculation of Ultimate Lump Sum Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Accident Year	Paid Loss Excluding Lump Sum	Implied Cumulative LDF	Ult Loss Excluding Lump Sum	Selected Incr Lump Sum % Outstdg	Cumulative Lump Sum % Outstdg	Total Lump Sum Outstdg	Paid Lump Sum to Date	Est Ult Lump Sum - Incr Method	Ultimate Lump Sum Percentage	Lump Sum LDF	Est Ult Lump Sum - Paid Method	Selected Est Ultimate Lump Sums	Prior Est Ultimate Lump Sums
All Prior Yrs	1,242,912	1.000	1,242,912	0.0%	0.0%	0	86,500	86,500	7.0%	1.000	86,500	86,500	86,500
6/30/82-83	271,340	1.001	271,536	0.0%	0.0%	0	35,000	35,000	12.9%	1.000	35,000	35,000	35,000
6/30/83-84	1,219,902	1.051	1,281,821	0.0%	0.0%	0	223,937	223,937	17.5%	1.000	223,937	223,937	223,937
6/30/84-85	837,745	1.001	838,349	0.0%	0.0%	0	15,000	15,000	1.8%	1.000	15,000	15,000	15,000
6/30/85-86	2,421,446	1.001	2,423,192	0.0%	0.0%	0	96,495	96,495	4.0%	1.000	96,495	96,495	96,495
6/30/86-87	3,072,101	1.001	3,074,316	0.0%	0.0%	0	307,918	307,918	10.0%	1.000	307,918	307,918	307,918
6/30/87-88	2,621,395	1.001	2,623,286	0.0%	0.0%	0	404,482	404,482	15.4%	1.000	404,482	404,482	404,482
6/30/88-89	2,245,396	1.001	2,247,016	0.0%	0.0%	0	378,250	378,250	16.8%	1.000	378,250	378,250	378,250
6/30/89-90	2,830,333	1.001	2,832,374	0.0%	0.0%	0	413,250	413,250	14.6%	1.000	413,250	413,250	413,250
6/30/90-91	887,647	1.002	889,176	0.0%	0.0%	0	214,176	214,176	24.1%	1.000	214,176	214,176	214,176
6/30/91-92	1,163,553	1.003	1,166,722	0.0%	0.0%	0	354,751	354,751	30.4%	1.000	354,751	354,751	354,751
6/30/92-93	494,916	1.003	496,264	0.0%	0.0%	0	143,251	143,251	28.9%	1.000	143,251	143,251	143,251
6/30/93-94	1,506,355	1.003	1,510,457	0.0%	0.0%	0	411,252	411,252	27.2%	1.000	411,252	411,252	411,252
6/30/94-95	273,127	1.008	275,240	0.0%	0.0%	0	248,000	248,000	90.1%	1.000	248,000	248,000	248,000
6/30/95-96	253,697	1.015	257,450	0.0%	0.0%	0	238,026	238,026	92.5%	1.000	238,026	238,026	238,026
6/30/96-97	113,590	1.023	116,192	0.0%	0.0%	0	308,800	308,800	265.8%	1.000	308,800	308,800	308,800
6/30/97-98	445,227	1.033	459,981	0.0%	0.0%	0	100,500	100,500	21.8%	1.000	100,500	100,500	100,500
6/30/98-99	289,851	1.043	302,450	0.0%	0.0%	0	341,750	341,750	113.0%	1.000	341,750	341,750	341,750
6/30/99-00	489,166	1.054	515,535	0.0%	0.0%	0	198,417	198,417	38.5%	1.000	198,417	198,417	198,417
6/30/00-01	431,926	1.054	455,209	0.0%	0.0%	0	306,047	306,047	67.2%	1.000	306,047	306,047	306,047
6/30/01-02	246,210	1.054	259,482	0.0%	0.0%	0	95,499	95,499	36.8%	1.000	95,499	95,499	95,499
6/30/02-03	1,003,703	1.054	1,057,807	0.0%	0.0%	0	101,416	101,416	9.6%	1.000	101,416	101,416	101,416
6/30/03-04	635,971	1.061	675,042	0.0%	0.0%	0	327,000	327,000	48.4%	1.000	327,000	327,000	327,000
6/30/04-05	134,102	1.074	144,006	0.0%	0.0%	0	67,000	67,000	46.5%	1.000	67,000	67,000	67,393
6/30/05-06	498,323	1.100	548,286	0.1%	0.1%	432	280,500	280,932	51.2%	1.010	283,305	282,118	283,715
6/30/06-07	238,698	1.111	265,256	0.1%	0.1%	382	130,000	130,382	49.2%	1.020	132,613	131,497	132,242
6/30/07-08	620,035	1.126	698,080	0.1%	0.2%	1,426	560,000	561,426	80.4%	1.030	576,969	569,197	572,637
6/30/08-09	369,959	1.135	419,924	0.2%	0.4%	1,530	133,501	135,031	32.2%	1.041	138,922	136,977	137,944
6/30/09-10	350,870	1.158	406,404	0.1%	0.5%	2,039	179,000	181,039	44.5%	1.051	188,131	184,585	134,404
6/30/10-11	582,594	1.196	696,857	0.2%	0.7%	4,795	112,500	117,295	16.8%	1.062	119,421	118,358	120,897
6/30/11-12	676,716	1.212	819,962	0.6%	1.3%	10,364	240,500	250,864	30.6%	1.072	257,849	254,356	226,251
6/30/12-13	286,699	1.236	354,335	0.9%	2.2%	7,756	120,000	127,756	36.1%	1.118	134,188	130,972	145,654
6/30/13-14	507,849	1.259	639,364	3.3%	5.5%	34,960	149,250	184,210	28.8%	1.264	188,597	186,404	95,135
6/30/14-15	257,327	1.403	360,964	5.0%	10.5%	37,947	0	37,947	10.5%	1.500	0	18,973	36,985
6/30/15-16	320,856	1.678	538,290	9.8%	20.3%	109,542	0	109,542	20.3%	2.733	0	54,771	70,249
6/30/16-17	113,090	2.366	267,537	7.1%	27.5%	73,473	0	73,473	27.5%	5.746	0	36,737	91,739
6/30/17-18	64,657	4.847	313,378	6.3%	33.7%	105,748	0	105,748	33.7%	5.746	0	52,874	
Total	30,019,282		31,744,455			390,395	7,321,968	7,712,363	24.3%		7,436,711	7,574,537	7,464,961

NOTES:

(2) From Section 6, Exhibit 1, Page 2, Column 3

(3) = (4) / (2)

(4) From Section 6, Exhibit 1, Page 2, Column 6

(5) From Section 6, Exhibit 1, Page 11

(6) Downward sum of (5)

(7) = (6) x (4)

(8) From Section 6, Exhibit 1, Page 10

(9) = (7) + (8)

(10) = (9) / (4)

(11) From Section 6, Exhibit 1, Page 12

(12) = (8) x (11)

(13) Selected based on (9) and (12)

(14) From Aon analysis as of June 30, 2016

Commonwealth of Massachusetts Workers Compensation
University of Massachusetts (Medical Center) - Cluster 4
INDEMNITY
Lump Sum Development
Incremental Lump Sum Payments

Acc Yr Ending	0-12	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444
All Prior Yrs	0	0	0	0	0	0	0	0	0	0	0	0	0	26,500	0	0	0	0	0	0	0	60,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-83	0	0	0	0	0	20,000	0	0	0	0	0	0	0	15,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jun-84	0	0	0	0	25,750	0	0	36,687	25,000	0	35,500	17,000	0	0	0	0	0	0	0	0	0	84,000	0	0	0	0	0	0	0	0	0	0	0	0	0		
Jun-85	0	0	0	0	0	0	0	0	0	0	5,000	0	0	0	0	0	0	0	10,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Jun-86	0	0	0	0	0	0	23,000	15,000	10,995	10,000	0	0	0	37,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Jun-87	0	0	8,323	0	0	43,000	9,000	5,000	0	30,000	38,424	25,671	112,500	36,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
Jun-88	0	0	0	0	10,482	6,500	21,000	46,000	29,000	0	45,000	32,500	0	0	40,000	0	0	0	0	0	0	0	0	58,000	58,000	58,000	0	0	0	0	0						
Jun-89	0	0	16,000	76,750	27,500	0	75,000	15,000	0	0	143,000	0	25,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
Jun-90	0	0	47,500	50,000	3,000	72,500	51,250	50,500	77,200	51,300	0	10,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								
Jun-91	0	6,300	28,000	0	88,376	13,000	30,000	41,500	7,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0									
Jun-92	0	0	80,001	43,500	79,250	35,000	117,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0										
Jun-93	0	28,000	1	22,500	52,750	40,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0											
Jun-94	0	68,500	118,500	39,375	92,877	79,500	0	0	12,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
Jun-95	0	158,500	29,500	35,000	25,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0													
Jun-96	0	25,000	162,356	22,670	0	0	0	0	28,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0														
Jun-97	15,000	113,800	110,000	0	70,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0															
Jun-98	1,500	62,500	15,000	0	21,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																
Jun-99	0	33,750	125,000	160,000	23,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0																	
Jun-00	5,000	72,513	47,154	18,750	0	0	25,000	30,000	0	0	0	0	0	0	0	0	0	0	0																		
Jun-01	0	71,047	80,000	60,000	0	50,000	0	45,000	0	0	0	0	0	0	0	0	0	0																			
Jun-02	0	9,000	38,999	30,000	17,500	0	0	0	0	0	0	0	0	0	0	0	0																				
Jun-03	0	16,416	55,000	0	0	0	30,000	0	0	0	0	0	0	0	0	0																					
Jun-04	0	65,000	30,000	125,000	55,000	52,000	0	0	0	0	0	0	0	0	0																						
Jun-05	0	0	67,000	0	0	0	0	0	0	0	0	0	0	0																							
Jun-06	0	15,000	18,000	177,500	40,000	30,000	0	0	0	0	0	0	0																								
Jun-07	0	70,000	45,000	15,000	0	0	0	0	0	0	0	0																									
Jun-08	0	170,000	150,000	165,000	0	75,000	0	0	0	0	0																										
Jun-09	0	0	0	133,501	0	0	0	0	0	0																											
Jun-10	0	36,000	93,000	0	0	0	0	0	50,000																												
Jun-11	0	50,000	0	37,500	25,000	0	0	0																													
Jun-12	0	95,000	0	110,500	0	0	35,000																														
Jun-13	0	50,000	0	70,000	0	0																															
Jun-14	0	0	0	49,250	100,000																																
Jun-15	0	0	0	0																																	
Jun-16	0	0	0																																		
Jun-17	0	0																																			
Jun-18	0																																				

Cumulative Lump Sum Payments

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444
All Prior Yrs	0	0	0	0	0	0	0	0	0	0	0	0	0	26,500	26,500	26,500	26,500	26,500	26,500	26,500	26,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500
Jun-83	0	0	0	0	0	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	
Jun-84	0	0	0	0	25,750	25,750	25,750	62,437	87,437	87,437	122,937	139,937	139,937	139,937	139,937	139,937	139,937	139,937	139,937	139,937	139,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937		
Jun-85	0	0	0	0	0	0	0	0	0	0	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000			
Jun-86	0	0	0	0	0	0	23,000	38,000	48,995	58,995	58,995	58,995	58,995	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495				
Jun-87	0	0	8,323	8,323	8,323	51,323	60,323	65,323	65,323	95,323	133,747	159,418	271,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918					
Jun-88	0	0	0	0	10,482	16,982	37,982	83,982	112,982	112,982	157,982	190,482	190,482	190,482	230,482	230,482	230,482	230,482	230,482	230,482	230,482	230,482	230,482	288,482	346,482	404,482	404,482	404,482	404,482	404,482	404,482						
Jun-89	0	0	16,000	92,750	120,250	120,250	195,250	210,250	210,250	210,250	353,250	353,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250							
Jun-90	0	0	47,500	97,500	100,500	173,000	224,250	274,750	351,950	403,250	403,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250								
Jun-91	0	6,300	34,300	34,300	122,676	135,676	165,676	207,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176									
Jun-92	0	0	80,001	123,501	202,751	237,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751										
Jun-93	0	28,000	28,001	50,501	103,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251											
Jun-94	0	68,500	187,000	226,375	319,252	398,752	398,752	398,752	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252												
Jun-95	0	158,500	188,000	223,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000													
Jun-96	0	25,000	187,356	210,026	210,026	210,026	210,026	210,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026														
Jun-97	15,000	128,800	238,800	238,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800															
Jun-98	1,500	64,000	79,000	79,000	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500																
Jun-99	0	33,750	158,750	318,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750																	
Jun-00	5,000	77,513	124,667	143,417	143,417	143,417	168,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417																		
Jun-01	0	71,047	151,047	211,047	211,047	261,047	261,047	306,047	306,047	306,047	306,047	306,047	306,047	306,047	306,047	306,047	306,047	306,047																			
Jun-02	0	9,000	47,999	77,999	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499																				
Jun-03	0	16,416	71,416	71,416	71,416	71,416	101,416	101,416	101,416	101,416	101,416	101,416	101,416	101,416	101,416	101,416																					
Jun-04	0	65,000	95,000	220,000	275,000	327,000	327,000	327,000	327,000	327,000	327,000	327,000	327,000	327,000	327,000																						
Jun-05	0	0	67,000	67,000	67,000	67,000	67,000	67,000	67,000	67,000	67,000	67,000	67,000	67,000																							
Jun-06	0	15,000	33,000	210,500	250,500	280,500	280,500	280,500	280,500	280,500	280,500	280,500	280,500																								
Jun-07	0	70,000	115,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000																									
Jun-08	0	170,000	320,000	485,000	485,000	560,000	560,000	560,000	560,000	560,000	560,000																										
Jun-09	0	0	0	133,501	133,501	133,501	133,501	133,501	133,501	133,501																											
Jun-10	0	36,000	129,000	129,000	129,000	129,000	129,000	129,000	179,000																												
Jun-11	0	50,000	50,000	87,500	112,500	112,500	112,500	112,500																													
Jun-12	0	95,000	95,000	265,500	265,500	265,500	240,500																														
Jun-13	0	50,000	50,000	120,000	120,000	120,000																															
Jun-14	0	0	0	49,250	149,250																																
Jun-15	0	0	0	0																																	
Jun-16	0	0	0																																		
Jun-17	0	0																																			
Jun-18	0																																				

Commonwealth of Massachusetts Workers Compensation
University of Massachusetts (Medical Center) - Cluster 4
INDEMNITY
Lump Sum Development
Incremental Lump Sums as a % of Ultimate Losses Excluding Lump Sums

Acc Yr Ending	0-12	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444
All Prior Yrs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.021	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.048	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jun-83	0.000	0.000	0.000	0.000	0.000	0.074	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Jun-84	0.000	0.000	0.000	0.000	0.020	0.000	0.000	0.029	0.020	0.000	0.028	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.066	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Jun-85	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
Jun-86	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.006	0.005	0.004	0.000	0.000	0.000	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Jun-87	0.000	0.000	0.003	0.000	0.000	0.014	0.003	0.002	0.000	0.010	0.012	0.008	0.037	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
Jun-88	0.000	0.000	0.000	0.000	0.004	0.002	0.008	0.018	0.011	0.000	0.017	0.012	0.000	0.000	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.022	0.022	0.000	0.000	0.000	0.000	0.000						
Jun-89	0.000	0.000	0.007	0.034	0.012	0.000	0.033	0.007	0.000	0.000	0.064	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000							
Jun-90	0.000	0.000	0.017	0.018	0.001	0.026	0.018	0.018	0.027	0.018	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000								
Jun-91	0.000	0.007	0.031	0.000	0.099	0.015	0.034	0.047	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000									
Jun-92	0.000	0.000	0.069	0.037	0.068	0.030	0.100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000										
Jun-93	0.000	0.056	0.000	0.045	0.106	0.081	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000												
Jun-94	0.000	0.045	0.078	0.026	0.061	0.053	0.000	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000													
Jun-95	0.000	0.576	0.107	0.127	0.091	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000														
Jun-96	0.000	0.097	0.631	0.088	0.000	0.000	0.000	0.000	0.109	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000															
Jun-97	0.129	0.979	0.947	0.000	0.602	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																
Jun-98	0.003	0.136	0.033	0.000	0.047	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																	
Jun-99	0.000	0.112	0.413	0.529	0.076	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																		
Jun-00	0.010	0.141	0.091	0.036	0.000	0.000	0.048	0.058	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																			
Jun-01	0.000	0.156	0.176	0.132	0.000	0.110	0.000	0.099	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																				
Jun-02	0.000	0.035	0.150	0.116	0.067	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																					
Jun-03	0.000	0.016	0.052	0.000	0.000	0.000	0.028	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																					
Jun-04	0.000	0.096	0.044	0.185	0.081	0.077	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																						
Jun-05	0.000	0.000	0.465	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																							
Jun-06	0.000	0.027	0.033	0.324	0.073	0.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000																								
Jun-07	0.000	0.264	0.170	0.057	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																									
Jun-08	0.000	0.244	0.215	0.236	0.000	0.107	0.000	0.000	0.000	0.000	0.000																										
Jun-09	0.000	0.000	0.000	0.318	0.000	0.000	0.000	0.000	0.000	0.000																											
Jun-10	0.000	0.089	0.229	0.000	0.000	0.000	0.000	0.000	0.123																												
Jun-11	0.000	0.072	0.000	0.054	0.036	0.000	0.000	0.000																													
Jun-12	0.000	0.116	0.000	0.135	0.000	0.000	0.043																														
Jun-13	0.000	0.141	0.000	0.198	0.000	0.000																															
Jun-14	0.000	0.000	0.000	0.077	0.156																																
Jun-15	0.000	0.000	0.000	0.000																																	
Jun-16	0.000	0.000	0.000																																		
Jun-17	0.000	0.000																																			
Jun-18	0.000																																				

Averages		12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444
Simple Avg																																					
All Yrs (ex P)	0.004	0.097	0.116	0.084	0.050	0.021	0.011	0.010	0.011	0.001	0.005	0.002	0.002	0.004	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.004	0.000	0.002	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Latest 5	0.000	0.028	0.000	0.093	0.038	0.000	0.009	0.000	0.025	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
Latest 3	0.000	0.000	0.000	0.092	0.052	0.000	0.014	0.000	0.041	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Olympic Avg																																					
All Yrs (ex P)	0.000	0.073	0.094	0.072	0.033	0.018	0.008	0.007	0.007	0.001	0.003	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Latest 10	0.000	0.052	0.048	0.134	0.014	0.016	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000										
Latest 5	0.000	0.000	0.000	0.089	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000						

Dev Factor Selection																																					
Prior	NA	0.066	0.074	0.135	0.050	0.033	0.009	0.006	0.002	0.001	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Selected	NA	0.063	0.071	0.098	0.050	0.033	0.009	0.006	0.002	0.001	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FacToUlt	NA	0.337	0.275	0.203	0.105	0.055	0.022	0.013	0.007	0.005	0.004	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Commonwealth of Massachusetts Workers Compensation
University of Massachusetts (Medical Center) - Cluster 4
INDEMNITY
Paid Loss Development
Paid Loss - Lump Sum only

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444
All Prior Yrs	0	0	0	0	0	0	0	0	0	0	0	0	0	26,500	26,500	26,500	26,500	26,500	26,500	26,500	26,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500	86,500
Jun-83	0	0	0	0	0	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	
Jun-84	0	0	0	0	25,750	25,750	25,750	62,437	87,437	87,437	122,937	139,937	139,937	139,937	139,937	139,937	139,937	139,937	139,937	139,937	139,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937	223,937		
Jun-85	0	0	0	0	0	0	0	0	0	0	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000			
Jun-86	0	0	0	0	0	0	23,000	38,000	48,995	58,995	58,995	58,995	58,995	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495	96,495				
Jun-87	0	0	8,323	8,323	8,323	51,323	60,323	65,323	65,323	95,323	133,747	159,418	271,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918	307,918					
Jun-88	0	0	0	0	10,482	16,982	37,982	83,982	112,982	112,982	157,982	190,482	190,482	190,482	230,482	230,482	230,482	230,482	230,482	230,482	230,482	230,482	230,482	288,482	346,482	404,482	404,482	404,482	404,482	404,482	404,482						
Jun-89	0	0	16,000	92,750	120,250	120,250	195,250	210,250	210,250	210,250	353,250	353,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250	378,250							
Jun-90	0	0	47,500	97,500	100,500	173,000	224,250	274,750	351,950	403,250	403,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250	413,250								
Jun-91	0	6,300	34,300	34,300	122,676	135,676	165,676	207,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176	214,176									
Jun-92	0	0	80,001	123,501	202,751	237,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751	354,751										
Jun-93	0	28,000	28,001	50,501	103,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251	143,251											
Jun-94	0	68,500	187,000	226,375	319,252	398,752	398,752	398,752	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252	411,252												
Jun-95	0	158,500	188,000	223,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000	248,000													
Jun-96	0	25,000	187,356	210,026	210,026	210,026	210,026	210,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026	238,026														
Jun-97	15,000	128,800	238,800	238,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800	308,800															
Jun-98	1,500	64,000	79,000	79,000	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500	100,500																
Jun-99	0	33,750	158,750	318,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750	341,750																	
Jun-00	5,000	77,513	124,667	143,417	143,417	143,417	168,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417	198,417																		
Jun-01	0	71,047	151,047	211,047	211,047	261,047	261,047	306,047	306,047	306,047	306,047	306,047	306,047	306,047	306,047	306,047	306,047	306,047																			
Jun-02	0	9,000	47,999	77,999	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499	95,499																				
Jun-03	0	16,416	71,416	71,416	71,416	71,416	101,416	101,416	101,416	101,416	101,416	101,416	101,416	101,416	101,416	101,416																					
Jun-04	0	65,000	95,000	220,000	275,000	327,000	327,000	327,000	327,000	327,000	327,000	327,000	327,000	327,000	327,000																						
Jun-05	0	0	67,000	67,000	67,000	67,000	67,000	67,000	67,000	67,000	67,000	67,000	67,000	67,000																							
Jun-06	0	15,000	33,000	210,500	250,500	280,500	280,500	280,500	280,500	280,500	280,500	280,500	280,500																								
Jun-07	0	70,000	115,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000																									
Jun-08	0	170,000	320,000	485,000	485,000	560,000	560,000	560,000	560,000	560,000	560,000																										
Jun-09	0	0	0	133,501	133,501	133,501	133,501	133,501	133,501	133,501																											
Jun-10	0	36,000	129,000	129,000	129,000	129,000	129,000	129,000	179,000																												
Jun-11	0	50,000	50,000	87,500	112,500	112,500	112,500	112,500																													
Jun-12	0	95,000	95,000	205,500	205,500	205,500	240,500																														
Jun-13	0	50,000	50,000	120,000	120,000	120,000																															
Jun-14	0	0	0	49,250	149,250																																
Jun-15	0	0	0	0																																	
Jun-16	0	0	0																																		
Jun-17	0	0																																			
Jun-18	0																																				

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	To Ult
All Prior Yrs														1.000	1.000	1.000	1.000	1.000	1.000	1.000	3.264	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Jun-83						1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.750	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Jun-84					1.000	1.000	2.425	1.400	1.000	1.406	1.138	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.600	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
Jun-85											1.000	1.000	1.000	1.000	1.000	1.000	3.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Jun-86							1.652	1.289	1.204	1.000	1.000	1.000	1.636	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Jun-87			1.000	1.000	6.166	1.175	1.083	1.000	1.459	1.403	1.192	1.706	1.132	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000							
Jun-88					1.620	2.237	2.211	1.345	1.000	1.398	1.206	1.000	1.000	1.210	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.252	1.201	1.167	1.000	1.000	1.000	1.000	1.000							
Jun-89			5.797	1.296	1.000	1.624	1.077	1.000	1.000	1.680	1.000	1.071	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000								
Jun-90			2.053	1.031	1.721	1.296	1.225	1.281	1.146	1.000	1.025	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000									
Jun-91		5.444	1.000	3.577	1.106	1.221	1.250	1.034	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000										
Jun-92			1.544	1.642	1.173	1.492	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000											
Jun-93		1.000	1.804	2.045	1.387	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
Jun-94		2.730	1.211	1.410	1.249	1.000	1.000	1.031	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
Jun-95		1.186	1.186	1.112	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
Jun-96		7.494	1.121	1.000	1.000	1.000	1.000	1.133	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000															
Jun-97	8.587	1.854	1.000	1.293	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																
Jun-98	42.667	1.234	1.000	1.272	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
Jun-99		4.704	2.008	1.072	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																		
Jun-00	15.503	1.608	1.150	1.000	1.000	1.174	1.178	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																			
Jun-01		2.126	1.397	1.000	1.237	1.000	1.172	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																				
Jun-02		5.333	1.625	1.224	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																					
Jun-03		4.350	1.000	1.000	1.000	1.420	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																						
Jun-04		1.462	2.316	1.250	1.189	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																							
Jun-05			1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																								
Jun-06		2.200	6.379	1.190	1.120	1.000	1.000	1.000	1.000	1.000	1.000	1.000																									
Jun-07		1.643	1.130	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																										
Jun-08		1.882	1.516	1.000	1.155	1.000	1.000	1.000	1.000	1.000																											
Jun-09				1.000	1.000	1.000	1.000	1.000	1.000																												
Jun-10		3.583	1.000	1.000	1.000	1.000	1.000	1.388																													
Jun-11		1.000	1.750	1.286	1.000	1.000	1.000																														
Jun-12		1.000	2.163	1.000	1.000	1.170																															
Jun-13		1.000	2.400	1.000	1.000																																
Jun-14				3.030																																	
Jun-15																																					
Jun-16																																					
Jun-17																																					

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	To Ult
Simple Avg																																					
All Yrs (ex P)	22.252	2.642	1.822	1.323	1.290	1.136	1.153	1.070	1.031	1.076	1.022	1.032	1.066	1.010	1.000	1.000	1.000	1.111	1.000	1.000	1.040	1.000	1.019	1.017	1.015	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Latest 5		1.000	2.104	1.463	1.000	1.034	1.000	1.078	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Latest 3			2.400	1.677	1.000	1.057	1.000	1.129	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Volume Wtd																																					
All Yrs (ex P)		2.102	1.554	1.187	1.111	1.082	1.054	1.044	1.017	1.049	1.017	1.027	1.018	1.008	1.000	1.000	1.000	1.002	1.000	1.000	1.024	1.000	1.019	1.020	1.023	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Latest 5		1.000	2.371	1.211	1.000	1.031	1.000	1.041	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Latest 3			3.385	1.267	1.000	1.078	1.000	1.061	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					

Dev Factor Selection																																					
Prior	1.000	2.102	1.828	1.164	1.130	1.043	1.010	1.010	1.010	1.010	1.010	1.010	1.010	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Selected	1.000	2.102	1.822	1.187	1.130	1.043	1.010	1.010	1.010	1.010	1.010	1.010	1.010	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
FacToUlt	5.746	5.746	2.733	1.500	1.264	1.118	1.072	1.062	1.051	1.041	1.030	1.020	1.010	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Percent of Ult	17.4%	17.4%	36.6%	66.7%	79.1%	89.4%	93.3%	94.2%	95.1%	96.1%	97.1%	98.0%	99.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Medical Center) - Cluster 4
Indemnity

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
444	100.0%	0.1%	0.0%	0.0%	0.0%	1.000	1.000
432	99.9%	0.0%	0.1%	0.0%	0.0%	0.981	0.971
420	99.9%	0.0%	0.1%	0.0%	0.0%	0.943	0.916
408	99.9%	0.0%	0.1%	0.0%	0.0%	0.907	0.864
396	99.9%	0.0%	0.1%	0.0%	0.0%	0.872	0.816
384	99.9%	0.0%	0.1%	0.0%	0.0%	0.838	0.769
372	99.9%	0.0%	0.1%	0.0%	0.0%	0.806	0.726
360	99.9%	0.0%	0.1%	0.0%	0.0%	0.775	0.685
348	99.9%	0.1%	0.1%	0.0%	0.0%	0.745	0.646
336	99.8%	0.1%	0.2%	0.0%	0.0%	0.870	0.820
324	99.7%	0.0%	0.3%	0.0%	0.0%	0.889	0.846
312	99.7%	0.0%	0.3%	0.0%	0.0%	0.855	0.798
300	99.7%	0.5%	0.3%	0.2%	0.1%	0.822	0.753
288	99.2%	0.7%	0.8%	0.3%	0.2%	0.913	0.879
276	98.5%	0.8%	1.5%	0.3%	0.2%	0.927	0.896
264	97.8%	1.0%	2.2%	0.4%	0.3%	0.922	0.890
252	96.8%	1.0%	3.2%	0.4%	0.3%	0.915	0.879
240	95.8%	0.9%	4.2%	0.4%	0.3%	0.903	0.862
228	94.9%	0.0%	5.1%	0.0%	0.0%	0.889	0.843
216	94.9%	0.0%	5.1%	0.0%	0.0%	0.855	0.795
204	94.9%	0.0%	5.1%	0.0%	0.0%	0.822	0.750
192	94.9%	0.7%	5.1%	0.4%	0.3%	0.790	0.707
180	94.2%	1.1%	5.8%	0.6%	0.5%	0.786	0.703
168	93.1%	2.2%	6.9%	1.3%	1.0%	0.791	0.712
156	90.9%	0.9%	9.1%	0.6%	0.4%	0.815	0.745
144	90.0%	1.2%	10.0%	0.7%	0.6%	0.801	0.727
132	88.8%	0.7%	11.2%	0.5%	0.4%	0.792	0.716
120	88.1%	1.8%	11.9%	1.2%	1.0%	0.775	0.693
108	86.3%	2.7%	13.7%	2.0%	1.7%	0.776	0.695
96	83.6%	1.1%	16.4%	0.8%	0.7%	0.785	0.708
84	82.5%	1.6%	17.5%	1.3%	1.1%	0.769	0.687
72	80.9%	1.5%	19.1%	1.2%	1.1%	0.759	0.675
60	79.4%	8.1%	20.6%	6.8%	6.3%	0.748	0.661
48	71.3%	11.7%	28.7%	10.2%	9.5%	0.794	0.722
36	59.6%	17.3%	40.4%	15.7%	15.0%	0.826	0.765
24	42.3%	21.6%	57.7%	20.4%	19.8%	0.850	0.797
12	20.6%	20.6%	79.4%	20.2%	20.0%	0.862	0.812
Total		100.0%					

NOTES:

(2) = 1 / Section 6, Exhibit 1, Page 2, Column 4

(3) Incremental % based on (2)

(4) = 1 - (2)

(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}

(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}

(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Medical Center) - Cluster 4
Indemnity

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	0	0		0	0
6/30/82-83	0	7,659	0.981	0	7,510
6/30/83-84	1,444	7,219	0.943	1,361	6,807
6/30/84-85	853	4,264	0.907	773	3,866
6/30/85-86	2,059	2,059	0.872	1,795	1,795
6/30/86-87	1,981	16,900	0.838	1,661	14,166
6/30/87-88	2,123	15,129	0.806	1,711	12,194
6/30/88-89	2,624	13,118	0.775	2,033	10,166
6/30/89-90	3,244	16,218	0.745	2,417	12,085
6/30/90-91	1,102	5,509	0.870	958	4,792
6/30/91-92	1,518	7,592	0.889	1,350	6,751
6/30/92-93	638	3,191	0.855	546	2,729
6/30/93-94	4,393	47,940	0.822	3,612	39,418
6/30/94-95	521	2,606	0.913	476	2,380
6/30/95-96	4,917	9,834	0.927	4,557	9,113
6/30/96-97	4,224	8,448	0.922	3,896	7,791
6/30/97-98	5,457	10,915	0.915	4,994	9,988
6/30/98-99	6,316	12,632	0.903	5,704	11,408
6/30/99-00	6,876	13,752	0.889	6,114	12,228
6/30/00-01	7,380	14,759	0.855	6,309	12,619
6/30/01-02	3,417	6,834	0.822	2,809	5,618
6/30/02-03	49,881	111,831	0.790	39,430	88,399
6/30/03-04	37,029	39,029	0.786	29,094	30,666
6/30/04-05	9,898	22,898	0.791	7,831	18,116
6/30/05-06	39,177	51,177	0.815	31,916	41,691
6/30/06-07	28,302	44,302	0.801	22,671	35,488
6/30/07-08	60,965	86,965	0.792	48,297	68,894
6/30/08-09	53,540	60,540	0.775	41,491	46,916
6/30/09-10	61,130	76,130	0.776	47,410	59,044
6/30/10-11	92,906	152,506	0.785	72,920	119,698
6/30/11-12	103,784	156,784	0.769	79,764	120,498
6/30/12-13	78,301	110,301	0.759	59,468	83,772
6/30/13-14	139,901	168,901	0.748	104,687	126,388
6/30/14-15	122,673	164,673	0.794	97,347	130,676
6/30/15-16	268,144	272,144	0.826	221,472	224,776
6/30/16-17	190,910	353,910	0.850	162,302	300,877
6/30/17-18	301,343	496,343	0.862	259,736	427,812
Total	1,698,972	2,595,012		1,378,913	2,117,133
			(7) Total Discount Factor:	0.812	0.816

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	0	0
(9) Projected Number of Years:	1	1
(10) Projected Paid Loss per Year:	0	0
(11) Discounted Value at 4%:	0	0

NOTES:

(2), (3) From Section 6, Exhibit 1, Page 1, Columns 8, 9

(4) From Section 6, Exhibit 1, Page 13, Column 7

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Medical Center) - Cluster 4
Indemnity

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	0	0		0	0
6/30/82-83	0	7,659	0.971	0	7,439
6/30/83-84	1,444	7,219	0.916	1,323	6,615
6/30/84-85	853	4,264	0.864	737	3,686
6/30/85-86	2,059	2,059	0.816	1,679	1,679
6/30/86-87	1,981	16,900	0.769	1,524	13,002
6/30/87-88	2,123	15,129	0.726	1,541	10,981
6/30/88-89	2,624	13,118	0.685	1,796	8,982
6/30/89-90	3,244	16,218	0.646	2,095	10,476
6/30/90-91	1,102	5,509	0.820	903	4,515
6/30/91-92	1,518	7,592	0.846	1,284	6,422
6/30/92-93	638	3,191	0.798	509	2,546
6/30/93-94	4,393	47,940	0.753	3,308	36,092
6/30/94-95	521	2,606	0.879	458	2,290
6/30/95-96	4,917	9,834	0.896	4,408	8,816
6/30/96-97	4,224	8,448	0.890	3,757	7,515
6/30/97-98	5,457	10,915	0.879	4,797	9,594
6/30/98-99	6,316	12,632	0.862	5,444	10,888
6/30/99-00	6,876	13,752	0.843	5,793	11,586
6/30/00-01	7,380	14,759	0.795	5,866	11,731
6/30/01-02	3,417	6,834	0.750	2,562	5,124
6/30/02-03	49,881	111,831	0.707	35,285	79,107
6/30/03-04	37,029	39,029	0.703	26,020	27,425
6/30/04-05	9,898	22,898	0.712	7,045	16,298
6/30/05-06	39,177	51,177	0.745	29,188	38,128
6/30/06-07	28,302	44,302	0.727	20,575	32,206
6/30/07-08	60,965	86,965	0.716	43,629	62,235
6/30/08-09	53,540	60,540	0.693	37,104	41,955
6/30/09-10	61,130	76,130	0.695	42,474	52,896
6/30/10-11	92,906	152,506	0.708	65,788	107,992
6/30/11-12	103,784	156,784	0.687	71,264	107,657
6/30/12-13	78,301	110,301	0.675	52,870	74,477
6/30/13-14	139,901	168,901	0.661	92,484	111,655
6/30/14-15	122,673	164,673	0.722	88,598	118,932
6/30/15-16	268,144	272,144	0.765	205,184	208,245
6/30/16-17	190,910	353,910	0.797	152,113	281,988
6/30/17-18	301,343	496,343	0.812	244,555	402,808
Total	1,698,972	2,595,012		1,263,962	1,943,984
			(7) Total Discount Factor:	0.744	0.749

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	0	0
(9) Projected Number of Years:	1	1
(10) Projected Paid Loss per Year:	0	0
(11) Discounted Value at 6%:	0	0

NOTES:

(2), (3) From Section 6, Exhibit 1, Page 1, Columns 8, 9

(4) From Section 6, Exhibit 1, Page 13, Column 8

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Medical Center) - Cluster 4
Total Indemnity (Including Lump Sums) + Medical

Calculation of Fiscal Year 7/01/18 - 19 Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
						Cumulative	Incremental Paid		Estimated Payments from		FY 07/01/18 - 06/30/19	
Accident	Est Ult Losses	Est Ult Losses	Paid Losses	Reserves	Reserves	Percent	as a % of	as a % of	07/01/18 - 06/30/19		as a % of Reserves	
Year	(Low)	(High)	to Date	(Low)	(High)	Paid	Ultimates	Reserves	(Low)	(High)	(Low)	(High)
All Prior Yrs	1,455,812	1,455,812	1,455,812	0	0				0	0		
6/30/82-83	328,340	335,999	327,566	774	8,433	98.6%	0.5%	36.1%	279	3,042	36.1%	36.1%
6/30/83-84	1,496,283	1,502,058	1,494,800	1,483	7,258	99.7%	0.2%	68.6%	1,017	4,979	68.6%	68.6%
6/30/84-85	1,016,598	1,020,009	1,015,470	1,128	4,539	99.7%	0.2%	71.9%	811	3,263	71.9%	71.9%
6/30/85-86	2,736,000	2,736,000	2,733,296	2,704	2,704	99.9%	0.1%	75.9%	2,052	2,052	75.9%	75.9%
6/30/86-87	3,780,000	3,794,919	3,777,375	2,625	17,544	99.7%	0.2%	75.1%	1,972	13,178	75.1%	75.1%
6/30/87-88	3,376,000	3,389,006	3,373,806	2,194	15,200	99.7%	0.2%	77.8%	1,707	11,823	77.8%	77.8%
6/30/88-89	3,115,270	3,125,764	3,112,432	2,838	13,332	99.7%	0.2%	77.2%	2,190	10,292	77.2%	77.2%
6/30/89-90	3,800,827	3,813,801	3,797,545	3,282	16,256	99.7%	0.2%	77.9%	2,558	12,671	77.9%	77.9%
6/30/90-91	1,404,925	1,409,332	1,403,520	1,405	5,812	99.7%	0.2%	78.0%	1,096	4,533	78.0%	78.0%
6/30/91-92	2,189,822	2,195,896	2,187,492	2,330	8,404	99.8%	0.2%	81.7%	1,904	6,867	81.7%	81.7%
6/30/92-93	1,035,977	1,044,458	1,033,363	2,614	11,095	99.3%	0.5%	75.9%	1,984	8,419	75.9%	75.9%
6/30/93-94	2,631,000	2,687,871	2,625,768	5,232	62,103	98.7%	0.5%	39.5%	2,066	24,528	39.5%	39.5%
6/30/94-95	943,161	952,133	940,543	2,618	11,590	99.3%	0.5%	66.7%	1,746	7,730	66.7%	66.7%
6/30/95-96	881,507	892,217	874,675	6,832	17,542	98.6%	1.0%	72.8%	4,972	12,766	72.8%	72.8%
6/30/96-97	624,614	632,798	619,988	4,626	12,810	98.6%	1.0%	72.1%	3,336	9,238	72.1%	72.1%
6/30/97-98	1,050,184	1,065,622	1,043,715	6,469	21,906	98.7%	1.0%	74.6%	4,824	16,334	74.6%	74.6%
6/30/98-99	947,917	954,233	940,822	7,094	13,410	98.9%	1.0%	92.8%	6,581	12,440	92.8%	92.8%
6/30/99-00	880,459	887,335	872,750	7,710	14,585	98.7%	1.0%	79.3%	6,113	11,565	79.3%	79.3%
6/30/00-01	952,353	959,733	943,388	8,965	16,345	98.7%	1.0%	75.5%	6,773	12,348	75.5%	75.5%
6/30/01-02	577,126	585,183	572,336	4,790	12,847	98.5%	1.0%	65.9%	3,157	8,466	65.9%	65.9%
6/30/02-03	1,385,000	1,451,550	1,331,416	53,584	120,134	93.9%	2.0%	32.7%	17,499	39,232	32.7%	32.7%
6/30/03-04	1,302,000	1,307,020	1,259,443	42,557	47,577	96.5%	2.0%	57.9%	24,637	27,543	57.9%	57.9%
6/30/04-05	381,000	403,550	367,387	13,613	36,163	93.7%	2.0%	31.5%	4,291	11,400	31.5%	31.5%
6/30/05-06	1,213,000	1,246,850	1,165,506	47,494	81,344	94.8%	2.0%	38.2%	18,136	31,061	38.2%	38.2%
6/30/06-07	641,000	659,000	605,124	35,876	53,876	93.1%	2.0%	29.0%	10,393	15,607	29.0%	29.0%
6/30/07-08	1,767,000	1,826,650	1,693,000	74,000	133,650	94.2%	2.0%	34.6%	25,613	46,260	34.6%	34.6%
6/30/08-09	1,002,000	1,035,450	933,914	68,086	101,536	91.7%	5.0%	60.1%	40,891	60,981	60.1%	60.1%
6/30/09-10	903,000	938,850	820,629	82,371	118,221	89.1%	5.0%	45.9%	37,817	54,276	45.9%	45.9%
6/30/10-11	1,148,000	1,228,750	1,025,472	122,528	203,278	86.3%	5.0%	36.5%	44,692	74,145	36.5%	36.5%
6/30/11-12	1,355,000	1,429,950	1,217,588	137,412	212,362	87.4%	5.0%	39.8%	54,705	84,543	39.8%	39.8%
6/30/12-13	793,000	849,850	679,207	113,793	170,643	82.7%	5.0%	28.9%	32,862	49,280	28.9%	28.9%
6/30/13-14	1,280,000	1,352,050	1,093,806	186,194	258,244	83.1%	5.0%	29.6%	55,134	76,469	29.6%	29.6%
6/30/14-15	547,000	630,950	397,784	149,216	233,166	67.5%	10.0%	30.8%	45,967	71,828	30.8%	30.8%
6/30/15-16	934,000	964,700	589,734	344,266	374,966	62.1%	10.0%	26.4%	90,883	98,987	26.4%	26.4%
6/30/16-17	578,000	795,650	299,794	278,206	495,856	43.6%	15.0%	26.6%	74,056	131,992	26.6%	26.6%
6/30/17-18	617,000	924,300	154,386	462,614	769,914	20.0%	20.0%	25.0%	115,702	192,558	25.0%	25.0%
Total	51,070,173	52,485,297	48,780,649	2,289,524	3,704,648				750,414	1,262,698	32.8%	34.1%

NOTES:

(2) Exhibit 1, Page 1, Column (4) + Exhibit 2, Page 1, Column (4)

(3) Exhibit 1, Page 1, Column (5) + Exhibit 2, Page 1, Column (5)

(4) Exhibit 1, Page 1, Column (2) + Exhibit 2, Page 1, Column (2)

(5) = (2) - (4)

(6) = (3) - (4)

(7) = (4) / Average of Columns (2), (3)

(8) = (7) - Prior Year's (7)

(9) = (8) / (1.00 - (7))

(10) = (5) * (9)

(11) = (6) * (9)

(12) = (10) / (5)

(13) = (11) / (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Medical Center) - Cluster 4
Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Paid Loss	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		126,400			126,400	126,400	0	0		
6/30/82-83		21,226	21,235		22,000	22,000	774	774		
6/30/83-84		50,961	50,981		51,000	51,000	39	39		
6/30/84-85	116,303	162,725	162,790	162,816	163,000	163,000	275	275	0.140	0.140
6/30/85-86	123,981	215,355	215,441	215,474	216,000	216,000	645	645	0.174	0.174
6/30/86-87	139,388	397,356	397,516	397,570	398,000	398,000	644	644	0.286	0.286
6/30/87-88	159,499	347,929	348,068	348,109	348,000	348,000	71	71	0.218	0.218
6/30/88-89	180,644	488,786	488,982	489,039	489,000	489,000	214	214	0.271	0.271
6/30/89-90	142,494	553,962	554,184	554,285	554,000	554,000	38	38	0.389	0.389
6/30/90-91	143,694	301,697	301,818	301,817	302,000	302,000	303	303	0.210	0.210
6/30/91-92	155,170	669,188	669,456	669,452	670,000	670,000	812	812	0.432	0.432
6/30/92-93	163,283	395,196	395,354	395,351	397,172	403,100	1,976	7,904	0.243	0.247
6/30/93-94	177,184	708,161	708,445	708,436	709,000	722,325	839	14,163	0.400	0.408
6/30/94-95	188,391	419,416	419,584	419,579	421,513	428,400	2,097	8,984	0.224	0.227
6/30/95-96	201,751	382,952	383,106	383,101	384,867	390,660	1,915	7,708	0.191	0.194
6/30/96-97	231,872	197,598	197,874	197,875	198,000	201,960	402	4,362	0.085	0.087
6/30/97-98	232,237	497,988	499,185	499,128	499,000	508,980	1,012	10,992	0.215	0.219
6/30/98-99	232,075	309,222	310,274	310,242	310,000	310,000	778	778	0.134	0.134
6/30/99-00	211,819	185,166	185,983	185,983	186,000	186,000	834	834	0.088	0.088
6/30/00-01	215,099	205,415	206,526	206,520	207,000	207,000	1,585	1,585	0.096	0.096
6/30/01-02	227,797	230,627	232,434	232,414	232,000	236,640	1,373	6,013	0.102	0.104
6/30/02-03	242,008	226,298	229,673	229,667	230,000	234,600	3,702	8,302	0.095	0.097
6/30/03-04	276,758	296,472	302,344	302,270	302,000	305,020	5,528	8,548	0.109	0.110
6/30/04-05	260,378	166,284	169,748	171,414	170,000	179,550	3,716	13,266	0.065	0.069
6/30/05-06	317,741	386,684	397,450	395,024	395,000	416,850	8,316	30,166	0.124	0.131
6/30/06-07	325,922	236,426	243,901	246,105	244,000	246,000	7,574	9,574	0.075	0.075
6/30/07-08	354,130	512,965	532,679	525,665	526,000	559,650	13,035	46,685	0.149	0.158
6/30/08-09	362,309	430,454	449,232	445,208	445,000	471,450	14,546	40,996	0.123	0.130
6/30/09-10	383,298	290,759	311,868	316,703	312,000	332,850	21,241	42,091	0.081	0.087
6/30/10-11	394,924	330,378	360,480	363,356	360,000	381,150	29,622	50,772	0.091	0.097
6/30/11-12	381,943	300,372	334,428	339,267	334,000	355,950	33,628	55,578	0.087	0.093
6/30/12-13	384,763	272,508	308,349	317,230	308,000	332,850	35,492	60,342	0.080	0.087
6/30/13-14	364,582	436,707	500,532	483,196	483,000	526,050	46,293	89,343	0.132	0.144
6/30/14-15	370,543	140,457	166,942	199,242	167,000	208,950	26,543	68,493	0.045	0.056
6/30/15-16	382,602	268,877	345,405	353,647	345,000	371,700	76,123	102,823	0.090	0.097
6/30/16-17	395,324	186,703	274,456	313,101	274,000	328,650	87,297	141,947	0.069	0.083
6/30/17-18	398,722	89,728	251,367	346,122	251,000	363,300	161,272	273,572	0.063	0.091
Total	8,838,630	11,439,399	11,928,091	12,024,407	12,029,951	12,549,034	590,552	1,109,635		
Tot 6/30/84-18	8,838,630	11,240,812	11,855,875	12,024,407	11,830,551	12,349,634	589,739	1,108,822	0.134	0.140

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 6, Exhibit 2, Page 2, Column 3

(4) From Section 6, Exhibit 2, Page 2, Column 8

(5) From Section 6, Exhibit 2, Page 3, Column 8

(6), (7) Selected based on (3), (4), and (5)

(8) = (6) - (3)

(9) = (7) - (3)

(10) = (6) / (2) / 10

(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Medical Center) - Cluster 4
Medical

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Accident Year	Payroll (000's)	Paid Loss	Paid LDF	Adjustment for Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/16-17	Paid Counts 7/1/17-18	Average Outstanding Claim
All Prior Yrs		126,400							0	0	
6/30/82-83		21,226	1.000	1.000	21,235	N/A	21,235		0	0	
6/30/83-84		50,961	1.000	1.000	50,981	N/A	50,981		0	0	
6/30/84-85	116,303	162,725	1.000	1.000	162,790	N/A	162,790	0.140	0	0	
6/30/85-86	123,981	215,355	1.000	1.000	215,441	N/A	215,441	0.174	0	0	
6/30/86-87	139,388	397,356	1.000	1.000	397,516	N/A	397,516	0.285	0	0	
6/30/87-88	159,499	347,929	1.000	1.000	348,068	N/A	348,068	0.218	0	0	
6/30/88-89	180,644	488,786	1.000	1.000	488,982	N/A	488,982	0.271	0	0	
6/30/89-90	142,494	553,962	1.000	1.000	554,184	N/A	554,184	0.389	0	0	
6/30/90-91	143,694	301,697	1.000	1.000	301,818	N/A	301,818	0.210	0	0	
6/30/91-92	155,170	669,188	1.000	1.000	669,456	N/A	669,456	0.431	0	0	
6/30/92-93	163,283	395,196	1.000	1.000	395,354	N/A	395,354	0.242	0	0	
6/30/93-94	177,184	708,161	1.000	1.000	708,445	N/A	708,445	0.400	1	1	284
6/30/94-95	188,391	419,416	1.000	1.000	419,584	N/A	419,584	0.223	2	1	168
6/30/95-96	201,751	382,952	1.000	1.000	383,106	N/A	383,106	0.190	0	0	
6/30/96-97	231,872	197,598	1.001	1.000	197,874	N/A	197,874	0.085	1	1	277
6/30/97-98	232,237	497,988	1.002	1.000	499,185	N/A	499,185	0.215	1	1	1,197
6/30/98-99	232,075	309,222	1.003	1.000	310,274	N/A	310,274	0.134	0	0	
6/30/99-00	211,819	185,166	1.004	1.000	185,983	N/A	185,983	0.088	0	0	
6/30/00-01	215,099	205,415	1.005	1.000	206,526	N/A	206,526	0.096	0	0	
6/30/01-02	227,797	230,627	1.008	1.000	232,434	N/A	232,434	0.102	1	1	1,806
6/30/02-03	242,008	226,298	1.015	1.000	229,673	N/A	229,673	0.095	1	1	3,376
6/30/03-04	276,758	296,472	1.020	1.000	302,344	N/A	302,344	0.109	0	0	
6/30/04-05	260,378	166,284	1.021	1.000	169,748	N/A	169,748	0.065	1	1	3,463
6/30/05-06	317,741	386,684	1.028	1.000	397,450	N/A	397,450	0.125	3	2	5,383
6/30/06-07	325,922	236,426	1.032	1.000	243,901	N/A	243,901	0.075	0	0	
6/30/07-08	354,130	512,965	1.038	1.000	532,679	N/A	532,679	0.150	2	1	19,714
6/30/08-09	362,309	430,454	1.044	1.000	449,232	N/A	449,232	0.124	1	2	9,389
6/30/09-10	383,298	290,759	1.073	1.000	311,868	N/A	311,868	0.081	2	1	21,109
6/30/10-11	394,924	330,378	1.091	1.000	360,480	N/A	360,480	0.091	1	0	
6/30/11-12	381,943	300,372	1.113	1.000	334,428	N/A	334,428	0.088	2	1	34,056
6/30/12-13	384,763	272,508	1.132	1.000	308,349	N/A	308,349	0.080	3	1	35,841
6/30/13-14	364,582	436,707	1.146	1.000	500,532	N/A	500,532	0.137	4	4	15,956
6/30/14-15	370,543	140,457	1.189	1.000	166,942	N/A	166,942	0.045	10	7	3,784
6/30/15-16	382,602	268,877	1.285	1.000	345,405	N/A	345,405	0.090	79	28	2,733
6/30/16-17	395,324	186,703	1.470	1.000	274,456	N/A	274,456	0.069	95	68	1,290
6/30/17-18	398,722	89,728	2.801	1.000	251,367	N/A	251,367	0.063		76	2,127
Total	8,838,630	11,439,399			11,928,091		11,928,091		210	198	

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3), (4) From Section 6, Exhibit 2, Page 7

(5) Based on information from the MA WCRIB 7/1/16 filing. Consideration for development beyond 252 months made in selection of LDF's.

(6) = (3) x (4) x (5)

(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10), (11) Provided by Commonwealth of Massachusetts

(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Medical Center) - Cluster 4
Medical

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	116,303	0.195	162,725	1.000	162,816	N/A	162,816	0.140	0.140
6/30/85-86	123,981	0.239	215,355	1.000	215,474	N/A	215,474	0.174	0.174
6/30/86-87	139,388	0.383	397,356	1.000	397,570	N/A	397,570	0.285	0.285
6/30/87-88	159,499	0.281	347,929	1.000	348,109	N/A	348,109	0.218	0.218
6/30/88-89	180,644	0.349	488,786	1.000	489,039	N/A	489,039	0.271	0.271
6/30/89-90	142,494	0.565	553,962	1.000	554,285	N/A	554,285	0.389	0.389
6/30/90-91	143,694	0.209	301,697	1.000	301,817	N/A	301,817	0.210	0.210
6/30/91-92	155,170	0.424	669,188	1.000	669,452	N/A	669,452	0.431	0.431
6/30/92-93	163,283	0.237	395,196	1.000	395,351	N/A	395,351	0.242	0.242
6/30/93-94	177,184	0.387	708,161	1.000	708,436	N/A	708,436	0.400	0.400
6/30/94-95	188,391	0.216	419,416	1.000	419,579	N/A	419,579	0.223	0.223
6/30/95-96	201,751	0.184	382,952	1.000	383,101	N/A	383,101	0.190	0.190
6/30/96-97	231,872	0.086	197,598	1.001	197,875	N/A	197,875	0.085	0.085
6/30/97-98	232,237	0.205	497,988	1.002	499,128	N/A	499,128	0.215	0.215
6/30/98-99	232,075	0.130	309,222	1.003	310,242	N/A	310,242	0.134	0.134
6/30/99-00	211,819	0.088	185,166	1.004	185,983	N/A	185,983	0.088	0.088
6/30/00-01	215,099	0.095	205,415	1.005	206,520	N/A	206,520	0.096	0.096
6/30/01-02	227,797	0.101	230,627	1.008	232,414	N/A	232,414	0.102	0.102
6/30/02-03	242,008	0.095	226,298	1.015	229,667	N/A	229,667	0.095	0.095
6/30/03-04	276,758	0.108	296,472	1.020	302,270	N/A	302,270	0.109	0.109
6/30/04-05	260,378	0.097	166,284	1.021	171,414	N/A	171,414	0.066	0.066
6/30/05-06	317,741	0.097	386,684	1.028	395,024	N/A	395,024	0.124	0.124
6/30/06-07	325,922	0.097	236,426	1.032	246,105	N/A	246,105	0.076	0.076
6/30/07-08	354,130	0.097	512,965	1.038	525,665	N/A	525,665	0.148	0.148
6/30/08-09	362,309	0.097	430,454	1.044	445,208	N/A	445,208	0.123	0.123
6/30/09-10	383,298	0.100	290,759	1.073	316,703	N/A	316,703	0.083	0.083
6/30/10-11	394,924	0.100	330,378	1.091	363,356	N/A	363,356	0.092	0.092
6/30/11-12	381,943	0.100	300,372	1.113	339,267	N/A	339,267	0.089	0.089
6/30/12-13	384,763	0.100	272,508	1.132	317,230	N/A	317,230	0.082	0.082
6/30/13-14	364,582	0.100	436,707	1.146	483,196	N/A	483,196	0.133	0.133
6/30/14-15	370,543	0.100	140,457	1.189	199,242	N/A	199,242	0.054	0.054
6/30/15-16	382,602	0.100	268,877	1.285	353,647	N/A	353,647	0.092	0.092
6/30/16-17	395,324	0.100	186,703	1.470	313,101	N/A	313,101	0.079	0.079
6/30/17-18	398,722	0.100	89,728	2.801	346,122	N/A	346,122	0.087	0.087
Total	8,838,630		11,240,812		12,024,407		12,024,407		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 6, Exhibit 2, Page 4, Column 11

(4) From Section 6, Exhibit 2, Page 2, Column 3

(5) From Section 6, Exhibit 2, Page 2, Column 4

(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]

(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Medical Center) - Cluster 4
Medical

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Expected Ult Loss	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									0.195	0.195
6/30/85-86									0.239	0.239
6/30/86-87									0.383	0.383
6/30/87-88									0.281	0.281
6/30/88-89									0.349	0.349
6/30/89-90									0.565	0.565
6/30/90-91	143,694	301,818	0.210	1.194	0.251	1.000	0.251	0.084	0.209	0.209
6/30/91-92	155,170	669,456	0.431	1.189	0.513	1.000	0.513	0.084	0.425	0.424
6/30/92-93	163,283	395,354	0.242	1.189	0.288	1.000	0.288	0.084	0.237	0.237
6/30/93-94	177,184	708,445	0.400	1.178	0.471	1.000	0.471	0.085	0.386	0.387
6/30/94-95	188,391	419,584	0.223	1.170	0.261	1.000	0.261	0.085	0.216	0.216
6/30/95-96	201,751	383,106	0.190	1.155	0.219	1.000	0.219	0.087	0.184	0.184
6/30/96-97	231,872	197,874	0.085	1.137	0.097	1.000	0.097	0.088	0.086	0.086
6/30/97-98	232,237	499,185	0.215	1.135	0.244	1.000	0.244	0.088	0.205	0.205
6/30/98-99	232,075	310,274	0.134	1.135	0.152	1.000	0.152	0.088	0.130	0.130
6/30/99-00	211,819	185,983	0.088	1.135	0.100	1.000	0.100	0.088	0.088	0.088
6/30/00-01	215,099	206,526	0.096	1.109	0.106	1.000	0.106	0.090	0.096	0.095
6/30/01-02	227,797	232,434	0.102	1.101	0.112	1.000	0.112	0.091	0.100	0.101
6/30/02-03	242,008	229,673	0.095	1.073	0.102	1.000	0.102	0.093	0.094	0.095
6/30/03-04	276,758	302,344	0.109	1.046	0.114	1.000	0.114	0.096	0.108	0.108
6/30/04-05	260,378	169,748	0.065	1.036	0.068	1.000	0.068	0.097	0.097	0.097
6/30/05-06	317,741	397,450	0.125	1.032	0.129	1.000	0.129	0.097	0.097	0.097
6/30/06-07	325,922	243,901	0.075	1.032	0.077	1.000	0.077	0.097	0.097	0.097
6/30/07-08	354,130	532,679	0.150	1.032	0.155	1.000	0.155	0.097	0.097	0.097
6/30/08-09	362,309	449,232	0.124	1.027	0.127	1.000	0.127	0.097	0.097	0.097
6/30/09-10	383,298	311,868	0.081	1.000	0.081	1.000	0.081	0.100	0.100	0.100
6/30/10-11	394,924	360,480	0.091	1.000	0.091	1.000	0.091	0.100	0.100	0.100
6/30/11-12	381,943	334,428	0.088	1.000	0.088	1.000	0.088	0.100	0.100	0.100
6/30/12-13	384,763	308,349	0.080	1.000	0.080	1.000	0.080	0.100	0.100	0.100
6/30/13-14	364,582	500,532	0.137	1.000	0.137	1.000	0.137	0.100	0.100	0.100
6/30/14-15	370,543	166,942	0.045	1.000	0.045	1.000	0.045	0.100	0.100	0.100
6/30/15-16	382,602	345,405	0.090	1.000	0.090	1.000	0.090	0.100	0.100	0.100
6/30/16-17	395,324	274,456	0.069	1.000	0.069	1.000	0.069	0.100	0.100	0.100
6/30/17-18	398,722	251,367	0.063	1.000	0.063	1.000	0.063	0.100		0.100
Total	7,976,321	9,688,893								

Trend Last 4 (ex 17-18):	-12.6%	Avg 3 (ex 17-18):	0.068
Trend Last 8 (ex 17-18):	-3.1%	Avg 5 (ex 17-18):	0.084
Trend Last 12 (ex 17-18):	-4.7%	Avg 10 (ex 17-18):	0.096
Prior Selected Trend:	0.0%	Prior Sel Avg:	0.100
Selected Trend:	0.0%	Sel. Loss Cost:	0.100

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 6, Exhibit 2, Page 2, Column 6

(4) = (3) / (2) / 10

(5) Based on information from the MA WCIRB

(6) = (4) x (5)

(7) Based on Selected Trend from (6)

(8) = (6) x (7)

(9) = Sel. Loss Cost / [(5) * (7)]

(10) From prior Aon analysis as of June 30, 2017

(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Medical Center) - Cluster 4
Medical

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend	0.750	
(2)	Credibility	14%	
(3)	Average Pmt Trend Statewide	0.950	
(4)	Credibility Weighted Trend	0.923	
		(Low)	(High)
(5)	Selected Range	0.914	0.932
(6)	Incremental Paid for 2018	0	0
(7)	Estimated Reserve	0	0
(8)	Paid to Date (82 & Prior)	126,400	126,400
(9)	Est Ult Paid for 1982 & Prior	126,400	126,400

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	0	0
(11)	Projected Number of Years	1	1
(12)	Estimated Reserve	0	0
(13)	Paid to Date (82 & Prior)	126,400	126,400
(14)	Est Ult Paid for 1982 & Prior	126,400	126,400
(14a)	Paid Counts During Fiscal Year	0	0
		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	126,400	126,400
(16)	Lump Sum Ultimates	N/A	N/A
(17)	Ult Loss Including Lump Sums	**126,400**	**126,400**
(18)	Implied Tail	1.000	1.000
(19)	Ult Loss Inc Lump Sums @ 6/17	126,400	126,400

NOTES:

(1) From Section 6, Exhibit 2, Page 6
(2) = (Average of Section 6, Exhibit 2, Page 6, Column 3 / 175,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 6, Exhibit 2, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 6, Exhibit 2, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) Lump Sums are considered in Indemnity analysis (Section 1)
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2017

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Medical Center) - Cluster 4
Medical

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	1,277	7.152			
1993	2	1,933	7.567	1.514		
1994	3	2,959	7.993	1.531		
1995	4	30,696	10.332	10.374		
1996	5	1,619	7.390	0.053		
1997	6	7,074	8.864	4.369		
1998	7	5,136	8.544	0.726		
1999	8	26,679	10.192	5.195		
2000	9	8,683	9.069	0.325	n =	12
2001	10	453	6.116	0.052	S(x) =	23,970
2002	11	573	6.351	1.265	S(x-sq) =	47,880,218
2003	12	16	2.773	0.028	S(xy) =	184,417
2004	13	0			S(y) =	92
2005	14	0			D =	1,716
2006	15	0			slope =	-0.246
2007	16	0			Avg Trend =	0.754
2008	17	0				
2009	18	0				
2010	19	0				
2011	20	0				
2012	21	0				
2013	22	0				
2014	23	0				
2015	24	0				
2016	25	0				
2017	26	0				
2018	27	0				
					Selected Trend:	**0.750**

NOTES:

(3) 2018 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2017

(4) LN [(3)]

(5) Eg. 2003: 0.028 = 16 / 573

Commonwealth of Massachusetts Workers Compensation
University of Massachusetts (Medical Center) - Cluster 4
MEDICAL
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432
June-83	1,234	3,103	4,861	6,300	7,916	9,821	13,039	13,611	14,794	16,517	16,901	19,950	21,086	21,192	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226	21,226
June-84	2,119	5,327	8,344	10,814	13,588	16,986	18,288	23,404	25,737	31,059	49,301	49,301	49,616	49,616	49,616	49,911	50,261	50,611	50,611	50,611	50,961	50,961	50,961	50,961	50,961	50,961	50,961	50,961	50,961	50,961	50,961	50,961	50,961	50,961	50,961	
June-85	12,116	30,459	47,713	61,836	82,871	90,557	102,192	116,196	126,162	134,269	144,586	146,053	155,423	156,868	159,570	160,025	160,725	160,725	162,725	162,725	162,725	162,725	162,725	162,725	162,725	162,725	162,725	162,725	162,725	162,725	162,725	162,725	162,725	162,725		
June-86	20,894	52,527	82,283	109,226	113,177	157,428	181,217	194,111	201,338	202,138	203,815	204,040	204,668	207,774	211,955	212,780	212,780	212,780	215,180	215,355	215,355	215,355	215,355	215,355	215,355	215,355	215,355	215,355	215,355	215,355	215,355	215,355	215,355			
June-87	31,042	78,039	128,883	164,579	225,534	253,273	269,701	290,822	307,535	321,418	343,535	347,855	391,585	394,847	396,769	397,163	397,163	397,163	397,163	397,163	397,356	397,356	397,356	397,356	397,356	397,356	397,356	397,356	397,356	397,356	397,356	397,356				
June-88	38,803	100,851	169,323	220,047	246,044	269,806	298,617	307,956	313,205	317,782	319,598	322,343	325,039	329,817	329,817	329,817	331,017	332,429	332,429	333,094	334,344	338,304	341,814	346,679	347,929	347,929	347,929	347,929	347,929	347,929	347,929					
June-89	23,530	123,605	224,861	257,852	314,169	363,076	415,231	428,349	431,502	433,102	439,481	459,235	462,320	479,638	484,373	488,387	488,786	488,786	488,786	488,786	488,786	488,786	488,786	488,786	488,786	488,786	488,786	488,786	488,786	488,786						
June-90	50,815	273,859	359,066	409,059	478,183	534,786	577,745	596,162	604,078	543,745	548,041	553,962	553,962	553,962	553,962	553,962	553,962	553,962	553,962	553,962	553,962	553,962	553,962	553,962	553,962	553,962	553,962	553,962	553,962							
June-91	100,348	235,116	278,654	299,094	305,642	311,577	324,200	331,771	300,441	301,585	301,697	301,697	301,697	301,697	301,697	301,697	301,697	301,697	301,697	301,697	301,697	301,697	301,697	301,697	301,697	301,697	301,697	301,697								
June-92	214,704	524,294	598,233	667,108	699,896	707,764	731,353	668,555	669,244	669,244	669,188	669,188	669,188	669,188	669,188	669,188	669,188	669,188	669,188	669,188	669,188	669,188	669,188	669,188	669,188	669,188	669,188									
June-93	170,873	375,060	420,253	430,949	444,131	448,308	394,918	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196	395,196										
June-94	300,512	596,595	667,456	713,591	730,452	676,827	679,845	681,410	682,760	684,108	684,108	684,335	686,279	687,551	690,014	691,979	693,434	694,829	694,829	694,829	694,829	698,854	701,213	705,470	708,161											
June-95	224,267	378,724	433,955	457,533	409,745	410,858	411,003	411,481	412,287	412,616	413,407	414,199	414,911	415,394	415,394	416,151	416,388	416,634	416,984	417,700	418,185	418,614	419,003	419,416												
June-96	167,356	393,930	501,689	378,074	378,587	378,666	378,667	379,037	379,508	382,952	382,952	382,952	382,952	382,952	382,952	382,952	382,952	382,952	382,952	382,952	382,952	382,952	382,952													
June-97	130,080	273,734	170,451	178,673	186,292	189,102	189,531	190,062	190,753	191,531	192,270	193,209	194,029	194,724	195,455	195,912	196,119	196,392	196,765	197,155	197,391	197,598														
June-98	153,489	249,584	276,046	301,383	308,237	314,372	326,267	379,647	404,376	420,822	440,261	450,569	452,424	455,322	458,466	462,440	470,685	482,508	490,581	496,849	497,988															
June-99	74,009	144,825	187,509	205,821	213,634	225,729	262,895	277,050	296,551	301,615	304,333	305,562	306,665	306,876	308,775	309,222	309,222	309,222	309,222	309,222																
June-00	42,966	116,743	129,805	138,406	149,847	152,795	156,525	163,267	168,512	177,868	177,868	177,992	185,166	185,166	185,166	185,166	185,166	185,166	185,166																	
June-01	66,977	112,847	134,511	164,585	186,174	191,353	193,876	196,194	197,019	200,449	202,529	202,659	204,334	205,415	205,415	205,415	205,415	205,415																		
June-02	51,704	99,105	124,129	132,683	137,298	144,909	146,854	147,302	174,745	189,334	201,469	209,356	215,153	219,704	222,933	226,700	230,627																			
June-03	24,338	126,639	167,817	173,658	176,063	176,926	181,096	186,492	190,822	196,704	200,649	205,235	213,052	217,199	225,005	226,298																				
June-04	83,690	216,265	266,643	284,876	292,325	295,052	295,295	296,029	296,255	296,405	296,405	296,405	296,472	296,472	296,472																					
June-05	70,794	151,383	161,299	162,118	162,383	162,449	162,848	165,224	165,325	165,630	165,860	165,925	166,093	166,284																						
June-06	111,267	215,773	247,375	290,539	295,723	304,040	318,675	338,665	353,952	368,605	379,144	382,941	386,684																							
June-07	135,214	210,808	235,383	235,931	236,426	236,426	236,426	236,426	236,426	236,426	236,426	236,426																								
June-08	163,349	354,750	465,422	484,430	499,466	503,458	508,133	512,405	512,687	512,826	512,965																									
June-09	147,783	237,019	285,263	290,878	311,776	330,161	342,462	384,890	396,420	430,454																										
June-10	151,041	251,654	264,987	272,182	276,801	280,207	281,828	287,482	290,759																											
June-11	207,552	306,733	317,839	322,382	326,484	328,928	330,378	330,378																												
June-12	139,332	221,373	251,760	270,206	297,007	298,180	300,372																													
June-13	127,443	223,391	256,039	266,425	269,907	272,508																														
June-14	99,522	206,623	252,452	419,049	436,707																															
June-15	68,762	116,468	133,363	140,457																																
June-16	152,780	258,891	268,877																																	
June-17	95,466	186,703																																		
June-18	89,728																																			

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432
June-83	2.515	1.567	1.296	1.257	1.241	1.328	1.044	1.087	1.116	1.023	1.180	1.057	1.005	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
June-84	2.514	1.566	1.296	1.257	1.250	1.077	1.280	1.100	1.207	1.587	1.000	1.006	1.000	1.000	1.006	1.007	1.007	1.000	1.000	1.007	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
June-85	2.514	1.566	1.296	1.340	1.093	1.128	1.137	1.086	1.064	1.077	1.010	1.064	1.009	1.017	1.003	1.004	1.000	1.012	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
June-86	2.514	1.566	1.327	1.036	1.391	1.151	1.071	1.037	1.004	1.008	1.001	1.003	1.015	1.020	1.004	1.000	1.000	1.011	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
June-87	2.514	1.652	1.277	1.370	1.123	1.065	1.078	1.057	1.045	1.069	1.013	1.126	1.008	1.005	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
June-88	2.599	1.679	1.300	1.118	1.097	1.107	1.031	1.017	1.015	1.006	1.009	1.008	1.015	1.000	1.000	1.004	1.004	1.000	1.002	1.004	1.012	1.010	1.014	1.004	1.000	1.000	1.000	1.000	1.000	1.000					
June-89	5.253	1.819	1.147	1.218	1.156	1.144	1.032	1.007	1.004	1.015	1.045	1.007	1.037	1.010	1.008	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
June-90	5.389	1.311	1.139	1.169	1.118	1.080	1.032	1.013	0.900	1.008	1.011	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000							
June-91	2.343	1.185	1.073	1.022	1.019	1.041	1.023	0.906	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000								
June-92	2.442	1.141	1.115	1.049	1.011	1.033	0.914	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000									
June-93	2.195	1.120	1.025	1.031	1.009	0.881	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000										
June-94	1.985	1.119	1.069	1.024	0.927	1.004	1.002	1.002	1.002	1.000	1.000	1.003	1.002	1.004	1.003	1.002	1.002	1.000	1.000	1.000	1.006	1.003	1.006	1.004											
June-95	1.689	1.146	1.054	0.896	1.003	1.000	1.001	1.002	1.001	1.002	1.002	1.002	1.001	1.000	1.002	1.001	1.001	1.001	1.002	1.001	1.001	1.001	1.001												
June-96	2.354	1.274	0.754	1.001	1.000	1.000	1.001	1.001	1.009	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
June-97	2.104	0.623	1.048	1.043	1.015	1.002	1.003	1.004	1.004	1.004	1.005	1.004	1.004	1.004	1.002	1.001	1.001	1.002	1.002	1.001	1.001														
June-98	1.626	1.106	1.092	1.023	1.020	1.038	1.164	1.065	1.041	1.046	1.023	1.004	1.006	1.007	1.009	1.018	1.025	1.017	1.013	1.002															
June-99	1.957	1.295	1.098	1.038	1.057	1.165	1.054	1.070	1.017	1.009	1.004	1.004	1.001	1.006	1.001	1.000	1.000	1.000	1.000																
June-00	2.717	1.112	1.066	1.083	1.020	1.024	1.043	1.032	1.056	1.000	1.001	1.040	1.000	1.000	1.000	1.000	1.000	1.000																	
June-01	1.685	1.192	1.224	1.131	1.028	1.013	1.012	1.004	1.017	1.010	1.001	1.008	1.005	1.000	1.000	1.000	1.000																		
June-02	1.917	1.252	1.069	1.035	1.055	1.013	1.003	1.186	1.083	1.064	1.039	1.028	1.021	1.015	1.017	1.017																			
June-03	5.203	1.325	1.035	1.014	1.005	1.024	1.030	1.023	1.031	1.020	1.023	1.038	1.019	1.036	1.006																				
June-04	2.584	1.233	1.068	1.026	1.009	1.001	1.002	1.001	1.001	1.000	1.000	1.000	1.000	1.000																					
June-05	2.138	1.066	1.005	1.002	1.000	1.002	1.015	1.001	1.002	1.001	1.000	1.001	1.001																						
June-06	1.939	1.146	1.174	1.018	1.028	1.048	1.063	1.045	1.041	1.029	1.010	1.010																							
June-07	1.559	1.117	1.002	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000																								
June-08	2.172	1.312	1.041	1.031	1.008	1.009	1.008	1.001	1.000	1.000																									
June-09	1.604	1.204	1.020	1.072	1.059	1.037	1.124	1.030	1.086																										
June-10	1.666	1.053	1.027	1.017	1.012	1.006	1.020	1.011																											
June-11	1.478	1.036	1.014	1.013	1.007	1.004	1.000																												
June-12	1.589	1.137	1.073	1.099	1.004	1.007																													
June-13	1.753	1.146	1.041	1.013	1.010																														
June-14	2.076	1.222	1.660	1.042																															
June-15	1.694	1.145	1.053																																
June-16	1.695	1.039																																	
June-17	1.956																																		

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	To Ult
Simple Avg																																				
All Yrs	2.341	1.249	1.121	1.078	1.057	1.048	1.041	1.028	1.028	1.038	1.015	1.017	1.007	1.006	1.003	1.003	1.002	1.002	1.001	1.001	1.001	1.001	1.002	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Latest 5	1.835	1.138	1.168	1.037	1.018	1.013	1.030	1.017	1.026	1.006	1.007	1.015	1.009	1.010	1.005	1.007	1.005	1.004	1.003	1.001	1.002	1.001	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Latest 3	1.781	1.135	1.251	1.051	1.007	1.006	1.048	1.014	1.029	1.010	1.003	1.004	1.007	1.017	1.008	1.006	1.000	1.006	1.005	1.001	1.001	1.001	1.002	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Volume Wtd																																				
All Yrs	2.038	1.173	1.081	1.049	1.030	1.030	1.023	1.016	1.010	1.015	1.009	1.012	1.006	1.005	1.003	1.003	1.002	1.002	1.001	1.001	1.002	1.001	1.002	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Latest 5	1.824	1.132	1.171	1.037	1.019	1.013	1.031	1.017	1.030	1.007	1.007	1.014	1.009	1.010	1.005	1.009	1.009	1.005	1.004	1.001	1.002	1.001	1.002	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Latest 3	1.773	1.125	1.287	1.050	1.007	1.006	1.050	1.013	1.030	1.010	1.005	1.005	1.006	1.015	1.008	1.006	1.000	1.008	1.007	1.001	1.001	1.002	1.003	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			

Dev Factor Selection																																				
Industry 1	1.952	1.145	1.055	1.025	1.015	1.012	1.012	1.013	1.010	1.009	1.011	1.010	1.009	1.008	1.009	1.007	1.007	1.006																		
Industry 2		1.268	1.086	1.037	1.014	1.010	1.014	1.010	1.007	1.010	1.011	1.009	1.008	1.009	1.010	1.007	1.007	1.009	1.006	1.006																
Prior	1.927	1.144	1.081	1.037	1.012	1.020	1.020	1.017	1.026	1.005	1.013	1.013	1.014	1.001	1.005	1.004	1.002	1.001	1.001	1.001	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.001	
Selected	1.906	1.144	1.081	1.037	1.013	1.016	1.020	1.017	1.028	1.005	1.007	1.004	1.007	1.001	1.005	1.007	1.002	1.001	1.001	1.001	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
FacToUlt	2.801	1.470	1.285	1.189	1.146	1.132	1.113	1.091	1.073	1.044	1.038	1.032	1.028	1.021	1.020	1.015	1.008	1.005	1.004	1.003	1.002	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Percent of Ult	35.7%	68.0%	77.8%	84.1%	87.2%	88.4%	89.8%	91.6%	93.2%	95.8%	96.3%	96.9%	97.3%	98.0%	98.1%	98.5%	99.2%	99.5%	99.6%	99.7%	99.8%	99.9%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Medical Center) - Cluster 4
Medical

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/17		As of 6/18		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	126,400	126,400	126,400	126,400	0	0.0%	0	0.0%
6/30/82-83	21,268	21,438	22,000	22,000	732	3.4%	562	2.6%
6/30/83-84	51,000	51,000	51,000	51,000	0	0.0%	0	0.0%
6/30/84-85	163,000	163,000	163,000	163,000	0	0.0%	0	0.0%
6/30/85-86	216,000	216,000	216,000	216,000	0	0.0%	0	0.0%
6/30/86-87	398,000	398,000	398,000	398,000	0	0.0%	0	0.0%
6/30/87-88	348,000	348,000	348,000	348,000	0	0.0%	0	0.0%
6/30/88-89	489,000	489,000	489,000	489,000	0	0.0%	0	0.0%
6/30/89-90	554,000	554,000	554,000	554,000	0	0.0%	0	0.0%
6/30/90-91	302,000	302,000	302,000	302,000	0	0.0%	0	0.0%
6/30/91-92	670,000	670,000	670,000	670,000	0	0.0%	0	0.0%
6/30/92-93	397,172	403,100	397,172	403,100	0	0.0%	0	0.0%
6/30/93-94	706,000	719,579	709,000	722,325	3,000	0.4%	2,745	0.4%
6/30/94-95	421,098	427,380	421,513	428,400	414	0.1%	1,020	0.2%
6/30/95-96	384,867	391,680	384,867	390,660	0	0.0%	(1,020)	-0.3%
6/30/96-97	198,000	201,960	198,000	201,960	0	0.0%	0	0.0%
6/30/97-98	499,000	508,980	499,000	508,980	0	0.0%	0	0.0%
6/30/98-99	311,000	311,000	310,000	310,000	(1,000)	-0.3%	(1,000)	-0.3%
6/30/99-00	186,000	186,000	186,000	186,000	0	0.0%	0	0.0%
6/30/00-01	207,000	207,000	207,000	207,000	0	0.0%	0	0.0%
6/30/01-02	229,000	233,580	232,000	236,640	3,000	1.3%	3,060	1.3%
6/30/02-03	229,000	233,580	230,000	234,600	1,000	0.4%	1,020	0.4%
6/30/03-04	302,000	305,020	302,000	305,020	0	0.0%	0	0.0%
6/30/04-05	171,000	182,700	170,000	179,550	(1,000)	-0.6%	(3,150)	-1.7%
6/30/05-06	396,000	420,000	395,000	416,850	(1,000)	-0.3%	(3,150)	-0.7%
6/30/06-07	250,000	254,000	244,000	246,000	(6,000)	-2.4%	(8,000)	-3.1%
6/30/07-08	534,000	573,300	526,000	559,650	(8,000)	-1.5%	(13,650)	-2.4%
6/30/08-09	426,000	454,650	445,000	471,450	19,000	4.5%	16,800	3.7%
6/30/09-10	319,000	341,250	312,000	332,850	(7,000)	-2.2%	(8,400)	-2.5%
6/30/10-11	374,000	395,850	360,000	381,150	(14,000)	-3.7%	(14,700)	-3.7%
6/30/11-12	344,000	366,450	334,000	355,950	(10,000)	-2.9%	(10,500)	-2.9%
6/30/12-13	316,000	342,300	308,000	332,850	(8,000)	-2.5%	(9,450)	-2.8%
6/30/13-14	483,000	533,400	483,000	526,050	0	0.0%	(7,350)	-1.4%
6/30/14-15	175,000	232,050	167,000	208,950	(8,000)	-4.6%	(23,100)	-10.0%
6/30/15-16	387,000	407,400	345,000	371,700	(42,000)	-10.9%	(35,700)	-8.8%
6/30/16-17	276,000	371,700	274,000	328,650	(2,000)	-0.7%	(43,050)	-11.6%
6/30/17-18								
Total	11,859,806	12,342,747	11,778,951	12,185,734	(80,854)	-0.7%	(157,013)	-1.3%

NOTES:

(2), (3) From prior Aon analysis as of June 30, 2017

(4), (5) From Section 6, Exhibit 2, Page 1, Columns 6, 7

(6) = (4) - (2)

(7) = (4) / (2) - 1

(8) = (5) - (3)

(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Medical Center) - Cluster 4
Medical

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
444	100.0%	0.0%	0.0%	0.0%	0.0%	1.000	1.000
432	100.0%	0.0%	0.0%	0.0%	0.0%	0.981	0.971
420	100.0%	0.0%	0.0%	0.0%	0.0%	0.943	0.916
408	100.0%	0.0%	0.0%	0.0%	0.0%	0.907	0.864
396	100.0%	0.0%	0.0%	0.0%	0.0%	0.872	0.816
384	100.0%	0.0%	0.0%	0.0%	0.0%	0.838	0.769
372	100.0%	0.0%	0.0%	0.0%	0.0%	0.806	0.726
360	100.0%	0.0%	0.0%	0.0%	0.0%	0.775	0.685
348	100.0%	0.0%	0.0%	0.0%	0.0%	0.745	0.646
336	100.0%	0.0%	0.0%	0.0%	0.0%	0.717	0.609
324	100.0%	0.0%	0.0%	0.0%	0.0%	0.689	0.575
312	100.0%	0.0%	0.0%	0.0%	0.0%	0.662	0.542
300	100.0%	0.0%	0.0%	0.0%	0.0%	0.637	0.512
288	100.0%	0.0%	0.0%	0.0%	0.0%	0.612	0.483
276	100.0%	0.1%	0.0%	0.0%	0.0%	0.589	0.455
264	99.9%	0.1%	0.1%	0.0%	0.0%	0.862	0.816
252	99.8%	0.1%	0.2%	0.0%	0.0%	0.892	0.854
240	99.7%	0.1%	0.3%	0.0%	0.0%	0.894	0.854
228	99.6%	0.1%	0.4%	0.0%	0.0%	0.887	0.843
216	99.5%	0.2%	0.5%	0.1%	0.1%	0.876	0.828
204	99.2%	0.7%	0.8%	0.4%	0.3%	0.885	0.840
192	98.5%	0.5%	1.5%	0.3%	0.2%	0.912	0.877
180	98.1%	0.1%	1.9%	0.1%	0.0%	0.902	0.862
168	98.0%	0.7%	2.0%	0.4%	0.3%	0.873	0.821
156	97.3%	0.4%	2.7%	0.2%	0.2%	0.874	0.823
144	96.9%	0.6%	3.1%	0.4%	0.3%	0.857	0.799
132	96.3%	0.5%	3.7%	0.3%	0.3%	0.851	0.791
120	95.8%	2.6%	4.2%	1.8%	1.5%	0.837	0.772
108	93.2%	1.6%	6.8%	1.1%	1.0%	0.872	0.821
96	91.6%	1.8%	8.4%	1.4%	1.2%	0.865	0.812
84	89.8%	1.4%	10.2%	1.1%	1.0%	0.859	0.803
72	88.4%	1.1%	11.6%	0.9%	0.8%	0.845	0.784
60	87.2%	3.1%	12.8%	2.6%	2.4%	0.827	0.760
48	84.1%	6.3%	15.9%	5.5%	5.1%	0.832	0.767
36	77.8%	9.8%	22.2%	8.9%	8.5%	0.851	0.794
24	68.0%	32.3%	32.0%	30.5%	29.6%	0.868	0.817
12	35.7%	35.7%	64.3%	35.0%	34.7%	0.908	0.872
Total		100.0%					

NOTES:

(2) = 1 / Section 6, Exhibit 2, Page 2, Column 4

(3) Incremental % based on (2)

(4) = 1 - (2)

(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}

(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}

(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Medical Center) - Cluster 4
Medical

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	0	0		0	0
6/30/82-83	774	774	0.981	759	759
6/30/83-84	39	39	0.943	37	37
6/30/84-85	275	275	0.907	249	249
6/30/85-86	645	645	0.872	562	562
6/30/86-87	644	644	0.838	539	539
6/30/87-88	71	71	0.806	57	57
6/30/88-89	214	214	0.775	166	166
6/30/89-90	38	38	0.745	28	28
6/30/90-91	303	303	0.717	217	217
6/30/91-92	812	812	0.689	559	559
6/30/92-93	1,976	7,904	0.662	1,309	5,236
6/30/93-94	839	14,163	0.637	534	9,022
6/30/94-95	2,097	8,984	0.612	1,284	5,503
6/30/95-96	1,915	7,708	0.589	1,128	4,539
6/30/96-97	402	4,362	0.862	347	3,760
6/30/97-98	1,012	10,992	0.892	902	9,804
6/30/98-99	778	778	0.894	696	696
6/30/99-00	834	834	0.887	739	739
6/30/00-01	1,585	1,585	0.876	1,389	1,389
6/30/01-02	1,373	6,013	0.885	1,215	5,321
6/30/02-03	3,702	8,302	0.912	3,377	7,572
6/30/03-04	5,528	8,548	0.902	4,988	7,712
6/30/04-05	3,716	13,266	0.873	3,243	11,580
6/30/05-06	8,316	30,166	0.874	7,270	26,372
6/30/06-07	7,574	9,574	0.857	6,489	8,203
6/30/07-08	13,035	46,685	0.851	11,090	39,720
6/30/08-09	14,546	40,996	0.837	12,171	34,302
6/30/09-10	21,241	42,091	0.872	18,519	36,698
6/30/10-11	29,622	50,772	0.865	25,631	43,932
6/30/11-12	33,628	55,578	0.859	28,877	47,727
6/30/12-13	35,492	60,342	0.845	29,987	50,983
6/30/13-14	46,293	89,343	0.827	38,298	73,912
6/30/14-15	26,543	68,493	0.832	22,078	56,971
6/30/15-16	76,123	102,823	0.851	64,791	87,516
6/30/16-17	87,297	141,947	0.868	75,790	123,237
6/30/17-18	161,272	273,572	0.908	146,450	248,430
Total	590,552	1,109,635		511,769	954,051
			(7) Total Discount Factor:	0.867	0.860

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	0	0
(9) Projected Number of Years:	1	1
(10) Projected Paid Loss per Year:	0	0
(11) Discounted Value at 4%:	0	0

NOTES:

(2), (3) From Section 6, Exhibit 2, Page 1, Columns 8, 9

(4) From Section 6, Exhibit 2, Page 9, Column 7

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

University of Massachusetts (Medical Center) - Cluster 4
Medical

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	0	0		0	0
6/30/82-83	774	774	0.971	752	752
6/30/83-84	39	39	0.916	36	36
6/30/84-85	275	275	0.864	238	238
6/30/85-86	645	645	0.816	526	526
6/30/86-87	644	644	0.769	495	495
6/30/87-88	71	71	0.726	52	52
6/30/88-89	214	214	0.685	147	147
6/30/89-90	38	38	0.646	25	25
6/30/90-91	303	303	0.609	185	185
6/30/91-92	812	812	0.575	467	467
6/30/92-93	1,976	7,904	0.542	1,072	4,287
6/30/93-94	839	14,163	0.512	429	7,247
6/30/94-95	2,097	8,984	0.483	1,012	4,337
6/30/95-96	1,915	7,708	0.455	872	3,510
6/30/96-97	402	4,362	0.816	328	3,560
6/30/97-98	1,012	10,992	0.854	864	9,384
6/30/98-99	778	778	0.854	665	665
6/30/99-00	834	834	0.843	703	703
6/30/00-01	1,585	1,585	0.828	1,313	1,313
6/30/01-02	1,373	6,013	0.840	1,152	5,048
6/30/02-03	3,702	8,302	0.877	3,245	7,277
6/30/03-04	5,528	8,548	0.862	4,766	7,369
6/30/04-05	3,716	13,266	0.821	3,050	10,889
6/30/05-06	8,316	30,166	0.823	6,844	24,826
6/30/06-07	7,574	9,574	0.799	6,051	7,649
6/30/07-08	13,035	46,685	0.791	10,313	36,936
6/30/08-09	14,546	40,996	0.772	11,232	31,656
6/30/09-10	21,241	42,091	0.821	17,446	34,571
6/30/10-11	29,622	50,772	0.812	24,054	41,229
6/30/11-12	33,628	55,578	0.803	27,004	44,630
6/30/12-13	35,492	60,342	0.784	27,828	47,311
6/30/13-14	46,293	89,343	0.760	35,190	67,915
6/30/14-15	26,543	68,493	0.767	20,358	52,534
6/30/15-16	76,123	102,823	0.794	60,436	81,634
6/30/16-17	87,297	141,947	0.817	71,342	116,005
6/30/17-18	161,272	273,572	0.872	140,579	238,470
Total	590,552	1,109,635		481,069	893,875
			(7) Total Discount Factor:	0.815	0.806

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	0	0
(9) Projected Number of Years:	1	1
(10) Projected Paid Loss per Year:	0	0
(11) Discounted Value at 6%:	0	0

NOTES:

(2), (3) From Section 6, Exhibit 2, Page 1, Columns 8, 9

(4) From Section 6, Exhibit 2, Page 9, Column 8

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4

Indemnity

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		3,019,826			3,022,846	3,034,925	3,020	15,099		
6/30/82-83		743,272	743,789		758,137	773,003	14,865	29,731		
6/30/83-84		917,731	960,252		936,086	954,440	18,355	36,709		
6/30/84-85	357,749	1,492,038	1,493,043	1,493,549	1,521,879	1,551,720	29,841	59,682	0.425	0.434
6/30/85-86	380,112	1,868,907	1,870,230	1,870,685	1,906,285	1,943,663	37,378	74,756	0.502	0.511
6/30/86-87	423,770	2,898,370	3,039,317	2,900,334	2,900,000	3,039,000	1,630	140,630	0.684	0.717
6/30/87-88	480,405	4,397,996	4,400,955	4,400,915	4,401,000	4,419,986	3,004	21,990	0.916	0.920
6/30/88-89	495,261	1,515,210	1,516,150	1,516,699	1,516,000	1,522,786	790	7,576	0.306	0.307
6/30/89-90	502,691	3,850,424	3,852,819	3,852,663	3,853,000	3,869,676	2,576	19,252	0.766	0.770
6/30/90-91	482,143	1,393,607	1,395,605	1,395,596	1,396,000	1,414,511	2,393	20,904	0.290	0.293
6/30/91-92	492,539	1,393,717	1,401,373	1,401,299	1,401,000	1,463,403	7,283	69,686	0.284	0.297
6/30/92-93	524,541	1,147,496	1,155,129	1,155,026	1,170,446	1,204,871	22,950	57,375	0.223	0.230
6/30/93-94	584,853	1,199,511	1,208,610	1,208,465	1,208,000	1,259,486	8,489	59,976	0.207	0.215
6/30/94-95	587,701	1,773,363	1,796,998	1,796,629	1,797,000	1,862,031	23,637	88,668	0.306	0.317
6/30/95-96	614,868	1,269,047	1,288,036	1,287,886	1,294,428	1,332,499	25,381	63,452	0.211	0.217
6/30/96-97	700,686	1,178,539	1,196,254	1,196,165	1,196,000	1,255,800	17,461	77,261	0.171	0.179
6/30/97-98	684,415	2,350,383	2,386,839	2,385,444	2,385,000	2,387,000	34,617	36,617	0.348	0.349
6/30/98-99	707,796	1,491,339	1,521,390	1,520,690	1,521,000	1,537,000	29,661	45,661	0.215	0.217
6/30/99-00	760,477	1,182,336	1,215,753	1,216,099	1,216,000	1,228,000	33,664	45,664	0.160	0.161
6/30/00-01	811,600	1,713,390	1,798,470	1,796,425	1,796,000	1,798,000	82,610	84,610	0.221	0.222
6/30/01-02	835,038	2,532,770	2,699,836	2,692,668	2,693,000	2,700,000	160,230	167,230	0.323	0.323
6/30/02-03	825,340	1,345,437	1,473,046	1,472,166	1,472,000	1,488,000	126,563	142,563	0.178	0.180
6/30/03-04	849,216	1,490,601	1,657,169	1,656,434	1,656,000	1,674,000	165,399	183,399	0.195	0.197
6/30/04-05	992,508	1,023,563	1,168,504	1,246,507	1,169,000	1,259,000	145,437	235,437	0.118	0.127
6/30/05-06	962,878	1,552,654	1,817,962	1,809,451	1,809,000	1,909,000	256,346	356,346	0.188	0.198
6/30/06-07	1,032,930	968,708	1,147,597	1,275,728	1,148,000	1,276,000	179,292	307,292	0.111	0.124
6/30/07-08	1,063,597	2,584,717	3,073,386	2,976,800	2,977,000	3,073,000	392,283	488,283	0.280	0.289
6/30/08-09	1,073,805	1,958,227	2,445,730	2,390,443	2,270,500	2,446,000	312,273	487,773	0.211	0.228
6/30/09-10	1,084,749	3,228,918	4,135,768	3,754,222	3,566,300	4,136,000	337,382	907,082	0.329	0.381
6/30/10-11	1,134,164	2,356,552	3,103,053	2,989,322	2,839,550	3,103,000	482,998	746,448	0.250	0.274
6/30/11-12	1,202,674	2,231,086	3,174,952	3,037,108	2,885,150	3,175,000	654,064	943,914	0.240	0.264
6/30/12-13	1,284,741	1,847,136	2,833,773	2,883,400	2,692,300	2,883,000	845,164	1,035,864	0.210	0.224
6/30/13-14	1,346,902	1,923,242	3,220,596	3,177,234	3,018,150	3,285,000	1,094,908	1,361,758	0.224	0.244
6/30/14-15	1,404,093	1,608,439	2,998,457	3,144,802	2,998,000	3,302,000	1,389,561	1,693,561	0.214	0.235
6/30/15-16	1,454,612	1,564,218	3,797,851	3,646,664	3,647,000	3,798,000	2,082,782	2,233,782	0.251	0.261
6/30/16-17	1,461,588	1,062,257	3,497,995	3,637,429	3,498,000	3,637,000	2,435,743	2,574,743	0.239	0.249
6/30/17-18	1,457,740	619,145	4,789,856	4,087,528	4,088,000	4,790,000	3,468,855	4,170,855	0.280	0.329
Total	29,058,181	66,694,172	81,276,544	78,272,477	81,623,057	85,785,801	14,928,885	19,091,629		
Tot 6/30/84-18	29,058,181	62,013,342	79,572,503	78,272,477	76,905,988	81,023,432	14,892,645	19,010,090	0.265	0.279

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) Sum of Section 7, Exhibit 1, Page 2, Column 3 and Section 7, Exhibit 1, Page 9, Column 8

(4) From Section 7, Exhibit 1, Page 2, Column 8

(5) From Section 7, Exhibit 1, Page 3, Column 8

(6), (7) Selected based on (3), (4), and (5)

(8) = (6) - (3)

(9) = (7) - (3)

(10) = (6) / (2) / 10

(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4
Indemnity

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Accident Year	Payroll (000's)	Paid Loss Excluding Lump Sum	Paid LDF	Adjstmnt for Extra Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/16-17	Paid Counts 7/1/17-18	Average Outstanding Claim	Average Age
All Prior Yrs		3,004,076							0	0		
6/30/82-83		716,272	1.001	1.000	716,789	27,000	743,789		0	0		
6/30/83-84		837,731	1.001	1.050	880,252	80,000	960,252		0	0		
6/30/84-85	357,749	1,393,062	1.001	1.000	1,394,067	98,976	1,493,043	0.417	0	0		
6/30/85-86	380,112	1,833,907	1.001	1.000	1,835,230	35,000	1,870,230	0.492	0	0		
6/30/86-87	423,770	2,776,870	1.001	1.050	2,917,817	121,500	3,039,317	0.717	1	1	140,947	92
6/30/87-88	480,405	4,103,153	1.001	1.000	4,106,112	294,843	4,400,955	0.916	1	0		
6/30/88-89	495,261	1,302,910	1.001	1.000	1,303,850	212,300	1,516,150	0.306	0	0		
6/30/89-90	502,691	3,320,712	1.001	1.000	3,323,107	529,712	3,852,819	0.766	0	0		
6/30/90-91	482,143	1,160,107	1.002	1.000	1,162,105	233,500	1,395,605	0.289	0	0		
6/30/91-92	492,539	1,137,534	1.007	1.000	1,145,190	256,183	1,401,373	0.285	1	0		
6/30/92-93	524,541	986,496	1.008	1.000	994,129	161,000	1,155,129	0.220	0	0		
6/30/93-94	584,853	1,040,511	1.009	1.000	1,049,610	159,000	1,208,610	0.207	1	1	9,099	59
6/30/94-95	587,701	1,404,158	1.010	1.000	1,417,854	379,144	1,796,998	0.306	1	1	13,696	81
6/30/95-96	614,868	927,586	1.011	1.000	937,570	350,466	1,288,036	0.209	0	0		
6/30/96-97	700,686	923,657	1.012	1.000	934,533	261,721	1,196,254	0.171	0	0		
6/30/97-98	684,415	2,085,383	1.014	1.000	2,114,157	272,682	2,386,839	0.349	2	2	14,387	85
6/30/98-99	707,796	1,286,089	1.019	1.000	1,310,354	211,036	1,521,390	0.215	1	1	24,264	72
6/30/99-00	760,477	844,236	1.029	1.000	868,766	346,987	1,215,753	0.160	0	0		
6/30/00-01	811,600	1,439,888	1.053	1.000	1,515,820	282,650	1,798,470	0.222	2	1	75,933	68
6/30/01-02	835,038	2,089,520	1.073	1.000	2,241,633	458,203	2,699,836	0.323	1	1	152,113	74
6/30/02-03	825,340	1,172,937	1.103	1.000	1,293,686	179,360	1,473,046	0.178	1	1	120,749	68
6/30/03-04	849,216	1,167,101	1.132	1.000	1,321,564	335,605	1,657,169	0.195	0	0		
6/30/04-05	992,508	825,463	1.166	1.000	962,627	205,877	1,168,504	0.118	0	0		
6/30/05-06	962,878	1,306,981	1.195	1.000	1,561,883	256,080	1,817,962	0.189	2	1	254,901	69
6/30/06-07	1,032,930	783,708	1.218	1.000	954,685	192,913	1,147,597	0.111	0	0		
6/30/07-08	1,063,597	1,803,467	1.251	1.000	2,255,414	817,972	3,073,386	0.289	1	1	451,947	76
6/30/08-09	1,073,805	1,628,227	1.287	1.000	2,095,486	350,244	2,445,730	0.228	3	4	116,815	64
6/30/09-10	1,084,749	2,579,668	1.333	1.000	3,438,649	697,119	4,135,768	0.381	8	6	143,164	66
6/30/10-11	1,134,164	1,770,369	1.382	1.000	2,446,911	656,142	3,103,053	0.274	6	4	169,136	59
6/30/11-12	1,202,674	1,830,824	1.452	1.000	2,658,954	515,998	3,174,952	0.264	2	2	414,065	75
6/30/12-13	1,284,741	1,482,689	1.549	1.000	2,296,647	537,126	2,833,773	0.221	8	4	203,490	60
6/30/13-14	1,346,902	1,636,242	1.665	1.000	2,724,607	495,989	3,220,596	0.239	10	7	155,481	54
6/30/14-15	1,404,093	1,350,939	1.831	1.000	2,474,163	524,294	2,998,457	0.214	14	8	140,403	61
6/30/15-16	1,454,612	1,487,788	2.189	1.000	3,256,132	541,720	3,797,851	0.261	42	19	93,071	59
6/30/16-17	1,461,588	977,257	2.927	1.000	2,860,406	637,589	3,497,995	0.239	77	37	50,896	53
6/30/17-18	1,457,740	619,145	6.422	1.000	3,976,010	813,846	4,789,856	0.329		118	28,448	49
Total	29,058,181	57,036,662			68,746,766	12,529,778	81,276,544		185	220		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3), (4) From Section 7, Exhibit 1, Page 7

(5) Based on information from the MA WCRIB

(6) = (3) x (4) x (5)

(7) From Section 7, Exhibit 1, Page 9, Column 13

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10), (11) Provided by Commonwealth of Massachusetts

(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4
Indemnity

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss Excluding Lump Sum	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	357,749	0.586	1,393,062	1.001	1,394,573	98,976	1,493,549	0.417	0.390
6/30/85-86	380,112	0.649	1,833,907	1.001	1,835,685	35,000	1,870,685	0.492	0.483
6/30/86-87	423,770	0.643	2,776,870	1.001	2,778,834	121,500	2,900,334	0.684	0.656
6/30/87-88	480,405	0.843	4,103,153	1.001	4,106,072	294,843	4,400,915	0.916	0.855
6/30/88-89	495,261	0.417	1,302,910	1.001	1,304,399	212,300	1,516,699	0.306	0.263
6/30/89-90	502,691	0.618	3,320,712	1.001	3,322,951	529,712	3,852,663	0.766	0.661
6/30/90-91	482,143	0.240	1,160,107	1.002	1,162,096	233,500	1,395,596	0.289	0.241
6/30/91-92	492,539	0.230	1,137,534	1.007	1,145,116	256,183	1,401,299	0.285	0.232
6/30/92-93	524,541	0.187	986,496	1.008	994,026	161,000	1,155,026	0.220	0.190
6/30/93-94	584,853	0.177	1,040,511	1.009	1,049,465	159,000	1,208,465	0.207	0.179
6/30/94-95	587,701	0.235	1,404,158	1.010	1,417,485	379,144	1,796,629	0.306	0.241
6/30/95-96	614,868	0.150	927,586	1.011	937,420	350,466	1,287,886	0.209	0.152
6/30/96-97	700,686	0.132	923,657	1.012	934,444	261,721	1,196,165	0.171	0.133
6/30/97-98	684,415	0.294	2,085,383	1.014	2,112,762	272,682	2,385,444	0.349	0.309
6/30/98-99	707,796	0.180	1,286,089	1.019	1,309,653	211,036	1,520,690	0.215	0.185
6/30/99-00	760,477	0.116	844,236	1.029	869,112	346,987	1,216,099	0.160	0.114
6/30/00-01	811,600	0.182	1,439,888	1.053	1,513,775	282,650	1,796,425	0.221	0.187
6/30/01-02	835,038	0.256	2,089,520	1.073	2,234,465	458,203	2,692,668	0.322	0.268
6/30/02-03	825,340	0.156	1,172,937	1.103	1,292,806	179,360	1,472,166	0.178	0.157
6/30/03-04	849,216	0.155	1,167,101	1.132	1,320,830	335,605	1,656,434	0.195	0.156
6/30/04-05	992,508	0.152	825,463	1.166	1,040,630	205,877	1,246,507	0.126	0.105
6/30/05-06	962,878	0.157	1,306,981	1.195	1,553,371	256,080	1,809,451	0.188	0.161
6/30/06-07	1,032,930	0.162	783,708	1.218	1,082,815	192,913	1,275,728	0.124	0.105
6/30/07-08	1,063,597	0.167	1,803,467	1.251	2,158,827	817,972	2,976,800	0.280	0.203
6/30/08-09	1,073,805	0.172	1,628,227	1.287	2,040,199	350,244	2,390,443	0.223	0.190
6/30/09-10	1,084,749	0.176	2,579,668	1.333	3,057,103	697,119	3,754,222	0.346	0.282
6/30/10-11	1,134,164	0.179	1,770,369	1.382	2,333,180	656,142	2,989,322	0.264	0.206
6/30/11-12	1,202,674	0.184	1,830,824	1.452	2,521,110	515,998	3,037,108	0.253	0.210
6/30/12-13	1,284,741	0.190	1,482,689	1.549	2,346,274	537,126	2,883,400	0.224	0.183
6/30/13-14	1,346,902	0.194	1,636,242	1.665	2,681,245	495,989	3,177,234	0.236	0.199
6/30/14-15	1,404,093	0.199	1,350,939	1.831	2,620,508	524,294	3,144,802	0.224	0.187
6/30/15-16	1,454,612	0.205	1,487,788	2.189	3,104,944	541,720	3,646,664	0.251	0.213
6/30/16-17	1,461,588	0.210	977,257	2.927	2,999,840	637,589	3,637,429	0.249	0.205
6/30/17-18	1,457,740	0.216	619,145	6.422	3,273,683	813,846	4,087,528	0.280	0.225
Total	29,058,181		52,478,583		65,849,699	12,422,778	78,272,477		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 7, Exhibit 1, Page 4, Column 11

(4) From Section 7, Exhibit 1, Page 2, Column 3

(5) From Section 7, Exhibit 1, Page 2, Column 4

(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]

(7) From Section 7, Exhibit 1, Page 9, Column 13

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4
Indemnity

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Exp Ult Loss Excluding Lump Sum	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									0.586	0.586
6/30/85-86									0.649	0.649
6/30/86-87									0.643	0.643
6/30/87-88									0.843	0.843
6/30/88-89									0.417	0.417
6/30/89-90									0.618	0.618
6/30/90-91	482,143	1,162,105	0.241	0.983	0.237	1.741	0.413	0.129	0.241	0.240
6/30/91-92	492,539	1,145,190	0.233	1.079	0.251	1.707	0.428	0.119	0.242	0.230
6/30/92-93	524,541	994,129	0.190	1.258	0.238	1.673	0.399	0.105	0.187	0.187
6/30/93-94	584,853	1,049,610	0.179	1.242	0.223	1.641	0.366	0.108	0.173	0.177
6/30/94-95	587,701	1,417,854	0.241	1.230	0.297	1.608	0.477	0.111	0.228	0.235
6/30/95-96	614,868	937,570	0.152	1.220	0.186	1.577	0.293	0.114	0.151	0.150
6/30/96-97	700,686	934,533	0.133	1.208	0.161	1.546	0.249	0.118	0.133	0.132
6/30/97-98	684,415	2,114,157	0.309	1.193	0.368	1.516	0.558	0.122	0.285	0.294
6/30/98-99	707,796	1,310,354	0.185	1.177	0.218	1.486	0.324	0.126	0.177	0.180
6/30/99-00	760,477	868,766	0.114	1.158	0.132	1.457	0.193	0.130	0.119	0.116
6/30/00-01	811,600	1,515,820	0.187	1.129	0.211	1.428	0.301	0.136	0.182	0.182
6/30/01-02	835,038	2,241,633	0.268	1.107	0.297	1.400	0.416	0.142	0.256	0.256
6/30/02-03	825,340	1,293,686	0.157	1.103	0.173	1.373	0.237	0.145	0.156	0.156
6/30/03-04	849,216	1,321,564	0.156	1.103	0.172	1.346	0.231	0.148	0.160	0.155
6/30/04-05	992,508	962,627	0.097	1.096	0.106	1.319	0.140	0.152	0.156	0.152
6/30/05-06	962,878	1,561,883	0.162	1.085	0.176	1.294	0.228	0.157	0.161	0.157
6/30/06-07	1,032,930	954,685	0.092	1.073	0.099	1.268	0.126	0.162	0.166	0.162
6/30/07-08	1,063,597	2,255,414	0.212	1.061	0.225	1.243	0.280	0.167	0.171	0.167
6/30/08-09	1,073,805	2,095,486	0.195	1.049	0.205	1.219	0.250	0.172	0.177	0.172
6/30/09-10	1,084,749	3,438,649	0.317	1.045	0.331	1.195	0.396	0.176	0.181	0.176
6/30/10-11	1,134,164	2,446,911	0.216	1.046	0.226	1.172	0.264	0.179	0.184	0.179
6/30/11-12	1,202,674	2,658,954	0.221	1.039	0.230	1.149	0.264	0.184	0.189	0.184
6/30/12-13	1,284,741	2,296,647	0.179	1.030	0.184	1.126	0.207	0.190	0.195	0.190
6/30/13-14	1,346,902	2,724,607	0.202	1.026	0.208	1.104	0.229	0.194	0.199	0.194
6/30/14-15	1,404,093	2,474,163	0.176	1.020	0.180	1.082	0.195	0.199	0.204	0.199
6/30/15-16	1,454,612	3,256,132	0.224	1.013	0.227	1.061	0.241	0.205	0.210	0.205
6/30/16-17	1,461,588	2,860,406	0.196	1.006	0.197	1.040	0.205	0.210	0.216	0.210
6/30/17-18	1,457,740	3,976,010	0.273	1.000	0.273	1.020	0.278	0.216		0.216
Total	26,418,193	52,269,543								

Trend Last 4 (ex 17-18):	0.7%	Avg 3 (ex 17-18):	0.213
Trend Last 8 (ex 17-18):	-4.9%	Avg 5 (ex 17-18):	0.215
Trend Last 12 (ex 17-18):	1.9%	Avg 10 (ex 17-18):	0.253
Prior Selected Trend:	2.0%	Prior Sel Avg:	0.220
Selected Trend:	2.0%	Sel. Loss Cost:	0.220

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 7, Exhibit 1, Page 2, Column 6

(4) = (3) / (2) / 10

(5) Based on information from the MA WCRIB

(6) = (4) x (5)

(7) Based on Selected Trend from (6)

(8) = (6) x (7)

(9) = Sel. Loss Cost / [(5) * (7)]

(10) From prior Aon analysis as of June 30, 2017

(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4
Indemnity

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend	0.950	
(2)	Credibility	16%	
(3)	Average Pmt Trend Statewide	0.960	
(4)	Credibility Weighted Trend	0.958	
		(Low)	(High)
(5)	Selected Range	0.954	0.968
(6)	Incremental Paid for 2018	0	0
(7)	Estimated Reserve	0	0
(8)	Paid to Date (82 & Prior)	3,004,076	3,004,076
(9)	Est Ult Paid for 1982 & Prior	3,004,076	3,004,076

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	0	0
(11)	Projected Number of Years	4	4
(12)	Estimated Reserve	0	0
(13)	Paid to Date (82 & Prior)	3,004,076	3,004,076
(14)	Est Ult Paid for 1982 & Prior	3,004,076	3,004,076
(14a)	Paid Counts During Fiscal Year	0	0

		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	3,004,076	3,004,076
(16)	Lump Sum Ultimates	15,750	15,750
(17)	Ult Loss Including Lump Sums	**3,019,826**	**3,019,826**
(18)	Implied Tail	1.000	1.000
(19)	Ult Loss Inc Lump Sums @ 6/17	3,019,826	3,031,831

NOTES:

(1) From Section 7, Exhibit 1, Page 6
(2) = (Average of Section 7, Exhibit 1, Page 6, Column 3 / 3,000,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 7, Exhibit 1, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 7, Exhibit 1, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) From Section 7, Exhibit 1, Page 9, Column 13
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2017

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4

Indemnity

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	96,383	11.476			
1993	2	98,686	11.500	1.024		
1994	3	90,507	11.413	0.917		
1995	4	91,599	11.425	1.012		
1996	5	82,524	11.321	0.901		
1997	6	95,179	11.464	1.153		
1998	7	100,117	11.514	1.052		
1999	8	101,445	11.527	1.013		
2000	9	91,541	11.425	0.902	n =	23
2001	10	95,087	11.463	1.039	S(x) =	46,069
2002	11	101,860	11.531	1.071	S(x-sq) =	92,277,219
2003	12	103,466	11.547	1.016	S(xy) =	519,929
2004	13	103,217	11.545	0.998	S(y) =	260
2005	14	106,270	11.574	1.030	D =	23,276
2006	15	111,087	11.618	1.045	slope =	-0.045
2007	16	115,666	11.658	1.041	Avg Trend =	0.955
2008	17	120,810	11.702	1.044		
2009	18	85,560	11.357	0.708		
2010	19	71,175	11.173	0.832		
2011	20	70,876	11.169	0.996		
2012	21	42,013	10.646	0.593		
2013	22	45,160	10.718	1.075		
2014	23	6,860	8.833	0.152		
2015	24	0				
2016	25	0				
2017	26	0				
2018	27	0				
					Selected Trend:	**0.950**

NOTES:

(3) 2018 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2017

(4) LN [(3)]

(5) Eg. 2014: 0.152 = 6860 / 45160

Commonwealth of Massachusetts Workers Compensation
Massachusetts Colleges & Universities - Cluster 4
INDEMNITY
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	*12*	*24*	*36*	*48*	*60*	*72*	*84*	*96*	*108*	*120*	*132*	*144*	*156*	*168*	*180*	*192*	*204*	*216*	*228*	*240*	*252*	*264*	*276*	*288*	*300*	*312*	*324*	*336*	*348*	*360*	*372*	*384*	*396*	*408*	*420*	*432*
June-83	54,010	142,576	208,148	264,888	314,931	357,219	371,053	469,928	488,830	527,760	553,935	571,859	597,183	632,418	652,652	668,547	668,547	676,026	716,272	716,272	716,272	716,272	716,272	716,272	716,272	716,272	716,272	716,272	716,272	716,272	716,272	716,272	716,272	716,272	716,272	716,272
June-84	99,917	266,707	383,604	485,764	576,711	646,670	708,919	756,240	783,256	798,348	807,607	799,910	809,636	819,761	830,411	841,202	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	837,731	
June-85	145,363	376,000	561,409	702,017	806,337	944,094	1,041,045	1,113,616	1,165,340	1,204,638	1,251,307	1,274,495	1,298,633	1,324,024	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062	1,393,062		
June-86	146,844	393,892	560,427	714,824	852,275	1,013,300	1,126,822	1,223,737	1,303,796	1,350,669	1,397,048	1,447,454	1,502,391	1,555,201	1,632,671	1,697,735	1,756,102	1,781,294	1,805,911	1,830,855	1,833,907	1,833,907	1,833,907	1,833,907	1,833,907	1,833,907	1,833,907	1,833,907	1,833,907	1,833,907	1,833,907	1,833,907	1,833,907			
June-87	205,350	542,065	782,031	964,915	1,140,809	1,261,213	1,366,787	1,443,695	1,510,844	1,568,560	1,627,834	1,689,585	1,754,007	1,801,170	1,862,691	1,928,482	1,995,204	2,043,636	2,086,293	2,127,530	2,170,638	2,215,734	2,269,157	2,341,746	2,389,183	2,436,751	2,486,729	2,537,563	2,590,111	2,644,957	2,708,228	2,776,870				
June-88	264,730	647,871	957,840	1,332,415	1,600,031	1,789,064	2,016,553	2,143,780	2,273,154	2,384,070	2,485,765	2,581,511	2,687,118	2,803,766	2,927,359	3,052,144	3,156,171	3,229,466	3,302,225	3,377,918	3,456,925	3,541,131	3,624,626	3,707,957	3,794,835	3,883,619	3,973,595	4,049,675	4,101,999	4,103,153	4,103,153					
June-89	203,700	458,930	663,759	873,071	1,047,827	1,143,271	1,198,464	1,232,178	1,250,874	1,282,165	1,292,717	1,298,047	1,302,239	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910	1,302,910						
June-90	251,034	593,345	877,389	1,070,415	1,170,169	1,310,507	1,405,772	1,541,316	1,646,975	1,785,002	1,902,032	2,022,921	2,130,629	2,240,435	2,354,155	2,465,796	2,583,494	2,694,389	2,807,976	2,928,761	3,000,834	3,057,656	3,117,154	3,198,892	3,277,762	3,320,712	3,320,712	3,320,712	3,320,712							
June-91	210,725	476,992	661,310	747,971	826,820	877,501	964,982	1,043,288	1,062,987	1,078,493	1,092,473	1,107,416	1,121,900	1,136,365	1,154,741	1,159,007	1,160,107	1,160,107	1,160,107	1,160,107	1,160,107	1,160,107	1,160,107	1,160,107	1,160,107	1,160,107	1,160,107	1,160,107								
June-92	230,185	473,793	612,524	709,857	752,262	788,923	831,701	862,151	886,987	914,044	968,299	997,727	1,032,093	1,067,423	1,093,472	1,120,923	1,133,758	1,133,853	1,135,353	1,135,353	1,135,353	1,136,695	1,136,695	1,136,799	1,137,283	1,137,534	1,137,534									
June-93	250,714	541,198	609,220	695,349	761,795	896,967	969,498	986,209	986,209	986,209	986,496	986,496	986,496	986,496	986,496	986,496	986,496	986,496	986,496	986,496	986,496	986,496	986,496	986,496	986,496	986,496										
June-94	142,078	335,638	434,332	540,452	602,360	665,759	700,338	683,894	702,764	722,297	742,006	760,225	779,419	799,569	819,773	841,452	863,666	885,787	907,933	930,019	952,106	974,192	996,338	1,018,425	1,040,511											
June-95	115,982	327,962	450,743	510,570	656,919	704,734	751,757	811,410	863,231	899,192	899,252	902,615	916,017	958,344	1,001,523	1,046,791	1,090,356	1,133,473	1,179,286	1,223,263	1,267,764	1,313,000	1,358,170	1,404,158												
June-96	206,256	426,449	543,267	632,734	711,202	763,750	825,421	867,895	906,744	927,586	927,586	927,586	927,586	927,586	927,586	927,586	927,586	927,586	927,586	927,586	927,586	927,586	927,586													
June-97	184,229	328,446	444,786	555,024	612,566	653,987	680,550	699,551	720,522	739,692	759,525	784,015	805,205	826,592	851,586	873,746	896,010	918,427	923,657	923,657	923,657	923,657														
June-98	204,733	326,969	438,428	556,503	656,266	750,818	946,526	1,035,878	1,116,871	1,200,899	1,288,861	1,378,390	1,471,075	1,560,882	1,640,371	1,713,867	1,786,522	1,860,045	1,934,781	2,009,408	2,085,383															
June-99	178,965	393,824	642,327	727,290	775,010	801,143	828,610	857,804	888,093	943,651	979,256	1,011,764	1,044,136	1,077,612	1,111,519	1,145,659	1,180,206	1,215,323	1,250,390	1,286,089																
June-00	277,497	570,937	719,211	779,101	816,241	839,009	844,236	844,236	844,236	844,236	844,236	844,236	844,236	844,236	844,236	844,236	844,236	844,236	844,236																	
June-01	211,269	540,991	786,054	907,942	982,546	1,034,355	1,086,105	1,123,788	1,153,822	1,184,076	1,214,203	1,245,356	1,276,910	1,308,682	1,340,850	1,373,532	1,406,664	1,439,888																		
June-02	189,348	645,495	949,546	1,190,744	1,315,603	1,438,839	1,509,596	1,578,992	1,633,082	1,686,943	1,742,639	1,799,055	1,855,859	1,913,344	1,971,775	2,030,119	2,089,520																			
June-03	291,166	554,149	689,280	758,177	839,325	895,935	923,456	950,915	977,016	1,004,005	1,031,413	1,059,708	1,087,564	1,115,879	1,144,152	1,172,937																				
June-04	217,692	487,010	658,712	817,060	1,008,366	1,101,139	1,150,675	1,163,453	1,163,453	1,163,453	1,163,453	1,167,101	1,167,101	1,167,101	1,167,101																					
June-05	230,521	418,799	624,539	726,139	780,814	805,681	824,654	825,393	825,463	825,463	825,463	825,463	825,463	825,463																						
June-06	295,643	638,840	855,565	960,239	1,005,254	1,031,933	1,059,134	1,097,733	1,118,317	1,164,085	1,206,474	1,273,089	1,306,981																							
June-07	271,385	517,910	631,652	710,911	719,279	741,612	769,416	783,708	783,708	783,708	783,708	783,708																								
June-08	266,597	683,370	951,226	1,163,168	1,327,356	1,479,040	1,567,518	1,628,952	1,687,167	1,743,580	1,803,467																									
June-09	286,738	569,698	809,591	1,006,874	1,150,080	1,267,290	1,367,159	1,453,260	1,515,587	1,628,227																										
June-10	418,176	997,028	1,315,276	1,658,156	1,884,889	2,102,819	2,299,652	2,447,833	2,579,668																											
June-11	441,106	954,293	1,366,571	1,466,786	1,533,060	1,599,427	1,689,571	1,770,369																												
June-12	412,473	870,425	1,295,826	1,604,006	1,727,037	1,778,724	1,830,824																													
June-13	360,464	710,865	979,073	1,207,494	1,361,567	1,482,689																														
June-14	466,274	972,487	1,248,894	1,467,060	1,636,242																															
June-15	513,416	935,315	1,168,489	1,350,939																																
June-16	552,170	1,131,899	1,487,788																																	
June-17	423,610	977,257																																		
June-18	619,145																																			

Age-to-Age Factors

Acc Yr Ending	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*
June-83	2.640	1.460	1.273	1.189	1.134	1.039	1.266	1.040	1.080	1.050	1.032	1.044	1.059	1.032	1.024	1.000	1.011	1.060	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
June-84	2.669	1.438	1.266	1.187	1.121	1.096	1.067	1.036	1.019	1.012	0.990	1.012	1.013	1.013	1.013	0.996	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
June-85	2.587	1.493	1.250	1.149	1.171	1.103	1.070	1.046	1.034	1.039	1.019	1.019	1.020	1.052	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
June-86	2.682	1.423	1.275	1.192	1.189	1.112	1.086	1.065	1.036	1.034	1.036	1.038	1.035	1.050	1.040	1.034	1.014	1.014	1.014	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
June-87	2.640	1.443	1.234	1.182	1.106	1.084	1.056	1.047	1.038	1.038	1.038	1.038	1.027	1.034	1.035	1.035	1.024	1.021	1.020	1.020	1.021	1.024	1.032	1.020	1.020	1.021	1.020	1.021	1.021	1.024	1.025				
June-88	2.447	1.478	1.391	1.201	1.118	1.127	1.063	1.060	1.049	1.043	1.039	1.041	1.043	1.044	1.043	1.034	1.023	1.023	1.023	1.023	1.024	1.024	1.023	1.023	1.023	1.023	1.019	1.013	1.000	1.000					
June-89	2.253	1.446	1.315	1.200	1.091	1.048	1.028	1.015	1.025	1.008	1.004	1.003	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
June-90	2.364	1.479	1.220	1.093	1.120	1.073	1.096	1.069	1.084	1.066	1.064	1.053	1.052	1.051	1.047	1.048	1.043	1.042	1.043	1.025	1.019	1.019	1.026	1.025	1.013	1.000	1.000	1.000							
June-91	2.264	1.386	1.131	1.105	1.061	1.100	1.081	1.019	1.015	1.013	1.014	1.013	1.013	1.016	1.004	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000								
June-92	2.058	1.293	1.159	1.060	1.049	1.054	1.037	1.029	1.031	1.059	1.030	1.034	1.034	1.024	1.025	1.011	1.000	1.001	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000									
June-93	2.159	1.126	1.141	1.096	1.177	1.081	1.017	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000										
June-94	2.362	1.294	1.244	1.115	1.105	1.052	0.977	1.028	1.028	1.027	1.025	1.025	1.026	1.025	1.026	1.026	1.026	1.025	1.024	1.024	1.023	1.023	1.022	1.022											
June-95	2.828	1.374	1.133	1.287	1.073	1.067	1.079	1.064	1.042	1.000	1.004	1.015	1.046	1.045	1.045	1.042	1.040	1.040	1.037	1.036	1.036	1.034	1.034												
June-96	2.068	1.274	1.165	1.124	1.074	1.081	1.051	1.045	1.023	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
June-97	1.783	1.354	1.248	1.104	1.068	1.041	1.028	1.030	1.027	1.027	1.032	1.027	1.027	1.030	1.026	1.025	1.025	1.006	1.000	1.000	1.000														
June-98	1.597	1.341	1.269	1.179	1.144	1.261	1.094	1.078	1.075	1.073	1.069	1.067	1.061	1.051	1.045	1.042	1.041	1.040	1.039	1.038															
June-99	2.201	1.631	1.132	1.066	1.034	1.034	1.035	1.035	1.063	1.038	1.033	1.032	1.032	1.031	1.031	1.030	1.030	1.029	1.029																
June-00	2.057	1.260	1.083	1.048	1.028	1.006	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
June-01	2.561	1.453	1.155	1.082	1.053	1.050	1.035	1.027	1.026	1.025	1.026	1.025	1.025	1.025	1.024	1.024	1.024																		
June-02	3.409	1.471	1.254	1.105	1.094	1.049	1.046	1.034	1.033	1.033	1.032	1.032	1.031	1.031	1.030	1.029																			
June-03	1.903	1.244	1.100	1.107	1.067	1.031	1.030	1.027	1.028	1.027	1.027	1.026	1.026	1.025	1.025																				
June-04	2.237	1.353	1.240	1.234	1.092	1.045	1.011	1.000	1.000	1.000	1.003	1.000	1.000	1.000																					
June-05	1.817	1.491	1.163	1.075	1.032	1.024	1.001	1.000	1.000	1.000	1.000	1.000	1.000																						
June-06	2.161	1.339	1.122	1.047	1.027	1.026	1.036	1.019	1.041	1.036	1.055	1.027																							
June-07	1.908	1.220	1.125	1.012	1.031	1.037	1.019	1.000	1.000	1.000	1.000																								
June-08	2.563	1.392	1.223	1.141	1.114	1.060	1.039	1.036	1.033	1.034																									
June-09	1.987	1.421	1.244	1.142	1.102	1.079	1.063	1.043	1.074																										
June-10	2.384	1.319	1.261	1.137	1.116	1.094	1.064	1.054																											
June-11	2.163	1.432	1.073	1.045	1.043	1.056	1.048																												
June-12	2.110	1.489	1.238	1.077	1.030	1.029																													
June-13	1.972	1.377	1.233	1.128	1.089																														
June-14	2.086	1.284	1.175	1.115																															
June-15	1.822	1.249	1.156																																
June-16	2.050	1.314																																	
June-17	2.307																																		

Averages	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*To Ult*
Simple Avg																																				
All Yrs	2.260	1.378	1.203	1.126	1.089	1.068	1.053	1.034	1.033	1.026	1.023	1.024	1.025	1.026	1.023	1.019	1.016	1.017	1.013	1.010	1.008	1.009	1.011	1.008	1.005	1.004	1.004	1.004	1.003	1.004	1.005	1.000	1.000	1.000	1.000	
Latest 5	2.047	1.343	1.175	1.100	1.076	1.064	1.047	1.030	1.030	1.014	1.017	1.017	1.016	1.016	1.022	1.025	1.024	1.015	1.021	1.020	1.012	1.011	1.011	1.009	1.003	1.005	1.008	1.007	1.004	1.005	1.005					
Latest 3	2.060	1.283	1.188	1.107	1.054	1.060	1.058	1.044	1.036	1.024	1.018	1.009	1.009	1.019	1.026	1.018	1.018	1.023	1.022	1.013	1.012	1.019	1.019	1.007	1.000	1.000	1.000	1.004	1.007	1.008	1.008	1.000	1.000			
Volume Wtd																																				
All Yrs	2.194	1.370	1.200	1.121	1.087	1.069	1.051	1.037	1.036	1.029	1.027	1.027	1.027	1.030	1.027	1.024	1.019	1.019	1.018	1.014	1.012	1.012	1.015	1.012	1.010	1.008	1.007	1.007	1.004	1.005	1.009	1.000	1.000	1.000	1.000	
Latest 5	2.041	1.337	1.171	1.100	1.075	1.064	1.051	1.037	1.036	1.018	1.020	1.019	1.019	1.019	1.024	1.028	1.027	1.020	1.025	1.024	1.013	1.013	1.012	1.014	1.005	1.008	1.010	1.008	1.005	1.006	1.009					
Latest 3	2.044	1.285	1.185	1.104	1.052	1.062	1.059	1.046	1.042	1.028	1.024	1.010	1.009	1.021	1.027	1.022	1.020	1.028	1.027	1.020	1.015	1.021	1.020	1.007	1.000	1.000	1.000	1.006	1.007	1.007	1.012	1.000	1.000			

Dev Factor Selection																																				
Industry 1	2.946	1.574	1.235	1.110	1.036	1.025	1.016	1.009	1.007	1.006	1.006	1.010	1.003	1.005	1.003	1.004	1.005	1.003																		
Industry 2		1.901	1.354	1.158	1.073	1.026	1.025	1.013	1.006	1.010	1.006	1.014	1.007	1.003	1.003	1.003	1.002	1.006	1.002	1.003																
Prior	*2.189*	*1.364*	*1.195*	*1.103*	*1.079*	*1.071*	*1.050*	*1.035*	*1.034*	*1.029*	*1.027*	*1.019*	*1.026*	*1.031*	*1.027*	*1.027*	*1.019*	*1.025*	*1.010*	*1.005*	*1.002*	*1.001*	*1.001*	*1.001*	*1.001*	*1.001*	*1.005*	*1.001*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.000*	*1.001*	
Selected	2.194	1.337	1.195	1.100	1.075	1.067	1.051	1.037	1.036	1.029	1.027	1.019	1.025	1.030	1.027	1.028	1.019	1.023	1.010	1.005	1.002	1.001	1.001	1.001	1.001	1.001	1.005	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.001
FacToUlt	6.422	2.927	2.189	1.831	1.665	1.549	1.452	1.382	1.333	1.287	1.251	1.218	1.195	1.166	1.132	1.103	1.073	1.053	1.029	1.019	1.014	1.012	1.011	1.010	1.009	1.008	1.007	1.002	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.001
Percent of Ult	15.6%	34.2%	45.7%	54.6%	60.1%	64.6%	68.9%	72.4%	75.0%	77.7%	80.0%	82.1%	83.7%	85.8%	88.3%	90.7%	93.2%	95.0%	97.2%	98.1%	98.6%	98.8%	98.9%	99.0%	99.1%	99.2%	99.3%	99.8%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4

Indemnity

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/17		As of 6/18		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	3,022,846	3,031,831	3,022,846	3,034,925	0	0.0%	3,094	0.1%
6/30/82-83	758,137	773,003	758,137	773,003	0	0.0%	0	0.0%
6/30/83-84	936,086	954,440	936,086	954,440	0	0.0%	0	0.0%
6/30/84-85	1,521,879	1,551,720	1,521,879	1,551,720	0	0.0%	0	0.0%
6/30/85-86	1,906,285	1,943,663	1,906,285	1,943,663	0	0.0%	0	0.0%
6/30/86-87	2,832,000	2,968,000	2,900,000	3,039,000	68,000	2.4%	71,000	2.4%
6/30/87-88	4,485,956	4,837,795	4,401,000	4,419,986	(84,956)	-1.9%	(417,810)	-8.6%
6/30/88-89	1,545,514	1,590,971	1,516,000	1,522,786	(29,514)	-1.9%	(68,184)	-4.3%
6/30/89-90	3,927,432	4,042,945	3,853,000	3,869,676	(74,432)	-1.9%	(173,269)	-4.3%
6/30/90-91	1,402,000	1,463,288	1,396,000	1,414,511	(6,000)	-0.4%	(48,776)	-3.3%
6/30/91-92	1,403,000	1,460,000	1,401,000	1,463,403	(2,000)	-0.1%	3,403	0.2%
6/30/92-93	1,170,446	1,204,871	1,170,446	1,204,871	0	0.0%	0	0.0%
6/30/93-94	1,192,000	1,236,296	1,208,000	1,259,486	16,000	1.3%	23,190	1.9%
6/30/94-95	1,752,000	1,813,744	1,797,000	1,862,031	45,000	2.6%	48,287	2.7%
6/30/95-96	1,294,428	1,332,499	1,294,428	1,332,499	0	0.0%	0	0.0%
6/30/96-97	1,198,000	1,257,900	1,196,000	1,255,800	(2,000)	-0.2%	(2,100)	-0.2%
6/30/97-98	2,319,000	2,320,000	2,385,000	2,387,000	66,000	2.8%	67,000	2.9%
6/30/98-99	1,497,000	1,513,000	1,521,000	1,537,000	24,000	1.6%	24,000	1.6%
6/30/99-00	1,240,000	1,253,000	1,216,000	1,228,000	(24,000)	-1.9%	(25,000)	-2.0%
6/30/00-01	1,792,000	1,795,000	1,796,000	1,798,000	4,000	0.2%	3,000	0.2%
6/30/01-02	2,692,000	2,701,000	2,693,000	2,700,000	1,000	0.0%	(1,000)	0.0%
6/30/02-03	1,476,000	1,491,000	1,472,000	1,488,000	(4,000)	-0.3%	(3,000)	-0.2%
6/30/03-04	1,699,000	1,717,000	1,656,000	1,674,000	(43,000)	-2.5%	(43,000)	-2.5%
6/30/04-05	1,196,000	1,302,000	1,169,000	1,259,000	(27,000)	-2.3%	(43,000)	-3.3%
6/30/05-06	1,811,000	1,903,000	1,809,000	1,909,000	(2,000)	-0.1%	6,000	0.3%
6/30/06-07	1,178,000	1,327,000	1,148,000	1,276,000	(30,000)	-2.5%	(51,000)	-3.8%
6/30/07-08	2,980,000	3,077,000	2,977,000	3,073,000	(3,000)	-0.1%	(4,000)	-0.1%
6/30/08-09	2,229,650	2,379,000	2,270,500	2,446,000	40,850	1.8%	67,000	2.8%
6/30/09-10	3,485,550	4,063,000	3,566,300	4,136,000	80,750	2.3%	73,000	1.8%
6/30/10-11	2,916,500	3,183,000	2,839,550	3,103,000	(76,950)	-2.6%	(80,000)	-2.5%
6/30/11-12	3,035,250	3,370,000	2,885,150	3,175,000	(150,100)	-4.9%	(195,000)	-5.8%
6/30/12-13	2,715,100	2,946,000	2,692,300	2,883,000	(22,800)	-0.8%	(63,000)	-2.1%
6/30/13-14	3,025,750	3,262,000	3,018,150	3,285,000	(7,600)	-0.3%	23,000	0.7%
6/30/14-15	3,144,000	3,466,000	2,998,000	3,302,000	(146,000)	-4.6%	(164,000)	-4.7%
6/30/15-16	3,861,000	4,099,000	3,647,000	3,798,000	(214,000)	-5.5%	(301,000)	-7.3%
6/30/16-17	3,444,000	3,747,000	3,498,000	3,637,000	54,000	1.6%	(110,000)	-2.9%
6/30/17-18								
Total	78,084,808	82,376,965	77,535,057	80,995,801	(549,752)	-0.7%	(1,381,164)	-1.7%

NOTES:

(2), (3) From prior Aon analysis as of June 30, 2017

(4), (5) From Section 7, Exhibit 1, Page 1, Columns 6, 7

(6) = (4) - (2)

(7) = (4) / (2) - 1

(8) = (5) - (3)

(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4
Indemnity

Calculation of Ultimate Lump Sum Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Accident Year	Paid Loss Excluding Lump Sum	Implied Cumulative LDF	Ult Loss Excluding Lump Sum	Selected Incr Lump Sum % Outstdg	Cumulative Lump Sum % Outstdg	Total Lump Sum Outstdg	Paid Lump Sum to Date	Est Ult Lump Sum - Incr Method	Ultimate Lump Sum Percentage	Lump Sum LDF	Est Ult Lump Sum - Paid Method	Selected Est Ultimate Lump Sums	Prior Est Ultimate Lump Sums
All Prior Yrs	3,004,076	1.000	3,004,076	0.0%	0.0%	0	15,750	15,750	0.5%	1.000	15,750	15,750	15,750
6/30/82-83	716,272	1.001	716,789	0.0%	0.0%	0	27,000	27,000	3.8%	1.000	27,000	27,000	27,000
6/30/83-84	837,731	1.051	880,252	0.0%	0.0%	0	80,000	80,000	9.1%	1.000	80,000	80,000	80,000
6/30/84-85	1,393,062	1.001	1,394,067	0.0%	0.0%	0	98,976	98,976	7.1%	1.000	98,976	98,976	98,976
6/30/85-86	1,833,907	1.001	1,835,230	0.0%	0.0%	0	35,000	35,000	1.9%	1.000	35,000	35,000	35,000
6/30/86-87	2,776,870	1.051	2,917,817	0.0%	0.0%	0	121,500	121,500	4.2%	1.000	121,500	121,500	121,500
6/30/87-88	4,103,153	1.001	4,106,112	0.0%	0.0%	0	294,843	294,843	7.2%	1.000	294,843	294,843	294,843
6/30/88-89	1,302,910	1.001	1,303,850	0.0%	0.0%	0	212,300	212,300	16.3%	1.000	212,300	212,300	212,300
6/30/89-90	3,320,712	1.001	3,323,107	0.0%	0.0%	0	529,712	529,712	15.9%	1.000	529,712	529,712	529,712
6/30/90-91	1,160,107	1.002	1,162,105	0.0%	0.0%	0	233,500	233,500	20.1%	1.000	233,500	233,500	233,500
6/30/91-92	1,137,534	1.007	1,145,190	0.0%	0.0%	0	256,183	256,183	22.4%	1.000	256,183	256,183	256,183
6/30/92-93	986,496	1.008	994,129	0.0%	0.0%	0	161,000	161,000	16.2%	1.000	161,000	161,000	161,000
6/30/93-94	1,040,511	1.009	1,049,610	0.0%	0.0%	0	159,000	159,000	15.1%	1.000	159,000	159,000	163,489
6/30/94-95	1,404,158	1.010	1,417,854	0.1%	0.1%	1,418	369,205	370,623	26.1%	1.050	387,665	379,144	379,122
6/30/95-96	927,586	1.011	937,570	0.0%	0.1%	938	341,461	342,399	36.5%	1.050	358,534	350,466	350,467
6/30/96-97	923,657	1.012	934,533	0.0%	0.1%	935	254,882	255,817	27.4%	1.050	267,626	261,721	261,722
6/30/97-98	2,085,383	1.014	2,114,157	0.0%	0.1%	2,114	265,000	267,114	12.6%	1.050	278,250	272,682	272,649
6/30/98-99	1,286,089	1.019	1,310,354	0.0%	0.1%	1,310	205,250	206,560	15.8%	1.050	215,513	211,036	211,025
6/30/99-00	844,236	1.029	868,766	0.0%	0.1%	869	338,100	338,969	39.0%	1.050	355,005	346,987	349,030
6/30/00-01	1,439,888	1.053	1,515,820	0.0%	0.1%	1,516	273,502	275,018	18.1%	1.061	290,282	282,650	282,884
6/30/01-02	2,089,520	1.073	2,241,633	0.0%	0.1%	2,242	443,250	445,492	19.9%	1.062	470,914	458,203	459,943
6/30/02-03	1,172,937	1.103	1,293,686	0.1%	0.2%	2,587	172,500	175,087	13.5%	1.065	183,633	179,360	179,605
6/30/03-04	1,167,101	1.132	1,321,564	0.0%	0.2%	2,643	323,500	326,143	24.7%	1.067	345,067	335,605	336,101
6/30/04-05	825,463	1.166	962,627	0.0%	0.2%	1,925	198,100	200,025	20.8%	1.069	211,729	205,877	206,289
6/30/05-06	1,306,981	1.195	1,561,883	0.0%	0.2%	3,124	245,673	248,797	15.9%	1.072	263,363	256,080	256,552
6/30/06-07	783,708	1.218	954,685	0.0%	0.2%	1,909	185,000	186,909	19.6%	1.075	198,916	192,913	194,254
6/30/07-08	1,803,467	1.251	2,255,414	0.0%	0.2%	4,511	781,250	785,761	34.8%	1.088	850,184	817,972	825,143
6/30/08-09	1,628,227	1.287	2,095,486	0.1%	0.3%	7,061	330,000	337,061	16.1%	1.101	363,427	350,244	355,687
6/30/09-10	2,579,668	1.333	3,438,649	0.3%	0.6%	22,329	649,250	671,579	19.5%	1.113	722,659	697,119	679,022
6/30/10-11	1,770,369	1.382	2,446,911	0.7%	1.4%	33,563	586,183	619,746	25.3%	1.181	692,539	656,142	730,434
6/30/11-12	1,830,824	1.452	2,658,954	2.5%	3.9%	102,734	400,262	502,996	18.9%	1.322	529,000	515,998	605,389
6/30/12-13	1,482,689	1.549	2,296,647	2.2%	6.1%	139,897	364,447	504,343	22.0%	1.564	569,908	537,126	574,024
6/30/13-14	1,636,242	1.665	2,724,607	1.0%	7.0%	192,048	287,000	479,048	17.6%	1.787	512,930	495,989	484,252
6/30/14-15	1,350,939	1.831	2,474,163	3.3%	10.3%	254,874	257,500	512,374	20.7%	2.453	631,576	524,294	560,798
6/30/15-16	1,487,788	2.189	3,256,132	4.8%	15.1%	492,505	76,430	568,936	17.5%	3.883	296,777	541,720	686,851
6/30/16-17	977,257	2.927	2,860,406	3.3%	18.5%	527,936	85,000	612,936	21.4%	10.111	859,471	637,589	648,949
6/30/17-18	619,145	6.422	3,976,010	2.0%	20.5%	813,846	0	813,846	20.5%	22.200	0	813,846	
Total	57,036,662		71,750,842			2,614,832	9,657,509	12,272,342	17.1%		12,079,731	12,545,528	12,119,444

NOTES:

(2) From Section 7, Exhibit 1, Page 2, Column 3

(3) = (4) / (2)

(4) From Section 7, Exhibit 1, Page 2, Column 6

(5) From Section 7, Exhibit 1, Page 11

(6) Downward sum of (5)

(7) = (6) x (4)

(8) From Section 7, Exhibit 1, Page 10

(9) = (7) + (8)

(10) = (9) / (4)

(11) From Section 7, Exhibit 1, Page 12

(12) = (8) x (11)

(13) Selected based on (9) and (12)

(14) From Aon analysis as of June 30, 2016

Commonwealth of Massachusetts Workers Compensation
Massachusetts Colleges & Universities - Cluster 4
INDEMNITY

Lump Sum Development
Incremental Lump Sum Payments

Acc Yr Ending	*0-12*	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*
All Prior Yrs	0	0	0	0	0	0	0	0	0	0	0	0	0	2,750	13,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun-83	0	0	0	0	0	0	0	0	12,000	0	0	0	0	0	15,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jun-84	0	0	0	0	0	0	0	46,500	16,000	0	0	17,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Jun-85	0	0	0	19,976	0	5,000	0	7,500	15,000	51,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Jun-86	0	0	0	0	0	0	0	0	35,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
Jun-87	0	0	0	0	0	27,500	0	20,000	30,000	0	0	0	0	44,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					
Jun-88	0	0	22,500	0	37,000	30,000	82,000	43,343	15,000	31,000	0	0	0	0	0	0	0	17,000	17,000	0	0	0	0	0	0	0	0	0	0	0	0						
Jun-89	0	33,000	0	6,800	0	67,500	0	30,000	0	0	75,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
Jun-90	0	0	25,211	30,000	35,001	76,500	30,000	0	53,000	0	0	0	0	0	0	0	0	0	0	0	33,333	33,333	33,333	0	180,000	0	0	0	0								
Jun-91	0	0	48,000	32,500	0	0	0	73,000	0	0	0	0	0	0	0	25,000	30,000	25,000	0	0	0	0	0	0	0	0	0	0									
Jun-92	0	0	15,000	89,500	0	0	0	12,000	0	20,000	9,683	0	0	0	0	0	75,000	35,000	0	0	0	0	0	0	0	0	0										
Jun-93	0	62,500	18,000	31,500	37,000	0	0	12,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0											
Jun-94	3,000	0	25,000	15,000	16,000	65,000	0	35,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0												
Jun-95	0	105,500	102,500	54,800	40,405	22,500	0	0	20,625	22,875	0	0	0	0	0	0	0	0	0	0	0	0	0	0													
Jun-96	22,500	97,000	10,000	15,500	70,461	20,000	0	0	40,000	66,000	0	0	0	0	0	0	0	0	0	0	0	0	0														
Jun-97	0	49,500	113,000	12,382	20,000	30,000	0	0	0	0	0	0	0	0	0	0	0	0	30,000	0	0	0															
Jun-98	0	80,000	90,000	25,000	25,000	0	0	40,000	0	0	0	0	5,000	0	0	0	0	0	0	0	0																
Jun-99	0	6,250	10,000	92,000	65,000	0	0	0	0	0	32,000	0	0	0	0	0	0	0	0	0																	
Jun-00	0	95,000	136,850	12,000	44,250	20,000	30,000	0	0	0	0	0	0	0	0	0	0	0	0																		
Jun-01	27,500	2,500	62,500	74,001	47,000	0	10,001	50,000	0	0	0	0	0	0	0	0	0	0																			
Jun-02	48,000	18,250	64,500	112,500	75,000	105,000	20,000	0	0	0	0	0	0	0	0	0	0																				
Jun-03	0	52,500	30,000	45,000	0	35,000	0	10,000	0	0	0	0	0	0	0	0																					
Jun-04	0	7,000	0	22,000	87,500	32,000	100,000	75,000	0	0	0	0	0	0	0																						
Jun-05	0	15,000	38,600	45,000	49,500	20,000	30,000	0	0	0	0	0	0	0																							
Jun-06	0	30,000	20,000	75,000	75,673	0	0	0	0	0	0	45,000	0																								
Jun-07	0	40,000	75,000	35,000	0	0	20,000	15,000	0	0	0	0																									
Jun-08	0	33,000	183,500	27,500	74,750	82,500	168,333	128,333	83,333	0	0																										
Jun-09	0	35,000	30,000	60,000	70,000	0	55,000	80,000	0	0																											
Jun-10	0	71,500	174,000	140,000	40,000	122,000	8,000	47,500	46,250																												
Jun-11	0	25,000	293,500	146,183	92,500	9,000	20,000	0																													
Jun-12	0	0	17,500	222,000	160,762	0	0																														
Jun-13	72,000	0	130,000	102,447	40,000	20,000																															
Jun-14	87,000	10,000	75,000	18,750	96,250																																
Jun-15	0	0	142,500	115,000																																	
Jun-16	0	17,000	59,430																																		
Jun-17	0	85,000																																			
Jun-18	0																																				

Cumulative Lump Sum Payments

Acc Yr Ending	*12*	*24*	*36*	*48*	*60*	*72*	*84*	*96*	*108*	*120*	*132*	*144*	*156*	*168*	*180*	*192*	*204*	*216*	*228*	*240*	*252*	*264*	*276*	*288*	*300*	*312*	*324*	*336*	*348*	*360*	*372*	*384*	*396*	*408*	*420*	*432*	*444*
All Prior Yrs	0	0	0	0	0	0	0	0	0	0	0	0	0	2,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750
Jun-83	0	0	0	0	0	0	0	0	12,000	12,000	12,000	12,000	12,000	12,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000		
Jun-84	0	0	0	0	0	0	0	46,500	62,500	62,500	62,500	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000			
Jun-85	0	0	0	19,976	19,976	24,976	24,976	32,476	47,476	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976				
Jun-86	0	0	0	0	0	0	0	0	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000					
Jun-87	0	0	0	0	0	27,500	27,500	47,500	77,500	77,500	77,500	77,500	77,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500						
Jun-88	0	0	22,500	22,500	59,500	89,500	171,500	214,843	229,843	260,843	260,843	260,843	260,843	260,843	260,843	260,843	277,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843							
Jun-89	0	33,000	33,000	39,800	39,800	107,300	107,300	137,300	137,300	137,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300								
Jun-90	0	0	25,211	55,211	90,212	166,712	196,712	196,712	249,712	249,712	249,712	249,712	249,712	249,712	249,712	249,712	249,712	249,712	249,712	249,712	283,045	316,379	349,712	349,712	529,712	529,712	529,712	529,712	529,712								
Jun-91	0	0	48,000	80,500	80,500	80,500	80,500	153,500	153,500	153,500	153,500	153,500	153,500	153,500	153,500	178,500	208,500	233,500	233,500	233,500	233,500	233,500	233,500	233,500	233,500	233,500	233,500	233,500									
Jun-92	0	0	15,000	104,500	104,500	104,500	104,500	116,500	116,500	136,500	146,183	146,183	146,183	146,183	146,183	146,183	221,183	256,183	256,183	256,183	256,183	256,183	256,183	256,183	256,183	256,183	256,183										
Jun-93	0	62,500	80,500	112,000	149,000	149,000	149,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000											
Jun-94	3,000	3,000	28,000	43,000	59,000	124,000	124,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000												
Jun-95	0	105,500	208,000	262,800	303,205	325,705	325,705	325,705	346,330	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205													
Jun-96	22,500	119,500	129,500	145,000	215,461	235,461	235,461	235,461	275,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461														
Jun-97	0	49,500	162,500	174,882	194,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	254,882	254,882																
Jun-98	0	80,000	170,000	195,000	220,000	220,000	220,000	260,000	260,000	260,000	260,000	260,000	265,000	265,000	265,000	265,000	265,000	265,000	265,000	265,000	265,000																
Jun-99	0	6,250	16,250	108,250	173,250	173,250	173,250	173,250	173,250	173,250	205,250	205,250	205,250	205,250	205,250	205,250	205,250	205,250	205,250	205,250																	
Jun-00	0	95,000	231,850	243,850	288,100	308,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100																		
Jun-01	27,500	30,000	92,500	166,501	213,501	213,501	223,502	273,502	273,502	273,502	273,502	273,502	273,502	273,502	273,502	273,502	273,502	273,502																			
Jun-02	48,000	66,250	130,750	243,250	318,250	423,250	443,250	443,250	443,250	443,250	443,250	443,250	443,250	443,250	443,250	443,250	443,250																				
Jun-03	0	52,500	82,500	127,500	127,500	162,500	162,500	172,500	172,500	172,500	172,500	172,500	172,500	172,500	172,500	172,500																					
Jun-04	0	7,000	7,000	29,000	116,500	148,500	248,500	323,500	323,500	323,500	323,500	323,500	323,500	323,500	323,500																						
Jun-05	0	15,000	53,600	98,600	148,100	168,100	198,100	198,100	198,100	198,100	198,100	198,100	198,100	198,100																							
Jun-06	0	30,000	50,000	125,000	200,673	200,673	200,673	200,673	200,673	200,673	200,673	245,673	245,673																								
Jun-07	0	40,000	115,000	150,000	150,000	150,000	170,000	185,000	185,000	185,000	185,000	185,000																									
Jun-08	0	33,000	216,500	244,000	318,750	401,250	569,583	697,917	781,250	781,250	781,250																										
Jun-09	0	35,000	65,000	125,000	195,000	195,000	250,000	330,000	330,000	330,000																											
Jun-10	0	71,500	245,500	385,500	425,500	547,500	555,500	603,000	649,250																												
Jun-11	0	25,000	318,500	464,683	557,183	566,183	586,183	586,183																													
Jun-12	0	0	17,500	239,500	400,262	400,262	400,262																														
Jun-13	72,000	72,000	202,000	304,447	344,447	364,447																															
Jun-14	87,000	97,000	172,000	190,750	287,000																																
Jun-15	0	0	142,500	257,500																																	
Jun-16	0	17,000	76,430																																		
Jun-17	0	85,000																																			
Jun-18	0																																				

Commonwealth of Massachusetts Workers Compensation
Massachusetts Colleges & Universities - Cluster 4
INDEMNITY

Lump Sum Development
Incremental Lump Sums as a % of Ultimate Losses Excluding Lump Sums

Acc Yr Ending	*0-12*	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*
All Prior Yrs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jun-83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.017	0.000	0.000	0.000	0.000	0.000	0.021	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Jun-84	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.053	0.018	0.000	0.000	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Jun-85	0.000	0.000	0.000	0.014	0.000	0.004	0.000	0.005	0.011	0.037	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
Jun-86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Jun-87	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.007	0.010	0.000	0.000	0.000	0.000	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
Jun-88	0.000	0.000	0.005	0.000	0.009	0.007	0.020	0.011	0.004	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000						
Jun-89	0.000	0.025	0.000	0.005	0.000	0.052	0.000	0.023	0.000	0.000	0.058	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000							
Jun-90	0.000	0.000	0.008	0.009	0.011	0.023	0.009	0.000	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.010	0.010	0.000	0.054	0.000	0.000	0.000	0.000								
Jun-91	0.000	0.000	0.041	0.028	0.000	0.000	0.000	0.063	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022	0.026	0.022	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000									
Jun-92	0.000	0.000	0.013	0.078	0.000	0.000	0.000	0.010	0.000	0.017	0.008	0.000	0.000	0.000	0.000	0.000	0.065	0.031	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000										
Jun-93	0.000	0.063	0.018	0.032	0.037	0.000	0.000	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000											
Jun-94	0.003	0.000	0.024	0.014	0.015	0.062	0.000	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000												
Jun-95	0.000	0.074	0.072	0.039	0.028	0.016	0.000	0.000	0.015	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000													
Jun-96	0.024	0.103	0.011	0.017	0.075	0.021	0.000	0.000	0.043	0.070	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000														
Jun-97	0.000	0.053	0.121	0.013	0.021	0.032	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.032	0.000	0.000	0.000															
Jun-98	0.000	0.038	0.043	0.012	0.012	0.000	0.000	0.019	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																
Jun-99	0.000	0.005	0.008	0.070	0.050	0.000	0.000	0.000	0.000	0.000	0.024	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																	
Jun-00	0.000	0.109	0.158	0.014	0.051	0.023	0.035	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																		
Jun-01	0.018	0.002	0.041	0.049	0.031	0.000	0.007	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																			
Jun-02	0.021	0.008	0.029	0.050	0.033	0.047	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																				
Jun-03	0.000	0.041	0.023	0.035	0.000	0.027	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000																					
Jun-04	0.000	0.005	0.000	0.017	0.066	0.024	0.076	0.057	0.000	0.000	0.000	0.000	0.000	0.000	0.000																						
Jun-05	0.000	0.016	0.040	0.047	0.051	0.021	0.031	0.000	0.000	0.000	0.000	0.000	0.000	0.000																							
Jun-06	0.000	0.019	0.013	0.048	0.048	0.000	0.000	0.000	0.000	0.000	0.000	0.029	0.000																								
Jun-07	0.000	0.042	0.079	0.037	0.000	0.000	0.021	0.016	0.000	0.000	0.000	0.000																									
Jun-08	0.000	0.015	0.081	0.012	0.033	0.037	0.075	0.057	0.037	0.000	0.000																										
Jun-09	0.000	0.017	0.014	0.029	0.033	0.000	0.026	0.038	0.000	0.000																											
Jun-10	0.000	0.021	0.051	0.041	0.012	0.035	0.002	0.014	0.013																												
Jun-11	0.000	0.010	0.120	0.060	0.038	0.004	0.008	0.000																													
Jun-12	0.000	0.000	0.007	0.083	0.060	0.000	0.000																														
Jun-13	0.031	0.000	0.057	0.045	0.017	0.009																															
Jun-14	0.032	0.004	0.028	0.007	0.035																																
Jun-15	0.000	0.000	0.058	0.046																																	
Jun-16	0.000	0.005	0.018																																		
Jun-17	0.000	0.030																																			
Jun-18	0.000																																				

Averages		*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*
Simple Avg																																					
All Yrs (ex P)	0.004	0.020	0.035	0.029	0.024	0.015	0.011	0.016	0.007	0.005	0.003	0.002	0.000	0.001	0.001	0.001	0.005	0.003	0.002	0.000	0.001	0.001	0.001	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Latest 5	0.006	0.008	0.033	0.048	0.033	0.010	0.022	0.025	0.010	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
Latest 3	0.000	0.012	0.034	0.033	0.038	0.004	0.004	0.017	0.017	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Olympic Avg																																					
All Yrs (ex P)	0.003	0.018	0.032	0.028	0.023	0.013	0.009	0.015	0.006	0.003	0.001	0.001	0.000	0.000	0.000	0.000	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
Latest 10	0.004	0.009	0.048	0.040	0.034	0.012	0.020	0.017	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000										
Latest 5	0.000	0.003	0.034	0.050	0.030	0.004	0.012	0.023	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000						

Dev Factor Selection																																					
Prior	*NA*	*0.020*	*0.053*	*0.047*	*0.032*	*0.015*	*0.027*	*0.025*	*0.007*	*0.003*	*0.001*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.001*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.001*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	
Selected	NA	0.020	0.033	0.048	0.033	0.010	0.022	0.025	0.007	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FacToUlt	NA	0.205	0.185	0.151	0.103	0.070	0.061	0.039	0.014	0.006	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Commonwealth of Massachusetts Workers Compensation
Massachusetts Colleges & Universities - Cluster 4
INDEMNITY

Paid Loss Development
Paid Loss - Lump Sum only

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444
All Prior Yrs	0	0	0	0	0	0	0	0	0	0	0	0	0	2,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750	15,750
Jun-83	0	0	0	0	0	0	0	0	12,000	12,000	12,000	12,000	12,000	12,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	27,000	
Jun-84	0	0	0	0	0	0	0	46,500	62,500	62,500	62,500	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000	80,000		
Jun-85	0	0	0	19,976	19,976	24,976	24,976	32,476	47,476	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976	98,976			
Jun-86	0	0	0	0	0	0	0	0	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000				
Jun-87	0	0	0	0	0	27,500	27,500	47,500	77,500	77,500	77,500	77,500	77,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500	121,500					
Jun-88	0	0	22,500	22,500	59,500	89,500	171,500	214,843	229,843	260,843	260,843	260,843	260,843	260,843	260,843	260,843	260,843	277,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843	294,843						
Jun-89	0	33,000	33,000	39,800	39,800	107,300	107,300	137,300	137,300	137,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300	212,300							
Jun-90	0	0	25,211	55,211	90,212	166,712	196,712	196,712	249,712	249,712	249,712	249,712	249,712	249,712	249,712	249,712	249,712	249,712	249,712	249,712	283,045	316,379	349,712	349,712	529,712	529,712	529,712	529,712	529,712								
Jun-91	0	0	48,000	80,500	80,500	80,500	80,500	153,500	153,500	153,500	153,500	153,500	153,500	153,500	153,500	178,500	208,500	233,500	233,500	233,500	233,500	233,500	233,500	233,500	233,500	233,500	233,500	233,500									
Jun-92	0	0	15,000	104,500	104,500	104,500	104,500	116,500	116,500	136,500	146,183	146,183	146,183	146,183	146,183	146,183	221,183	256,183	256,183	256,183	256,183	256,183	256,183	256,183	256,183	256,183	256,183										
Jun-93	0	62,500	80,500	112,000	149,000	149,000	149,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000	161,000											
Jun-94	3,000	3,000	28,000	43,000	59,000	124,000	124,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000	159,000												
Jun-95	0	105,500	208,000	262,800	303,205	325,705	325,705	325,705	346,330	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205	369,205													
Jun-96	22,500	119,500	129,500	145,000	215,461	235,461	235,461	235,461	275,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461	341,461														
Jun-97	0	49,500	162,500	174,882	194,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	224,882	254,882	254,882	254,882															
Jun-98	0	80,000	170,000	195,000	220,000	220,000	220,000	260,000	260,000	260,000	260,000	260,000	265,000	265,000	265,000	265,000	265,000	265,000	265,000	265,000	265,000																
Jun-99	0	6,250	16,250	108,250	173,250	173,250	173,250	173,250	173,250	173,250	205,250	205,250	205,250	205,250	205,250	205,250	205,250	205,250	205,250	205,250																	
Jun-00	0	95,000	231,850	243,850	288,100	308,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100	338,100																		
Jun-01	27,500	30,000	92,500	166,501	213,501	213,501	223,502	273,502	273,502	273,502	273,502	273,502	273,502	273,502	273,502	273,502	273,502	273,502																			
Jun-02	48,000	66,250	130,750	243,250	318,250	423,250	443,250	443,250	443,250	443,250	443,250	443,250	443,250	443,250	443,250	443,250	443,250																				
Jun-03	0	52,500	82,500	127,500	127,500	162,500	162,500	172,500	172,500	172,500	172,500	172,500	172,500	172,500	172,500	172,500																					
Jun-04	0	7,000	7,000	29,000	116,500	148,500	248,500	323,500	323,500	323,500	323,500	323,500	323,500	323,500	323,500																						
Jun-05	0	15,000	53,600	98,600	148,100	168,100	198,100	198,100	198,100	198,100	198,100	198,100	198,100	198,100																							
Jun-06	0	30,000	50,000	125,000	200,673	200,673	200,673	200,673	200,673	200,673	200,673	245,673	245,673																								
Jun-07	0	40,000	115,000	150,000	150,000	150,000	170,000	185,000	185,000	185,000	185,000	185,000																									
Jun-08	0	33,000	216,500	244,000	318,750	401,250	569,583	697,917	781,250	781,250	781,250																										
Jun-09	0	35,000	65,000	125,000	195,000	195,000	250,000	330,000	330,000	330,000																											
Jun-10	0	71,500	245,500	385,500	425,500	547,500	555,500	603,000	649,250																												
Jun-11	0	25,000	318,500	464,683	557,183	566,183	586,183	586,183																													
Jun-12	0	0	17,500	239,500	400,262	400,262	400,262																														
Jun-13	72,000	72,000	202,000	304,447	344,447	364,447																															
Jun-14	87,000	97,000	172,000	190,750	287,000																																
Jun-15	0	0	142,500	257,500																																	
Jun-16	0	17,000	76,430																																		
Jun-17	0	85,000																																			
Jun-18	0																																				

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	To Ult
All Prior Yrs														5.727	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
Jun-83									1.000	1.000	1.000	1.000	1.000	2.250	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Jun-84								1.344	1.000	1.000	1.280	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Jun-85				1.000	1.250	1.000	1.300	1.462	2.085	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
Jun-86									1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Jun-87						1.000	1.727	1.632	1.000	1.000	1.000	1.568	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Jun-88			1.000	2.644	1.504	1.916	1.253	1.070	1.135	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.065	1.061	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000							
Jun-89		1.000	1.206	1.000	2.696	1.000	1.280	1.000	1.000	1.546	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000								
Jun-90			2.190	1.634	1.848	1.180	1.000	1.269	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.133	1.118	1.105	1.000	1.515	1.000	1.000	1.000	1.000									
Jun-91			1.677	1.000	1.000	1.000	1.907	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.163	1.168	1.120	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000									
Jun-92			6.967	1.000	1.000	1.000	1.115	1.000	1.172	1.071	1.000	1.000	1.000	1.000	1.000	1.513	1.158	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000											
Jun-93		1.288	1.391	1.330	1.000	1.000	1.081	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000												
Jun-94	1.000	9.333	1.536	1.372	2.102	1.000	1.282	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
Jun-95		1.972	1.263	1.154	1.074	1.000	1.000	1.063	1.066	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
Jun-96	5.311	1.084	1.120	1.486	1.093	1.000	1.000	1.170	1.240	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000															
Jun-97		3.283	1.076	1.114	1.154	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.133	1.000	1.000	1.000																
Jun-98		2.125	1.147	1.128	1.000	1.000	1.182	1.000	1.000	1.000	1.000	1.019	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																	
Jun-99		2.600	6.662	1.600	1.000	1.000	1.000	1.000	1.000	1.185	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																		
Jun-00		2.441	1.052	1.181	1.069	1.097	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																			
Jun-01	1.091	3.083	1.800	1.282	1.000	1.047	1.224	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																				
Jun-02	1.380	1.974	1.860	1.308	1.330	1.047	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																					
Jun-03		1.571	1.545	1.000	1.275	1.000	1.062	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																						
Jun-04		1.000	4.143	4.017	1.275	1.673	1.302	1.000	1.000	1.000	1.000	1.000	1.000	1.000																							
Jun-05		3.573	1.840	1.502	1.135	1.178	1.000	1.000	1.000	1.000	1.000	1.000	1.000																								
Jun-06		1.667	2.500	1.605	1.000	1.000	1.000	1.000	1.000	1.000	1.224	1.000																									
Jun-07		2.875	1.304	1.000	1.000	1.133	1.088	1.000	1.000	1.000	1.000																										
Jun-08		6.561	1.127	1.306	1.259	1.420	1.225	1.119	1.000	1.000																											
Jun-09		1.857	1.923	1.560	1.000	1.282	1.320	1.000	1.000																												
Jun-10		3.434	1.570	1.104	1.287	1.015	1.086	1.077																													
Jun-11		12.740	1.459	1.199	1.016	1.035	1.000																														
Jun-12			13.686	1.671	1.000	1.000																															
Jun-13	1.000	2.806	1.507	1.131	1.058																																
Jun-14	1.115	1.773	1.109	1.505																																	
Jun-15			1.807																																		
Jun-16		4.496																																			
Jun-17																																					

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	To Ult
Simple Avg																																					
All Yrs (ex P)	1.816	3.241	2.410	1.423	1.238	1.112	1.170	1.085	1.063	1.031	1.020	1.001	1.025	1.057	1.008	1.034	1.018	1.011	1.000	1.008	1.008	1.008	1.000	1.043	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Latest 5		3.025	3.914	1.322	1.072	1.150	1.144	1.039	1.000	1.000	1.045	1.000	1.000	1.000	1.000	1.000	1.000	1.027	1.000	1.000	1.000	1.000	1.000	1.103	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Latest 3		3.135	1.474	1.436	1.025	1.017	1.135	1.065	1.000	1.000	1.075	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Volume Wtd																																					
All Yrs (ex P)		2.757	1.544	1.289	1.143	1.097	1.119	1.059	1.032	1.020	1.012	1.001	1.009	1.003	1.006	1.025	1.020	1.013	1.000	1.011	1.011	1.012	1.000	1.089	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Latest 5		3.282	1.709	1.271	1.079	1.119	1.127	1.064	1.000	1.000	1.042	1.000	1.000	1.000	1.000	1.000	1.000	1.022	1.000	1.000	1.000	1.000	1.000	1.155	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Latest 3		3.429	1.457	1.404	1.022	1.018	1.092	1.079	1.000	1.000	1.077	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					

Dev Factor Selection																																					
Prior	2.196	2.604	1.768	1.376	1.143	1.183	1.131	1.054	1.011	1.012	1.013	1.003	1.003	1.002	1.002	1.002	1.001	1.011	1.000	1.000	1.000	1.000	1.000	1.050	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Selected	2.196	2.604	1.583	1.372	1.143	1.183	1.119	1.061	1.011	1.012	1.012	1.003	1.003	1.002	1.002	1.002	1.001	1.011	1.000	1.000	1.000	1.000	1.000	1.050	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
FacToUlt	22.200	10.111	3.883	2.453	1.787	1.564	1.322	1.181	1.113	1.101	1.088	1.075	1.072	1.069	1.067	1.065	1.062	1.061	1.050	1.050	1.050	1.050	1.050	1.050	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Percent of Ult	4.5%	9.9%	25.8%	40.8%	56.0%	63.9%	75.7%	84.6%	89.8%	90.8%	91.9%	93.0%	93.3%	93.6%	93.8%	93.9%	94.1%	94.2%	95.2%	95.2%	95.2%	95.2%	95.2%	95.2%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4
Indemnity

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
444	100.0%	0.1%	0.0%	0.0%	0.0%	1.000	1.000
432	99.9%	0.0%	0.1%	0.0%	0.0%	0.981	0.971
420	99.9%	0.0%	0.1%	0.0%	0.0%	0.943	0.916
408	99.9%	0.0%	0.1%	0.0%	0.0%	0.907	0.864
396	99.9%	0.0%	0.1%	0.0%	0.0%	0.872	0.816
384	99.9%	0.0%	0.1%	0.0%	0.0%	0.838	0.769
372	99.9%	0.0%	0.1%	0.0%	0.0%	0.806	0.726
360	99.9%	0.0%	0.1%	0.0%	0.0%	0.775	0.685
348	99.9%	0.1%	0.1%	0.0%	0.0%	0.745	0.646
336	99.8%	0.5%	0.2%	0.2%	0.1%	0.870	0.820
324	99.3%	0.1%	0.7%	0.0%	0.0%	0.944	0.920
312	99.2%	0.1%	0.8%	0.0%	0.0%	0.917	0.882
300	99.1%	0.1%	0.9%	0.0%	0.0%	0.893	0.848
288	99.0%	0.1%	1.0%	0.0%	0.0%	0.871	0.817
276	98.9%	0.1%	1.1%	0.0%	0.0%	0.851	0.790
264	98.8%	0.2%	1.2%	0.1%	0.1%	0.832	0.764
252	98.6%	0.5%	1.4%	0.2%	0.1%	0.826	0.757
240	98.1%	1.0%	1.9%	0.5%	0.3%	0.844	0.782
228	97.2%	2.2%	2.8%	1.1%	0.7%	0.869	0.818
216	95.0%	1.8%	5.0%	0.9%	0.6%	0.899	0.859
204	93.2%	2.5%	6.8%	1.3%	1.0%	0.895	0.852
192	90.7%	2.4%	9.3%	1.3%	1.0%	0.893	0.850
180	88.3%	2.6%	11.7%	1.5%	1.1%	0.883	0.836
168	85.8%	2.1%	14.2%	1.2%	0.9%	0.873	0.821
156	83.7%	1.6%	16.3%	1.0%	0.8%	0.857	0.800
144	82.1%	2.1%	17.9%	1.4%	1.1%	0.838	0.774
132	80.0%	2.3%	20.0%	1.5%	1.2%	0.825	0.756
120	77.7%	2.7%	22.3%	1.8%	1.5%	0.812	0.739
108	75.0%	2.7%	25.0%	1.9%	1.6%	0.802	0.727
96	72.4%	3.5%	27.6%	2.6%	2.3%	0.791	0.713
84	68.9%	4.3%	31.1%	3.3%	2.9%	0.786	0.706
72	64.6%	4.5%	35.4%	3.6%	3.3%	0.783	0.703
60	60.1%	5.5%	39.9%	4.6%	4.2%	0.778	0.698
48	54.6%	8.9%	45.4%	7.8%	7.3%	0.776	0.696
36	45.7%	11.5%	54.3%	10.5%	10.0%	0.785	0.708
24	34.2%	18.6%	65.8%	17.5%	17.0%	0.794	0.721
12	15.6%	15.6%	84.4%	15.3%	15.1%	0.811	0.745
Total		100.0%					

NOTES:

(2) = 1 / Section 7, Exhibit 1, Page 2, Column 4

(3) Incremental % based on (2)

(4) = 1 - (2)

(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}

(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}

(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4
Indemnity

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	3,020	15,099		2,795	13,976
6/30/82-83	14,865	29,731	0.981	14,577	29,154
6/30/83-84	18,355	36,709	0.943	17,306	34,612
6/30/84-85	29,841	59,682	0.907	27,054	54,107
6/30/85-86	37,378	74,756	0.872	32,584	65,167
6/30/86-87	1,630	140,630	0.838	1,366	117,877
6/30/87-88	3,004	21,990	0.806	2,421	17,723
6/30/88-89	790	7,576	0.775	612	5,871
6/30/89-90	2,576	19,252	0.745	1,920	14,346
6/30/90-91	2,393	20,904	0.870	2,081	18,184
6/30/91-92	7,283	69,686	0.944	6,871	65,749
6/30/92-93	22,950	57,375	0.917	21,038	52,596
6/30/93-94	8,489	59,976	0.893	7,579	53,545
6/30/94-95	23,637	88,668	0.871	20,587	77,227
6/30/95-96	25,381	63,452	0.851	21,593	53,983
6/30/96-97	17,461	77,261	0.832	14,525	64,269
6/30/97-98	34,617	36,617	0.826	28,595	30,247
6/30/98-99	29,661	45,661	0.844	25,023	38,522
6/30/99-00	33,664	45,664	0.869	29,271	39,705
6/30/00-01	82,610	84,610	0.899	74,277	76,075
6/30/01-02	160,230	167,230	0.895	143,393	149,657
6/30/02-03	126,563	142,563	0.893	113,056	127,348
6/30/03-04	165,399	183,399	0.883	146,118	162,019
6/30/04-05	145,437	235,437	0.873	126,969	205,540
6/30/05-06	256,346	356,346	0.857	219,779	305,514
6/30/06-07	179,292	307,292	0.838	150,289	257,583
6/30/07-08	392,283	488,283	0.825	323,456	402,612
6/30/08-09	312,273	487,773	0.812	253,523	396,004
6/30/09-10	337,382	907,082	0.802	270,615	727,573
6/30/10-11	482,998	746,448	0.791	382,272	590,781
6/30/11-12	654,064	943,914	0.786	513,873	741,598
6/30/12-13	845,164	1,035,864	0.783	661,541	810,808
6/30/13-14	1,094,908	1,361,758	0.778	852,207	1,059,906
6/30/14-15	1,389,561	1,693,561	0.776	1,078,696	1,314,687
6/30/15-16	2,082,782	2,233,782	0.785	1,634,659	1,753,170
6/30/16-17	2,435,743	2,574,743	0.794	1,934,502	2,044,898
6/30/17-18	3,468,855	4,170,855	0.811	2,814,756	3,384,384
Total	14,928,885	19,091,629		11,971,776	15,357,016
			(7) Total Discount Factor:	0.802	0.804

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	3,020	15,099
(9) Projected Number of Years:	4	4
(10) Projected Paid Loss per Year:	755	3,775
(11) Discounted Value at 4%:	2,795	13,976

NOTES:

(2), (3) From Section 7, Exhibit 1, Page 1, Columns 8, 9

(4) From Section 7, Exhibit 1, Page 13, Column 7

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4
Indemnity

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	3,020	15,099		2,694	13,472
6/30/82-83	14,865	29,731	0.971	14,439	28,877
6/30/83-84	18,355	36,709	0.916	16,818	33,637
6/30/84-85	29,841	59,682	0.864	25,796	51,591
6/30/85-86	37,378	74,756	0.816	30,482	60,965
6/30/86-87	1,630	140,630	0.769	1,254	108,194
6/30/87-88	3,004	21,990	0.726	2,181	15,960
6/30/88-89	790	7,576	0.685	541	5,187
6/30/89-90	2,576	19,252	0.646	1,664	12,436
6/30/90-91	2,393	20,904	0.820	1,961	17,132
6/30/91-92	7,283	69,686	0.920	6,703	64,135
6/30/92-93	22,950	57,375	0.882	20,232	50,580
6/30/93-94	8,489	59,976	0.848	7,196	50,837
6/30/94-95	23,637	88,668	0.817	19,317	72,464
6/30/95-96	25,381	63,452	0.790	20,041	50,102
6/30/96-97	17,461	77,261	0.764	13,342	59,037
6/30/97-98	34,617	36,617	0.757	26,211	27,725
6/30/98-99	29,661	45,661	0.782	23,207	35,726
6/30/99-00	33,664	45,664	0.818	27,550	37,370
6/30/00-01	82,610	84,610	0.859	70,961	72,679
6/30/01-02	160,230	167,230	0.852	136,595	142,563
6/30/02-03	126,563	142,563	0.850	107,558	121,156
6/30/03-04	165,399	183,399	0.836	138,255	153,301
6/30/04-05	145,437	235,437	0.821	119,463	193,390
6/30/05-06	256,346	356,346	0.800	205,035	285,019
6/30/06-07	179,292	307,292	0.774	138,735	237,780
6/30/07-08	392,283	488,283	0.756	296,422	368,962
6/30/08-09	312,273	487,773	0.739	230,786	360,490
6/30/09-10	337,382	907,082	0.727	245,157	659,125
6/30/10-11	482,998	746,448	0.713	344,424	532,289
6/30/11-12	654,064	943,914	0.706	461,929	666,634
6/30/12-13	845,164	1,035,864	0.703	594,356	728,465
6/30/13-14	1,094,908	1,361,758	0.698	764,413	950,715
6/30/14-15	1,389,561	1,693,561	0.696	967,391	1,179,031
6/30/15-16	2,082,782	2,233,782	0.708	1,475,394	1,582,359
6/30/16-17	2,435,743	2,574,743	0.721	1,756,981	1,857,247
6/30/17-18	3,468,855	4,170,855	0.745	2,582,699	3,105,366
Total	14,928,885	19,091,629		10,898,183	13,991,998
			(7) Total Discount Factor:	0.730	0.733

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	3,020	15,099
(9) Projected Number of Years:	4	4
(10) Projected Paid Loss per Year:	755	3,775
(11) Discounted Value at 6%:	2,694	13,472

NOTES:

(2), (3) From Section 7, Exhibit 1, Page 1, Columns 8, 9

(4) From Section 7, Exhibit 1, Page 13, Column 8

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4
Total Indemnity (Including Lump Sums) + Medical

Calculation of Fiscal Year 7/01/18 - 19 Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
						Cumulative	Incremental Paid		Estimated Payments from		FY 07/01/18 - 06/30/19	
Accident	Est Ult Losses	Est Ult Losses	Paid Losses	Reserves	Reserves	Percent	as a % of	as a % of	07/01/18 - 06/30/19		as a % of Reserves	
Year	(Low)	(High)	to Date	(Low)	(High)	Paid	Ultimates	Reserves	(Low)	(High)	(Low)	(High)
All Prior yrs	3,361,301	3,373,380	3,358,281	3,020	15,099				0	0	0.0%	0.0%
6/30/82-83	811,448	826,578	796,317	15,131	30,261	97.2%	1.0%	36.1%	5,460	10,920	36.1%	36.1%
6/30/83-84	963,997	982,491	945,504	18,493	36,987	97.1%	1.0%	35.1%	6,488	12,977	35.1%	35.1%
6/30/84-85	1,635,334	1,665,739	1,604,929	30,405	60,810	97.2%	1.0%	36.2%	11,004	22,007	36.2%	36.2%
6/30/85-86	2,292,554	2,329,932	2,253,254	39,300	76,678	97.5%	1.0%	39.9%	15,664	30,561	39.9%	39.9%
6/30/86-87	3,140,000	3,279,455	3,137,628	2,372	141,826	97.8%	1.0%	44.5%	1,056	63,139	44.5%	44.5%
6/30/87-88	5,073,000	5,091,986	5,069,952	3,048	22,033	99.8%	0.1%	32.4%	988	7,144	32.4%	32.4%
6/30/88-89	1,943,000	1,949,786	1,941,224	1,776	8,562	99.7%	0.1%	30.1%	535	2,579	30.1%	30.1%
6/30/89-90	4,401,000	4,417,676	4,397,880	3,120	19,796	99.7%	0.1%	30.8%	961	6,094	30.8%	30.8%
6/30/90-91	1,869,000	1,887,511	1,866,079	2,921	21,432	99.4%	0.2%	30.9%	901	6,612	30.9%	30.9%
6/30/91-92	2,209,000	2,271,403	2,201,490	7,510	69,913	98.3%	0.7%	40.5%	3,042	28,321	40.5%	40.5%
6/30/92-93	1,679,326	1,716,282	1,653,844	25,482	62,438	97.4%	0.7%	27.0%	6,889	16,880	27.0%	27.0%
6/30/93-94	1,907,947	1,964,294	1,893,902	14,044	70,391	97.8%	0.7%	32.1%	4,509	22,597	32.1%	32.1%
6/30/94-95	2,373,391	2,442,425	2,345,180	28,211	97,245	97.4%	0.7%	26.9%	7,581	26,130	26.9%	26.9%
6/30/95-96	1,879,180	1,920,160	1,850,889	28,290	69,271	97.4%	1.0%	38.9%	11,017	26,976	38.9%	38.9%
6/30/96-97	2,047,235	2,111,270	2,005,078	42,157	106,192	96.4%	1.5%	42.0%	17,726	44,651	42.0%	42.0%
6/30/97-98	2,831,000	2,837,460	2,782,933	48,067	54,527	98.2%	1.5%	82.9%	39,837	45,190	82.9%	82.9%
6/30/98-99	1,896,000	1,916,760	1,853,631	42,369	63,129	97.2%	2.0%	72.3%	30,625	45,630	72.3%	72.3%
6/30/99-00	1,724,000	1,736,000	1,668,934	55,066	67,066	96.5%	2.0%	56.7%	31,200	38,000	56.7%	56.7%
6/30/00-01	2,390,000	2,392,000	2,278,201	111,799	113,799	95.3%	2.0%	42.4%	47,396	48,244	42.4%	42.4%
6/30/01-02	3,260,000	3,268,000	3,066,571	193,429	201,429	94.0%	3.0%	49.6%	95,936	99,904	49.6%	49.6%
6/30/02-03	2,134,480	2,164,000	1,975,533	158,947	188,467	91.9%	3.0%	37.1%	58,999	69,956	37.1%	37.1%
6/30/03-04	2,390,020	2,423,000	2,181,691	208,329	241,309	90.7%	3.0%	32.1%	66,900	77,491	32.1%	32.1%
6/30/04-05	1,876,560	1,993,000	1,683,358	193,202	309,642	87.0%	3.0%	23.1%	44,603	71,484	23.1%	23.1%
6/30/05-06	2,671,400	2,794,000	2,352,880	318,520	441,120	86.1%	3.0%	21.6%	68,750	95,212	21.6%	21.6%
6/30/06-07	1,898,680	2,056,000	1,650,952	247,728	405,048	83.5%	3.0%	18.2%	45,024	73,616	18.2%	18.2%
6/30/07-08	3,975,620	4,104,000	3,498,798	476,822	605,202	86.6%	3.0%	22.4%	106,815	135,574	22.4%	22.4%
6/30/08-09	3,390,640	3,616,000	2,990,497	400,143	625,503	85.4%	3.0%	20.5%	82,007	128,193	20.5%	20.5%
6/30/09-10	4,717,800	5,341,000	4,275,985	441,815	1,065,015	85.0%	4.0%	26.7%	117,973	284,379	26.7%	26.7%
6/30/10-11	4,092,970	4,424,000	3,492,890	600,080	931,110	82.0%	4.0%	22.2%	133,514	207,165	22.2%	22.2%
6/30/11-12	3,908,270	4,226,000	3,102,159	806,111	1,123,841	76.3%	5.0%	21.1%	169,878	236,836	21.1%	21.1%
6/30/12-13	3,640,720	3,878,000	2,626,642	1,014,078	1,251,358	69.9%	5.0%	16.6%	168,280	207,656	16.6%	16.6%
6/30/13-14	4,201,010	4,493,000	2,876,797	1,324,213	1,616,203	66.2%	5.0%	14.8%	195,767	238,934	14.8%	14.8%
6/30/14-15	4,128,000	4,463,000	2,471,362	1,656,639	1,991,639	57.5%	8.6%	20.4%	337,251	405,449	20.4%	20.4%
6/30/15-16	4,981,000	5,142,000	2,523,380	2,457,621	2,618,621	49.9%	7.7%	15.3%	376,363	401,018	15.3%	15.3%
6/30/16-17	4,583,000	4,825,770	1,715,282	2,867,718	3,110,488	36.5%	13.4%	21.1%	604,474	655,646	21.1%	21.1%
6/30/17-18	5,520,000	6,515,000	1,119,296	4,400,704	5,395,704	18.6%	17.9%	21.9%	965,604	1,183,927	21.9%	21.9%
Total	107,797,882	112,838,358	89,509,202	18,288,679	23,329,156				3,881,013	5,077,093	21.2%	21.8%

NOTES:

(2) Exhibit 1, Page 1, Column (4) + Exhibit 2, Page 1, Column (4)

(3) Exhibit 1, Page 1, Column (5) + Exhibit 2, Page 1, Column (5)

(4) Exhibit 1, Page 1, Column (2) + Exhibit 2, Page 1, Column (2)

(5) = (2) - (4)

(6) = (3) - (4)

(7) = (4) / Average of Columns (2), (3)

(8) = (7) - Prior Year's (7)

(9) = (8) / (1.00 - (7))

(10) = (5) * (9)

(11) = (6) * (9)

(12) = (10) / (5)

(13) = (11) / (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4
Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Paid Loss	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		338,455			338,455	338,455	0	0		
6/30/82-83		53,045	53,066		53,310	53,575	265	530		
6/30/83-84		27,773	27,784		27,912	28,051	139	278		
6/30/84-85	357,749	112,891	112,936	112,961	113,455	114,020	564	1,129	0.032	0.032
6/30/85-86	380,112	384,347	384,501	384,553	386,269	386,269	1,922	1,922	0.102	0.102
6/30/86-87	423,770	239,258	239,354	239,398	240,000	240,455	742	1,196	0.057	0.057
6/30/87-88	480,405	671,957	672,226	672,288	672,000	672,000	43	43	0.140	0.140
6/30/88-89	495,261	426,014	426,185	426,255	427,000	427,000	986	986	0.086	0.086
6/30/89-90	502,691	547,456	547,676	547,761	548,000	548,000	544	544	0.109	0.109
6/30/90-91	482,143	472,472	472,661	472,661	473,000	473,000	528	528	0.098	0.098
6/30/91-92	492,539	807,773	808,097	808,093	808,000	808,000	227	227	0.164	0.164
6/30/92-93	524,541	506,348	506,894	506,890	508,880	511,411	2,532	5,063	0.097	0.097
6/30/93-94	584,853	694,392	695,140	695,129	699,947	704,808	5,555	10,416	0.120	0.121
6/30/94-95	587,701	571,816	575,741	575,699	576,391	580,394	4,575	8,577	0.098	0.099
6/30/95-96	614,868	581,842	588,586	588,511	584,752	587,661	2,909	5,818	0.095	0.096
6/30/96-97	700,686	826,538	847,305	846,803	851,235	855,470	24,697	28,932	0.121	0.122
6/30/97-98	684,415	432,549	445,649	445,877	446,000	450,460	13,451	17,911	0.065	0.066
6/30/98-99	707,796	362,292	374,961	375,527	375,000	379,760	12,708	17,468	0.053	0.054
6/30/99-00	760,477	486,598	507,584	507,978	508,000	508,000	21,402	21,402	0.067	0.067
6/30/00-01	811,600	564,812	594,122	594,439	594,000	594,000	29,188	29,188	0.073	0.073
6/30/01-02	835,038	533,801	567,117	567,796	567,000	568,000	33,199	34,199	0.068	0.068
6/30/02-03	825,340	630,096	676,116	676,226	662,480	676,000	32,384	45,904	0.080	0.082
6/30/03-04	849,216	691,090	748,980	748,836	734,020	749,000	42,930	57,910	0.086	0.088
6/30/04-05	992,508	659,795	722,214	734,345	707,560	734,000	47,765	74,205	0.071	0.074
6/30/05-06	962,878	800,226	884,690	880,397	862,400	885,000	62,174	84,774	0.090	0.092
6/30/06-07	1,032,930	682,244	765,569	780,289	750,680	780,000	68,436	97,756	0.073	0.076
6/30/07-08	1,063,597	914,081	1,030,850	1,019,149	998,620	1,031,000	84,539	116,919	0.094	0.097
6/30/08-09	1,073,805	1,032,270	1,170,401	1,143,380	1,120,140	1,170,000	87,870	137,730	0.104	0.109
6/30/09-10	1,084,749	1,047,067	1,204,986	1,175,012	1,151,500	1,205,000	104,433	157,933	0.106	0.111
6/30/10-11	1,134,164	1,136,338	1,320,798	1,278,893	1,253,420	1,321,000	117,082	184,662	0.111	0.116
6/30/11-12	1,202,674	871,073	1,044,248	1,050,576	1,023,120	1,051,000	152,047	179,927	0.085	0.087
6/30/12-13	1,284,741	779,506	957,839	994,783	948,420	995,000	168,914	215,494	0.074	0.077
6/30/13-14	1,346,902	953,555	1,206,857	1,207,981	1,182,860	1,208,000	229,305	254,445	0.088	0.090
6/30/14-15	1,404,093	862,923	1,129,561	1,161,221	1,130,000	1,161,000	267,077	298,077	0.080	0.083
6/30/15-16	1,454,612	959,161	1,343,929	1,333,972	1,334,000	1,344,000	374,839	384,839	0.092	0.092
6/30/16-17	1,461,588	653,025	1,084,788	1,176,587	1,085,000	1,188,770	431,975	535,745	0.074	0.081
6/30/17-18	1,457,740	500,150	1,724,635	1,431,641	1,432,000	1,725,000	931,850	1,224,850	0.098	0.118
Total	29,058,181	22,815,031	26,464,045	26,161,908	26,174,825	27,052,558	3,359,794	4,237,527		
Tot 6/30/84-18	29,058,181	22,395,758	26,383,195	26,161,908	25,755,148	26,632,477	3,359,390	4,236,719	0.089	0.092

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 7, Exhibit 2, Page 2, Column 3

(4) From Section 7, Exhibit 2, Page 2, Column 8

(5) From Section 7, Exhibit 2, Page 3, Column 8

(6), (7) Selected based on (3), (4), and (5)

(8) = (6) - (3)

(9) = (7) - (3)

(10) = (6) / (2) / 10

(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4
Medical

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Accident Year	Payroll (000's)	Paid Loss	Paid LDF	Adjustment for Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/16-17	Paid Counts 7/1/17-18	Average Outstanding Claim
All Prior Yrs		338,455							0	0	
6/30/82-83		53,045	1.000	1.000	53,066	N/A	53,066		0	0	
6/30/83-84		27,773	1.000	1.000	27,784	N/A	27,784		0	0	
6/30/84-85	357,749	112,891	1.000	1.000	112,936	N/A	112,936	0.032	0	0	
6/30/85-86	380,112	384,347	1.000	1.000	384,501	N/A	384,501	0.101	0	0	
6/30/86-87	423,770	239,258	1.000	1.000	239,354	N/A	239,354	0.056	0	0	
6/30/87-88	480,405	671,957	1.000	1.000	672,226	N/A	672,226	0.140	0	0	
6/30/88-89	495,261	426,014	1.000	1.000	426,185	N/A	426,185	0.086	0	0	
6/30/89-90	502,691	547,456	1.000	1.000	547,676	N/A	547,676	0.109	0	0	
6/30/90-91	482,143	472,472	1.000	1.000	472,661	N/A	472,661	0.098	0	0	
6/30/91-92	492,539	807,773	1.000	1.000	808,097	N/A	808,097	0.164	1	1	324
6/30/92-93	524,541	506,348	1.001	1.000	506,894	N/A	506,894	0.097	0	0	
6/30/93-94	584,853	694,392	1.001	1.000	695,140	N/A	695,140	0.119	3	2	374
6/30/94-95	587,701	571,816	1.007	1.000	575,741	N/A	575,741	0.098	1	1	3,925
6/30/95-96	614,868	581,842	1.012	1.000	588,586	N/A	588,586	0.096	0	0	
6/30/96-97	700,686	826,538	1.025	1.000	847,305	N/A	847,305	0.121	3	2	10,383
6/30/97-98	684,415	432,549	1.030	1.000	445,649	N/A	445,649	0.065	1	0	
6/30/98-99	707,796	362,292	1.035	1.000	374,961	N/A	374,961	0.053	1	2	6,334
6/30/99-00	760,477	486,598	1.043	1.000	507,584	N/A	507,584	0.067	0	0	
6/30/00-01	811,600	564,812	1.052	1.000	594,122	N/A	594,122	0.073	1	0	
6/30/01-02	835,038	533,801	1.062	1.000	567,117	N/A	567,117	0.068	0	0	
6/30/02-03	825,340	630,096	1.073	1.000	676,116	N/A	676,116	0.082	1	1	46,020
6/30/03-04	849,216	691,090	1.084	1.000	748,980	N/A	748,980	0.088	2	0	
6/30/04-05	992,508	659,795	1.095	1.000	722,214	N/A	722,214	0.073	2	1	62,419
6/30/05-06	962,878	800,226	1.106	1.000	884,690	N/A	884,690	0.092	3	3	28,155
6/30/06-07	1,032,930	682,244	1.122	1.000	765,569	N/A	765,569	0.074	1	1	83,325
6/30/07-08	1,063,597	914,081	1.128	1.000	1,030,850	N/A	1,030,850	0.097	7	3	38,923
6/30/08-09	1,073,805	1,032,270	1.134	1.000	1,170,401	N/A	1,170,401	0.109	11	6	23,022
6/30/09-10	1,084,749	1,047,067	1.151	1.000	1,204,986	N/A	1,204,986	0.111	10	8	19,740
6/30/10-11	1,134,164	1,136,338	1.162	1.000	1,320,798	N/A	1,320,798	0.116	9	7	26,351
6/30/11-12	1,202,674	871,073	1.199	1.000	1,044,248	N/A	1,044,248	0.087	9	6	28,862
6/30/12-13	1,284,741	779,506	1.229	1.000	957,839	N/A	957,839	0.075	12	12	14,861
6/30/13-14	1,346,902	953,555	1.266	1.000	1,206,857	N/A	1,206,857	0.090	28	14	18,093
6/30/14-15	1,404,093	862,923	1.309	1.000	1,129,561	N/A	1,129,561	0.080	43	17	15,685
6/30/15-16	1,454,612	959,161	1.401	1.000	1,343,929	N/A	1,343,929	0.092	171	48	8,016
6/30/16-17	1,461,588	653,025	1.661	1.000	1,084,788	N/A	1,084,788	0.074	233	140	3,084
6/30/17-18	1,457,740	500,150	3.448	1.000	1,724,635	N/A	1,724,635	0.118		277	4,421
Total	29,058,181	22,815,031			26,464,045		26,464,045		553	552	

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3), (4) From Section 7, Exhibit 2, Page 7

(5) Based on information from the MA WCRIB 7/1/16 filing. Consideration for development beyond 252 months made in selection of LDF's.

(6) = (3) x (4) x (5)

(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10), (11) Provided by Commonwealth of Massachusetts

(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4
Medical

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	357,749	0.049	112,891	1.000	112,961	N/A	112,961	0.032	0.032
6/30/85-86	380,112	0.135	384,347	1.000	384,553	N/A	384,553	0.101	0.101
6/30/86-87	423,770	0.082	239,258	1.000	239,398	N/A	239,398	0.056	0.056
6/30/87-88	480,405	0.172	671,957	1.000	672,288	N/A	672,288	0.140	0.140
6/30/88-89	495,261	0.121	426,014	1.000	426,255	N/A	426,255	0.086	0.086
6/30/89-90	502,691	0.151	547,456	1.000	547,761	N/A	547,761	0.109	0.109
6/30/90-91	482,143	0.098	472,472	1.000	472,661	N/A	472,661	0.098	0.098
6/30/91-92	492,539	0.162	807,773	1.000	808,093	N/A	808,093	0.164	0.164
6/30/92-93	524,541	0.096	506,348	1.001	506,890	N/A	506,890	0.097	0.097
6/30/93-94	584,853	0.117	694,392	1.001	695,129	N/A	695,129	0.119	0.119
6/30/94-95	587,701	0.097	571,816	1.007	575,699	N/A	575,699	0.098	0.098
6/30/95-96	614,868	0.095	581,842	1.012	588,511	N/A	588,511	0.096	0.096
6/30/96-97	700,686	0.118	826,538	1.025	846,803	N/A	846,803	0.121	0.121
6/30/97-98	684,415	0.066	432,549	1.030	445,877	N/A	445,877	0.065	0.065
6/30/98-99	707,796	0.055	362,292	1.035	375,527	N/A	375,527	0.053	0.053
6/30/99-00	760,477	0.068	486,598	1.043	507,978	N/A	507,978	0.067	0.067
6/30/00-01	811,600	0.074	564,812	1.052	594,439	N/A	594,439	0.073	0.073
6/30/01-02	835,038	0.069	533,801	1.062	567,796	N/A	567,796	0.068	0.068
6/30/02-03	825,340	0.082	630,096	1.073	676,226	N/A	676,226	0.082	0.082
6/30/03-04	849,216	0.088	691,090	1.084	748,836	N/A	748,836	0.088	0.088
6/30/04-05	992,508	0.087	659,795	1.095	734,345	N/A	734,345	0.074	0.074
6/30/05-06	962,878	0.087	800,226	1.106	880,397	N/A	880,397	0.091	0.091
6/30/06-07	1,032,930	0.087	682,244	1.122	780,289	N/A	780,289	0.076	0.076
6/30/07-08	1,063,597	0.087	914,081	1.128	1,019,149	N/A	1,019,149	0.096	0.096
6/30/08-09	1,073,805	0.088	1,032,270	1.134	1,143,380	N/A	1,143,380	0.106	0.106
6/30/09-10	1,084,749	0.090	1,047,067	1.151	1,175,012	N/A	1,175,012	0.108	0.108
6/30/10-11	1,134,164	0.090	1,136,338	1.162	1,278,893	N/A	1,278,893	0.113	0.113
6/30/11-12	1,202,674	0.090	871,073	1.199	1,050,576	N/A	1,050,576	0.087	0.087
6/30/12-13	1,284,741	0.090	779,506	1.229	994,783	N/A	994,783	0.077	0.077
6/30/13-14	1,346,902	0.090	953,555	1.266	1,207,981	N/A	1,207,981	0.090	0.090
6/30/14-15	1,404,093	0.090	862,923	1.309	1,161,221	N/A	1,161,221	0.083	0.083
6/30/15-16	1,454,612	0.090	959,161	1.401	1,333,972	N/A	1,333,972	0.092	0.092
6/30/16-17	1,461,588	0.090	653,025	1.661	1,176,587	N/A	1,176,587	0.081	0.081
6/30/17-18	1,457,740	0.090	500,150	3.448	1,431,641	N/A	1,431,641	0.098	0.098
Total	29,058,181		22,395,758		26,161,908		26,161,908		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 7, Exhibit 2, Page 4, Column 11

(4) From Section 7, Exhibit 2, Page 2, Column 3

(5) From Section 7, Exhibit 2, Page 2, Column 4

(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]

(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4
Medical

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Expected Ult Loss	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									0.049	0.049
6/30/85-86									0.135	0.135
6/30/86-87									0.082	0.082
6/30/87-88									0.172	0.172
6/30/88-89									0.121	0.121
6/30/89-90									0.151	0.151
6/30/90-91	482,143	472,661	0.098	1.194	0.117	1.000	0.117	0.075	0.098	0.098
6/30/91-92	492,539	808,097	0.164	1.189	0.195	1.000	0.195	0.076	0.162	0.162
6/30/92-93	524,541	506,894	0.097	1.189	0.115	1.000	0.115	0.076	0.096	0.096
6/30/93-94	584,853	695,140	0.119	1.178	0.140	1.000	0.140	0.076	0.113	0.117
6/30/94-95	587,701	575,741	0.098	1.170	0.115	1.000	0.115	0.077	0.097	0.097
6/30/95-96	614,868	588,586	0.096	1.155	0.111	1.000	0.111	0.078	0.096	0.095
6/30/96-97	700,686	847,305	0.121	1.137	0.137	1.000	0.137	0.079	0.117	0.118
6/30/97-98	684,415	445,649	0.065	1.135	0.074	1.000	0.074	0.079	0.066	0.066
6/30/98-99	707,796	374,961	0.053	1.135	0.060	1.000	0.060	0.079	0.055	0.055
6/30/99-00	760,477	507,584	0.067	1.135	0.076	1.000	0.076	0.079	0.068	0.068
6/30/00-01	811,600	594,122	0.073	1.109	0.081	1.000	0.081	0.081	0.074	0.074
6/30/01-02	835,038	567,117	0.068	1.101	0.075	1.000	0.075	0.082	0.070	0.069
6/30/02-03	825,340	676,116	0.082	1.073	0.088	1.000	0.088	0.084	0.083	0.082
6/30/03-04	849,216	748,980	0.088	1.046	0.092	1.000	0.092	0.086	0.089	0.088
6/30/04-05	992,508	722,214	0.073	1.036	0.075	1.000	0.075	0.087	0.087	0.087
6/30/05-06	962,878	884,690	0.092	1.032	0.095	1.000	0.095	0.087	0.087	0.087
6/30/06-07	1,032,930	765,569	0.074	1.032	0.076	1.000	0.076	0.087	0.087	0.087
6/30/07-08	1,063,597	1,030,850	0.097	1.032	0.100	1.000	0.100	0.087	0.087	0.087
6/30/08-09	1,073,805	1,170,401	0.109	1.027	0.112	1.000	0.112	0.088	0.088	0.088
6/30/09-10	1,084,749	1,204,986	0.111	1.000	0.111	1.000	0.111	0.090	0.090	0.090
6/30/10-11	1,134,164	1,320,798	0.116	1.000	0.116	1.000	0.116	0.090	0.090	0.090
6/30/11-12	1,202,674	1,044,248	0.087	1.000	0.087	1.000	0.087	0.090	0.090	0.090
6/30/12-13	1,284,741	957,839	0.075	1.000	0.075	1.000	0.075	0.090	0.090	0.090
6/30/13-14	1,346,902	1,206,857	0.090	1.000	0.090	1.000	0.090	0.090	0.090	0.090
6/30/14-15	1,404,093	1,129,561	0.080	1.000	0.080	1.000	0.080	0.090	0.090	0.090
6/30/15-16	1,454,612	1,343,929	0.092	1.000	0.092	1.000	0.092	0.090	0.090	0.090
6/30/16-17	1,461,588	1,084,788	0.074	1.000	0.074	1.000	0.074	0.090	0.090	0.090
6/30/17-18	1,457,740	1,724,635	0.118	1.000	0.118	1.000	0.118	0.090		0.090
Total	26,418,193	24,000,316								

Trend Last 4 (ex 17-18):	-4.2%	Avg 3 (ex 17-18):	0.082
Trend Last 8 (ex 17-18):	-4.7%	Avg 5 (ex 17-18):	0.082
Trend Last 12 (ex 17-18):	-1.8%	Avg 10 (ex 17-18):	0.094
Prior Selected Trend:	0.0%	Prior Sel Avg:	0.090
Selected Trend:	0.0%	Sel. Loss Cost:	0.090

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 7, Exhibit 2, Page 2, Column 6

(4) = (3) / (2) / 10

(5) Based on information from the MA WCIRB

(6) = (4) x (5)

(7) Based on Selected Trend from (6)

(8) = (6) x (7)

(9) = Sel. Loss Cost / [(5) * (7)]

(10) From prior Aon analysis as of June 30, 2017

(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4
Medical

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend		0.970	
(2)	Credibility		21%	
(3)	Average Pmt Trend Statewide		0.950	
(4)	Credibility Weighted Trend		0.954	
		(Low)		(High)
(5)	Selected Range	0.945		0.964
(6)	Incremental Paid for 2018	0		0
(7)	Estimated Reserve	0		0
(8)	Paid to Date (82 & Prior)	338,455		338,455
(9)	Est Ult Paid for 1982 & Prior	338,455		338,455

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	0	0
(11)	Projected Number of Years	3	3
(12)	Estimated Reserve	0	0
(13)	Paid to Date (82 & Prior)	338,455	338,455
(14)	Est Ult Paid for 1982 & Prior	338,455	338,455
(14a)	Paid Counts During Fiscal Year	0	0

		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	338,455	338,455
(16)	Lump Sum Ultimates	N/A	N/A
(17)	Ult Loss Including Lump Sums	**338,455**	**338,455**
(18)	Implied Tail	1.000	1.000
(19)	Ult Loss Inc Lump Sums @ 6/17	338,455	338,455

NOTES:

(1) From Section 7, Exhibit 2, Page 6
(2) = (Average of Section 7, Exhibit 2, Page 6, Column 3 / 175,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 7, Exhibit 2, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 7, Exhibit 2, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) Lump Sums are considered in Indemnity analysis (Section 1)
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2017

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4
Medical

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	31,197	10.348			
1993	2	17,697	9.781	0.567		
1994	3	8,752	9.077	0.495		
1995	4	6,932	8.844	0.792		
1996	5	3,727	8.223	0.538		
1997	6	2,222	7.706	0.596		
1998	7	9,087	9.115	4.090		
1999	8	5,853	8.675	0.644		
2000	9	12,069	9.398	2.062	n =	22
2001	10	7,279	8.893	0.603	S(x) =	44,055
2002	11	8,308	9.025	1.141	S(x-sq) =	88,221,023
2003	12	8,142	9.005	0.980	S(xy) =	395,139
2004	13	19,519	9.879	2.397	S(y) =	197
2005	14	7,873	8.971	0.403	D =	19,481
2006	15	11,471	9.348	1.457	slope =	-0.032
2007	16	10,042	9.215	0.875	Avg Trend =	0.968
2008	17	8,213	9.014	0.818		
2009	18	9,432	9.152	1.148		
2010	19	7,136	8.873	0.757		
2011	20	10,399	9.249	1.457		
2012	21	3,318	8.107	0.319		
2013	22	1,702	7.440	0.513		
2014	23	0				
2015	24	0				
2016	25	0				
2017	26	0				
2018	27	0				
					Selected Trend:	**0.970**

NOTES:

(3) 2018 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2017

(4) LN [(3)]

(5) Eg. 2013: 0.513 = 1702 / 3318

Commonwealth of Massachusetts Workers Compensation
Massachusetts Colleges & Universities - Cluster 4
MEDICAL
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432
June-83	5,425	13,479	21,113	27,654	30,220	32,596	38,756	40,003	49,390	49,452	49,902	49,902	49,902	52,680	52,680	52,680	52,680	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045	53,045
June-84	3,642	9,520	14,025	17,952	20,550	23,119	24,788	27,281	27,458	27,458	27,458	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	27,773	
June-85	13,476	35,975	51,552	65,364	72,959	79,579	86,331	95,092	106,398	110,557	111,969	111,969	112,255	112,573	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891	112,891		
June-86	33,919	90,663	130,143	159,111	250,739	286,799	294,926	297,883	299,398	302,212	307,822	320,541	325,361	342,239	344,332	347,860	364,047	376,849	380,765	383,694	384,347	384,347	384,347	384,347	384,347	384,347	384,347	384,347	384,347	384,347	384,347	384,347	384,347			
June-87	33,322	88,558	133,068	167,433	202,414	217,655	221,836	226,928	230,316	231,634	233,141	233,163	235,329	236,440	236,440	236,440	236,440	237,211	237,211	237,211	237,211	237,211	238,056	238,056	238,056	238,056	238,056	238,056	238,056	239,258	239,258	239,258				
June-88	59,518	204,414	290,147	350,533	381,836	423,661	513,908	554,667	558,927	578,241	580,791	582,947	585,666	587,383	588,760	590,429	611,904	620,480	621,465	623,581	623,951	627,240	627,525	631,767	636,396	638,704	641,961	665,538	671,957	671,957	671,957					
June-89	62,198	211,475	294,554	322,576	356,178	387,366	391,897	394,643	397,103	398,291	400,332	413,505	414,824	415,958	415,958	424,869	425,154	425,154	425,154	425,154	425,154	425,154	425,840	425,973	426,014	426,014	426,014	426,014	426,014	426,014						
June-90	50,219	295,860	408,825	438,277	465,544	487,856	501,254	508,956	511,410	519,157	521,054	521,523	523,073	526,415	531,243	532,370	532,613	534,177	535,910	537,636	540,156	540,156	541,381	543,131	547,456	547,456	547,456	547,456	547,456							
June-91	73,392	311,241	360,552	400,955	419,114	437,552	445,905	451,717	456,911	463,872	466,034	467,206	468,330	470,247	472,258	472,472	472,472	472,472	472,472	472,472	472,472	472,472	472,472	472,472	472,472	472,472	472,472	472,472								
June-92	221,188	477,478	560,364	598,339	631,891	641,232	646,926	650,216	653,117	658,289	666,600	671,991	681,366	690,612	701,403	710,623	719,185	728,531	738,270	747,976	759,027	768,431	778,806	790,246	800,553	806,429	807,773									
June-93	150,073	407,193	449,884	478,264	489,794	496,554	498,030	498,889	501,701	503,184	504,152	505,509	506,348	506,348	506,348	506,348	506,348	506,348	506,348	506,348	506,348	506,348	506,348	506,348	506,348	506,348										
June-94	156,060	302,215	335,354	369,121	403,159	421,734	441,218	452,877	461,708	470,189	479,925	489,958	504,404	513,367	522,984	528,697	539,677	552,169	567,707	583,321	603,468	622,024	645,934	667,090	694,392											
June-95	109,792	244,835	298,417	304,966	313,919	317,775	323,966	336,940	345,737	404,548	417,872	419,186	507,915	517,682	526,590	533,675	537,590	548,842	549,714	552,788	553,266	561,548	569,946	571,816												
June-96	187,362	423,531	463,708	493,442	512,072	523,060	559,979	563,249	572,255	575,372	578,197	581,714	581,842	581,842	581,842	581,842	581,842	581,842	581,842	581,842	581,842	581,842	581,842													
June-97	169,255	306,866	359,926	403,511	440,040	450,988	458,674	483,346	503,475	519,848	535,734	556,260	578,975	602,453	632,460	672,797	707,292	751,693	784,391	804,120	816,637	826,538														
June-98	130,372	302,957	339,295	363,480	383,927	388,726	391,919	417,459	417,733	418,585	421,666	427,310	427,449	428,766	428,839	429,419	429,419	431,949	431,949	432,549	432,549															
June-99	97,937	205,527	246,679	296,667	310,533	318,692	324,215	326,063	327,858	331,461	334,241	334,867	336,644	336,644	338,914	356,188	359,425	359,425	359,555	362,292																
June-00	149,711	324,594	408,387	446,980	464,695	474,595	478,979	480,612	480,853	482,147	483,486	483,486	483,486	485,189	486,598	486,598	486,598	486,598	486,598																	
June-01	146,796	329,001	398,588	483,338	524,021	540,381	553,789	559,032	562,148	562,831	562,932	563,168	564,300	564,300	564,300	564,530	564,812	564,812																		
June-02	113,531	244,127	383,389	485,433	511,686	522,029	525,064	528,876	530,895	532,387	533,222	533,611	533,769	533,801	533,801	533,801	533,801																			
June-03	68,006	374,633	451,946	472,102	486,597	492,733	520,395	535,451	548,996	558,702	571,378	580,801	592,448	598,138	629,209	630,096																				
June-04	226,665	540,314	613,339	657,569	676,213	687,448	689,931	690,265	690,426	690,599	690,599	690,599	690,884	691,090	691,090																					
June-05	267,264	502,730	569,792	616,429	634,553	643,543	651,061	654,330	656,278	658,062	658,406	659,359	659,643	659,795																						
June-06	266,086	533,067	604,845	688,237	700,485	712,078	725,521	746,165	766,110	772,551	782,793	794,068	800,226																							
June-07	237,774	472,669	580,019	596,123	625,421	633,211	640,381	648,441	650,946	666,396	670,898	682,244																								
June-08	254,702	609,536	722,745	829,701	850,544	872,814	886,112	897,837	903,732	908,296	914,081																									
June-09	295,106	650,179	756,525	816,761	864,784	890,799	963,239	1,000,628	1,014,297	1,032,270																										
June-10	419,730	775,749	865,851	909,378	969,822	1,003,582	1,022,429	1,035,175	1,047,067																											
June-11	454,614	843,137	950,680	997,564	1,027,642	1,049,028	1,062,683	1,136,338																												
June-12	330,317	676,973	804,310	841,448	851,396	859,087	871,073																													
June-13	291,036	557,666	662,793	737,262	766,215	779,506																														
June-14	380,527	800,583	898,971	931,664	953,555																															
June-15	425,720	650,664	818,632	862,923																																
June-16	452,409	811,805	959,161																																	
June-17	304,508	653,025																																		
June-18	500,150																																			

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432
June-83	2.485	1.566	1.310	1.093	1.079	1.189	1.032	1.235	1.001	1.009	1.000	1.000	1.056	1.000	1.000	1.000	1.007	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
June-84	2.614	1.473	1.280	1.145	1.125	1.072	1.101	1.006	1.000	1.000	1.011	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	
June-85	2.670	1.433	1.268	1.116	1.091	1.085	1.101	1.119	1.039	1.013	1.000	1.003	1.003	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
June-86	2.673	1.435	1.223	1.576	1.144	1.028	1.010	1.005	1.009	1.019	1.041	1.015	1.052	1.006	1.010	1.047	1.035	1.010	1.008	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
June-87	2.658	1.503	1.258	1.209	1.075	1.019	1.023	1.015	1.006	1.007	1.000	1.009	1.005	1.000	1.000	1.000	1.003	1.000	1.000	1.000	1.000	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.005	1.000	1.000				
June-88	3.434	1.419	1.208	1.089	1.110	1.213	1.079	1.008	1.035	1.004	1.004	1.005	1.003	1.002	1.003	1.036	1.014	1.002	1.003	1.001	1.005	1.000	1.007	1.007	1.004	1.005	1.037	1.010	1.000	1.000					
June-89	3.400	1.393	1.095	1.104	1.088	1.012	1.007	1.006	1.003	1.005	1.033	1.003	1.003	1.000	1.021	1.001	1.000	1.000	1.000	1.000	1.000	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
June-90	5.891	1.382	1.072	1.062	1.048	1.027	1.015	1.005	1.015	1.004	1.001	1.003	1.006	1.009	1.002	1.000	1.003	1.003	1.003	1.005	1.000	1.002	1.003	1.008	1.000	1.000	1.000	1.000							
June-91	4.241	1.158	1.112	1.045	1.044	1.019	1.013	1.011	1.015	1.005	1.003	1.002	1.004	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000								
June-92	2.159	1.174	1.068	1.056	1.015	1.009	1.005	1.004	1.008	1.013	1.008	1.014	1.014	1.016	1.013	1.012	1.013	1.013	1.013	1.015	1.012	1.014	1.015	1.013	1.007	1.002									
June-93	2.713	1.105	1.063	1.024	1.014	1.003	1.002	1.006	1.003	1.002	1.003	1.002	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000										
June-94	1.937	1.110	1.101	1.092	1.046	1.046	1.026	1.019	1.018	1.021	1.021	1.029	1.018	1.019	1.011	1.021	1.023	1.028	1.028	1.035	1.031	1.038	1.033	1.041											
June-95	2.230	1.219	1.022	1.029	1.012	1.019	1.040	1.026	1.170	1.033	1.003	1.212	1.019	1.017	1.013	1.007	1.021	1.002	1.006	1.001	1.015	1.015	1.003												
June-96	2.260	1.095	1.064	1.038	1.021	1.071	1.006	1.016	1.005	1.005	1.006	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
June-97	1.813	1.173	1.121	1.091	1.025	1.017	1.054	1.042	1.033	1.031	1.038	1.041	1.041	1.050	1.064	1.051	1.063	1.043	1.025	1.016	1.012														
June-98	2.324	1.120	1.071	1.056	1.012	1.008	1.065	1.001	1.002	1.007	1.013	1.000	1.003	1.000	1.001	1.000	1.006	1.000	1.001	1.000															
June-99	2.099	1.200	1.203	1.047	1.026	1.017	1.006	1.006	1.011	1.008	1.002	1.005	1.000	1.007	1.051	1.009	1.000	1.000	1.008																
June-00	2.168	1.258	1.095	1.040	1.021	1.009	1.003	1.001	1.003	1.003	1.000	1.000	1.004	1.003	1.000	1.000	1.000	1.000																	
June-01	2.241	1.212	1.213	1.084	1.031	1.025	1.009	1.006	1.001	1.000	1.000	1.002	1.000	1.000	1.000	1.000	1.000																		
June-02	2.150	1.570	1.266	1.054	1.020	1.006	1.007	1.004	1.003	1.002	1.001	1.000	1.000	1.000	1.000	1.000																			
June-03	5.509	1.206	1.045	1.031	1.013	1.056	1.029	1.025	1.018	1.023	1.016	1.020	1.010	1.052	1.001																				
June-04	2.384	1.135	1.072	1.028	1.017	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000																					
June-05	1.881	1.133	1.082	1.029	1.014	1.012	1.005	1.003	1.003	1.001	1.001	1.000	1.000																						
June-06	2.003	1.135	1.138	1.018	1.017	1.019	1.028	1.027	1.008	1.013	1.014	1.008																							
June-07	1.988	1.227	1.028	1.049	1.012	1.011	1.013	1.004	1.024	1.007	1.017																								
June-08	2.393	1.186	1.148	1.025	1.026	1.015	1.013	1.007	1.005	1.006																									
June-09	2.203	1.164	1.080	1.059	1.030	1.081	1.039	1.014	1.018																										
June-10	1.848	1.116	1.050	1.066	1.035	1.019	1.012	1.011																											
June-11	1.855	1.128	1.049	1.030	1.021	1.013	1.069																												
June-12	2.049	1.188	1.046	1.012	1.009	1.014																													
June-13	1.916	1.189	1.112	1.039	1.017																														
June-14	2.104	1.123	1.036	1.023																															
June-15	1.528	1.258	1.054																																
June-16	1.794	1.182																																	
June-17	2.145																																		

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	To Ult
Simple Avg																																				
All Yrs	2.507	1.246	1.123	1.077	1.041	1.038	1.028	1.023	1.017	1.009	1.010	1.016	1.010	1.009	1.009	1.009	1.010	1.006	1.006	1.005	1.005	1.005	1.005	1.006	1.001	1.001	1.004	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	
Latest 5	1.897	1.188	1.060	1.034	1.022	1.028	1.029	1.012	1.012	1.005	1.010	1.006	1.002	1.011	1.011	1.002	1.014	1.009	1.008	1.010	1.012	1.013	1.010	1.012	1.001	1.001	1.007	1.002	1.001	1.000	1.000					
Latest 3	1.822	1.188	1.068	1.025	1.016	1.015	1.040	1.011	1.016	1.009	1.011	1.003	1.003	1.017	1.001	1.000	1.000	1.000	1.011	1.005	1.009	1.018	1.012	1.018	1.002	1.001	1.000	1.003	1.002	1.000	1.000	1.000	1.000			
Volume Wtd																																				
All Yrs	2.150	1.189	1.091	1.052	1.029	1.029	1.024	1.012	1.015	1.009	1.010	1.016	1.009	1.011	1.010	1.011	1.013	1.008	1.008	1.007	1.007	1.008	1.008	1.010	1.002	1.001	1.008	1.003	1.001	1.000	1.000	1.000	1.000	1.000	1.000	
Latest 5	1.873	1.185	1.057	1.034	1.023	1.028	1.031	1.012	1.012	1.006	1.010	1.006	1.002	1.011	1.007	1.001	1.018	1.013	1.010	1.011	1.012	1.014	1.012	1.014	1.002	1.002	1.010	1.003	1.001	1.000	1.000					
Latest 3	1.789	1.183	1.064	1.024	1.016	1.015	1.041	1.011	1.015	1.009	1.011	1.003	1.003	1.017	1.001	1.000	1.000	1.000	1.015	1.007	1.009	1.018	1.013	1.019	1.003	1.001	1.000	1.004	1.001	1.000	1.000	1.000	1.000			

Dev Factor Selection																																				
Industry 1	1.952	1.145	1.055	1.025	1.015	1.012	1.012	1.013	1.010	1.009	1.011	1.010	1.009	1.008	1.009	1.007	1.007	1.006																		
Industry 2		1.268	1.086	1.037	1.014	1.010	1.014	1.010	1.007	1.010	1.011	1.009	1.008	1.009	1.010	1.007	1.007	1.009	1.006	1.006																
Prior	2.068	1.182	1.070	1.041	1.030	1.025	1.021	1.010	1.015	1.009	1.005	1.015	1.010	1.010	1.010	1.010	1.010	1.009	1.008	1.005	1.005	1.013	1.005	1.003	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.001	
Selected	2.076	1.186	1.070	1.034	1.030	1.025	1.031	1.010	1.015	1.005	1.005	1.015	1.010	1.010	1.010	1.010	1.010	1.008	1.008	1.005	1.005	1.013	1.005	1.006	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
FacToUlt	3.448	1.661	1.401	1.309	1.266	1.229	1.199	1.162	1.151	1.134	1.128	1.122	1.106	1.095	1.084	1.073	1.062	1.052	1.043	1.035	1.030	1.025	1.012	1.007	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Percent of Ult	29.0%	60.2%	71.4%	76.4%	79.0%	81.4%	83.4%	86.0%	86.9%	88.2%	88.7%	89.1%	90.5%	91.4%	92.3%	93.2%	94.1%	95.1%	95.9%	96.6%	97.1%	97.5%	98.9%	99.3%	99.9%	99.9%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4
Medical

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/17		As of 6/18		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	338,455	338,455	338,455	338,455	0	0.0%	0	0.0%
6/30/82-83	53,310	53,575	53,310	53,575	0	0.0%	0	0.0%
6/30/83-84	27,912	28,051	27,912	28,051	0	0.0%	0	0.0%
6/30/84-85	113,455	114,020	113,455	114,020	0	0.0%	0	0.0%
6/30/85-86	386,269	386,269	386,269	386,269	0	0.0%	0	0.0%
6/30/86-87	240,000	240,455	240,000	240,455	0	0.0%	0	0.0%
6/30/87-88	672,000	672,000	672,000	672,000	0	0.0%	0	0.0%
6/30/88-89	427,000	427,000	427,000	427,000	0	0.0%	0	0.0%
6/30/89-90	548,000	548,000	548,000	548,000	0	0.0%	0	0.0%
6/30/90-91	473,000	473,000	473,000	473,000	0	0.0%	0	0.0%
6/30/91-92	807,000	807,000	808,000	808,000	1,000	0.1%	1,000	0.1%
6/30/92-93	508,880	511,411	508,880	511,411	0	0.0%	0	0.0%
6/30/93-94	670,425	673,761	699,947	704,808	29,522	4.4%	31,047	4.6%
6/30/94-95	572,796	575,645	576,391	580,394	3,595	0.6%	4,748	0.8%
6/30/95-96	584,752	587,661	584,752	587,661	0	0.0%	0	0.0%
6/30/96-97	842,190	846,380	851,235	855,470	9,045	1.1%	9,090	1.1%
6/30/97-98	446,000	450,460	446,000	450,460	0	0.0%	0	0.0%
6/30/98-99	374,000	377,740	375,000	379,760	1,000	0.3%	2,020	0.5%
6/30/99-00	510,000	511,000	508,000	508,000	(2,000)	-0.4%	(3,000)	-0.6%
6/30/00-01	598,000	599,000	594,000	594,000	(4,000)	-0.7%	(5,000)	-0.8%
6/30/01-02	571,000	572,000	567,000	568,000	(4,000)	-0.7%	(4,000)	-0.7%
6/30/02-03	666,400	680,000	662,480	676,000	(3,920)	-0.6%	(4,000)	-0.6%
6/30/03-04	738,920	754,000	734,020	749,000	(4,900)	-0.7%	(5,000)	-0.7%
6/30/04-05	712,460	740,000	707,560	734,000	(4,900)	-0.7%	(6,000)	-0.8%
6/30/05-06	865,340	889,000	862,400	885,000	(2,940)	-0.3%	(4,000)	-0.4%
6/30/06-07	739,900	771,000	750,680	780,000	10,780	1.5%	9,000	1.2%
6/30/07-08	997,640	1,030,000	998,620	1,031,000	980	0.1%	1,000	0.1%
6/30/08-09	1,115,240	1,168,000	1,120,140	1,170,000	4,900	0.4%	2,000	0.2%
6/30/09-10	1,148,560	1,204,000	1,151,500	1,205,000	2,940	0.3%	1,000	0.1%
6/30/10-11	1,199,520	1,262,000	1,253,420	1,321,000	53,900	4.5%	59,000	4.7%
6/30/11-12	1,025,080	1,052,000	1,023,120	1,051,000	(1,960)	-0.2%	(1,000)	-0.1%
6/30/12-13	951,390	1,000,000	948,420	995,000	(2,970)	-0.3%	(5,000)	-0.5%
6/30/13-14	1,191,680	1,217,000	1,182,860	1,208,000	(8,820)	-0.7%	(9,000)	-0.7%
6/30/14-15	1,144,000	1,178,000	1,130,000	1,161,000	(14,000)	-1.2%	(17,000)	-1.4%
6/30/15-16	1,328,000	1,354,410	1,334,000	1,344,000	6,000	0.5%	(10,410)	-0.8%
6/30/16-17	1,040,000	1,235,000	1,085,000	1,188,770	45,000	4.3%	(46,230)	-3.7%
6/30/17-18								
Total	24,628,573	25,327,293	24,742,825	25,327,558	114,252	0.5%	265	0.0%

NOTES:

(2), (3) From prior Aon analysis as of June 30, 2017

(4), (5) From Section 7, Exhibit 2, Page 1, Columns 6, 7

(6) = (4) - (2)

(7) = (4) / (2) - 1

(8) = (5) - (3)

(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4
Medical

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
444	100.0%	0.0%	0.0%	0.0%	0.0%	1.000	1.000
432	100.0%	0.0%	0.0%	0.0%	0.0%	1.000	1.000
420	100.0%	0.0%	0.0%	0.0%	0.0%	1.000	1.000
408	100.0%	0.0%	0.0%	0.0%	0.0%	1.000	1.000
396	100.0%	0.0%	0.0%	0.0%	0.0%	1.000	1.000
384	100.0%	0.0%	0.0%	0.0%	0.0%	1.000	1.000
372	100.0%	0.0%	0.0%	0.0%	0.0%	0.806	0.726
360	100.0%	0.0%	0.0%	0.0%	0.0%	0.775	0.685
348	100.0%	0.0%	0.0%	0.0%	0.0%	0.745	0.646
336	100.0%	0.0%	0.0%	0.0%	0.0%	0.717	0.609
324	100.0%	0.1%	0.0%	0.0%	0.0%	0.689	0.575
312	99.9%	0.0%	0.1%	0.0%	0.0%	0.862	0.812
300	99.9%	0.6%	0.1%	0.2%	0.1%	0.829	0.766
288	99.3%	0.5%	0.7%	0.2%	0.1%	0.952	0.932
276	98.9%	1.3%	1.1%	0.5%	0.4%	0.942	0.917
264	97.5%	0.5%	2.5%	0.2%	0.1%	0.945	0.921
252	97.1%	0.4%	2.9%	0.2%	0.1%	0.921	0.886
240	96.6%	0.8%	3.4%	0.4%	0.2%	0.898	0.854
228	95.9%	0.8%	4.1%	0.4%	0.3%	0.885	0.836
216	95.1%	0.9%	4.9%	0.5%	0.3%	0.872	0.818
204	94.1%	0.9%	5.9%	0.5%	0.4%	0.861	0.804
192	93.2%	0.9%	6.8%	0.5%	0.4%	0.849	0.787
180	92.3%	0.9%	7.7%	0.5%	0.4%	0.836	0.770
168	91.4%	0.9%	8.6%	0.5%	0.4%	0.822	0.752
156	90.5%	1.3%	9.5%	0.8%	0.6%	0.809	0.735
144	89.1%	0.4%	10.9%	0.3%	0.2%	0.803	0.727
132	88.7%	0.5%	11.3%	0.3%	0.3%	0.780	0.697
120	88.2%	1.3%	11.8%	0.9%	0.7%	0.759	0.670
108	86.9%	0.9%	13.1%	0.6%	0.5%	0.755	0.666
96	86.0%	2.6%	14.0%	2.0%	1.7%	0.742	0.649
84	83.4%	2.0%	16.6%	1.6%	1.4%	0.755	0.669
72	81.4%	2.4%	18.6%	1.9%	1.7%	0.754	0.669
60	79.0%	2.6%	21.0%	2.2%	2.0%	0.754	0.669
48	76.4%	5.0%	23.6%	4.4%	4.1%	0.753	0.669
36	71.4%	11.2%	28.6%	10.1%	9.7%	0.769	0.691
24	60.2%	31.2%	39.8%	29.4%	28.6%	0.807	0.741
12	29.0%	29.0%	71.0%	28.4%	28.2%	0.866	0.819
Total		100.0%					

NOTES:

(2) = 1 / Section 7, Exhibit 2, Page 2, Column 4

(3) Incremental % based on (2)

(4) = 1 - (2)

(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}

(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}

(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4
Medical

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	0	0		0	0
6/30/82-83	265	530	1.000	265	530
6/30/83-84	139	278	1.000	139	278
6/30/84-85	564	1,129	1.000	564	1,129
6/30/85-86	1,922	1,922	1.000	1,922	1,922
6/30/86-87	742	1,196	1.000	742	1,196
6/30/87-88	43	43	0.806	35	35
6/30/88-89	986	986	0.775	764	764
6/30/89-90	544	544	0.745	405	405
6/30/90-91	528	528	0.717	378	378
6/30/91-92	227	227	0.689	156	156
6/30/92-93	2,532	5,063	0.862	2,183	4,366
6/30/93-94	5,555	10,416	0.829	4,605	8,635
6/30/94-95	4,575	8,577	0.952	4,353	8,162
6/30/95-96	2,909	5,818	0.942	2,739	5,478
6/30/96-97	24,697	28,932	0.945	23,348	27,352
6/30/97-98	13,451	17,911	0.921	12,388	16,495
6/30/98-99	12,708	17,468	0.898	11,410	15,684
6/30/99-00	21,402	21,402	0.885	18,936	18,936
6/30/00-01	29,188	29,188	0.872	25,446	25,446
6/30/01-02	33,199	34,199	0.861	28,586	29,447
6/30/02-03	32,384	45,904	0.849	27,488	38,965
6/30/03-04	42,930	57,910	0.836	35,881	48,402
6/30/04-05	47,765	74,205	0.822	39,280	61,024
6/30/05-06	62,174	84,774	0.809	50,281	68,558
6/30/06-07	68,436	97,756	0.803	54,923	78,453
6/30/07-08	84,539	116,919	0.780	65,928	91,179
6/30/08-09	87,870	137,730	0.759	66,705	104,556
6/30/09-10	104,433	157,933	0.755	78,833	119,218
6/30/10-11	117,082	184,662	0.742	86,820	136,932
6/30/11-12	152,047	179,927	0.755	114,833	135,889
6/30/12-13	168,914	215,494	0.754	127,360	162,482
6/30/13-14	229,305	254,445	0.754	172,864	191,816
6/30/14-15	267,077	298,077	0.753	201,166	224,516
6/30/15-16	374,839	384,839	0.769	288,338	296,030
6/30/16-17	431,975	535,745	0.807	348,721	432,491
6/30/17-18	931,850	1,224,850	0.866	807,000	1,060,744
Total	3,359,794	4,237,527		2,705,786	3,418,049
			(7) Total Discount Factor:	0.805	0.807

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	0	0
(9) Projected Number of Years:	3	3
(10) Projected Paid Loss per Year:	0	0
(11) Discounted Value at 4%:	0	0

NOTES:

(2), (3) From Section 7, Exhibit 2, Page 1, Columns 8, 9

(4) From Section 7, Exhibit 2, Page 9, Column 7

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

Massachusetts Colleges & Universities - Cluster 4
Medical

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	0	0		0	0
6/30/82-83	265	530	1.000	265	530
6/30/83-84	139	278	1.000	139	278
6/30/84-85	564	1,129	1.000	564	1,129
6/30/85-86	1,922	1,922	1.000	1,922	1,922
6/30/86-87	742	1,196	1.000	742	1,196
6/30/87-88	43	43	0.726	32	32
6/30/88-89	986	986	0.685	675	675
6/30/89-90	544	544	0.646	351	351
6/30/90-91	528	528	0.609	322	322
6/30/91-92	227	227	0.575	130	130
6/30/92-93	2,532	5,063	0.812	2,055	4,110
6/30/93-94	5,555	10,416	0.766	4,254	7,975
6/30/94-95	4,575	8,577	0.932	4,263	7,994
6/30/95-96	2,909	5,818	0.917	2,666	5,333
6/30/96-97	24,697	28,932	0.921	22,756	26,658
6/30/97-98	13,451	17,911	0.886	11,921	15,873
6/30/98-99	12,708	17,468	0.854	10,848	14,911
6/30/99-00	21,402	21,402	0.836	17,885	17,885
6/30/00-01	29,188	29,188	0.818	23,876	23,876
6/30/01-02	33,199	34,199	0.804	26,680	27,484
6/30/02-03	32,384	45,904	0.787	25,498	36,142
6/30/03-04	42,930	57,910	0.770	33,059	44,595
6/30/04-05	47,765	74,205	0.752	35,936	55,828
6/30/05-06	62,174	84,774	0.735	45,669	62,270
6/30/06-07	68,436	97,756	0.727	49,763	71,083
6/30/07-08	84,539	116,919	0.697	58,937	81,510
6/30/08-09	87,870	137,730	0.670	58,900	92,321
6/30/09-10	104,433	157,933	0.666	69,560	105,194
6/30/10-11	117,082	184,662	0.649	76,044	119,937
6/30/11-12	152,047	179,927	0.669	101,770	120,431
6/30/12-13	168,914	215,494	0.669	112,933	144,075
6/30/13-14	229,305	254,445	0.669	153,450	170,274
6/30/14-15	267,077	298,077	0.669	178,676	199,415
6/30/15-16	374,839	384,839	0.691	258,952	265,860
6/30/16-17	431,975	535,745	0.741	320,276	397,213
6/30/17-18	931,850	1,224,850	0.819	763,093	1,003,031
Total	3,359,794	4,237,527		2,474,859	3,127,843
			(7) Total Discount Factor:	0.737	0.738

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	0	0
(9) Projected Number of Years:	3	3
(10) Projected Paid Loss per Year:	0	0
(11) Discounted Value at 6%:	0	0

NOTES:

(2), (3) From Section 7, Exhibit 2, Page 1, Columns 8, 9

(4) From Section 7, Exhibit 2, Page 9, Column 8

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Other - Clusters 5-17 & 95

Indemnity

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Pd Loss Including Lump Sum	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		45,481,398			48,982,800	51,826,222	3,501,401	6,344,824		
6/30/82-83		5,610,779	5,726,354		5,611,827	5,669,000	1,048	58,221		
6/30/83-84		8,126,285	8,341,755		8,174,920	8,759,000	48,636	632,715		
6/30/84-85	732,729	16,908,299	17,395,791	17,242,484	17,242,000	17,396,000	333,701	487,701	2.353	2.374
6/30/85-86	787,208	20,330,636	20,951,189	20,762,788	20,763,000	20,951,000	432,364	620,364	2.638	2.661
6/30/86-87	902,483	21,334,819	22,058,137	21,856,083	21,856,000	22,058,000	521,181	723,181	2.422	2.444
6/30/87-88	1,366,586	28,800,700	29,942,691	29,770,507	29,771,000	30,542,000	970,300	1,741,300	2.178	2.235
6/30/88-89	1,486,478	26,463,905	27,671,320	27,383,230	27,383,000	28,225,000	919,095	1,761,095	1.842	1.899
6/30/89-90	1,494,463	25,229,990	26,604,307	26,437,380	26,437,000	27,136,000	1,207,010	1,906,010	1.769	1.816
6/30/90-91	1,405,560	21,640,631	23,077,078	22,970,082	22,970,000	23,539,000	1,329,369	1,898,369	1.634	1.675
6/30/91-92	1,364,510	13,391,479	14,467,610	14,391,834	14,392,000	15,191,000	1,000,521	1,799,521	1.055	1.113
6/30/92-93	1,347,359	10,034,192	10,960,472	10,897,189	10,897,000	10,960,000	862,808	925,808	0.809	0.813
6/30/93-94	1,424,410	11,121,315	12,353,381	12,222,000	12,222,000	12,600,000	1,100,685	1,478,685	0.858	0.885
6/30/94-95	1,497,829	9,822,297	10,932,230	10,896,162	10,896,000	11,479,000	1,073,703	1,656,703	0.727	0.766
6/30/95-96	1,582,635	10,280,186	11,639,240	11,586,935	11,587,000	12,221,000	1,306,814	1,940,814	0.732	0.772
6/30/96-97	1,979,748	10,379,301	11,841,503	11,789,650	11,790,000	12,434,000	1,410,699	2,054,699	0.596	0.628
6/30/97-98	1,917,994	8,909,187	10,179,837	10,144,109	10,144,000	10,689,000	1,234,813	1,779,813	0.529	0.557
6/30/98-99	2,081,524	9,400,216	10,949,199	10,901,582	10,902,000	11,497,000	1,501,784	2,096,784	0.524	0.552
6/30/99-00	2,207,243	10,887,745	12,977,669	12,894,077	12,894,000	13,627,000	2,006,255	2,739,255	0.584	0.617
6/30/00-01	2,201,008	10,162,814	12,310,735	12,237,991	12,238,000	12,926,000	2,075,186	2,763,186	0.556	0.587
6/30/01-02	2,292,592	10,405,462	12,685,186	12,625,436	12,625,000	13,319,000	2,219,538	2,913,538	0.551	0.581
6/30/02-03	2,260,534	10,199,369	12,607,071	12,549,012	12,549,000	13,237,000	2,349,631	3,037,631	0.555	0.586
6/30/03-04	2,255,942	9,391,262	11,775,972	11,739,468	11,739,000	12,365,000	2,347,738	2,973,738	0.520	0.548
6/30/04-05	2,309,083	10,946,829	13,867,091	13,307,393	13,307,000	13,867,000	2,360,171	2,920,171	0.576	0.601
6/30/05-06	2,480,693	10,131,389	13,013,986	12,981,392	12,981,000	13,014,000	2,849,611	2,882,611	0.523	0.525
6/30/06-07	2,612,577	9,223,523	12,186,746	12,567,182	12,187,000	12,567,000	2,963,477	3,343,477	0.466	0.481
6/30/07-08	2,783,717	13,176,285	17,811,118	17,266,951	16,922,000	17,828,811	3,745,715	4,652,526	0.608	0.640
6/30/08-09	2,750,907	13,220,349	18,330,851	17,810,088	17,631,900	18,349,331	4,411,551	5,128,982	0.641	0.667
6/30/09-10	2,806,048	13,035,703	18,461,948	18,293,174	18,110,070	18,480,462	5,074,367	5,444,759	0.645	0.659
6/30/10-11	2,942,638	14,955,303	21,931,486	21,134,073	20,922,660	21,952,931	5,967,357	6,997,628	0.711	0.746
6/30/11-12	3,006,849	15,522,941	23,766,631	22,777,766	22,778,000	23,790,767	7,255,059	8,267,826	0.758	0.791
6/30/12-13	3,138,905	12,117,046	19,781,467	20,788,077	19,781,000	20,788,000	7,663,954	8,670,954	0.630	0.662
6/30/13-14	3,311,947	14,236,704	25,345,706	25,328,765	24,315,840	25,346,000	10,079,136	11,109,296	0.734	0.765
6/30/14-15	3,511,622	13,875,194	28,089,562	28,263,853	27,247,300	28,264,000	13,372,106	14,388,806	0.776	0.805
6/30/15-16	3,491,558	12,428,497	31,059,018	30,538,407	29,621,860	31,059,000	17,193,363	18,630,503	0.848	0.890
6/30/16-17	3,338,327	7,935,244	27,625,409	28,420,171	26,796,250	28,420,000	18,861,006	20,484,756	0.803	0.851
6/30/17-18	3,401,479	4,081,252	33,291,130	32,896,414	32,238,080	33,291,000	28,156,828	29,209,748	0.948	0.979
Total	74,475,184	519,198,530	642,010,880	623,671,707	678,906,507	705,664,524	159,707,977	186,465,994		
Tot 6/30/84-18	74,475,184	459,980,068	627,942,771	623,671,707	616,136,960	639,410,302	156,156,892	179,430,234	0.827	0.859

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) Sum of Section 8, Exhibit 1, Page 2, Column 3 and Section 8, Exhibit 1, Page 9, Column 8

(4) From Section 8, Exhibit 1, Page 2, Column 8

(5) From Section 8, Exhibit 1, Page 3, Column 8

(6), (7) Selected based on (3), (4), and (5)

(8) = (6) - (3)

(9) = (7) - (3)

(10) = (6) / (2) / 10

(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Other - Clusters 5-17 & 95
Indemnity

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Accident Year	Payroll (000's)	Paid Loss Excluding Lump Sum	Paid LDF	Adjstmnt for Extra Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/16-17	Paid Counts 7/1/17-18	Average Outstanding Claim	Average Age
All Prior Yrs		43,821,184							10	7		80
6/30/82-83		5,567,029	1.021	1.000	5,682,385	43,969	5,726,354		0	0		
6/30/83-84		7,642,735	1.023	1.005	7,855,787	485,968	8,341,755		1	1	213,053	72
6/30/84-85	732,729	16,161,795	1.025	1.005	16,645,554	750,237	17,395,791	2.374	1	1	483,760	
6/30/85-86	787,208	19,224,102	1.027	1.005	19,839,123	1,112,066	20,951,189	2.661	3	3	205,007	82
6/30/86-87	902,483	19,814,955	1.031	1.005	20,530,674	1,527,463	22,058,137	2.444	6	6	119,286	77
6/30/87-88	1,366,586	26,729,296	1.037	1.005	27,860,930	2,081,761	29,942,691	2.191	7	7	161,662	75
6/30/88-89	1,486,478	23,537,672	1.045	1.005	24,730,456	2,940,864	27,671,320	1.862	7	5	238,557	70
6/30/89-90	1,494,463	22,514,365	1.055	1.005	23,875,104	2,729,203	26,604,307	1.780	7	7	194,391	70
6/30/90-91	1,405,560	19,143,029	1.069	1.005	20,566,988	2,510,090	23,077,078	1.642	4	4	355,990	82
6/30/91-92	1,364,510	12,009,744	1.084	1.005	13,078,268	1,389,342	14,467,610	1.060	5	4	267,131	73
6/30/92-93	1,347,359	8,791,819	1.099	1.005	9,710,632	1,249,840	10,960,472	0.813	4	3	306,271	76
6/30/93-94	1,424,410	9,814,793	1.113	1.010	11,037,023	1,316,358	12,353,381	0.867	6	6	203,705	76
6/30/94-95	1,497,829	8,290,079	1.132	1.000	9,386,143	1,546,086	10,932,230	0.730	3	2	548,032	75
6/30/95-96	1,582,635	8,934,504	1.150	1.000	10,274,186	1,365,054	11,639,240	0.735	2	2	669,841	85
6/30/96-97	1,979,748	8,470,482	1.168	1.000	9,897,721	1,943,782	11,841,503	0.598	4	3	475,746	70
6/30/97-98	1,917,994	6,506,992	1.188	1.000	7,729,467	2,450,370	10,179,837	0.531	1	1	1,222,475	76
6/30/98-99	2,081,524	7,277,152	1.205	1.000	8,771,071	2,178,128	10,949,199	0.526	4	6	248,986	59
6/30/99-00	2,207,243	8,949,196	1.225	1.000	10,962,306	2,015,364	12,977,669	0.588	4	4	503,277	70
6/30/00-01	2,201,008	8,560,385	1.241	1.000	10,627,144	1,683,591	12,310,735	0.559	7	5	413,352	66
6/30/01-02	2,292,592	8,400,043	1.260	1.000	10,580,790	2,104,396	12,685,186	0.553	3	3	726,916	52
6/30/02-03	2,260,534	8,355,976	1.276	1.000	10,664,174	1,942,897	12,607,071	0.558	3	4	577,049	54
6/30/03-04	2,255,942	7,689,498	1.296	1.000	9,963,341	1,812,630	11,775,972	0.522	4	6	378,974	56
6/30/04-05	2,309,083	8,584,628	1.322	1.000	11,345,726	2,521,365	13,867,091	0.601	3	5	552,220	58
6/30/05-06	2,480,693	7,730,889	1.350	1.000	10,435,294	2,578,693	13,013,986	0.525	4	2	1,352,202	70
6/30/06-07	2,612,577	7,349,434	1.380	1.000	10,145,499	2,041,247	12,186,746	0.466	5	4	699,016	62
6/30/07-08	2,783,717	10,537,637	1.414	1.000	14,896,515	2,914,603	17,811,118	0.640	6	8	544,860	59
6/30/08-09	2,750,907	10,573,730	1.452	1.000	15,357,094	2,973,757	18,330,851	0.666	8	6	797,227	61
6/30/09-10	2,806,048	10,173,489	1.496	1.000	15,224,345	3,237,603	18,461,948	0.658	8	4	1,262,714	57
6/30/10-11	2,942,638	11,983,128	1.540	1.000	18,455,658	3,475,829	21,931,486	0.745	23	14	462,324	56
6/30/11-12	3,006,849	12,599,871	1.597	1.000	20,122,560	3,644,071	23,766,631	0.790	32	23	327,073	56
6/30/12-13	3,138,905	10,032,096	1.679	1.000	16,839,477	2,941,990	19,781,467	0.630	37	22	309,426	54
6/30/13-14	3,311,947	11,937,152	1.804	1.000	21,538,332	3,807,374	25,345,706	0.765	72	47	204,280	56
6/30/14-15	3,511,622	11,997,955	1.976	1.000	23,711,292	4,378,269	28,089,562	0.800	104	73	160,457	51
6/30/15-16	3,491,558	11,329,296	2.315	1.000	26,231,983	4,827,034	31,059,018	0.890	244	125	119,221	50
6/30/16-17	3,338,327	7,778,444	3.139	1.000	24,417,873	3,207,536	27,625,409	0.828	527	217	76,679	47
6/30/17-18	3,401,479	4,074,884	6.871	1.000	27,997,736	5,293,394	33,291,130	0.979		510	46,908	45
Total	74,475,184	452,889,459			556,988,653	85,022,228	642,010,880		1,169	1,150		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3), (4) From Section 8, Exhibit 1, Page 7

(5) Based on information from the MA WCRIB

(6) = (3) x (4) x (5)

(7) From Section 8, Exhibit 1, Page 9, Column 13

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10), (11) Provided by Commonwealth of Massachusetts

(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Other - Clusters 5-17 & 95
Indemnity

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss Excluding Lump Sum	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	732,729	1.863	16,161,795	1.025	16,492,248	750,237	17,242,484	2.353	2.251
6/30/85-86	787,208	2.072	19,224,102	1.027	19,650,721	1,112,066	20,762,788	2.638	2.496
6/30/86-87	902,483	1.895	19,814,955	1.031	20,328,620	1,527,463	21,856,083	2.422	2.253
6/30/87-88	1,366,586	1.960	26,729,296	1.037	27,688,746	2,081,761	29,770,507	2.178	2.026
6/30/88-89	1,486,478	1.400	23,537,672	1.045	24,442,366	2,940,864	27,383,230	1.842	1.644
6/30/89-90	1,494,463	1.528	22,514,365	1.055	23,708,177	2,729,203	26,437,380	1.769	1.586
6/30/90-91	1,405,560	1.451	19,143,029	1.069	20,459,992	2,510,090	22,970,082	1.634	1.456
6/30/91-92	1,364,510	0.944	12,009,744	1.084	13,002,492	1,389,342	14,391,834	1.055	0.953
6/30/92-93	1,347,359	0.705	8,791,819	1.099	9,647,348	1,249,840	10,897,189	0.809	0.716
6/30/93-94	1,424,410	0.752	9,814,793	1.113	10,905,642	1,316,358	12,222,000	0.858	0.766
6/30/94-95	1,497,829	0.606	8,290,079	1.132	9,350,076	1,546,086	10,896,162	0.727	0.624
6/30/95-96	1,582,635	0.624	8,934,504	1.150	10,221,881	1,365,054	11,586,935	0.732	0.646
6/30/96-97	1,979,748	0.482	8,470,482	1.168	9,845,868	1,943,782	11,789,650	0.596	0.497
6/30/97-98	1,917,994	0.391	6,506,992	1.188	7,693,739	2,450,370	10,144,109	0.529	0.401
6/30/98-99	2,081,524	0.408	7,277,152	1.205	8,723,454	2,178,128	10,901,582	0.524	0.419
6/30/99-00	2,207,243	0.476	8,949,196	1.225	10,878,714	2,015,364	12,894,077	0.584	0.493
6/30/00-01	2,201,008	0.466	8,560,385	1.241	10,554,399	1,683,591	12,237,991	0.556	0.480
6/30/01-02	2,292,592	0.449	8,400,043	1.260	10,521,040	2,104,396	12,625,436	0.551	0.459
6/30/02-03	2,260,534	0.460	8,355,976	1.276	10,606,115	1,942,897	12,549,012	0.555	0.469
6/30/03-04	2,255,942	0.435	7,689,498	1.296	9,926,838	1,812,630	11,739,468	0.520	0.440
6/30/04-05	2,309,083	0.392	8,584,628	1.322	10,786,028	2,521,365	13,307,393	0.576	0.467
6/30/05-06	2,480,693	0.416	7,730,889	1.350	10,402,700	2,578,693	12,981,392	0.523	0.419
6/30/06-07	2,612,577	0.441	7,349,434	1.380	10,525,935	2,041,247	12,567,182	0.481	0.403
6/30/07-08	2,783,717	0.468	10,537,637	1.414	14,352,348	2,914,603	17,266,951	0.620	0.516
6/30/08-09	2,750,907	0.497	10,573,730	1.452	14,836,330	2,973,757	17,810,088	0.647	0.539
6/30/09-10	2,806,048	0.524	10,173,489	1.496	15,055,571	3,237,603	18,293,174	0.652	0.537
6/30/10-11	2,942,638	0.550	11,983,128	1.540	17,658,244	3,475,829	21,134,073	0.718	0.600
6/30/11-12	3,006,849	0.581	12,599,871	1.597	19,133,695	3,644,071	22,777,766	0.758	0.636
6/30/12-13	3,138,905	0.616	10,032,096	1.679	17,846,086	2,941,990	20,788,077	0.662	0.569
6/30/13-14	3,311,947	0.649	11,937,152	1.804	21,521,391	3,807,374	25,328,765	0.765	0.650
6/30/14-15	3,511,622	0.685	11,997,955	1.976	23,885,584	4,378,269	28,263,853	0.805	0.680
6/30/15-16	3,491,558	0.725	11,329,296	2.315	25,711,373	4,827,034	30,538,407	0.875	0.736
6/30/16-17	3,338,327	0.766	7,778,444	3.139	25,212,635	3,207,536	28,420,171	0.851	0.755
6/30/17-18	3,401,479	0.810	4,074,884	6.871	27,603,020	5,293,394	32,896,414	0.967	0.812
Total	74,475,184		395,858,511		539,179,416	84,492,291	623,671,707		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 8, Exhibit 1, Page 4, Column 11

(4) From Section 8, Exhibit 1, Page 2, Column 3

(5) From Section 8, Exhibit 1, Page 2, Column 4

(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]

(7) From Section 8, Exhibit 1, Page 9, Column 13

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Other - Clusters 5-17 & 95
Indemnity

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Exp Ult Loss Excluding Lump Sum	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									1.863	1.863
6/30/85-86									2.072	2.072
6/30/86-87									1.895	1.895
6/30/87-88									1.960	1.960
6/30/88-89									1.400	1.400
6/30/89-90									1.528	1.528
6/30/90-91	1,405,560	20,566,988	1.463	0.983	1.439	3.920	5.640	0.221	1.460	1.451
6/30/91-92	1,364,510	13,078,268	0.958	1.079	1.034	3.733	3.860	0.211	0.947	0.944
6/30/92-93	1,347,359	9,710,632	0.721	1.258	0.907	3.556	3.223	0.190	0.774	0.705
6/30/93-94	1,424,410	11,037,023	0.775	1.242	0.962	3.386	3.258	0.202	0.743	0.752
6/30/94-95	1,497,829	9,386,143	0.627	1.230	0.771	3.225	2.486	0.214	0.609	0.606
6/30/95-96	1,582,635	10,274,186	0.649	1.220	0.792	3.072	2.434	0.227	0.628	0.624
6/30/96-97	1,979,748	9,897,721	0.500	1.208	0.604	2.925	1.767	0.240	0.486	0.482
6/30/97-98	1,917,994	7,729,467	0.403	1.193	0.481	2.786	1.339	0.256	0.396	0.391
6/30/98-99	2,081,524	8,771,071	0.421	1.177	0.496	2.653	1.316	0.272	0.413	0.408
6/30/99-00	2,207,243	10,962,306	0.497	1.158	0.575	2.527	1.454	0.290	0.480	0.476
6/30/00-01	2,201,008	10,627,144	0.483	1.129	0.545	2.407	1.312	0.313	0.472	0.466
6/30/01-02	2,292,592	10,580,790	0.462	1.107	0.511	2.292	1.171	0.335	0.458	0.449
6/30/02-03	2,260,534	10,664,174	0.472	1.103	0.520	2.183	1.136	0.353	0.471	0.460
6/30/03-04	2,255,942	9,963,341	0.442	1.103	0.487	2.079	1.013	0.371	0.442	0.435
6/30/04-05	2,309,083	11,345,726	0.491	1.096	0.538	1.980	1.066	0.392	0.389	0.392
6/30/05-06	2,480,693	10,435,294	0.421	1.085	0.456	1.886	0.860	0.416	0.413	0.416
6/30/06-07	2,612,577	10,145,499	0.388	1.073	0.417	1.796	0.748	0.441	0.439	0.441
6/30/07-08	2,783,717	14,896,515	0.535	1.061	0.568	1.710	0.971	0.468	0.466	0.468
6/30/08-09	2,750,907	15,357,094	0.558	1.049	0.586	1.629	0.954	0.497	0.495	0.497
6/30/09-10	2,806,048	15,224,345	0.543	1.045	0.567	1.551	0.879	0.524	0.521	0.524
6/30/10-11	2,942,638	18,455,658	0.627	1.046	0.656	1.477	0.969	0.550	0.547	0.550
6/30/11-12	3,006,849	20,122,560	0.669	1.039	0.696	1.407	0.979	0.581	0.578	0.581
6/30/12-13	3,138,905	16,839,477	0.536	1.030	0.553	1.340	0.741	0.616	0.612	0.616
6/30/13-14	3,311,947	21,538,332	0.650	1.026	0.667	1.276	0.852	0.649	0.645	0.649
6/30/14-15	3,511,622	23,711,292	0.675	1.020	0.689	1.216	0.838	0.685	0.681	0.685
6/30/15-16	3,491,558	26,231,983	0.751	1.013	0.761	1.158	0.881	0.725	0.721	0.725
6/30/16-17	3,338,327	24,417,873	0.731	1.006	0.736	1.103	0.811	0.766	0.762	0.766
6/30/17-18	3,401,479	27,997,736	0.823	1.000	0.823	1.050	0.864	0.810		0.810
Total	67,705,237	409,968,639								

Trend Last 4 (ex 17-18):	4.0%	Avg 3 (ex 17-18):	0.843
Trend Last 8 (ex 17-18):	3.3%	Avg 5 (ex 17-18):	0.824
Trend Last 12 (ex 17-18):	4.5%	Avg 10 (ex 17-18):	0.887
Prior Selected Trend:	5.0%	Prior Sel Avg:	0.800
Selected Trend:	5.0%	Sel. Loss Cost:	0.850

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 8, Exhibit 1, Page 2, Column 6

(4) = (3) / (2) / 10

(5) Based on information from the MA WCRIB

(6) = (4) x (5)

(7) Based on Selected Trend from (6)

(8) = (6) x (7)

(9) = Sel. Loss Cost / [(5) * (7)]

(10) From prior Aon analysis as of June 30, 2017

(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Other - Clusters 5-17 & 95
Indemnity

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend	0.950	
(2)	Credibility	58%	
(3)	Average Pmt Trend Statewide	0.960	
(4)	Credibility Weighted Trend	0.954	
		(Low)	(High)
(5)	Selected Range	0.951	0.975
(6)	Incremental Paid for 2018	303,381	303,381
(7)	Estimated Reserve	5,929,606	11,831,864
(8)	Paid to Date (82 & Prior)	43,821,184	43,821,184
(9)	Est Ult Paid for 1982 & Prior	49,750,790	55,653,048

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	382,990	477,528
(11)	Projected Number of Years	7	7
(12)	Estimated Reserve	2,680,932	3,342,699
(13)	Paid to Date (82 & Prior)	43,821,184	43,517,803
(14)	Est Ult Paid for 1982 & Prior	46,502,116	46,860,503
(14a)	Paid Counts During Fiscal Year	7	10
		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	47,314,284	50,157,707
(16)	Lump Sum Ultimates	1,668,515	1,668,515
(17)	Ult Loss Including Lump Sums	**48,982,800**	**51,826,222**
(18)	Implied Tail	1.080	1.145
(19)	Ult Loss Inc Lump Sums @ 6/17	49,462,611	52,658,727

NOTES:

(1) From Section 8, Exhibit 1, Page 6
(2) = (Average of Section 8, Exhibit 1, Page 6, Column 3 / 3,000,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 8, Exhibit 1, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 8, Exhibit 1, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) From Section 8, Exhibit 1, Page 9, Column 13
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2017

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Other - Clusters 5-17 & 95

Indemnity

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	1,836,769	14.424			
1993	2	1,798,132	14.402	0.979		
1994	3	1,805,622	14.406	1.004		
1995	4	1,547,567	14.252	0.857		
1996	5	1,421,249	14.167	0.918		
1997	6	1,347,840	14.114	0.948		
1998	7	1,296,821	14.075	0.962		
1999	8	1,188,256	13.988	0.916		
2000	9	1,366,125	14.127	1.150	n =	27
2001	10	1,385,608	14.142	1.014	S(x) =	54,135
2002	11	1,127,515	13.936	0.814	S(x-sq) =	108,542,313
2003	12	1,046,115	13.861	0.928	S(xy) =	742,955
2004	13	1,007,259	13.823	0.963	S(y) =	371
2005	14	889,985	13.699	0.884	D =	44,226
2006	15	854,725	13.659	0.960	slope =	-0.059
2007	16	901,012	13.711	1.054	Avg Trend =	0.941
2008	17	757,677	13.538	0.841		
2009	18	716,898	13.483	0.946		
2010	19	794,268	13.585	1.108		
2011	20	682,924	13.434	0.860		
2012	21	659,520	13.399	0.966		
2013	22	610,950	13.323	0.926		
2014	23	572,165	13.257	0.937		
2015	24	586,996	13.283	1.026		
2016	25	482,894	13.088	0.823		
2017	26	362,696	12.801	0.751		
2018	27	303,381	12.623	0.836		
					Selected Trend:	**0.950**

NOTES:

(3) 2018 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2017

(4) LN [(3)]

(5) Eg. 2017: 0.836 = 303381 / 482894

Commonwealth of Massachusetts Workers Compensation
All Other - Clusters 5-17 & 95
INDEMNITY
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432
June-83	231,024	575,253	850,794	1,079,038	1,313,630	1,547,045	1,752,282	2,008,011	2,253,139	2,495,680	2,697,289	2,900,500	3,128,719	3,307,827	3,431,589	3,539,243	3,710,205	3,863,378	3,993,953	4,130,963	4,277,923	4,408,084	4,548,681	4,684,745	4,831,991	4,987,790	5,125,598	5,253,262	5,365,011	5,438,336	5,513,211	5,568,431	5,567,029	5,567,029	5,567,029	5,567,029
June-84	474,232	1,177,837	1,738,838	2,206,285	2,688,699	3,194,391	3,593,923	3,979,171	4,253,324	4,483,497	4,692,563	4,887,962	5,105,946	5,268,212	5,510,171	5,713,715	5,953,029	6,114,581	6,330,589	6,551,091	6,749,135	6,911,821	7,056,179	7,158,846	7,234,716	7,305,169	7,339,786	7,374,258	7,408,772	7,445,202	7,482,504	7,520,670	7,560,195	7,600,776	7,642,735	
June-85	977,090	2,372,578	3,464,586	4,349,747	5,275,439	6,134,761	6,920,369	7,655,499	8,408,427	8,983,219	9,607,477	10,145,930	10,640,204	11,178,862	11,641,664	12,100,236	12,599,733	13,016,766	13,426,358	13,778,892	14,131,892	14,427,029	14,710,082	14,949,032	15,141,235	15,309,397	15,476,853	15,650,018	15,828,834	15,902,384	15,963,360	16,026,507	16,092,726	16,161,795		
June-86	1,346,949	3,307,907	4,829,702	6,090,487	7,340,375	8,352,083	9,113,471	9,830,455	10,384,747	11,054,823	11,652,485	12,298,057	12,995,823	13,464,328	13,904,681	14,437,279	14,899,857	15,315,399	15,687,156	16,043,093	16,396,498	16,749,018	17,081,069	17,430,688	17,722,515	17,979,439	18,192,658	18,367,288	18,528,274	18,693,051	18,865,007	19,041,560	19,224,102			
June-87	1,601,233	3,880,011	5,503,885	7,082,566	8,405,662	9,270,533	9,956,299	10,556,456	11,085,673	11,623,420	12,106,294	12,632,595	13,327,657	13,820,597	14,335,672	14,795,690	15,267,959	15,661,703	15,953,801	16,321,920	16,607,046	16,861,857	17,127,747	17,450,228	17,735,296	18,028,041	18,331,993	18,621,372	18,914,419	19,217,565	19,527,567	19,814,955				
June-88	2,137,513	5,007,777	7,745,041	10,041,912	12,075,717	13,478,064	14,314,633	15,200,521	15,990,897	16,687,795	17,326,343	17,991,163	18,710,472	19,340,236	19,962,128	20,594,429	21,200,720	21,738,131	22,267,656	22,756,365	23,248,699	23,645,371	23,973,193	24,351,090	24,721,300	25,061,227	25,402,296	25,751,197	26,108,153	26,409,112	26,729,296					
June-89	1,712,857	5,080,303	7,663,780	9,679,037	11,203,387	12,173,513	13,105,806	13,862,567	14,433,962	15,035,025	15,605,979	16,156,892	16,752,699	17,314,807	17,864,824	18,333,675	18,761,144	19,180,530	19,588,446	20,011,654	20,402,670	20,798,618	21,197,603	21,577,022	21,928,411	22,287,434	22,650,460	22,992,900	23,294,273	23,537,672						
June-90	2,296,897	5,721,042	8,298,538	10,219,139	11,305,744	12,281,818	13,134,163	13,878,235	14,556,408	15,345,419	15,898,180	16,435,568	16,919,598	17,383,167	17,777,202	18,153,288	18,514,019	18,829,999	19,129,560	19,445,117	19,770,540	20,083,209	20,405,842	20,740,230	21,078,475	21,425,424	21,783,413	22,151,866	22,514,365							
June-91	1,963,238	4,739,981	6,742,583	8,047,589	9,308,882	10,318,373	10,933,284	11,411,152	12,022,048	12,546,665	13,141,453	13,738,283	14,329,913	14,888,135	15,354,127	15,837,750	16,311,134	16,689,475	17,129,945	17,375,269	17,615,173	17,862,598	18,129,844	18,364,459	18,577,053	18,761,226	18,948,944	19,143,029								
June-92	1,567,027	3,199,073	4,248,177	5,126,895	5,548,304	5,823,625	6,278,092	6,617,495	6,955,659	7,247,236	7,617,889	7,987,140	8,298,781	8,572,496	8,940,354	9,365,337	9,715,209	10,024,920	10,338,595	10,607,880	10,865,629	11,121,672	11,298,499	11,478,454	11,664,168	11,843,558	12,009,744									
June-93	1,093,248	2,645,187	3,492,766	4,149,352	4,610,531	4,966,351	5,148,147	5,423,620	5,783,566	6,064,338	6,275,882	6,484,665	6,664,357	6,833,263	7,010,090	7,177,333	7,331,914	7,520,747	7,748,152	7,957,233	8,148,509	8,300,461	8,427,178	8,541,121	8,721,600	8,791,819										
June-94	1,108,341	2,442,329	3,499,107	4,117,213	4,786,813	5,345,023	5,784,388	6,350,297	6,596,878	6,855,808	7,108,040	7,401,172	7,629,538	7,841,336	8,036,532	8,208,058	8,388,758	8,566,268	8,735,517	8,920,103	9,094,927	9,272,603	9,452,424	9,631,985	9,814,793											
June-95	1,320,706	2,682,119	3,617,627	4,377,145	4,799,858	5,146,590	5,470,951	5,690,639	5,928,230	6,125,266	6,322,277	6,510,106	6,695,050	6,862,701	7,023,885	7,185,394	7,342,550	7,524,723	7,689,350	7,855,113	7,982,201	8,105,050	8,207,710	8,290,079												
June-96	1,108,821	2,267,039	3,245,140	3,817,977	4,427,598	4,928,644	5,324,160	5,709,230	6,066,925	6,359,154	6,633,555	6,919,769	7,184,823	7,415,770	7,649,372	7,874,542	8,065,046	8,199,310	8,329,411	8,584,454	8,752,873	8,842,875	8,934,504													
June-97	1,085,126	2,350,834	3,458,998	4,440,774	5,289,243	5,991,102	6,443,225	6,730,818	6,877,491	7,036,406	7,147,793	7,354,650	7,473,882	7,593,508	7,713,847	7,874,055	7,998,711	8,115,077	8,205,201	8,300,591	8,386,898	8,470,482														
June-98	760,353	2,208,225	3,319,672	3,933,784	4,535,498	4,913,580	5,187,189	5,377,292	5,538,593	5,683,480	5,803,895	5,909,062	5,992,596	6,108,804	6,223,326	6,269,462	6,315,915	6,362,921	6,410,703	6,458,417	6,506,992															
June-99	1,160,394	2,519,810	3,441,432	4,263,196	4,763,871	5,080,496	5,423,838	5,694,351	5,858,839	6,093,043	6,235,873	6,377,337	6,494,424	6,587,838	6,682,288	6,778,115	6,925,083	7,070,436	7,202,887	7,277,152																
June-00	1,478,087	3,369,760	4,601,283	5,433,894	6,170,827	6,679,071	7,051,320	7,313,676	7,476,289	7,629,742	7,749,526	7,893,815	8,042,197	8,192,773	8,347,186	8,503,330	8,663,410	8,825,026	8,949,196																	
June-01	1,609,875	3,605,278	4,700,879	5,525,999	6,126,399	6,527,511	6,768,096	7,002,422	7,073,145	7,226,294	7,426,582	7,654,033	7,849,861	8,020,910	8,190,421	8,343,041	8,462,386	8,560,385																		
June-02	1,821,131	4,134,238	5,441,659	6,321,376	6,748,539	7,056,349	7,305,019	7,488,627	7,707,068	7,893,060	8,009,207	8,123,218	8,235,728	8,305,377	8,337,160	8,368,599	8,400,043																			
June-03	2,185,619	4,646,586	6,055,662	6,651,765	7,013,996	7,231,292	7,459,850	7,624,463	7,742,363	7,842,222	7,917,384	8,045,457	8,162,493	8,243,468	8,319,058	8,355,976																				
June-04	1,753,076	3,756,461	4,930,176	5,714,500	6,081,077	6,318,306	6,512,915	6,733,332	6,893,294	7,027,971	7,170,376	7,302,807	7,438,524	7,571,596	7,689,498																					
June-05	1,819,778	3,933,297	5,289,170	6,002,168	6,318,763	6,666,265	7,108,767	7,449,646	7,676,782	7,893,608	8,127,072	8,305,978	8,437,198	8,584,628																						
June-06	1,788,326	3,829,026	4,910,437	5,443,647	5,995,523	6,675,753	7,041,075	7,199,757	7,277,714	7,519,741	7,637,818	7,685,159	7,730,889																							
June-07	1,734,963	3,632,388	4,091,097	4,999,633	5,805,615	6,226,124	6,546,082	6,722,055	6,991,701	7,150,792	7,262,766	7,349,434																								
June-08	2,020,827	4,505,431	6,126,330	7,479,871	8,430,592	9,094,716	9,567,218	9,850,781	10,074,097	10,300,314	10,537,637																									
June-09	1,952,179	4,646,609	6,562,837	7,998,181	8,997,984	9,939,858	10,332,984	10,514,184	10,522,712	10,573,730																										
June-10	2,633,117	5,635,921	7,589,725	8,649,349	9,377,427	9,682,440	9,913,357	10,053,526	10,173,489																											
June-11	3,051,305	6,236,233	8,335,371	9,693,865	10,723,507	11,281,886	11,720,021	11,983,128																												
June-12	3,091,255	6,520,051	8,927,094	10,508,623	11,447,181	12,143,610	12,599,871																													
June-13	3,164,952	6,219,894	8,032,100	9,109,069	9,525,823	10,032,096																														
June-14	3,352,283	7,306,365	9,677,378	10,985,528	11,937,152																															
June-15	3,469,231	7,330,865	10,059,402	11,997,955																																
June-16	3,743,094	8,120,540	11,329,296																																	
June-17	3,508,611	7,778,444																																		
June-18	4,074,884																																			

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432
June-83	2.490	1.479	1.268	1.217	1.178	1.133	1.146	1.122	1.108	1.081	1.075	1.079	1.057	1.037	1.031	1.048	1.041	1.034	1.034	1.036	1.030	1.032	1.030	1.031	1.032	1.028	1.025	1.021	1.014	1.014	1.010	1.000	1.000	1.000	1.000
June-84	2.484	1.476	1.269	1.219	1.188	1.125	1.107	1.069	1.054	1.047	1.042	1.045	1.032	1.046	1.037	1.042	1.027	1.035	1.035	1.030	1.024	1.021	1.015	1.011	1.010	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.005	1.006	
June-85	2.428	1.460	1.255	1.213	1.163	1.128	1.106	1.098	1.068	1.069	1.056	1.049	1.051	1.041	1.039	1.041	1.033	1.031	1.026	1.026	1.021	1.020	1.016	1.013	1.011	1.011	1.011	1.011	1.005	1.004	1.004	1.004	1.004		
June-86	2.456	1.460	1.261	1.205	1.138	1.091	1.079	1.056	1.065	1.054	1.055	1.057	1.036	1.033	1.038	1.032	1.028	1.024	1.023	1.022	1.021	1.020	1.020	1.017	1.014	1.012	1.010	1.009	1.009	1.009	1.009	1.010			
June-87	2.423	1.419	1.287	1.187	1.103	1.074	1.060	1.050	1.049	1.042	1.043	1.055	1.037	1.037	1.032	1.032	1.026	1.019	1.023	1.017	1.015	1.016	1.019	1.016	1.017	1.017	1.016	1.016	1.016	1.016	1.015				
June-88	2.343	1.547	1.297	1.203	1.116	1.062	1.062	1.052	1.044	1.038	1.038	1.040	1.034	1.032	1.032	1.029	1.025	1.024	1.022	1.022	1.017	1.014	1.016	1.015	1.014	1.014	1.014	1.014	1.012	1.012					
June-89	2.966	1.509	1.263	1.157	1.087	1.077	1.058	1.041	1.042	1.038	1.035	1.037	1.034	1.032	1.026	1.023	1.022	1.021	1.022	1.020	1.019	1.019	1.018	1.016	1.016	1.016	1.015	1.013	1.010						
June-90	2.491	1.451	1.231	1.106	1.086	1.069	1.057	1.049	1.054	1.036	1.034	1.029	1.027	1.023	1.021	1.020	1.017	1.016	1.016	1.017	1.016	1.016	1.016	1.016	1.016	1.017	1.017	1.016							
June-91	2.414	1.422	1.194	1.157	1.108	1.060	1.044	1.054	1.044	1.047	1.045	1.043	1.039	1.031	1.031	1.030	1.023	1.026	1.014	1.014	1.014	1.015	1.013	1.012	1.010	1.010	1.010								
June-92	2.041	1.328	1.207	1.082	1.050	1.078	1.054	1.051	1.042	1.051	1.048	1.039	1.033	1.043	1.048	1.037	1.032	1.031	1.026	1.024	1.024	1.016	1.016	1.016	1.015	1.014									
June-93	2.420	1.320	1.188	1.111	1.077	1.037	1.054	1.066	1.049	1.035	1.033	1.028	1.025	1.026	1.024	1.022	1.026	1.030	1.027	1.024	1.019	1.015	1.014	1.021	1.008										
June-94	2.204	1.433	1.177	1.163	1.117	1.082	1.098	1.039	1.039	1.037	1.041	1.031	1.028	1.025	1.021	1.022	1.021	1.020	1.021	1.020	1.020	1.019	1.019	1.019											
June-95	2.031	1.349	1.210	1.097	1.072	1.063	1.040	1.042	1.033	1.032	1.030	1.028	1.025	1.023	1.023	1.022	1.025	1.022	1.022	1.016	1.015	1.013	1.010												
June-96	2.045	1.431	1.177	1.160	1.113	1.080	1.072	1.063	1.048	1.043	1.043	1.038	1.032	1.032	1.029	1.024	1.017	1.016	1.031	1.020	1.010	1.010													
June-97	2.166	1.471	1.284	1.191	1.133	1.075	1.045	1.022	1.023	1.016	1.029	1.016	1.016	1.016	1.021	1.016	1.015	1.011	1.012	1.010	1.010														
June-98	2.904	1.503	1.185	1.153	1.083	1.056	1.037	1.030	1.026	1.021	1.018	1.014	1.019	1.019	1.007	1.007	1.007	1.008	1.007	1.008															
June-99	2.172	1.366	1.239	1.117	1.066	1.068	1.050	1.029	1.040	1.023	1.023	1.018	1.014	1.014	1.014	1.022	1.021	1.019	1.010																
June-00	2.280	1.365	1.181	1.136	1.082	1.056	1.037	1.022	1.021	1.016	1.019	1.019	1.019	1.019	1.019	1.019	1.019	1.014																	
June-01	2.239	1.304	1.176	1.109	1.065	1.037	1.035	1.010	1.022	1.028	1.031	1.026	1.022	1.021	1.019	1.014	1.012																		
June-02	2.270	1.316	1.162	1.068	1.046	1.035	1.025	1.029	1.024	1.015	1.014	1.014	1.008	1.004	1.004	1.004																			
June-03	2.126	1.303	1.098	1.054	1.031	1.032	1.022	1.015	1.013	1.010	1.016	1.015	1.010	1.009	1.004																				
June-04	2.143	1.312	1.159	1.064	1.039	1.031	1.034	1.024	1.020	1.020	1.018	1.019	1.018	1.016																					
June-05	2.161	1.345	1.135	1.053	1.055	1.066	1.048	1.030	1.028	1.030	1.022	1.016	1.017																						
June-06	2.141	1.282	1.109	1.101	1.113	1.055	1.023	1.011	1.033	1.016	1.006	1.006																							
June-07	2.094	1.126	1.222	1.161	1.072	1.051	1.027	1.040	1.023	1.016	1.012																								
June-08	2.229	1.360	1.221	1.127	1.079	1.052	1.030	1.023	1.022	1.023																									
June-09	2.380	1.412	1.219	1.125	1.105	1.040	1.018	1.001	1.005																										
June-10	2.140	1.347	1.140	1.084	1.033	1.024	1.014	1.012																											
June-11	2.044	1.337	1.163	1.106	1.052	1.039	1.022																												
June-12	2.109	1.369	1.177	1.089	1.061	1.038																													
June-13	1.965	1.291	1.134	1.046	1.053																														
June-14	2.180	1.325	1.135	1.087																															
June-15	2.113	1.372	1.193																																
June-16	2.169	1.395																																	
June-17	2.217																																		

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	To Ult
Simple Avg																																				
All Yrs	2.271	1.382	1.200	1.130	1.089	1.064	1.052	1.041	1.038	1.034	1.033	1.032	1.028	1.026	1.025	1.025	1.023	1.022	1.022	1.020	1.018	1.018	1.017	1.017	1.015	1.014	1.014	1.013	1.010	1.010	1.009	1.005	1.003	1.003	1.000	
Latest 5	2.129	1.350	1.160	1.082	1.061	1.038	1.022	1.017	1.022	1.021	1.015	1.014	1.015	1.014	1.012	1.013	1.015	1.013	1.016	1.015	1.015	1.015	1.014	1.017	1.013	1.014	1.014	1.014	1.010	1.009	1.009					
Latest 3	2.167	1.364	1.154	1.074	1.055	1.033	1.018	1.012	1.017	1.018	1.013	1.013	1.015	1.010	1.009	1.012	1.017	1.013	1.010	1.013	1.012	1.014	1.014	1.019	1.011	1.014	1.014	1.014	1.013	1.012	1.009	1.006	1.003			
Volume Wtd																																				
All Yrs	2.229	1.374	1.194	1.122	1.083	1.059	1.048	1.039	1.038	1.034	1.034	1.033	1.029	1.027	1.026	1.026	1.023	1.022	1.021	1.020	1.018	1.017	1.017	1.016	1.014	1.014	1.013	1.013	1.010	1.010	1.009	1.006	1.004	1.003	1.000	
Latest 5	2.132	1.353	1.161	1.083	1.060	1.038	1.022	1.016	1.021	1.021	1.015	1.014	1.015	1.014	1.012	1.013	1.015	1.014	1.017	1.015	1.015	1.015	1.014	1.016	1.014	1.014	1.014	1.014	1.011	1.010	1.009					
Latest 3	2.167	1.365	1.156	1.075	1.056	1.034	1.018	1.012	1.016	1.019	1.014	1.013	1.015	1.009	1.009	1.012	1.017	1.014	1.010	1.013	1.012	1.014	1.014	1.019	1.011	1.014	1.014	1.014	1.012	1.012	1.010	1.007	1.004			

Dev Factor Selection																																				
Industry 1	2.946	1.574	1.235	1.110	1.036	1.025	1.016	1.009	1.007	1.006	1.006	1.010	1.003	1.005	1.003	1.004	1.005	1.003																		
Industry 2		1.901	1.354	1.158	1.073	1.026	1.025	1.013	1.006	1.010	1.006	1.014	1.007	1.003	1.003	1.003	1.002	1.006	1.002	1.003																
Prior	*2.178*	*1.356*	*1.166*	*1.101*	*1.078*	*1.053*	*1.037*	*1.032*	*1.032*	*1.026*	*1.025*	*1.025*	*1.022*	*1.020*	*1.017*	*1.016*	*1.016*	*1.015*	*1.018*	*1.018*	*1.018*	*1.017*	*1.017*	*1.017*	*1.015*	*1.014*	*1.014*	*1.013*	*1.009*	*1.008*	*1.006*	*1.004*	*1.002*	*1.002*	*1.021*	
Selected	2.189	1.356	1.172	1.095	1.075	1.051	1.037	1.029	1.030	1.027	1.024	1.023	1.021	1.020	1.015	1.013	1.015	1.013	1.016	1.015	1.017	1.016	1.016	1.017	1.013	1.014	1.014	1.013	1.009	1.008	1.006	1.004	1.002	1.002	1.002	1.021
FacToUlt	6.871	3.139	2.315	1.976	1.804	1.679	1.597	1.540	1.496	1.452	1.414	1.380	1.350	1.322	1.296	1.276	1.260	1.241	1.225	1.205	1.188	1.168	1.150	1.132	1.113	1.099	1.084	1.069	1.055	1.045	1.037	1.031	1.027	1.025	1.023	1.021
Percent of Ult	14.6%	31.9%	43.2%	50.6%	55.4%	59.6%	62.6%	64.9%	66.8%	68.9%	70.7%	72.4%	74.1%	75.7%	77.2%	78.4%	79.4%	80.6%	81.6%	83.0%	84.2%	85.6%	87.0%	88.3%	89.8%	91.0%	92.3%	93.5%	94.8%	95.7%	96.4%	97.0%	97.4%	97.6%	97.8%	98.0%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Other - Clusters 5-17 & 95
Indemnity

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/17		As of 6/18		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	49,462,611	52,658,727	48,982,800	51,826,222	(479,811)	-1.0%	(832,505)	-1.6%
6/30/82-83	5,639,587	6,073,401	5,611,827	5,669,000	(27,760)	-0.5%	(404,401)	-6.7%
6/30/83-84	8,130,411	8,755,827	8,174,920	8,759,000	44,509	0.5%	3,173	0.0%
6/30/84-85	17,176,000	17,410,000	17,242,000	17,396,000	66,000	0.4%	(14,000)	-0.1%
6/30/85-86	20,615,000	20,903,000	20,763,000	20,951,000	148,000	0.7%	48,000	0.2%
6/30/86-87	21,638,000	21,946,000	21,856,000	22,058,000	218,000	1.0%	112,000	0.5%
6/30/87-88	29,609,000	30,515,000	29,771,000	30,542,000	162,000	0.5%	27,000	0.1%
6/30/88-89	27,287,000	28,275,000	27,383,000	28,225,000	96,000	0.4%	(50,000)	-0.2%
6/30/89-90	26,307,000	27,125,000	26,437,000	27,136,000	130,000	0.5%	11,000	0.0%
6/30/90-91	23,007,000	23,674,000	22,970,000	23,539,000	(37,000)	-0.2%	(135,000)	-0.6%
6/30/91-92	14,376,000	15,238,000	14,392,000	15,191,000	16,000	0.1%	(47,000)	-0.3%
6/30/92-93	11,018,000	11,915,000	10,897,000	10,960,000	(121,000)	-1.1%	(955,000)	-8.0%
6/30/93-94	12,179,000	12,461,000	12,222,000	12,600,000	43,000	0.4%	139,000	1.1%
6/30/94-95	10,953,000	11,544,000	10,896,000	11,479,000	(57,000)	-0.5%	(65,000)	-0.6%
6/30/95-96	11,658,000	12,302,000	11,587,000	12,221,000	(71,000)	-0.6%	(81,000)	-0.7%
6/30/96-97	11,882,000	12,538,000	11,790,000	12,434,000	(92,000)	-0.8%	(104,000)	-0.8%
6/30/97-98	10,249,000	10,805,000	10,144,000	10,689,000	(105,000)	-1.0%	(116,000)	-1.1%
6/30/98-99	11,012,000	11,621,000	10,902,000	11,497,000	(110,000)	-1.0%	(124,000)	-1.1%
6/30/99-00	12,951,000	13,698,000	12,894,000	13,627,000	(57,000)	-0.4%	(71,000)	-0.5%
6/30/00-01	12,377,000	13,084,000	12,238,000	12,926,000	(139,000)	-1.1%	(158,000)	-1.2%
6/30/01-02	12,857,000	13,576,000	12,625,000	13,319,000	(232,000)	-1.8%	(257,000)	-1.9%
6/30/02-03	12,782,000	13,496,000	12,549,000	13,237,000	(233,000)	-1.8%	(259,000)	-1.9%
6/30/03-04	11,890,000	12,534,000	11,739,000	12,365,000	(151,000)	-1.3%	(169,000)	-1.3%
6/30/04-05	13,383,000	14,079,000	13,307,000	13,867,000	(76,000)	-0.6%	(212,000)	-1.5%
6/30/05-06	13,230,000	13,389,000	12,981,000	13,014,000	(249,000)	-1.9%	(375,000)	-2.8%
6/30/06-07	12,522,000	12,827,000	12,187,000	12,567,000	(335,000)	-2.7%	(260,000)	-2.0%
6/30/07-08	17,041,000	18,139,121	16,922,000	17,828,811	(119,000)	-0.7%	(310,310)	-1.7%
6/30/08-09	17,966,520	19,011,993	17,631,900	18,349,331	(334,620)	-1.9%	(662,662)	-3.5%
6/30/09-10	18,468,450	19,110,091	18,110,070	18,480,462	(358,380)	-1.9%	(629,629)	-3.3%
6/30/10-11	21,402,810	22,825,803	20,922,660	21,952,931	(480,150)	-2.2%	(872,872)	-3.8%
6/30/11-12	23,233,000	24,723,699	22,778,000	23,790,767	(455,000)	-2.0%	(932,932)	-3.8%
6/30/12-13	20,970,000	21,687,000	19,781,000	20,788,000	(1,189,000)	-5.7%	(899,000)	-4.1%
6/30/13-14	25,092,480	26,666,000	24,315,840	25,346,000	(776,640)	-3.1%	(1,320,000)	-5.0%
6/30/14-15	28,111,570	28,989,000	27,247,300	28,264,000	(864,270)	-3.1%	(725,000)	-2.5%
6/30/15-16	27,712,900	29,281,000	29,621,860	31,059,000	1,908,960	6.9%	1,778,000	6.1%
6/30/16-17	28,694,400	29,950,000	26,796,250	28,420,000	(1,898,150)	-6.6%	(1,530,000)	-5.1%
6/30/17-18								
Total	652,883,739	682,826,663	646,668,427	672,373,524	(6,215,312)	-1.0%	(10,453,138)	-1.5%

NOTES:

(2), (3) From prior Aon analysis as of June 30, 2017

(4), (5) From Section 8, Exhibit 1, Page 1, Columns 6, 7

(6) = (4) - (2)

(7) = (4) / (2) - 1

(8) = (5) - (3)

(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Other - Clusters 5-17 & 95
Indemnity

Calculation of Ultimate Lump Sum Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Accident Year	Paid Loss Excluding Lump Sum	Implied Cumulative LDF	Ult Loss Excluding Lump Sum	Selected Incr Lump Sum % Outstdg	Cumulative Lump Sum % Outstdg	Total Lump Sum Outstdg	Paid Lump Sum to Date	Est Ult Lump Sum - Incr Method	Ultimate Lump Sum Percentage	Lump Sum LDF	Est Ult Lump Sum - Paid Method	Selected Est Ultimate Lump Sums	Prior Est Ultimate Lump Sums
All Prior Yrs	43,821,184	1.112	48,735,996	0.0%	0.0%	0	1,660,214	1,660,214	3.4%	1.010	1,676,816	1,668,515	1,668,515
6/30/82-83	5,567,029	1.021	5,682,385	0.0%	0.0%	0	43,750	43,750	0.8%	1.010	44,188	43,969	43,969
6/30/83-84	7,642,735	1.028	7,855,787	0.0%	0.0%	0	483,550	483,550	6.2%	1.010	488,386	485,968	485,968
6/30/84-85	16,161,795	1.030	16,645,554	0.0%	0.0%	0	746,504	746,504	4.5%	1.010	753,969	750,237	750,237
6/30/85-86	19,224,102	1.032	19,839,123	0.0%	0.0%	0	1,106,534	1,106,534	5.6%	1.010	1,117,599	1,112,066	1,112,066
6/30/86-87	19,814,955	1.036	20,530,674	0.0%	0.0%	0	1,519,864	1,519,864	7.4%	1.010	1,535,063	1,527,463	1,527,463
6/30/87-88	26,729,296	1.042	27,860,930	0.0%	0.0%	0	2,071,404	2,071,404	7.4%	1.010	2,092,118	2,081,761	2,081,761
6/30/88-89	23,537,672	1.051	24,730,456	0.0%	0.0%	0	2,926,233	2,926,233	11.8%	1.010	2,955,495	2,940,864	2,940,864
6/30/89-90	22,514,365	1.060	23,875,104	0.0%	0.0%	0	2,715,625	2,715,625	11.4%	1.010	2,742,781	2,729,203	2,729,203
6/30/90-91	19,143,029	1.074	20,566,988	0.0%	0.0%	0	2,497,602	2,497,602	12.1%	1.010	2,522,578	2,510,090	2,511,351
6/30/91-92	12,009,744	1.089	13,078,268	0.0%	0.0%	0	1,381,736	1,381,736	10.6%	1.011	1,396,949	1,389,342	1,390,041
6/30/92-93	8,791,819	1.105	9,710,632	0.0%	0.0%	0	1,242,373	1,242,373	12.8%	1.012	1,257,308	1,249,840	1,237,117
6/30/93-94	9,814,793	1.125	11,037,023	0.0%	0.0%	0	1,306,522	1,306,522	11.8%	1.015	1,326,194	1,316,358	1,318,347
6/30/94-95	8,290,079	1.132	9,386,143	0.0%	0.0%	0	1,532,218	1,532,218	16.3%	1.018	1,559,955	1,546,086	1,553,147
6/30/95-96	8,934,504	1.150	10,274,186	0.1%	0.1%	10,274	1,345,682	1,355,956	13.2%	1.021	1,374,152	1,365,054	1,373,695
6/30/96-97	8,470,482	1.168	9,897,721	0.1%	0.2%	19,795	1,908,819	1,928,614	19.5%	1.026	1,958,949	1,943,782	1,952,309
6/30/97-98	6,506,992	1.188	7,729,467	0.1%	0.3%	20,937	2,402,195	2,423,132	31.3%	1.031	2,477,609	2,450,370	2,460,615
6/30/98-99	7,277,152	1.205	8,771,071	0.1%	0.4%	32,530	2,123,064	2,155,594	24.6%	1.037	2,200,663	2,178,128	2,174,069
6/30/99-00	8,949,196	1.225	10,962,306	0.1%	0.5%	52,635	1,938,548	1,991,183	18.2%	1.052	2,039,545	2,015,364	1,985,112
6/30/00-01	8,560,385	1.241	10,627,144	0.1%	0.6%	61,653	1,602,429	1,664,082	15.7%	1.063	1,703,101	1,683,591	1,689,398
6/30/01-02	8,400,043	1.260	10,580,790	0.1%	0.7%	71,964	2,005,419	2,077,383	19.6%	1.063	2,131,409	2,104,396	2,110,616
6/30/02-03	8,355,976	1.276	10,664,174	0.1%	0.8%	83,196	1,843,393	1,926,589	18.1%	1.063	1,959,205	1,942,897	1,911,774
6/30/03-04	7,689,498	1.296	9,963,341	0.2%	1.0%	97,655	1,701,764	1,799,419	18.1%	1.073	1,825,842	1,812,630	1,777,782
6/30/04-05	8,584,628	1.322	11,345,726	0.2%	1.2%	133,896	2,362,201	2,496,097	22.0%	1.078	2,546,634	2,521,365	2,512,998
6/30/05-06	7,730,889	1.350	10,435,294	0.2%	1.4%	142,674	2,400,500	2,543,174	24.4%	1.089	2,614,211	2,578,693	2,587,937
6/30/06-07	7,349,434	1.380	10,145,499	0.2%	1.6%	157,941	1,874,089	2,032,030	20.0%	1.094	2,050,465	2,041,247	2,062,518
6/30/07-08	10,537,637	1.414	14,896,515	0.2%	1.8%	261,696	2,638,648	2,900,344	19.5%	1.110	2,928,862	2,914,603	2,897,161
6/30/08-09	10,573,730	1.452	15,357,094	0.1%	1.9%	291,483	2,646,619	2,938,102	19.1%	1.137	3,009,413	2,973,757	2,935,730
6/30/09-10	10,173,489	1.496	15,224,345	0.2%	2.1%	319,376	2,862,214	3,181,590	20.9%	1.151	3,293,616	3,237,603	3,265,122
6/30/10-11	11,983,128	1.540	18,455,658	0.5%	2.6%	470,780	2,972,176	3,442,956	18.7%	1.181	3,508,702	3,475,829	3,661,996
6/30/11-12	12,599,871	1.597	20,122,560	1.1%	3.7%	740,134	2,923,071	3,663,204	18.2%	1.240	3,624,937	3,644,071	3,818,245
6/30/12-13	10,032,096	1.679	16,839,477	1.5%	5.2%	869,695	2,084,950	2,954,646	17.5%	1.405	2,929,334	2,941,990	3,310,981
6/30/13-14	11,937,152	1.804	21,538,332	1.8%	6.9%	1,493,324	2,299,552	3,792,876	17.6%	1.662	3,821,872	3,807,374	4,254,550
6/30/14-15	11,997,955	1.976	23,711,292	3.4%	10.4%	2,460,073	1,877,240	4,337,313	18.3%	2.354	4,419,226	4,378,269	5,051,954
6/30/15-16	11,329,296	2.315	26,231,983	3.7%	14.1%	3,687,578	1,099,201	4,786,779	18.2%	4.428	4,867,290	4,827,034	3,082,284
6/30/16-17	7,778,444	3.139	24,417,873	3.3%	17.4%	4,246,858	156,800	4,403,658	18.0%	12.828	2,011,414	3,207,536	4,626,866
6/30/17-18	4,074,884	6.871	27,997,736	1.5%	18.9%	5,287,026	6,368	5,293,394	18.9%	56.303	358,558	5,293,394	
Total	452,889,459		605,724,648			21,013,173	66,309,071	87,322,244	14.4%		81,124,405	86,690,743	82,853,763

NOTES:

(2) From Section 8, Exhibit 1, Page 2, Column 3

(3) = (4) / (2)

(4) From Section 8, Exhibit 1, Page 2, Column 6

(5) From Section 8, Exhibit 1, Page 11

(6) Downward sum of (5)

(7) = (6) x (4)

(8) From Section 8, Exhibit 1, Page 10

(9) = (7) + (8)

(10) = (9) / (4)

(11) From Section 8, Exhibit 1, Page 12

(12) = (8) x (11)

(13) Selected based on (9) and (12)

(14) From prior Aon analysis as of June 30, 2017

Commonwealth of Massachusetts Workers Compensation
All Other - Clusters 5-17 & 95
INDEMNITY
Lump Sum Development
Incremental Lump Sum Payments

Acc Yr Ending	0-12	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444
All Prior Yrs	0	0	0	0	0	0	0	22,500	0	0	137,500	40,000	80,500	250,234	367,000	139,604	85,000	0	57,500	55,001	30,000	12,250	84,000	140,000	66,000	0	78,125	0	0	7,500	7,500	0	0	0	0	0	0
Jun-83	0	0	0	0	0	0	0	0	0	0	35,000	7,750	1,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jun-84	0	0	0	0	0	0	91,600	53,250	15,000	55,000	59,700	57,000	0	57,000	0	0	0	85,000	0	0	0	0	0	10,000	0	0	0	0	0	0	0	0	0	0	0		
Jun-85	0	0	0	30,000	3,000	52,500	34,554	34,000	58,000	215,750	30,200	92,500	50,000	40,000	0	49,000	32,000	0	25,000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Jun-86	0	0	12,000	40,559	73,500	32,500	75,000	175,399	179,500	0	92,000	20,000	50,000	0	0	0	0	30,000	55,000	64,000	16,000	45,000	58,275	87,801	0	0	0	0	0	0	0	0	0				
Jun-87	0	25,000	130,000	100,666	150,501	60,866	192,525	168,500	91,501	59,806	28,000	0	12,500	65,000	50,000	164,999	50,000	80,000	80,000	10,000	0	0	0	0	0	0	0	0	0	0	0	0					
Jun-88	0	49,000	40,808	39,958	205,752	408,847	243,000	223,039	268,000	62,000	75,000	30,000	61,000	0	0	0	155,000	20,000	0	100,000	90,000	0	0	0	0	0	0	0	0	0	0						
Jun-89	0	69,855	143,500	275,776	374,100	341,500	255,000	238,502	222,500	170,500	146,000	30,000	123,000	40,000	25,000	0	63,500	185,000	50,000	110,000	62,500	0	0	0	0	0	0	0	0	0							
Jun-90	0	114,301	281,968	342,440	535,751	231,565	150,800	494,500	46,300	140,000	0	157,000	0	15,000	0	25,000	106,000	60,000	0	15,000	0	0	0	0	0	0	0	0	0								
Jun-91	3,500	73,750	373,500	399,501	281,850	319,500	203,500	25,001	143,000	0	10,000	54,000	0	0	10,000	153,000	72,500	255,000	120,000	0	0	0	0	0	0	0	0	0									
Jun-92	12,000	110,012	182,635	135,586	76,000	151,001	0	112,000	76,500	98,000	105,000	20,000	13,500	86,268	20,867	20,867	86,500	35,000	0	0	0	0	0	0	0	40,000	0										
Jun-93	6,000	137,948	181,424	231,001	158,000	58,000	49,000	16,000	77,000	85,000	0	55,000	0	0	0	0	50,000	40,000	35,000	35,000	0	0	13,500	0	0	14,500											
Jun-94	9,500	273,155	204,001	189,365	168,500	29,001	28,000	96,000	0	14,000	0	230,000	65,000	0	0	0	0	0	0	0	0	0	0	0	0												
Jun-95	185,350	223,402	371,000	281,000	90,965	116,600	17,000	0	0	62,000	58,400	34,000	0	80,000	0	12,500	0	0	0	0	0	1	0	0													
Jun-96	6,000	246,050	463,500	224,701	104,430	25,501	3,000	40,000	0	1	35,000	62,500	0	18,400	16,600	0	0	0	0	0	99,999	0	0														
Jun-97	23,365	498,701	322,500	317,501	204,000	108,251	0	105,000	106,501	60,000	83,000	0	0	0	40,000	40,000	0	0	0	0	0	0															
Jun-98	287,037	356,948	285,460	504,000	281,500	83,000	69,535	88,965	20,000	0	10,000	202,750	75,000	69,000	69,000	0	0	0	0	0	0																
Jun-99	203,500	124,500	487,181	242,900	185,982	168,001	201,000	120,000	65,000	170,000	20,000	65,000	0	0	0	45,000	0	0	0	25,000																	
Jun-00	97,731	486,478	307,037	269,800	93,500	190,999	184,884	110,118	53,001	76,000	24,000	0	0	0	0	0	0	0	45,000																		
Jun-01	10,000	182,428	335,500	71,500	244,500	251,000	145,000	220,000	80,000	0	0	0	62,500	0	0	0	1	0																			
Jun-02	0	114,545	362,081	283,539	440,001	286,251	109,000	265,000	25,001	50,000	50,000	15,000	0	5,000	1	0	0																				
Jun-03	0	77,201	596,801	430,835	218,160	255,001	75,000	65,000	6,000	6,000	7,500	60,000	1	1	0	45,894																					
Jun-04	47,500	25,277	294,987	520,000	358,000	189,000	27,000	100,000	100,000	0	0	0	0	0	40,000																						
Jun-05	6,157	60,866	417,500	949,001	378,677	150,000	105,000	105,000	150,000	0	0	20,000	0	20,000																							
Jun-06	0	159,500	370,000	715,000	208,000	359,500	359,500	89,000	0	0	140,000	0	0																								
Jun-07	26,000	238,583	574,002	426,500	153,002	153,002	120,000	90,000	28,000	65,000	0	0																									
Jun-08	0	282,500	346,648	610,000	610,000	174,962	459,538	62,000	43,000	0	50,000																										
Jun-09	250,000	140,000	501,500	501,500	370,926	384,000	186,001	207,691	50,000	55,001																											
Jun-10	0	385,501	385,501	536,711	679,197	380,304	405,000	50,000	40,000																												
Jun-11	307,191	319,191	604,218	357,283	873,292	282,000	214,001	15,000																													
Jun-12	0	294,800	409,461	1,071,604	420,200	532,901	194,104																														
Jun-13	37,000	127,500	406,096	801,278	615,076	98,000																															
Jun-14	15,000	6,251	1,012,351	775,950	490,000																																
Jun-15	0	319,341	896,354	661,545																																	
Jun-16	21,500	94,701	983,000																																		
Jun-17	2,200	154,600																																			
Jun-18	6,368																																				

Cumulative Lump Sum Payments

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444
All Prior Yrs	0	0	0	0	0	0	0	22,500	22,500	22,500	160,000	200,000	280,500	530,734	897,734	1,037,338	1,122,338	1,122,338	1,179,838	1,234,839	1,264,839	1,277,089	1,361,089	1,501,089	1,567,089	1,567,089	1,645,214	1,645,214	1,645,214	1,652,714	1,660,214	1,660,214	1,660,214	1,660,214	1,660,214	1,660,214
Jun-83	0	0	0	0	0	0	0	0	0	0	35,000	42,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750		
Jun-84	0	0	0	0	0	0	91,600	144,850	159,850	214,850	274,550	331,550	331,550	388,550	388,550	388,550	388,550	473,550	473,550	473,550	473,550	473,550	473,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550		
Jun-85	0	0	0	30,000	33,000	85,500	120,054	154,054	212,054	427,804	458,004	550,504	600,504	640,504	640,504	689,504	721,504	721,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504			
Jun-86	0	0	12,000	52,559	126,059	158,559	233,559	408,958	588,458	588,458	680,458	700,458	750,458	750,458	750,458	750,458	750,458	780,458	835,458	899,458	915,458	960,458	1,018,733	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534				
Jun-87	0	25,000	155,000	255,666	406,167	467,033	659,558	828,058	919,559	979,365	1,007,365	1,007,365	1,019,865	1,084,865	1,134,865	1,299,864	1,349,864	1,429,864	1,509,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864					
Jun-88	0	49,000	89,808	129,766	335,518	744,365	987,365	1,210,404	1,478,404	1,540,404	1,615,404	1,645,404	1,706,404	1,706,404	1,706,404	1,706,404	1,861,404	1,881,404	1,881,404	1,981,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404							
Jun-89	0	69,855	213,355	489,131	863,231	1,204,731	1,459,731	1,698,233	1,920,733	2,091,233	2,237,233	2,267,233	2,390,233	2,430,233	2,455,233	2,455,233	2,518,733	2,703,733	2,753,733	2,863,733	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233							
Jun-90	0	114,301	396,269	738,709	1,274,460	1,506,025	1,656,825	2,151,325	2,197,625	2,337,625	2,337,625	2,494,625	2,494,625	2,509,625	2,509,625	2,534,625	2,640,625	2,700,625	2,700,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625								
Jun-91	3,500	77,250	450,750	850,251	1,132,101	1,451,601	1,655,101	1,680,102	1,823,102	1,823,102	1,833,102	1,887,102	1,887,102	1,887,102	1,897,102	2,050,102	2,122,602	2,377,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602									
Jun-92	12,000	122,012	304,647	440,233	516,233	667,234	667,234	779,234	855,734	953,734	1,058,734	1,078,734	1,092,234	1,178,502	1,199,369	1,220,236	1,306,736	1,341,736	1,341,736	1,341,736	1,341,736	1,341,736	1,341,736	1,341,736	1,341,736	1,381,736	1,381,736										
Jun-93	6,000	143,948	325,372	556,373	714,373	772,373	821,373	837,373	914,373	999,373	999,373	1,054,373	1,054,373	1,054,373	1,054,373	1,054,373	1,104,373	1,144,373	1,179,373	1,214,373	1,214,373	1,214,373	1,227,873	1,227,873	1,227,873	1,242,373											
Jun-94	9,500	282,655	486,656	676,021	844,521	873,522	901,522	997,522	997,522	1,011,522	1,011,522	1,241,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522												
Jun-95	185,350	408,752	779,752	1,060,752	1,151,717	1,268,317	1,285,317	1,285,317	1,285,317	1,347,317	1,405,717	1,439,717	1,439,717	1,519,717	1,519,717	1,532,217	1,532,217	1,532,217	1,532,217	1,532,217	1,532,217	1,532,218	1,532,218	1,532,218													
Jun-96	6,000	252,050	715,550	940,251	1,044,681	1,070,182	1,073,182	1,113,182	1,113,182	1,113,183	1,148,183	1,210,683	1,210,683	1,229,083	1,245,683	1,245,683	1,245,683	1,245,683	1,245,683	1,245,683	1,345,682	1,345,682	1,345,682														
Jun-97	23,365	522,066	844,566	1,162,067	1,366,067	1,474,318	1,474,318	1,579,318	1,685,819	1,745,819	1,828,819	1,828,819	1,828,819	1,828,819	1,868,819	1,908,819	1,908,819	1,908,819	1,908,819	1,908,819	1,908,819	1,908,819															
Jun-98	287,037	643,985	929,445	1,433,445	1,714,945	1,797,945	1,867,480	1,956,445	1,976,445	1,976,445	1,986,445	2,189,195	2,264,195	2,333,195	2,402,195	2,402,195	2,402,195	2,402,195	2,402,195	2,402,195	2,402,195																
Jun-99	203,500	328,000	815,181	1,058,081	1,244,063	1,412,064	1,613,064	1,733,064	1,798,064	1,968,064	1,988,064	2,053,064	2,053,064	2,053,064	2,053,064	2,098,064	2,098,064	2,098,064	2,098,064	2,123,064																	
Jun-00	97,731	584,209	891,246	1,161,046	1,254,546	1,445,545	1,630,429	1,740,547	1,793,548	1,869,548	1,893,548	1,893,548	1,893,548	1,893,548	1,893,548	1,893,548	1,893,548	1,893,548	1,938,548																		
Jun-01	10,000	192,428	527,928	599,428	843,928	1,094,928	1,239,928	1,459,928	1,539,928	1,539,928	1,539,928	1,539,928	1,602,428	1,602,428	1,602,428	1,602,428	1,602,429	1,602,429																			
Jun-02	0	114,545	476,626	760,165	1,200,166	1,486,417	1,595,417	1,860,417	1,885,418	1,935,418	1,985,418	2,000,418	2,000,418	2,005,418	2,005,419	2,005,419	2,005,419																				
Jun-03	0	77,201	674,002	1,104,837	1,322,997	1,577,998	1,652,998	1,717,998	1,723,998	1,729,998	1,737,498	1,797,498	1,797,499	1,797,500	1,797,500	1,843,393																					
Jun-04	47,500	72,777	367,764	887,764	1,245,764	1,434,764	1,461,764	1,561,764	1,661,764	1,661,764	1,661,764	1,661,764	1,661,764	1,661,764	1,701,764																						
Jun-05	6,157	67,023	484,523	1,433,524	1,812,201	1,962,201	2,067,201	2,172,201	2,322,201	2,322,201	2,322,201	2,342,201	2,342,201	2,362,201																							
Jun-06	0	159,500	529,500	1,244,500	1,452,500	1,812,000	2,171,500	2,260,500	2,260,500	2,260,500	2,400,500	2,400,500	2,400,500																								
Jun-07	26,000	264,583	838,585	1,265,085	1,418,087	1,571,089	1,691,089	1,781,089	1,809,089	1,874,089	1,874,089	1,874,089																									
Jun-08	0	282,500	629,148	1,239,148	1,849,148	2,024,110	2,483,648	2,545,648	2,588,648	2,588,648	2,638,648																										
Jun-09	250,000	390,000	891,500	1,393,000	1,763,926	2,147,926	2,333,927	2,541,618	2,591,618	2,646,619																											
Jun-10	0	385,501	771,002	1,307,713	1,986,910	2,367,214	2,772,214	2,822,214	2,862,214																												
Jun-11	307,191	626,381	1,230,599	1,587,882	2,461,175	2,743,175	2,957,176	2,972,176																													
Jun-12	0	294,800	704,261	1,775,865	2,196,065	2,728,967	2,923,071																														
Jun-13	37,000	164,500	570,596	1,371,874	1,986,950	2,084,950																															
Jun-14	15,000	21,251	1,033,602	1,809,552	2,299,552																																
Jun-15	0	319,341	1,215,695	1,877,240																																	
Jun-16	21,500	116,201	1,099,201																																		
Jun-17	2,200	156,800																																			
Jun-18	6,368																																				

Commonwealth of Massachusetts Workers Compensation
All Other - Clusters 5-17 & 95
INDEMNITY
Lump Sum Development
Incremental Lump Sums as a % of Ultimate Losses Excluding Lump Sums

Acc Yr Ending	*0-12*	*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*
All Prior Yrs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.001	0.002	0.005	0.008	0.003	0.002	0.000	0.001	0.001	0.001	0.000	0.002	0.003	0.001	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jun-83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Jun-84	0.000	0.000	0.000	0.000	0.000	0.000	0.012	0.007	0.002	0.007	0.008	0.007	0.000	0.007	0.000	0.000	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Jun-85	0.000	0.000	0.000	0.002	0.000	0.003	0.002	0.002	0.003	0.013	0.002	0.006	0.003	0.002	0.000	0.003	0.002	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000			
Jun-86	0.000	0.000	0.001	0.002	0.004	0.002	0.004	0.009	0.009	0.000	0.005	0.001	0.003	0.000	0.000	0.000	0.000	0.002	0.003	0.003	0.001	0.002	0.003	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Jun-87	0.000	0.001	0.006	0.005	0.007	0.003	0.009	0.008	0.004	0.003	0.001	0.000	0.001	0.003	0.002	0.008	0.002	0.004	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000					
Jun-88	0.000	0.002	0.001	0.001	0.007	0.015	0.009	0.008	0.010	0.002	0.003	0.001	0.002	0.000	0.000	0.000	0.006	0.001	0.000	0.004	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000						
Jun-89	0.000	0.003	0.006	0.011	0.015	0.014	0.010	0.010	0.009	0.007	0.006	0.001	0.005	0.002	0.001	0.000	0.003	0.007	0.002	0.004	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000							
Jun-90	0.000	0.005	0.012	0.014	0.022	0.010	0.006	0.021	0.002	0.006	0.000	0.007	0.000	0.001	0.000	0.001	0.004	0.003	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000								
Jun-91	0.000	0.004	0.018	0.019	0.014	0.016	0.010	0.001	0.007	0.000	0.000	0.003	0.000	0.000	0.000	0.007	0.004	0.012	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000									
Jun-92	0.001	0.008	0.014	0.010	0.006	0.012	0.000	0.009	0.006	0.007	0.008	0.002	0.001	0.007	0.002	0.002	0.007	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000										
Jun-93	0.001	0.014	0.019	0.024	0.016	0.006	0.005	0.002	0.008	0.009	0.000	0.006	0.000	0.000	0.000	0.000	0.005	0.004	0.004	0.004	0.000	0.000	0.001	0.000	0.000	0.001											
Jun-94	0.001	0.025	0.018	0.017	0.015	0.003	0.003	0.009	0.000	0.001	0.000	0.021	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000												
Jun-95	0.020	0.024	0.040	0.030	0.010	0.012	0.002	0.000	0.000	0.007	0.006	0.004	0.000	0.009	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000													
Jun-96	0.001	0.024	0.045	0.022	0.010	0.002	0.000	0.004	0.000	0.000	0.003	0.006	0.000	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.000														
Jun-97	0.002	0.050	0.033	0.032	0.021	0.011	0.000	0.011	0.011	0.006	0.008	0.000	0.000	0.000	0.004	0.004	0.000	0.000	0.000	0.000	0.000	0.000															
Jun-98	0.037	0.046	0.037	0.065	0.036	0.011	0.009	0.012	0.003	0.000	0.001	0.026	0.010	0.009	0.009	0.000	0.000	0.000	0.000	0.000	0.000																
Jun-99	0.023	0.014	0.056	0.028	0.021	0.019	0.023	0.014	0.007	0.019	0.002	0.007	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.003																	
Jun-00	0.009	0.044	0.028	0.025	0.009	0.017	0.017	0.010	0.005	0.007	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004																		
Jun-01	0.001	0.017	0.032	0.007	0.023	0.024	0.014	0.021	0.008	0.000	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000																			
Jun-02	0.000	0.011	0.034	0.027	0.042	0.027	0.010	0.025	0.002	0.005	0.005	0.001	0.000	0.000	0.000	0.000	0.000																				
Jun-03	0.000	0.007	0.056	0.040	0.020	0.024	0.007	0.006	0.001	0.001	0.001	0.006	0.000	0.000	0.000	0.004																					
Jun-04	0.005	0.003	0.030	0.052	0.036	0.019	0.003	0.010	0.010	0.000	0.000	0.000	0.000	0.000	0.004																						
Jun-05	0.001	0.005	0.037	0.084	0.033	0.013	0.009	0.009	0.013	0.000	0.000	0.002	0.000	0.002																							
Jun-06	0.000	0.015	0.035	0.069	0.020	0.034	0.034	0.009	0.000	0.000	0.013	0.000	0.000																								
Jun-07	0.003	0.024	0.057	0.042	0.015	0.015	0.012	0.009	0.003	0.006	0.000	0.000																									
Jun-08	0.000	0.019	0.023	0.041	0.041	0.012	0.031	0.004	0.003	0.000	0.003																										
Jun-09	0.016	0.009	0.033	0.033	0.024	0.025	0.012	0.014	0.003	0.004																											
Jun-10	0.000	0.025	0.025	0.035	0.045	0.025	0.027	0.003	0.003																												
Jun-11	0.017	0.017	0.033	0.019	0.047	0.015	0.012	0.001																													
Jun-12	0.000	0.015	0.020	0.053	0.021	0.026	0.010																														
Jun-13	0.002	0.008	0.024	0.048	0.037	0.006																															
Jun-14	0.001	0.000	0.047	0.036	0.023																																
Jun-15	0.000	0.013	0.038	0.028																																	
Jun-16	0.001	0.004	0.037																																		
Jun-17	0.000	0.006																																			
Jun-18	0.000																																				

Averages		*12-24*	*24-36*	*36-48*	*48-60*	*60-72*	*72-84*	*84-96*	*96-108*	*108-120*	*120-132*	*132-144*	*144-156*	*156-168*	*168-180*	*180-192*	*192-204*	*204-216*	*216-228*	*228-240*	*240-252*	*252-264*	*264-276*	*276-288*	*288-300*	*300-312*	*312-324*	*324-336*	*336-348*	*348-360*	*360-372*	*372-384*	*384-396*	*396-408*	*408-420*	*420-432*	*432-444*
Simple Avg																																					
All Yrs (ex P)	0.004	0.013	0.026	0.028	0.020	0.014	0.010	0.008	0.005	0.004	0.003	0.004	0.001	0.002	0.001	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Latest 5	0.000	0.006	0.033	0.037	0.034	0.020	0.018	0.006	0.002	0.002	0.003	0.001	0.000	0.000	0.001	0.002	0.000	0.000	0.001	0.001	0.002	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000					
Latest 3	0.000	0.008	0.041	0.037	0.027	0.016	0.016	0.006	0.003	0.003	0.006	0.001	0.000	0.001	0.001	0.001	0.000	0.000	0.001	0.001	0.003	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Olympic Avg																																					
All Yrs (ex P)	0.003	0.013	0.026	0.027	0.020	0.013	0.010	0.008	0.005	0.004	0.003	0.004	0.001	0.002	0.001	0.001	0.001	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000				
Latest 10	0.003	0.011	0.033	0.039	0.030	0.019	0.015	0.008	0.004	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000										
Latest 5	0.000	0.006	0.033	0.037	0.035	0.022	0.017	0.005	0.003	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000						

Dev Factor Selection																																					
Prior	*NA*	*0.015*	*0.031*	*0.037*	*0.033*	*0.021*	*0.015*	*0.011*	*0.005*	*0.001*	*0.001*	*0.002*	*0.002*	*0.002*	*0.002*	*0.002*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	
Selected	NA	0.015	0.033	0.037	0.034	0.018	0.015	0.011	0.005	0.002	0.001	0.002	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FacToUlt	NA	0.189	0.174	0.141	0.104	0.069	0.052	0.037	0.026	0.021	0.019	0.018	0.016	0.014	0.012	0.010	0.008	0.007	0.006	0.005	0.004	0.003	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Commonwealth of Massachusetts Workers Compensation
All Other - Clusters 5-17 & 95
INDEMNITY
Paid Loss Development
Paid Loss - Lump Sum only

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432	444
All Prior Yrs	0	0	0	0	0	0	0	22,500	22,500	22,500	160,000	200,000	280,500	530,734	897,734	1,037,338	1,122,338	1,122,338	1,179,838	1,234,839	1,264,839	1,277,089	1,361,089	1,501,089	1,567,089	1,567,089	1,645,214	1,645,214	1,645,214	1,652,714	1,660,214	1,660,214	1,660,214	1,660,214	1,660,214	1,660,214
Jun-83	0	0	0	0	0	0	0	0	0	0	35,000	42,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	43,750	
Jun-84	0	0	0	0	0	0	91,600	144,850	159,850	214,850	274,550	331,550	331,550	388,550	388,550	388,550	388,550	473,550	473,550	473,550	473,550	473,550	473,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550	483,550		
Jun-85	0	0	0	30,000	33,000	85,500	120,054	154,054	212,054	427,804	458,004	550,504	600,504	640,504	640,504	689,504	721,504	721,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504	746,504			
Jun-86	0	0	12,000	52,559	126,059	158,559	233,559	408,958	588,458	588,458	680,458	700,458	750,458	750,458	750,458	750,458	750,458	780,458	835,458	899,458	915,458	960,458	1,018,733	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534	1,106,534				
Jun-87	0	25,000	155,000	255,666	406,167	467,033	659,558	828,058	919,559	979,365	1,007,365	1,007,365	1,019,865	1,084,865	1,134,865	1,299,864	1,349,864	1,429,864	1,509,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864	1,519,864					
Jun-88	0	49,000	89,808	129,766	335,518	744,365	987,365	1,210,404	1,478,404	1,540,404	1,615,404	1,645,404	1,706,404	1,706,404	1,706,404	1,706,404	1,861,404	1,881,404	1,881,404	1,981,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404	2,071,404							
Jun-89	0	69,855	213,355	489,131	863,231	1,204,731	1,459,731	1,698,233	1,920,733	2,091,233	2,237,233	2,267,233	2,390,233	2,430,233	2,455,233	2,455,233	2,518,733	2,703,733	2,753,733	2,863,733	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233	2,926,233							
Jun-90	0	114,301	396,269	738,709	1,274,460	1,506,025	1,656,825	2,151,325	2,197,625	2,337,625	2,337,625	2,494,625	2,494,625	2,509,625	2,509,625	2,534,625	2,640,625	2,700,625	2,700,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625	2,715,625								
Jun-91	3,500	77,250	450,750	850,251	1,132,101	1,451,601	1,655,101	1,680,102	1,823,102	1,823,102	1,833,102	1,887,102	1,887,102	1,887,102	1,897,102	2,050,102	2,122,602	2,377,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602	2,497,602								
Jun-92	12,000	122,012	304,647	440,233	516,233	667,234	667,234	779,234	855,734	953,734	1,058,734	1,078,734	1,092,234	1,178,502	1,199,369	1,220,236	1,306,736	1,341,736	1,341,736	1,341,736	1,341,736	1,341,736	1,341,736	1,341,736	1,341,736	1,381,736	1,381,736									
Jun-93	6,000	143,948	325,372	556,373	714,373	772,373	821,373	837,373	914,373	999,373	999,373	1,054,373	1,054,373	1,054,373	1,054,373	1,054,373	1,104,373	1,144,373	1,179,373	1,214,373	1,214,373	1,214,373	1,227,873	1,227,873	1,227,873	1,242,373										
Jun-94	9,500	282,655	486,656	676,021	844,521	873,522	901,522	997,522	997,522	1,011,522	1,011,522	1,241,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522	1,306,522											
Jun-95	185,350	408,752	779,752	1,060,752	1,151,717	1,268,317	1,285,317	1,285,317	1,285,317	1,347,317	1,405,717	1,439,717	1,439,717	1,519,717	1,519,717	1,532,217	1,532,217	1,532,217	1,532,217	1,532,217	1,532,217	1,532,218	1,532,218	1,532,218												
Jun-96	6,000	252,050	715,550	940,251	1,044,681	1,070,182	1,073,182	1,113,182	1,113,182	1,113,183	1,148,183	1,210,683	1,210,683	1,229,083	1,245,683	1,245,683	1,245,683	1,245,683	1,245,683	1,245,683	1,345,682	1,345,682	1,345,682													
Jun-97	23,365	522,066	844,566	1,162,067	1,366,067	1,474,318	1,474,318	1,579,318	1,685,819	1,745,819	1,828,819	1,828,819	1,828,819	1,828,819	1,868,819	1,908,819	1,908,819	1,908,819	1,908,819	1,908,819	1,908,819	1,908,819														
Jun-98	287,037	643,985	929,445	1,433,445	1,714,945	1,797,945	1,867,480	1,956,445	1,976,445	1,976,445	1,986,445	2,189,195	2,264,195	2,333,195	2,402,195	2,402,195	2,402,195	2,402,195	2,402,195	2,402,195	2,402,195															
Jun-99	203,500	328,000	815,181	1,058,081	1,244,063	1,412,064	1,613,064	1,733,064	1,798,064	1,968,064	1,988,064	2,053,064	2,053,064	2,053,064	2,053,064	2,098,064	2,098,064	2,098,064	2,098,064	2,123,064																
Jun-00	97,731	584,209	891,246	1,161,046	1,254,546	1,445,545	1,630,429	1,740,547	1,793,548	1,869,548	1,893,548	1,893,548	1,893,548	1,893,548	1,893,548	1,893,548	1,893,548	1,893,548	1,938,548																	
Jun-01	10,000	192,428	527,928	599,428	843,928	1,094,928	1,239,928	1,459,928	1,539,928	1,539,928	1,539,928	1,539,928	1,602,428	1,602,428	1,602,428	1,602,428	1,602,429	1,602,429																		
Jun-02	0	114,545	476,626	760,165	1,200,166	1,486,417	1,595,417	1,860,417	1,885,418	1,935,418	1,985,418	2,000,418	2,000,418	2,005,418	2,005,419	2,005,419	2,005,419																			
Jun-03	0	77,201	674,002	1,104,837	1,322,997	1,577,998	1,652,998	1,717,998	1,723,998	1,729,998	1,737,498	1,797,498	1,797,499	1,797,500	1,797,500	1,843,393																				
Jun-04	47,500	72,777	367,764	887,764	1,245,764	1,434,764	1,461,764	1,561,764	1,661,764	1,661,764	1,661,764	1,661,764	1,661,764	1,661,764	1,701,764																					
Jun-05	6,157	67,023	484,523	1,433,524	1,812,201	1,962,201	2,067,201	2,172,201	2,322,201	2,322,201	2,322,201	2,342,201	2,342,201	2,362,201																						
Jun-06	0	159,500	529,500	1,244,500	1,452,500	1,812,000	2,171,500	2,260,500	2,260,500	2,260,500	2,400,500	2,400,500	2,400,500																							
Jun-07	26,000	264,583	838,585	1,265,085	1,418,087	1,571,089	1,691,089	1,781,089	1,809,089	1,874,089	1,874,089	1,874,089																								
Jun-08	0	282,500	629,148	1,239,148	1,849,148	2,024,110	2,483,648	2,545,648	2,588,648	2,588,648	2,638,648																									
Jun-09	250,000	390,000	891,500	1,393,000	1,763,926	2,147,926	2,333,927	2,541,618	2,591,618	2,646,619																										
Jun-10	0	385,501	771,002	1,307,713	1,986,910	2,367,214	2,772,214	2,822,214	2,862,214																											
Jun-11	307,191	626,381	1,230,599	1,587,882	2,461,175	2,743,175	2,957,176	2,972,176																												
Jun-12	0	294,800	704,261	1,775,865	2,196,065	2,728,967	2,923,071																													
Jun-13	37,000	164,500	570,596	1,371,874	1,986,950	2,084,950																														
Jun-14	15,000	21,251	1,033,602	1,809,552	2,299,552																															
Jun-15	0	319,341	1,215,695	1,877,240																																
Jun-16	21,500	116,201	1,099,201																																	
Jun-17	2,200	156,800																																		
Jun-18	6,368																																			

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	To Ult
All Prior Yrs								1.000	1.000	7.111	1.250	1.403	1.892	1.691	1.156	1.082	1.000	1.051	1.047	1.024	1.010	1.066	1.103	1.044	1.000	1.050	1.000	1.000	1.005	1.005	1.000	1.000	1.000	1.000	1.000	1.000	
Jun-83											1.221	1.023	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Jun-84							1.581	1.104	1.344	1.278	1.208	1.000	1.172	1.000	1.000	1.000	1.219	1.000	1.000	1.000	1.000	1.000	1.021	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Jun-85				1.100	2.591	1.404	1.283	1.376	2.017	1.071	1.202	1.091	1.067	1.000	1.077	1.046	1.000	1.035	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
Jun-86			4.380	2.398	1.258	1.473	1.751	1.439	1.000	1.156	1.029	1.071	1.000	1.000	1.000	1.000	1.040	1.070	1.077	1.018	1.049	1.061	1.086	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Jun-87		6.200	1.649	1.589	1.150	1.412	1.255	1.111	1.065	1.029	1.000	1.012	1.064	1.046	1.145	1.038	1.059	1.056	1.007	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Jun-88		1.833	1.445	2.586	2.219	1.326	1.226	1.221	1.042	1.049	1.019	1.037	1.000	1.000	1.000	1.091	1.011	1.000	1.053	1.045	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000						
Jun-89		3.054	2.293	1.765	1.396	1.212	1.163	1.131	1.089	1.070	1.013	1.054	1.017	1.010	1.000	1.026	1.073	1.018	1.040	1.022	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000								
Jun-90		3.467	1.864	1.725	1.182	1.100	1.298	1.022	1.064	1.000	1.067	1.000	1.006	1.000	1.010	1.042	1.023	1.000	1.006	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000									
Jun-91	22.071	5.835	1.886	1.331	1.282	1.140	1.015	1.085	1.000	1.005	1.029	1.000	1.000	1.005	1.081	1.035	1.120	1.050	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000										
Jun-92	10.168	2.497	1.445	1.173	1.293	1.000	1.168	1.098	1.115	1.110	1.019	1.013	1.079	1.018	1.017	1.071	1.027	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.030	1.000											
Jun-93	23.991	2.260	1.710	1.284	1.081	1.063	1.019	1.092	1.093	1.000	1.055	1.000	1.000	1.000	1.000	1.047	1.036	1.031	1.030	1.000	1.000	1.011	1.000	1.000	1.012												
Jun-94	29.753	1.722	1.389	1.249	1.034	1.032	1.106	1.000	1.014	1.000	1.227	1.052	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000													
Jun-95	2.205	1.908	1.360	1.086	1.101	1.013	1.000	1.000	1.048	1.043	1.024	1.000	1.056	1.000	1.008	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000														
Jun-96	42.008	2.839	1.314	1.111	1.024	1.003	1.037	1.000	1.000	1.031	1.054	1.000	1.015	1.014	1.000	1.000	1.000	1.000	1.000	1.080	1.000	1.000															
Jun-97	22.344	1.618	1.376	1.176	1.079	1.000	1.071	1.067	1.036	1.048	1.000	1.000	1.000	1.022	1.021	1.000	1.060	1.000	1.000	1.000	1.000																
Jun-98	2.244	1.443	1.542	1.196	1.048	1.039	1.048	1.010	1.000	1.005	1.102	1.034	1.030	1.030	1.000	1.000	1.000	1.000	1.000	1.000																	
Jun-99	1.612	2.485	1.298	1.176	1.135	1.142	1.074	1.038	1.095	1.010	1.033	1.000	1.000	1.000	1.022	1.000	1.000	1.000	1.012																		
Jun-00	5.978	1.526	1.303	1.081	1.152	1.128	1.068	1.030	1.042	1.013	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.024																			
Jun-01	19.243	2.744	1.135	1.408	1.297	1.132	1.177	1.055	1.000	1.000	1.000	1.041	1.000	1.000	1.000	1.000	1.000																				
Jun-02		4.161	1.595	1.579	1.239	1.073	1.166	1.013	1.027	1.026	1.008	1.000	1.002	1.000	1.000	1.000																					
Jun-03		8.730	1.639	1.197	1.193	1.048	1.039	1.003	1.003	1.004	1.035	1.000	1.000	1.000	1.026																						
Jun-04	1.532	5.053	2.414	1.403	1.152	1.019	1.068	1.064	1.000	1.000	1.000	1.000	1.000	1.024																							
Jun-05	10.886	7.229	2.959	1.264	1.083	1.054	1.051	1.069	1.000	1.000	1.009	1.000	1.009																								
Jun-06		3.320	2.350	1.167	1.248	1.198	1.041	1.000	1.000	1.062	1.000	1.000																									
Jun-07	10.176	3.169	1.509	1.121	1.108	1.076	1.053	1.016	1.036	1.000	1.000																										
Jun-08		2.227	1.970	1.492	1.095	1.227	1.025	1.017	1.000	1.019																											
Jun-09	1.560	2.286	1.563	1.266	1.218	1.087	1.089	1.020	1.021																												
Jun-10		2.000	1.696	1.519	1.191	1.171	1.018	1.014																													
Jun-11	2.039	1.965	1.290	1.550	1.115	1.078	1.005																														
Jun-12		2.389	2.522	1.237	1.243	1.071																															
Jun-13	4.446	3.469	2.404	1.448	1.049																																
Jun-14	1.417	48.638	1.751	1.271																																	
Jun-15		3.807	1.544																																		
Jun-16	5.405	9.459																																			
Jun-17	71.273																																				

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	432-444	To Ult
Simple Avg																																					
All Yrs (ex P)	14.518	4.978	1.820	1.398	1.250	1.133	1.139	1.078	1.083	1.041	1.054	1.018	1.022	1.008	1.019	1.020	1.032	1.016	1.013	1.010	1.003	1.005	1.008	1.000	1.004	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
Latest 5		13.552	1.902	1.405	1.163	1.127	1.038	1.013	1.011	1.016	1.009	1.000	1.002	1.005	1.009	1.000	1.000	1.005	1.002	1.016	1.000	1.002	1.000	1.000	1.008	1.000	1.000	1.000	1.000	1.000	1.000						
Latest 3		20.635	1.900	1.319	1.136	1.107	1.037	1.017	1.019	1.027	1.003	1.000	1.003	1.008	1.009	1.000	1.000	1.008	1.004	1.027	1.000	1.000	1.000	1.000	1.014	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000				
Volume Wtd																																					
All Yrs (ex P)		2.713	1.672	1.314	1.165	1.107	1.083	1.047	1.036	1.027	1.032	1.014	1.014	1.008	1.018	1.020	1.027	1.015	1.014	1.011	1.002	1.003	1.005	1.000	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000			
Latest 5		5.047	1.771	1.392	1.161	1.121	1.035	1.013	1.010	1.018	1.008	1.000	1.003	1.004	1.010	1.000	1.000	1.005	1.003	1.012	1.000	1.002	1.000	1.000	1.005	1.000	1.000	1.000	1.000	1.000	1.000	1.000					
Latest 3		7.330	1.794	1.308	1.137	1.104	1.034	1.017	1.017	1.028	1.003	1.000	1.003	1.007	1.008	1.000	1.000	1.007	1.004	1.018	1.000	1.000	1.000	1.000	1.011	1.000	1.000	1.000	1.000	1.000	1.000	1.000					

Dev Factor Selection																																					
Prior	4.389	2.897	1.881	1.416	1.204	1.135	1.058	1.030	1.012	1.021	1.016	1.007	1.010	1.000	1.004	1.000	1.000	1.010	1.015	1.005	1.005	1.005	1.003	1.003	1.003	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.010	
Selected	4.389	2.897	1.881	1.416	1.183	1.133	1.050	1.026	1.012	1.024	1.015	1.005	1.010	1.005	1.009	1.000	1.000	1.010	1.015	1.005	1.005	1.005	1.003	1.003	1.003	1.001	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.010
FacToUlt	56.303	12.828	4.428	2.354	1.662	1.405	1.240	1.181	1.151	1.137	1.110	1.094	1.089	1.078	1.073	1.063	1.063	1.063	1.052	1.037	1.031	1.026	1.021	1.018	1.015	1.012	1.011	1.010	1.010	1.010	1.010	1.010	1.010	1.010	1.010	1.010	1.010
Percent of Ult	1.8%	7.8%	22.6%	42.5%	60.2%	71.2%	80.6%	84.7%	86.9%	87.9%	90.1%	91.4%	91.8%	92.8%	93.2%	94.1%	94.1%	94.1%	95.0%	96.5%	97.0%	97.4%	97.9%	98.2%	98.5%	98.8%	98.9%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Other - Clusters 5-17 & 95
Indemnity

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
444	100.0%	2.0%	0.0%	0.5%	0.2%	1.000	1.000
432	98.0%	0.2%	2.0%	0.0%	0.0%	0.981	0.971
420	97.8%	0.2%	2.2%	0.1%	0.0%	0.946	0.921
408	97.6%	0.2%	2.4%	0.1%	0.0%	0.915	0.877
396	97.4%	0.4%	2.6%	0.1%	0.1%	0.888	0.838
384	97.0%	0.6%	3.0%	0.2%	0.1%	0.870	0.814
372	96.4%	0.8%	3.6%	0.2%	0.1%	0.860	0.801
360	95.7%	0.9%	4.3%	0.3%	0.2%	0.854	0.794
348	94.8%	1.2%	5.2%	0.4%	0.2%	0.848	0.786
336	93.5%	1.3%	6.5%	0.4%	0.3%	0.847	0.785
324	92.3%	1.3%	7.7%	0.5%	0.3%	0.841	0.778
312	91.0%	1.2%	9.0%	0.4%	0.3%	0.834	0.768
300	89.8%	1.5%	10.2%	0.6%	0.4%	0.822	0.753
288	88.3%	1.4%	11.7%	0.5%	0.3%	0.815	0.744
276	87.0%	1.4%	13.0%	0.6%	0.4%	0.804	0.730
264	85.6%	1.4%	14.4%	0.6%	0.4%	0.793	0.716
252	84.2%	1.2%	15.8%	0.5%	0.4%	0.782	0.701
240	83.0%	1.3%	17.0%	0.6%	0.4%	0.768	0.684
228	81.6%	1.1%	18.4%	0.5%	0.4%	0.756	0.669
216	80.6%	1.2%	19.4%	0.6%	0.4%	0.741	0.650
204	79.4%	1.0%	20.6%	0.5%	0.4%	0.728	0.633
192	78.4%	1.2%	21.6%	0.6%	0.5%	0.713	0.615
180	77.2%	1.5%	22.8%	0.9%	0.7%	0.701	0.601
168	75.7%	1.6%	24.3%	0.9%	0.7%	0.693	0.592
156	74.1%	1.6%	25.9%	1.0%	0.8%	0.686	0.583
144	72.4%	1.7%	27.6%	1.1%	0.9%	0.678	0.576
132	70.7%	1.9%	29.3%	1.2%	1.0%	0.671	0.568
120	68.9%	2.0%	31.1%	1.4%	1.2%	0.666	0.562
108	66.8%	1.9%	33.2%	1.4%	1.2%	0.661	0.557
96	64.9%	2.3%	35.1%	1.7%	1.5%	0.654	0.550
84	62.6%	3.0%	37.4%	2.4%	2.1%	0.651	0.547
72	59.6%	4.2%	40.4%	3.3%	3.0%	0.652	0.550
60	55.4%	4.8%	44.6%	4.0%	3.7%	0.660	0.561
48	50.6%	7.4%	49.4%	6.5%	6.0%	0.669	0.572
36	43.2%	11.3%	56.8%	10.3%	9.8%	0.687	0.596
24	31.9%	17.3%	68.1%	16.3%	15.9%	0.714	0.631
12	14.6%	14.6%	85.4%	14.3%	14.1%	0.746	0.671
Total		100.0%					

NOTES:

(2) = 1 / Section 8, Exhibit 1, Page 2, Column 4

(3) Incremental % based on (2)

(4) = 1 - (2)

(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}

(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}

(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Other - Clusters 5-17 & 95
Indemnity

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	3,501,401	6,344,824		3,062,273	5,549,089
6/30/82-83	1,048	58,221	0.981	1,027	57,090
6/30/83-84	48,636	632,715	0.946	46,018	598,663
6/30/84-85	333,701	487,701	0.915	305,502	446,488
6/30/85-86	432,364	620,364	0.888	383,832	550,730
6/30/86-87	521,181	723,181	0.870	453,432	629,175
6/30/87-88	970,300	1,741,300	0.860	834,274	1,497,187
6/30/88-89	919,095	1,761,095	0.854	784,742	1,503,658
6/30/89-90	1,207,010	1,906,010	0.848	1,023,382	1,616,040
6/30/90-91	1,329,369	1,898,369	0.847	1,125,641	1,607,441
6/30/91-92	1,000,521	1,799,521	0.841	841,657	1,513,791
6/30/92-93	862,808	925,808	0.834	719,243	771,760
6/30/93-94	1,100,685	1,478,685	0.822	904,992	1,215,787
6/30/94-95	1,073,703	1,656,703	0.815	874,932	1,350,003
6/30/95-96	1,306,814	1,940,814	0.804	1,050,825	1,560,632
6/30/96-97	1,410,699	2,054,699	0.793	1,118,742	1,629,460
6/30/97-98	1,234,813	1,779,813	0.782	965,357	1,391,429
6/30/98-99	1,501,784	2,096,784	0.768	1,153,463	1,610,460
6/30/99-00	2,006,255	2,739,255	0.756	1,516,876	2,071,078
6/30/00-01	2,075,186	2,763,186	0.741	1,537,979	2,047,875
6/30/01-02	2,219,538	2,913,538	0.728	1,615,240	2,120,289
6/30/02-03	2,349,631	3,037,631	0.713	1,675,670	2,166,326
6/30/03-04	2,347,738	2,973,738	0.701	1,645,643	2,084,437
6/30/04-05	2,360,171	2,920,171	0.693	1,635,744	2,023,858
6/30/05-06	2,849,611	2,882,611	0.686	1,953,576	1,976,199
6/30/06-07	2,963,477	3,343,477	0.678	2,010,302	2,268,079
6/30/07-08	3,745,715	4,652,526	0.671	2,514,717	3,123,513
6/30/08-09	4,411,551	5,128,982	0.666	2,937,342	3,415,029
6/30/09-10	5,074,367	5,444,759	0.661	3,354,322	3,599,163
6/30/10-11	5,967,357	6,997,628	0.654	3,904,106	4,578,154
6/30/11-12	7,255,059	8,267,826	0.651	4,721,840	5,380,984
6/30/12-13	7,663,954	8,670,954	0.652	5,000,642	5,657,698
6/30/13-14	10,079,136	11,109,296	0.660	6,655,150	7,335,354
6/30/14-15	13,372,106	14,388,806	0.669	8,941,146	9,620,954
6/30/15-16	17,193,363	18,630,503	0.687	11,811,386	12,798,663
6/30/16-17	18,861,006	20,484,756	0.714	13,462,546	14,621,541
6/30/17-18	28,156,828	29,209,748	0.746	21,002,330	21,787,709
Total	159,707,977	186,465,994		113,545,892	133,775,785
			(7) Total Discount Factor:	0.711	0.717

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	3,501,401	6,344,824
(9) Projected Number of Years:	7	7
(10) Projected Paid Loss per Year:	500,200	906,403
(11) Discounted Value at 4%:	3,062,273	5,549,089

NOTES:

(2), (3) From Section 8, Exhibit 1, Page 1, Columns 8, 9

(4) From Section 8, Exhibit 1, Page 13, Column 7

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Other - Clusters 5-17 & 95
Indemnity

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	3,501,401	6,344,824		2,876,077	5,211,686
6/30/82-83	1,048	58,221	0.971	1,018	56,549
6/30/83-84	48,636	632,715	0.921	44,800	582,818
6/30/84-85	333,701	487,701	0.877	292,737	427,833
6/30/85-86	432,364	620,364	0.838	362,446	520,045
6/30/86-87	521,181	723,181	0.814	424,318	588,777
6/30/87-88	970,300	1,741,300	0.801	777,099	1,394,582
6/30/88-89	919,095	1,761,095	0.794	729,327	1,397,476
6/30/89-90	1,207,010	1,906,010	0.786	948,855	1,498,353
6/30/90-91	1,329,369	1,898,369	0.785	1,044,049	1,490,926
6/30/91-92	1,000,521	1,799,521	0.778	778,754	1,400,655
6/30/92-93	862,808	925,808	0.768	663,016	711,428
6/30/93-94	1,100,685	1,478,685	0.753	829,228	1,114,003
6/30/94-95	1,073,703	1,656,703	0.744	798,877	1,232,652
6/30/95-96	1,306,814	1,940,814	0.730	954,047	1,416,903
6/30/96-97	1,410,699	2,054,699	0.716	1,009,756	1,470,721
6/30/97-98	1,234,813	1,779,813	0.701	866,091	1,248,351
6/30/98-99	1,501,784	2,096,784	0.684	1,026,929	1,433,794
6/30/99-00	2,006,255	2,739,255	0.669	1,341,688	1,831,883
6/30/00-01	2,075,186	2,763,186	0.650	1,348,603	1,795,714
6/30/01-02	2,219,538	2,913,538	0.633	1,405,611	1,845,114
6/30/02-03	2,349,631	3,037,631	0.615	1,445,733	1,869,061
6/30/03-04	2,347,738	2,973,738	0.601	1,410,147	1,786,148
6/30/04-05	2,360,171	2,920,171	0.592	1,396,784	1,728,200
6/30/05-06	2,849,611	2,882,611	0.583	1,662,725	1,681,980
6/30/06-07	2,963,477	3,343,477	0.576	1,705,666	1,924,380
6/30/07-08	3,745,715	4,652,526	0.568	2,127,144	2,642,111
6/30/08-09	4,411,551	5,128,982	0.562	2,479,832	2,883,116
6/30/09-10	5,074,367	5,444,759	0.557	2,827,786	3,034,194
6/30/10-11	5,967,357	6,997,628	0.550	3,280,819	3,847,257
6/30/11-12	7,255,059	8,267,826	0.547	3,966,234	4,519,899
6/30/12-13	7,663,954	8,670,954	0.550	4,215,228	4,769,085
6/30/13-14	10,079,136	11,109,296	0.561	5,654,529	6,232,462
6/30/14-15	13,372,106	14,388,806	0.572	7,654,337	8,236,307
6/30/15-16	17,193,363	18,630,503	0.596	10,251,926	11,108,853
6/30/16-17	18,861,006	20,484,756	0.631	11,891,942	12,915,723
6/30/17-18	28,156,828	29,209,748	0.671	18,894,461	19,601,016
Total	159,707,977	186,465,994		99,388,620	117,450,054
			(7) Total Discount Factor:	0.622	0.630

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	3,501,401	6,344,824
(9) Projected Number of Years:	7	7
(10) Projected Paid Loss per Year:	500,200	906,403
(11) Discounted Value at 6%:	2,876,077	5,211,686

NOTES:

(2), (3) From Section 8, Exhibit 1, Page 1, Columns 8, 9

(4) From Section 8, Exhibit 1, Page 13, Column 8

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Other - Clusters 5-17 & 95
Total Indemnity (Including Lump Sums) + Medical

Calculation of Fiscal Year 7/01/18 - 19 Payments

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
						Cumulative	Incremental Paid		Estimated Payments from		FY 07/01/18 - 06/30/19	
Accident	Est Ult Losses	Est Ult Losses	Paid Losses	Reserves	Reserves	Percent	as a % of	as a % of	07/01/18 - 06/30/19		as a % of Reserves	
Year	(Low)	(High)	to Date	(Low)	(High)	Paid	Ultimates	Reserves	(Low)	(High)	(Low)	(High)
All Prior Yrs	52,070,225	54,961,792	48,539,250	3,530,976	6,422,542				291,209	320,330	8.2%	5.0%
6/30/82-83	6,123,967	6,188,538	6,122,919	1,048	65,618	99.5%	0.3%	46.2%	484	30,298	46.2%	46.2%
6/30/83-84	8,977,920	9,569,920	8,924,062	53,858	645,858	96.2%	1.5%	39.8%	21,415	256,803	39.8%	39.8%
6/30/84-85	18,365,956	18,540,757	18,032,255	333,701	508,502	97.7%	1.5%	65.7%	219,350	334,251	65.7%	65.7%
6/30/85-86	22,666,435	22,883,130	22,223,840	442,595	659,290	97.6%	1.5%	62.0%	274,439	408,805	62.0%	62.0%
6/30/86-87	23,594,265	23,823,480	23,059,486	534,779	763,994	97.3%	1.5%	54.8%	292,869	418,397	54.8%	54.8%
6/30/87-88	33,020,670	33,842,680	32,013,956	1,006,714	1,828,724	95.8%	1.5%	35.4%	356,095	646,856	35.4%	35.4%
6/30/88-89	31,034,000	31,914,530	30,044,562	989,438	1,869,968	95.5%	1.5%	33.0%	326,730	617,498	33.0%	33.0%
6/30/89-90	30,392,000	31,134,590	29,097,786	1,294,214	2,036,804	94.6%	1.5%	27.7%	358,578	564,321	27.7%	27.7%
6/30/90-91	26,565,000	27,170,960	25,146,368	1,418,632	2,024,592	93.6%	1.0%	15.5%	220,006	313,980	15.5%	15.5%
6/30/91-92	17,261,000	18,089,700	16,180,639	1,080,361	1,909,061	91.5%	2.0%	24.2%	261,746	462,520	24.2%	24.2%
6/30/92-93	13,494,000	13,582,970	12,546,347	947,653	1,036,623	92.7%	1.5%	20.5%	193,972	212,183	20.5%	20.5%
6/30/93-94	15,299,000	15,708,780	14,083,868	1,215,132	1,624,912	90.8%	1.5%	16.4%	199,003	266,113	16.4%	16.4%
6/30/94-95	13,579,000	14,189,840	12,392,784	1,186,216	1,797,056	89.3%	1.5%	14.0%	165,623	250,910	14.0%	14.0%
6/30/95-96	13,778,000	14,434,920	12,368,134	1,409,866	2,066,786	87.7%	1.5%	12.2%	171,615	251,579	12.2%	12.2%
6/30/96-97	14,713,000	15,386,230	13,150,048	1,562,952	2,236,182	87.4%	0.3%	2.4%	37,040	52,994	2.4%	2.4%
6/30/97-98	12,298,000	12,868,580	10,939,492	1,358,508	1,929,088	86.9%	0.4%	3.4%	45,894	65,169	3.4%	3.4%
6/30/98-99	13,700,000	14,326,010	12,016,170	1,683,830	2,309,840	85.8%	1.2%	8.3%	140,206	192,331	8.3%	8.3%
6/30/99-00	16,330,000	17,131,720	14,074,376	2,255,624	3,057,344	84.1%	1.6%	10.3%	231,259	313,456	10.3%	10.3%
6/30/00-01	15,696,000	16,455,200	13,344,992	2,351,008	3,110,208	83.0%	1.1%	6.5%	153,397	202,932	6.5%	6.5%
6/30/01-02	15,862,000	16,626,860	13,345,445	2,516,555	3,281,415	82.2%	2.0%	11.2%	282,030	367,747	11.2%	11.2%
6/30/02-03	16,229,000	16,993,660	13,488,699	2,740,301	3,504,961	81.2%	1.0%	5.1%	138,803	177,535	5.1%	5.1%
6/30/03-04	15,390,000	16,095,140	12,567,145	2,822,855	3,527,995	79.8%	1.4%	6.8%	192,111	240,100	6.8%	6.8%
6/30/04-05	18,407,000	19,202,000	15,428,636	2,978,364	3,773,364	82.0%	2.0%	11.1%	331,806	420,374	11.1%	11.1%
6/30/05-06	17,181,000	17,377,000	13,646,462	3,534,538	3,730,538	79.0%	2.0%	9.5%	336,257	354,903	9.5%	9.5%
6/30/06-07	18,187,000	18,915,000	14,324,474	3,862,526	4,590,526	77.2%	1.8%	7.7%	298,451	354,703	7.7%	7.7%
6/30/07-08	21,922,000	23,001,811	17,225,042	4,696,958	5,776,769	76.7%	0.5%	2.3%	107,005	131,605	2.3%	2.3%
6/30/08-09	23,131,900	24,039,331	17,627,533	5,504,367	6,411,798	74.7%	1.9%	7.7%	424,262	494,204	7.7%	7.7%
6/30/09-10	23,610,070	24,201,462	17,377,753	6,232,317	6,823,709	72.7%	2.0%	7.5%	466,903	511,208	7.5%	7.5%
6/30/10-11	27,322,660	28,714,931	19,994,893	7,327,767	8,720,038	71.4%	1.3%	4.6%	340,396	405,071	4.6%	4.6%
6/30/11-12	29,178,000	30,533,767	20,437,615	8,740,385	10,096,152	68.5%	2.9%	9.2%	805,774	930,762	9.2%	9.2%
6/30/12-13	25,481,000	26,801,000	16,293,726	9,187,274	10,507,274	62.3%	6.1%	16.3%	1,493,597	1,708,193	16.3%	16.3%
6/30/13-14	31,015,840	32,540,000	19,007,183	12,008,657	13,532,817	59.8%	2.5%	6.3%	752,302	847,786	6.3%	6.3%
6/30/14-15	34,347,300	35,902,000	18,615,192	15,732,108	17,286,808	53.0%	6.8%	14.5%	2,281,045	2,506,465	14.5%	14.5%
6/30/15-16	37,221,860	39,370,000	17,136,144	20,085,716	22,233,856	44.7%	8.3%	14.9%	2,999,359	3,320,136	14.9%	14.9%
6/30/16-17	34,196,250	36,731,000	11,723,581	22,472,669	25,007,419	33.1%	11.7%	17.5%	3,923,908	4,366,496	17.5%	17.5%
6/30/17-18	39,738,080	42,341,000	5,874,321	33,863,759	36,466,679	14.3%	18.7%	21.9%	7,407,848	7,977,249	21.9%	21.9%
Total	827,379,398	861,590,289	638,415,179	188,964,220	223,175,110				26,542,785	31,296,262	14.0%	14.0%

NOTES:

(2) Exhibit 1, Page 1, Column (4) + Exhibit 2, Page 1, Column (4)

(3) Exhibit 1, Page 1, Column (5) + Exhibit 2, Page 1, Column (5)

(4) Exhibit 1, Page 1, Column (2) + Exhibit 2, Page 1, Column (2)

(5) = (2) - (4)

(6) = (3) - (4)

(7) = (4) / Average of Columns (2), (3)

(8) = (7) - Prior Year's (7)

(9) = (8) / (1.00 - (7))

(10) = (5) * (9)

(11) = (6) * (9)

(12) = (10) / (5)

(13) = (11) / (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Other - Clusters 5-17 & 95

Indemnity

Allocation of Outstanding Reserve to MassDOT Agencies

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
		Aon	Aon	Outstanding	Outstanding	**MassDOT Allocation - Method 1**					**MassDOT Allocation - Method 2**					**MassDOT Allocation - Method 3**					MassDOT	MassDOT	All Other	All Other
Accident		Selected Ult	Selected Ult	Losses	Losses	Paid Counts	MassDOT	MassDOT /	MassDOT OS	MassDOT OS	Total Paid	MassDOT	MassDOT /	MassDOT OS	MassDOT OS	Total Payroll	MassDOT	MassDOT /	MassDOT OS	MassDOT OS	Outstanding	Outstanding	Outstanding	Outstanding
Year	Paid Loss	(Low)	(High)	(Low)	(High)	7/1/17-18	7/1/17-18	Paid Counts	(Low)	(High)	7/1/17-18	7/1/17-18	Total Paid	(Low)	(High)	($000)	($000)	Total Payroll	(Low)	(High)	(Low)	(High)	(Low)	(High)
All Prior Yrs	45,481,398	48,982,800	51,826,222	3,501,401	6,344,824	7					303,381								228,610	414,260	76,203	138,087	3,425,198	6,206,737
6/30/82-83	5,610,779	5,611,827	5,669,000	1,048	58,221	0					0								68	3,801	23	1,267	1,025	56,954
6/30/83-84	8,126,285	8,174,920	8,759,000	48,636	632,715	1					41,958								3,175	41,311	1,058	13,770	47,577	618,945
6/30/84-85	16,908,299	17,242,000	17,396,000	333,701	487,701	1	1	100.0%	333,701	487,701	69,068	69,068	100.0%	333,701	487,701				21,788	31,843	125,759	183,795	207,942	303,906
6/30/85-86	20,330,636	20,763,000	20,951,000	432,364	620,364	3	1	33.3%	144,121	206,788	182,542	68,642	37.6%	162,584	233,278				28,230	40,504	111,645	160,190	320,719	460,174
6/30/86-87	21,334,819	21,856,000	22,058,000	521,181	723,181	6	1	16.7%	86,863	120,530	287,388	36,201	12.6%	65,650	91,095				34,028	47,217	62,181	86,281	459,000	636,900
6/30/87-88	28,800,700	29,771,000	30,542,000	970,300	1,741,300	7	1	14.3%	138,614	248,757	320,183	51,841	16.2%	157,102	281,935				63,352	113,691	119,689	214,795	850,611	1,526,505
6/30/88-89	26,463,905	27,383,000	28,225,000	919,095	1,761,095	5	1	20.0%	183,819	352,219	243,399	39,678	16.3%	149,827	287,086				60,009	114,984	131,218	251,430	787,877	1,509,665
6/30/89-90	25,229,990	26,437,000	27,136,000	1,207,010	1,906,010	7	1	14.3%	172,430	272,287	362,499	59,847	16.5%	199,272	314,673				78,807	124,445	150,169	237,135	1,056,840	1,668,875
6/30/90-91	21,640,631	22,970,000	23,539,000	1,329,369	1,898,369	4	1	25.0%	332,342	474,592	194,085	42,636	22.0%	292,034	417,031				86,796	123,946	237,057	338,523	1,092,311	1,559,845
6/30/91-92	13,391,479	14,392,000	15,191,000	1,000,521	1,799,521	4					166,185								65,325	117,493	21,775	39,164	978,746	1,760,357
6/30/92-93	10,034,192	10,897,000	10,960,000	862,808	925,808	3					84,719								56,334	60,447	18,778	20,149	844,030	905,659
6/30/93-94	11,121,315	12,222,000	12,600,000	1,100,685	1,478,685	6	2	33.3%	366,895	492,895	182,807	43,024	23.5%	259,045	348,007				71,865	96,545	165,455	222,276	935,230	1,256,409
6/30/94-95	9,822,297	10,896,000	11,479,000	1,073,703	1,656,703	2					82,369								70,103	108,168	23,368	36,056	1,050,335	1,620,647
6/30/95-96	10,280,186	11,587,000	12,221,000	1,306,814	1,940,814	2					91,628								85,323	126,718	28,441	42,239	1,278,373	1,898,575
6/30/96-97	10,379,301	11,790,000	12,434,000	1,410,699	2,054,699	3					83,584								92,106	134,153	30,702	44,718	1,379,997	2,009,981
6/30/97-98	8,909,187	10,144,000	10,689,000	1,234,813	1,779,813	1					48,575					1,917,994	137,500	7.2%	88,523	127,594	88,523	127,594	1,146,290	1,652,220
6/30/98-99	9,400,216	10,902,000	11,497,000	1,501,784	2,096,784	6					99,266					2,081,524	136,688	6.6%	98,618	137,690	49,309	68,845	1,452,475	2,027,939
6/30/99-00	10,887,745	12,894,000	13,627,000	2,006,255	2,739,255	4	1	25.0%	501,564	684,814	169,170	1,095	0.6%	12,987	17,733	2,207,243	137,892	6.2%	125,336	171,129	125,336	171,129	1,880,919	2,568,127
6/30/00-01	10,162,814	12,238,000	12,926,000	2,075,186	2,763,186	5	1	20.0%	415,037	552,637	97,999	22,334	22.8%	472,942	629,740	2,201,008	145,149	6.6%	136,851	182,222	341,610	454,866	1,733,576	2,308,319
6/30/01-02	10,405,462	12,625,000	13,319,000	2,219,538	2,913,538	3					31,445					2,292,592	140,223	6.1%	135,755	178,203	67,877	89,101	2,151,660	2,824,437
6/30/02-03	10,199,369	12,549,000	13,237,000	2,349,631	3,037,631	4					82,811					2,260,534	140,250	6.2%	145,778	188,463	145,778	188,463	2,203,853	2,849,167
6/30/03-04	9,391,262	11,739,000	12,365,000	2,347,738	2,973,738	6					157,902					2,255,942	137,408	6.1%	142,999	181,128	142,999	181,128	2,204,739	2,792,610
6/30/04-05	10,946,829	13,307,000	13,867,000	2,360,171	2,920,171	5					167,430					2,309,083	145,033	6.3%	148,242	183,415	49,414	61,138	2,310,757	2,859,032
6/30/05-06	10,131,389	12,981,000	13,014,000	2,849,611	2,882,611	2					45,730					2,480,693	156,390	6.3%	179,648	181,728	89,824	90,864	2,759,787	2,791,747
6/30/06-07	9,223,523	12,187,000	12,567,000	2,963,477	3,343,477	4	1	25.0%	740,869	835,869	86,668	585	0.7%	20,015	22,582	2,612,577	157,146	6.0%	178,252	201,109	125,506	141,600	2,837,970	3,201,877
6/30/07-08	13,176,285	16,922,000	17,828,811	3,745,715	4,652,526	8	1	12.5%	468,214	581,566	287,323	51,995	18.1%	677,837	841,937	2,783,717	168,663	6.1%	226,949	281,892	307,371	381,783	3,438,344	4,270,742
6/30/08-09	13,220,349	17,631,900	18,349,331	4,411,551	5,128,982	6	2	33.3%	1,470,517	1,709,661	106,020	3,459	3.3%	143,937	167,345	2,750,907	180,456	6.6%	289,392	336,454	289,392	336,454	4,122,159	4,792,528
6/30/09-10	13,035,703	18,110,070	18,480,462	5,074,367	5,444,759	4					159,962					2,806,048	203,138	7.2%	367,347	394,161	183,674	197,081	4,890,694	5,247,679
6/30/10-11	14,955,303	20,922,660	21,952,931	5,967,357	6,997,628	14					278,107					2,942,638	196,775	6.7%	399,038	467,932	159,615	187,173	5,807,741	6,810,455
6/30/11-12	15,522,941	22,778,000	23,790,767	7,255,059	8,267,826	23	3	13.0%	946,312	1,078,412	650,365	33,348	5.1%	372,008	423,939	3,006,849	207,250	6.9%	500,063	569,869	436,036	496,904	6,819,023	7,770,922
6/30/12-13	12,117,046	19,781,000	20,788,000	7,663,954	8,670,954	22					604,273	38,000	6.3%	481,952	545,277	3,138,905	218,884	7.0%	534,428	604,649	267,214	302,325	7,396,739	8,368,629
6/30/13-14	14,236,704	24,315,840	25,346,000	10,079,136	11,109,296	47	6	12.8%	1,286,698	1,418,208	1,441,624	122,338	8.5%	855,327	942,748	3,311,947	231,765	7.0%	705,322	777,411	888,168	978,945	9,190,968	10,130,351
6/30/14-15	13,875,194	27,247,300	28,264,000	13,372,106	14,388,806	73	6	8.2%	1,099,077	1,182,642	2,600,098	288,298	11.1%	1,482,694	1,595,426	3,511,622	252,444	7.2%	961,295	1,034,384	1,071,159	1,152,600	12,300,947	13,236,205
6/30/15-16	12,428,497	29,621,860	31,059,000	17,193,363	18,630,503	125	10	8.0%	1,375,469	1,490,440	4,191,756	223,129	5.3%	915,209	991,708	3,491,558	239,716	6.9%	1,180,427	1,279,095	1,168,731	1,266,422	16,024,632	17,364,081
6/30/16-17	7,935,244	26,796,250	28,420,000	18,861,006	20,484,756	217	25	11.5%	2,172,927	2,359,995	4,424,433	554,309	12.5%	2,362,976	2,566,405	3,338,327	202,091	6.1%	1,141,783	1,240,080	1,141,783	1,240,080	17,719,223	19,244,677
6/30/17-18	4,081,252	32,238,080	33,291,000	28,156,828	29,209,748	510	36	7.1%	1,987,541	2,061,865	4,081,252	262,580	6.4%	1,811,559	1,879,302	3,401,479	204,258	6.0%	1,690,810	1,754,037	1,690,810	1,754,037	26,466,018	27,455,710
Total	519,198,530	678,906,507	705,664,524	159,707,977	186,465,994	1,150	101	8.8%	14,223,012	16,611,878	22,508,006	2,012,408	8.9%	11,228,659	13,084,948						10,133,650	11,898,407	149,574,326	174,567,587

Sel. FY97 & Prior	6.53%

NOTES:

(2), (7), (8), (12), (13), (17). (18) Provided by Commonwealth of Massachusetts
(3) From Section 8, Exhibit 1, Page 1, Column 6
(4) From Section 8, Exhibit 1, Page 1, Column 7
(5) = (3) - (2)
(6) = (4) - (2)
(9) = (8) / (7)
(10) = (9) * (5)
(11) = (9) * (6)

(14) = (13) / (12)
(15) = (14) * (5)
(16) = (14) * (6)
(19) = (18) / (17)
(20) = (19) * (5)
(21) = (19) * (6)

(22) Selected judgementally based on (10), (15), (20)
(23) Selected judgementally based on (11), (16). (21)
(24) = (5) - (22)
(25) = (6) - (23)

Commonwealth of Massachusetts

Workers Compensation

Reserve Analysis at June, 30, 2017

All Other - Clusters 5-17 & 95

Indemnity

Allocation of Outstanding Reserve to MassDOT Agencies

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
		Aon	Aon	Outstanding	Outstanding		MassDOT Allocation - Method 1					MassDOT Allocation - Method 2					MassDOT Allocation - Method 3				MassDOT	MassDOT	All Other	All Other
Accident		Selected Ult	Selected Ult	Losses	Losses	Paid Counts	MassDOT	MassDOT /	MassDOT OS	MassDOT OS	Total Paid	MassDOT	MassDOT /	MassDOT OS	MassDOT OS	Total Payroll	MassDOT	MassDOT /	MassDOT OS	MassDOT OS	Outstanding	Outstanding	Outstanding	Outstanding
Year	Paid Loss	(Low)	(High)	(Low)	(High)	7/1/16-17	7/1/16-17	Paid Counts	(Low)	(High)	7/1/16-17	7/1/16-17	Total Paid	(Low)	(High)	($000)	($000)	Total Payroll	(Low)	(High)	(Low)	(High)	(Low)	(High)
All Prior Yrs	45,178,017	49,462,611	52,658,727	4,284,594	7,480,710	10					362,696								280,869	490,384	93,623	163,461	4,190,971	7,317,248
6/30/82-83	5,610,779	5,639,587	6,073,401	28,808	462,622	0					0								1,888	30,326	629	10,109	28,178	452,513
6/30/83-84	8,084,326	8,130,411	8,755,827	46,085	671,501	1					40,582								3,021	44,019	1,007	14,673	45,078	656,828
6/30/84-85	16,839,230	17,176,000	17,410,000	336,770	570,770	1	1	100.0%	336,770	570,770	66,219	66,219	100.0%	336,770	570,770				22,076	37,416	126,974	215,200	209,796	355,569
6/30/85-86	20,148,094	20,615,000	20,903,000	466,906	754,906	3	1	33.3%	155,635	251,635	176,553	66,390	37.6%	175,572	283,869				30,607	49,486	120,605	194,997	346,302	559,909
6/30/86-87	21,047,431	21,638,000	21,946,000	590,569	898,569	6	1	16.7%	98,428	149,761	310,003	66,389	21.4%	126,474	192,434				38,714	58,904	87,872	133,700	502,697	764,869
6/30/87-88	28,480,516	29,609,000	30,515,000	1,128,484	2,034,484	7	1	14.3%	161,212	290,641	300,960	50,140	16.7%	188,007	338,948				73,976	133,367	141,065	254,318	987,419	1,780,165
6/30/88-89	26,220,506	27,287,000	28,275,000	1,066,494	2,054,494	7	1	14.3%	152,356	293,499	301,373	38,376	12.7%	135,804	261,613				69,912	134,679	119,357	229,930	947,137	1,824,564
6/30/89-90	24,867,491	26,307,000	27,125,000	1,439,509	2,257,509	7	1	14.3%	205,644	322,501	368,453	57,884	15.7%	226,147	354,656				94,364	147,987	175,385	275,048	1,264,123	1,982,461
6/30/90-91	21,446,546	23,007,000	23,674,000	1,560,454	2,227,454	4	1	25.0%	390,113	556,863	187,718	41,237	22.0%	342,796	489,321				102,293	146,017	278,401	397,400	1,282,053	1,830,054
6/30/91-92	13,225,294	14,376,000	15,238,000	1,150,706	2,012,706	5					219,390								75,432	131,939	25,144	43,980	1,125,562	1,968,726
6/30/92-93	9,949,473	11,018,000	11,915,000	1,068,527	1,965,527	4	1	25.0%	267,132	491,382	180,479	22,972	12.7%	136,006	250,179				70,045	128,846	157,728	290,136	910,799	1,675,391
6/30/93-94	10,938,507	12,179,000	12,461,000	1,240,493	1,522,493	6	2	33.3%	413,498	507,498	179,561	42,260	23.5%	291,948	358,316				81,318	99,804	186,633	229,060	1,053,860	1,293,432
6/30/94-95	9,739,928	10,953,000	11,544,000	1,213,072	1,804,072	3					102,660								79,521	118,263	26,507	39,421	1,186,565	1,764,651
6/30/95-96	10,188,557	11,658,000	12,302,000	1,469,443	2,113,443	2					90,003								96,327	138,543	32,109	46,181	1,437,334	2,067,262
6/30/96-97	10,295,717	11,882,000	12,538,000	1,586,283	2,242,283	4					86,307								103,986	146,989	34,662	48,996	1,551,621	2,193,287
6/30/97-98	8,860,612	10,249,000	10,805,000	1,388,388	1,944,388	1					47,713					1,917,994	137,500	7.2%	99,533	139,392	99,533	139,392	1,288,856	1,804,996
6/30/98-99	9,300,951	11,012,000	11,621,000	1,711,049	2,320,049	4					132,450					2,081,524	136,688	6.6%	112,360	152,352	56,180	76,176	1,654,869	2,243,874
6/30/99-00	10,718,575	12,951,000	13,698,000	2,232,425	2,979,425	4					161,616					2,207,243	137,892	6.2%	139,466	186,133	139,466	186,133	2,092,960	2,793,293
6/30/00-01	10,064,815	12,377,000	13,084,000	2,312,185	3,019,185	7	1	14.3%	330,312	431,312	119,346	21,937	18.4%	425,002	554,956	2,201,008	145,149	6.6%	152,480	199,104	302,598	395,124	2,009,586	2,624,061
6/30/01-02	10,374,018	12,857,000	13,576,000	2,482,982	3,201,982	3	1	33.3%	827,661	1,067,327	31,439	19	0.1%	1,521	1,962	2,292,592	140,223	6.1%	151,868	195,845	76,695	98,903	2,406,288	3,103,079
6/30/02-03	10,116,558	12,782,000	13,496,000	2,665,442	3,379,442	3					75,590					2,260,534	140,250	6.2%	165,372	209,670	165,372	209,670	2,500,070	3,169,771
6/30/03-04	9,233,360	11,890,000	12,534,000	2,656,640	3,300,640	4					133,072					2,255,942	137,408	6.1%	161,814	201,039	161,814	201,039	2,494,826	3,099,600
6/30/04-05	10,779,399	13,383,000	14,079,000	2,603,601	3,299,601	3					131,220					2,309,083	145,033	6.3%	163,532	207,247	54,511	69,082	2,549,090	3,230,519
6/30/05-06	10,085,659	13,230,000	13,389,000	3,144,341	3,303,341	4					47,341					2,480,693	156,390	6.3%	198,229	208,253	99,114	104,126	3,045,226	3,199,214
6/30/06-07	9,136,855	12,522,000	12,827,000	3,385,145	3,690,145	5	2	40.0%	1,354,058	1,476,058	111,974	5,829	5.2%	176,217	192,094	2,612,577	157,146	6.0%	203,615	221,961	194,483	212,005	3,190,662	3,478,140
6/30/07-08	12,888,962	17,041,000	18,139,121	4,152,038	5,250,159	6	1	16.7%	692,006	875,026	226,217	51,073	22.6%	937,412	1,185,337	2,783,717	168,663	6.1%	251,568	318,102	398,381	503,743	3,753,657	4,746,415
6/30/08-09	13,114,329	17,966,520	19,011,993	4,852,191	5,897,664	8	2	25.0%	1,213,048	1,474,416	58,527	-8,705	-14.9%	-721,712	-877,215	2,750,907	180,456	6.6%	318,297	386,878	318,297	386,878	4,533,894	5,510,785
6/30/09-10	12,875,740	18,468,450	19,110,091	5,592,710	6,234,351	8					190,170					2,806,048	203,138	7.2%	404,872	451,322	202,436	225,661	5,390,274	6,008,690
6/30/10-11	14,677,197	21,402,810	22,825,803	6,725,613	8,148,606	23	1	4.3%	292,418	354,287	652,136	137,984	21.2%	1,423,061	1,724,150	2,942,638	196,775	6.7%	449,743	544,898	581,476	704,504	6,144,137	7,444,102
6/30/11-12	14,872,577	23,233,000	24,723,699	8,360,423	9,851,122	32	3	9.4%	783,790	923,543	1,229,330	80,870	6.6%	549,981	648,045	3,006,849	207,250	6.9%	576,251	678,999	563,116	663,522	7,797,307	9,187,600
6/30/12-13	11,512,774	20,970,000	21,687,000	9,457,226	10,174,226	37	1	2.7%	255,601	274,979	1,031,831	-3,189	-0.3%	-29,225	-31,441	3,138,905	218,884	7.0%	659,478	709,477	457,539	492,228	8,999,687	9,681,998
6/30/13-14	12,795,080	25,092,480	26,666,000	12,297,400	13,870,920	72	8	11.1%	1,366,378	1,541,213	2,084,100	275,862	13.2%	1,627,748	1,836,028	3,311,947	231,765	7.0%	860,553	970,666	1,178,808	1,329,643	11,118,592	12,541,277
6/30/14-15	11,275,096	28,111,570	28,989,000	16,836,474	17,713,904	104	10	9.6%	1,618,892	1,703,260	3,624,891	532,178	14.7%	2,471,797	2,600,614	3,511,622	252,444	7.2%	1,210,342	1,273,419	1,488,676	1,566,258	15,347,798	16,147,645
6/30/15-16	8,236,741	27,712,900	29,281,000	19,476,159	21,044,259	244	18	7.4%	1,436,766	1,552,445	4,472,147	399,223	8.9%	1,738,612	1,878,594	3,491,558	239,716	6.9%	1,337,155	1,444,814	1,337,155	1,444,814	18,139,004	19,599,445
6/30/16-17	3,510,811	28,694,400	29,950,000	25,183,589	26,439,189	527	41	7.8%	1,959,255	2,056,939	3,510,811	313,255	8.9%	2,247,030	2,359,062	3,338,327	202,091	6.1%	1,524,531	1,600,541	1,524,531	1,600,541	23,659,058	24,838,648
Total	496,690,524	652,883,739	682,826,663	156,193,215	186,136,138	1,169	99	8.5%	14,310,971	17,165,356	21,044,876	2,258,204	10.7%	12,806,968	15,172,290						11,007,880	13,196,055	145,185,334	172,940,083

Sel. FY97 & Prior	6.56%

NOTES:

(2), (7), (8), (12), (13), (17). (18) Provided by Commonwealth of Massachusetts
(3) From Prior Analysis - Section 8, Exhibit 2, Page 1, Column 6
(4) From Prior Analysis - Section 8, Exhibit 2, Page 1, Column 7
(5) = (3) - (2)
(6) = (4) - (2)
(9) = (8) / (7)
(10) = (9) * (5)
(11) = (9) * (6)

(14) = (13) / (12)
(15) = (14) * (5)
(16) = (14) * (6)
(19) = (18) / (17)
(20) = (19) * (5)
(21) = (19) * (6)

(22) Selected judgementally based on (10), (15), (20)
(23) Selected judgementally based on (11), (16). (21)
(24) = (5) - (22)
(25) = (6) - (23)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Other - Clusters 5-17 & 95
Medical

Summary of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Paid Loss	Ult Loss - Paid Loss Method	Ult Loss - Paid BF Method	Aon Selected Ult (Low)	Aon Selected Ult (High)	Outstanding Losses (Low)	Outstanding Losses (High)	Ult Loss Cost (Low)	Ult Loss Cost (High)
All Prior Yrs		3,057,851			3,087,426	3,135,570	29,574	77,718		
6/30/82-83		512,140	514,394		512,140	519,538	0	7,398		
6/30/83-84		797,778	802,891		803,000	810,920	5,222	13,142		
6/30/84-85	732,729	1,123,956	1,133,423	1,133,687	1,123,956	1,144,757	0	20,801	0.153	0.156
6/30/85-86	787,208	1,893,204	1,912,968	1,913,130	1,903,435	1,932,130	10,231	38,926	0.242	0.245
6/30/86-87	902,483	1,724,666	1,747,899	1,747,458	1,738,265	1,765,480	13,599	40,814	0.193	0.196
6/30/87-88	1,366,586	3,213,256	3,266,310	3,268,083	3,249,670	3,300,680	36,414	87,424	0.238	0.242
6/30/88-89	1,486,478	3,580,657	3,650,697	3,653,380	3,651,000	3,689,530	70,343	108,873	0.246	0.248
6/30/89-90	1,494,463	3,867,795	3,955,282	3,959,030	3,955,000	3,998,590	87,205	130,795	0.265	0.268
6/30/90-91	1,405,560	3,505,736	3,595,789	3,595,379	3,595,000	3,631,960	89,264	126,224	0.256	0.258
6/30/91-92	1,364,510	2,789,160	2,869,527	2,869,001	2,869,000	2,898,700	79,840	109,540	0.210	0.212
6/30/92-93	1,347,359	2,512,155	2,597,463	2,596,800	2,597,000	2,622,970	84,845	110,815	0.193	0.195
6/30/93-94	1,424,410	2,962,553	3,078,472	3,076,959	3,077,000	3,108,780	114,447	146,227	0.216	0.218
6/30/94-95	1,497,829	2,570,487	2,684,420	2,683,431	2,683,000	2,710,840	112,513	140,353	0.179	0.181
6/30/95-96	1,582,635	2,087,948	2,191,396	2,191,979	2,191,000	2,213,920	103,052	125,972	0.138	0.140
6/30/96-97	1,979,748	2,770,748	2,922,565	2,923,132	2,923,000	2,952,230	152,252	181,482	0.148	0.149
6/30/97-98	1,917,994	2,030,306	2,154,402	2,158,375	2,154,000	2,179,580	123,694	149,274	0.112	0.114
6/30/98-99	2,081,524	2,615,954	2,798,052	2,801,031	2,798,000	2,829,010	182,046	213,056	0.134	0.136
6/30/99-00	2,207,243	3,186,632	3,435,723	3,436,489	3,436,000	3,504,720	249,368	318,088	0.156	0.159
6/30/00-01	2,201,008	3,182,178	3,458,437	3,459,964	3,458,000	3,529,200	275,822	347,022	0.157	0.160
6/30/01-02	2,292,592	2,939,983	3,236,929	3,242,723	3,237,000	3,307,860	297,017	367,877	0.141	0.144
6/30/02-03	2,260,534	3,289,330	3,680,451	3,683,345	3,680,000	3,756,660	390,670	467,330	0.163	0.166
6/30/03-04	2,255,942	3,175,883	3,651,327	3,656,977	3,651,000	3,730,140	475,117	554,257	0.162	0.165
6/30/04-05	2,309,083	4,481,807	5,230,045	5,092,350	5,100,000	5,335,000	618,193	853,193	0.221	0.231
6/30/05-06	2,480,693	3,515,073	4,204,463	4,276,964	4,200,000	4,363,000	684,927	847,927	0.169	0.176
6/30/06-07	2,612,577	5,100,951	6,223,397	5,992,394	6,000,000	6,348,000	899,049	1,247,049	0.230	0.243
6/30/07-08	2,783,717	4,048,757	5,012,916	5,071,794	5,000,000	5,173,000	951,243	1,124,243	0.180	0.186
6/30/08-09	2,750,907	4,407,183	5,524,230	5,486,416	5,500,000	5,690,000	1,092,817	1,282,817	0.200	0.207
6/30/09-10	2,806,048	4,342,050	5,529,950	5,554,557	5,500,000	5,721,000	1,157,950	1,378,950	0.196	0.204
6/30/10-11	2,942,638	5,039,589	6,564,873	6,428,623	6,400,000	6,762,000	1,360,411	1,722,411	0.217	0.230
6/30/11-12	3,006,849	4,914,674	6,546,379	6,452,564	6,400,000	6,743,000	1,485,326	1,828,326	0.213	0.224
6/30/12-13	3,138,905	4,176,679	5,746,439	5,953,759	5,700,000	6,013,000	1,523,321	1,836,321	0.182	0.192
6/30/13-14	3,311,947	4,770,478	6,816,479	6,851,348	6,700,000	7,194,000	1,929,522	2,423,522	0.202	0.217
6/30/14-15	3,511,622	4,739,997	7,197,063	7,274,580	7,100,000	7,638,000	2,360,003	2,898,003	0.202	0.218
6/30/15-16	3,491,558	4,707,647	7,915,555	7,729,117	7,600,000	8,311,000	2,892,353	3,603,353	0.218	0.238
6/30/16-17	3,338,327	3,788,337	7,914,813	7,541,932	7,400,000	8,311,000	3,611,663	4,522,663	0.222	0.249
6/30/17-18	3,401,479	1,793,068	8,619,348	7,660,916	7,500,000	9,050,000	5,706,932	7,256,932	0.220	0.266
Total	74,475,184	119,216,649	148,384,768	145,417,666	148,472,892	155,925,765	29,256,243	36,709,116		
Tot 6/30/84-18	74,475,184	114,848,879	147,067,483	145,417,666	144,070,326	151,459,737	29,221,447	36,610,858	0.193	0.203

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 8, Exhibit 2, Page 2, Column 3

(4) From Section 8, Exhibit 2, Page 2, Column 8

(5) From Section 8, Exhibit 2, Page 3, Column 8

(6), (7) Selected based on (3), (4), and (5)

(8) = (6) - (3)

(9) = (7) - (3)

(10) = (6) / (2) / 10

(11) = (7) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Other - Clusters 5-17 & 95
Medical

Paid Loss Development Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Accident Year	Payroll (000's)	Paid Loss	Paid LDF	Adjustment for Tail	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Paid Counts 7/1/16-17	Paid Counts 7/1/17-18	Average Outstanding Claim
All Prior Yrs		3,057,851							3	3	
6/30/82-83		512,140	1.004	1.000	514,394	N/A	514,394		0	0	
6/30/83-84		797,778	1.006	1.000	802,891	N/A	802,891		1	1	5,114
6/30/84-85	732,729	1,123,956	1.008	1.000	1,133,423	N/A	1,133,423	0.155	0	0	
6/30/85-86	787,208	1,893,204	1.010	1.000	1,912,968	N/A	1,912,968	0.243	2	1	19,764
6/30/86-87	902,483	1,724,666	1.013	1.000	1,747,899	N/A	1,747,899	0.194	2	2	11,616
6/30/87-88	1,366,586	3,213,256	1.017	1.000	3,266,310	N/A	3,266,310	0.239	4	4	13,264
6/30/88-89	1,486,478	3,580,657	1.020	1.000	3,650,697	N/A	3,650,697	0.246	5	3	23,347
6/30/89-90	1,494,463	3,867,795	1.023	1.000	3,955,282	N/A	3,955,282	0.265	7	5	17,497
6/30/90-91	1,405,560	3,505,736	1.026	1.000	3,595,789	N/A	3,595,789	0.256	6	5	18,010
6/30/91-92	1,364,510	2,789,160	1.029	1.000	2,869,527	N/A	2,869,527	0.210	3	3	26,789
6/30/92-93	1,347,359	2,512,155	1.034	1.000	2,597,463	N/A	2,597,463	0.193	2	3	28,436
6/30/93-94	1,424,410	2,962,553	1.039	1.000	3,078,472	N/A	3,078,472	0.216	5	5	23,184
6/30/94-95	1,497,829	2,570,487	1.044	1.000	2,684,420	N/A	2,684,420	0.179	8	8	14,242
6/30/95-96	1,582,635	2,087,948	1.050	1.000	2,191,396	N/A	2,191,396	0.138	2	2	51,724
6/30/96-97	1,979,748	2,770,748	1.055	1.000	2,922,565	N/A	2,922,565	0.148	4	4	37,954
6/30/97-98	1,917,994	2,030,306	1.061	1.000	2,154,402	N/A	2,154,402	0.112	5	3	41,365
6/30/98-99	2,081,524	2,615,954	1.070	1.000	2,798,052	N/A	2,798,052	0.134	7	6	30,350
6/30/99-00	2,207,243	3,186,632	1.078	1.000	3,435,723	N/A	3,435,723	0.156	12	13	19,161
6/30/00-01	2,201,008	3,182,178	1.087	1.000	3,458,437	N/A	3,458,437	0.157	11	9	30,695
6/30/01-02	2,292,592	2,939,983	1.101	1.000	3,236,929	N/A	3,236,929	0.141	14	12	24,745
6/30/02-03	2,260,534	3,289,330	1.119	1.000	3,680,451	N/A	3,680,451	0.163	17	11	35,556
6/30/03-04	2,255,942	3,175,883	1.150	1.000	3,651,327	N/A	3,651,327	0.162	17	16	29,715
6/30/04-05	2,309,083	4,481,807	1.167	1.000	5,230,045	N/A	5,230,045	0.226	10	10	74,824
6/30/05-06	2,480,693	3,515,073	1.196	1.000	4,204,463	N/A	4,204,463	0.169	16	14	49,242
6/30/06-07	2,612,577	5,100,951	1.220	1.000	6,223,397	N/A	6,223,397	0.238	23	18	62,358
6/30/07-08	2,783,717	4,048,757	1.238	1.000	5,012,916	N/A	5,012,916	0.180	18	14	68,869
6/30/08-09	2,750,907	4,407,183	1.253	1.000	5,524,230	N/A	5,524,230	0.201	23	17	65,709
6/30/09-10	2,806,048	4,342,050	1.274	1.000	5,529,950	N/A	5,529,950	0.197	24	21	56,567
6/30/10-11	2,942,638	5,039,589	1.303	1.000	6,564,873	N/A	6,564,873	0.223	41	32	47,665
6/30/11-12	3,006,849	4,914,674	1.332	1.000	6,546,379	N/A	6,546,379	0.218	49	41	39,798
6/30/12-13	3,138,905	4,176,679	1.376	1.000	5,746,439	N/A	5,746,439	0.183	59	41	38,287
6/30/13-14	3,311,947	4,770,478	1.429	1.000	6,816,479	N/A	6,816,479	0.206	103	65	31,477
6/30/14-15	3,511,622	4,739,997	1.518	1.000	7,197,063	N/A	7,197,063	0.205	211	103	23,855
6/30/15-16	3,491,558	4,707,647	1.681	1.000	7,915,555	N/A	7,915,555	0.227	715	215	14,921
6/30/16-17	3,338,327	3,788,337	2.089	1.000	7,914,813	N/A	7,914,813	0.237	968	636	6,488
6/30/17-18	3,401,479	1,793,068	4.807	1.000	8,619,348	N/A	8,619,348	0.253		942	7,247
Total	74,475,184	119,216,649			148,384,768		148,384,768		2,397	2,288	

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3), (4) From Section 8, Exhibit 2, Page 7

(5) Based on information from the MA WCRIB 7/1/16 filing. Consideration for development beyond 252 months made in selection of LDF's.

(6) = (3) x (4) x (5)

(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10), (11) Provided by Commonwealth of Massachusetts

(12) = Maximum of [{(6) - (3)} / (11)] and 0

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Other - Clusters 5-17 & 95
Medical

Paid Bornhuetter-Ferguson Method

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Accident Year	Payroll (000's)	A Priori Loss Rate	Paid Loss	Paid LDF	Ultimate Loss Excluding Lump Sum	Est Ult Lump Sum Payments	Ultimate Loss Including Lump Sum	Ultimate Loss Cost	Ultimate Loss Cost Excluding Lump Sum
All Prior Yrs									
6/30/82-83									
6/30/83-84									
6/30/84-85	732,729	0.159	1,123,956	1.008	1,133,687	N/A	1,133,687	0.155	0.155
6/30/85-86	787,208	0.245	1,893,204	1.010	1,913,130	N/A	1,913,130	0.243	0.243
6/30/86-87	902,483	0.190	1,724,666	1.013	1,747,458	N/A	1,747,458	0.194	0.194
6/30/87-88	1,366,586	0.247	3,213,256	1.017	3,268,083	N/A	3,268,083	0.239	0.239
6/30/88-89	1,486,478	0.255	3,580,657	1.020	3,653,380	N/A	3,653,380	0.246	0.246
6/30/89-90	1,494,463	0.276	3,867,795	1.023	3,959,030	N/A	3,959,030	0.265	0.265
6/30/90-91	1,405,560	0.255	3,505,736	1.026	3,595,379	N/A	3,595,379	0.256	0.256
6/30/91-92	1,364,510	0.209	2,789,160	1.029	2,869,001	N/A	2,869,001	0.210	0.210
6/30/92-93	1,347,359	0.191	2,512,155	1.034	2,596,800	N/A	2,596,800	0.193	0.193
6/30/93-94	1,424,410	0.213	2,962,553	1.039	3,076,959	N/A	3,076,959	0.216	0.216
6/30/94-95	1,497,829	0.178	2,570,487	1.044	2,683,431	N/A	2,683,431	0.179	0.179
6/30/95-96	1,582,635	0.139	2,087,948	1.050	2,191,979	N/A	2,191,979	0.139	0.139
6/30/96-97	1,979,748	0.148	2,770,748	1.055	2,923,132	N/A	2,923,132	0.148	0.148
6/30/97-98	1,917,994	0.116	2,030,306	1.061	2,158,375	N/A	2,158,375	0.113	0.113
6/30/98-99	2,081,524	0.137	2,615,954	1.070	2,801,031	N/A	2,801,031	0.135	0.135
6/30/99-00	2,207,243	0.156	3,186,632	1.078	3,436,489	N/A	3,436,489	0.156	0.156
6/30/00-01	2,201,008	0.158	3,182,178	1.087	3,459,964	N/A	3,459,964	0.157	0.157
6/30/01-02	2,292,592	0.144	2,939,983	1.101	3,242,723	N/A	3,242,723	0.141	0.141
6/30/02-03	2,260,534	0.164	3,289,330	1.119	3,683,345	N/A	3,683,345	0.163	0.163
6/30/03-04	2,255,942	0.164	3,175,883	1.150	3,656,977	N/A	3,656,977	0.162	0.162
6/30/04-05	2,309,083	0.185	4,481,807	1.167	5,092,350	N/A	5,092,350	0.221	0.221
6/30/05-06	2,480,693	0.187	3,515,073	1.196	4,276,964	N/A	4,276,964	0.172	0.172
6/30/06-07	2,612,577	0.189	5,100,951	1.220	5,992,394	N/A	5,992,394	0.229	0.229
6/30/07-08	2,783,717	0.191	4,048,757	1.238	5,071,794	N/A	5,071,794	0.182	0.182
6/30/08-09	2,750,907	0.194	4,407,183	1.253	5,486,416	N/A	5,486,416	0.199	0.199
6/30/09-10	2,806,048	0.201	4,342,050	1.274	5,554,557	N/A	5,554,557	0.198	0.198
6/30/10-11	2,942,638	0.203	5,039,589	1.303	6,428,623	N/A	6,428,623	0.218	0.218
6/30/11-12	3,006,849	0.205	4,914,674	1.332	6,452,564	N/A	6,452,564	0.215	0.215
6/30/12-13	3,138,905	0.207	4,176,679	1.376	5,953,759	N/A	5,953,759	0.190	0.190
6/30/13-14	3,311,947	0.209	4,770,478	1.429	6,851,348	N/A	6,851,348	0.207	0.207
6/30/14-15	3,511,622	0.211	4,739,997	1.518	7,274,580	N/A	7,274,580	0.207	0.207
6/30/15-16	3,491,558	0.214	4,707,647	1.681	7,729,117	N/A	7,729,117	0.221	0.221
6/30/16-17	3,338,327	0.216	3,788,337	2.089	7,541,932	N/A	7,541,932	0.226	0.226
6/30/17-18	3,401,479	0.218	1,793,068	4.807	7,660,916	N/A	7,660,916	0.225	0.225
Total	74,475,184		114,848,879		145,417,666		145,417,666		

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 8, Exhibit 2, Page 4, Column 11

(4) From Section 8, Exhibit 2, Page 2, Column 3

(5) From Section 8, Exhibit 2, Page 2, Column 4

(6) = (4) + [{1 - {1 / (5)}} x (3) x (2) x 10]

(7) Lump Sum Payments are considered in the Indemnity analysis (Section 1)

(8) = (6) + (7)

(9) = (8) / (2) / 10

(10) = (6) / (2) / 10

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Other - Clusters 5-17 & 95
Medical

Calculation of Initial Expected Loss Rate

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Accident Year	Payroll (000's)	Expected Ult Loss	Unadjusted Loss Cost	Benefit Level Factor	Adjusted Loss Cost	Trend Factor	Trended Adjusted Loss Cost	Detrended Selected Loss Cost	Prior Selected Loss Cost	Current Selected Loss Cost
All Prior Yrs										
6/30/82-83										
6/30/83-84										
6/30/84-85									0.159	0.159
6/30/85-86									0.245	0.245
6/30/86-87									0.190	0.190
6/30/87-88									0.247	0.247
6/30/88-89									0.255	0.255
6/30/89-90									0.276	0.276
6/30/90-91	1,405,560	3,595,789	0.256	1.194	0.305	1.321	0.404	0.139	0.254	0.255
6/30/91-92	1,364,510	2,869,527	0.210	1.189	0.250	1.308	0.327	0.141	0.210	0.209
6/30/92-93	1,347,359	2,597,463	0.193	1.189	0.229	1.295	0.297	0.143	0.191	0.191
6/30/93-94	1,424,410	3,078,472	0.216	1.178	0.255	1.282	0.327	0.146	0.213	0.213
6/30/94-95	1,497,829	2,684,420	0.179	1.170	0.210	1.270	0.266	0.148	0.176	0.178
6/30/95-96	1,582,635	2,191,396	0.138	1.155	0.160	1.257	0.201	0.151	0.140	0.139
6/30/96-97	1,979,748	2,922,565	0.148	1.137	0.168	1.245	0.209	0.155	0.149	0.148
6/30/97-98	1,917,994	2,154,402	0.112	1.135	0.127	1.232	0.157	0.157	0.116	0.116
6/30/98-99	2,081,524	2,798,052	0.134	1.135	0.153	1.220	0.186	0.159	0.136	0.137
6/30/99-00	2,207,243	3,435,723	0.156	1.135	0.177	1.208	0.213	0.160	0.154	0.156
6/30/00-01	2,201,008	3,458,437	0.157	1.109	0.174	1.196	0.208	0.166	0.157	0.158
6/30/01-02	2,292,592	3,236,929	0.141	1.101	0.155	1.184	0.184	0.169	0.142	0.144
6/30/02-03	2,260,534	3,680,451	0.163	1.073	0.175	1.173	0.205	0.175	0.165	0.164
6/30/03-04	2,255,942	3,651,327	0.162	1.046	0.169	1.161	0.197	0.181	0.164	0.164
6/30/04-05	2,309,083	5,230,045	0.226	1.036	0.235	1.149	0.270	0.185	0.187	0.185
6/30/05-06	2,480,693	4,204,463	0.169	1.032	0.175	1.138	0.199	0.187	0.189	0.187
6/30/06-07	2,612,577	6,223,397	0.238	1.032	0.246	1.127	0.277	0.189	0.191	0.189
6/30/07-08	2,783,717	5,012,916	0.180	1.032	0.186	1.116	0.207	0.191	0.193	0.191
6/30/08-09	2,750,907	5,524,230	0.201	1.027	0.206	1.105	0.228	0.194	0.196	0.194
6/30/09-10	2,806,048	5,529,950	0.197	1.000	0.197	1.094	0.216	0.201	0.203	0.201
6/30/10-11	2,942,638	6,564,873	0.223	1.000	0.223	1.083	0.242	0.203	0.205	0.203
6/30/11-12	3,006,849	6,546,379	0.218	1.000	0.218	1.072	0.233	0.205	0.207	0.205
6/30/12-13	3,138,905	5,746,439	0.183	1.000	0.183	1.062	0.194	0.207	0.209	0.207
6/30/13-14	3,311,947	6,816,479	0.206	1.000	0.206	1.051	0.216	0.209	0.211	0.209
6/30/14-15	3,511,622	7,197,063	0.205	1.000	0.205	1.041	0.213	0.211	0.214	0.211
6/30/15-16	3,491,558	7,915,555	0.227	1.000	0.227	1.030	0.234	0.214	0.216	0.214
6/30/16-17	3,338,327	7,914,813	0.237	1.000	0.237	1.020	0.242	0.216	0.218	0.216
6/30/17-18	3,401,479	8,619,348	0.253	1.000	0.253	1.010	0.256	0.218		0.218
Total	67,705,237	131,400,904								

Trend Last 4 (ex 17-18):	5.4%	Avg 3 (ex 17-18):	0.230
Trend Last 8 (ex 17-18):	1.6%	Avg 5 (ex 17-18):	0.220
Trend Last 12 (ex 17-18):	1.1%	Avg 10 (ex 17-18):	0.222
Prior Selected Trend:	1.0%	Prior Sel Avg:	0.220
Selected Trend:	1.0%	Sel. Loss Cost:	0.220

NOTES:

(2) Provided by Commonwealth of Massachusetts

(3) From Section 8, Exhibit 2, Page 2, Column 6

(4) = (3) / (2) / 10

(5) Based on information from the MA WCIRB

(6) = (4) x (5)

(7) Based on Selected Trend from (6)

(8) = (6) x (7)

(9) = Sel. Loss Cost / [(5) * (7)]

(10) From prior Aon analysis as of June 30, 2017

(11) Selected based on (9) and (4)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Other - Clusters 5-17 & 95
Medical

Calculation of 1982 & Prior Reserves (Page 1)

Method 1

(1)	Average Payment Trend	0.925	
(2)	Credibility	55%	
(3)	Average Pmt Trend Statewide	0.950	
(4)	Credibility Weighted Trend	0.936	
		(Low)	(High)
(5)	Selected Range	0.899	0.955
(6)	Incremental Paid for 2018	3,240	3,240
(7)	Estimated Reserve	28,794	68,818
(8)	Paid to Date (82 & Prior)	3,057,851	3,057,851
(9)	Est Ult Paid for 1982 & Prior	3,086,646	3,126,669

Method 2

		(Current)	(Prior)
(10)	Avg Incremental Paid (3 yrs)	6,071	17,972
(11)	Projected Number of Years	5	5
(12)	Estimated Reserve	30,354	89,858
(13)	Paid to Date (82 & Prior)	3,057,851	3,054,611
(14)	Est Ult Paid for 1982 & Prior	3,088,206	3,144,470
(14a)	Paid Counts During Fiscal Year	3	3
		(Low)	(High)
(15)	Sel Ult Excluding Lump Sums	3,087,426	3,135,570
(16)	Lump Sum Ultimates	N/A	N/A
(17)	Ult Loss Including Lump Sums	**3,087,426**	**3,135,570**
(18)	Implied Tail	1.010	1.025
(19)	Ult Loss Inc Lump Sums @ 6/17	3,113,503	3,201,142

NOTES:

(1) From Section 8, Exhibit 2, Page 6
(2) = (Average of Section 8, Exhibit 2, Page 6, Column 3 / 175,000) ^ 0.5
(3) Average Statewide Trend
(4) = (1) x (2) + (4) x {1 - (2)}
(5) Selected judgmentally based on (4)
(6), (14a) Provided by Commonwealth of Massachusetts
(7) = (6) x (5) / {1 - (5)}
(8), (16) From Section 8, Exhibit 2, Page 2, Column 3
(9) = (7) + (8)
(10) Avg of 3 latest years from Section 8, Exhibit 2, Page 6, Column 3
(11) Selected judgmentally
(12) = (10 x (11)
(14) = (12) + (13)
(15) = Average of (9) and (14)
(16) Lump Sums are considered in Indemnity analysis (Section 1)
(17) = (15) + (16)
(18) = (15) / (8)
(19) From prior Aon analysis as of June 30, 2017

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Other - Clusters 5-17 & 95
Medical

Calculation of 1982 & Prior Reserves (Page 2)

(1)	(2)	(3)	(4)	(5)		
Year	X	Incremental Paids	LN	Average Observed Trend		Trend Calculations
1992	1	206,798	12.239			
1993	2	153,285	11.940	0.741		
1994	3	146,363	11.894	0.955		
1995	4	120,472	11.699	0.823		
1996	5	130,279	11.777	1.081		
1997	6	37,349	10.528	0.287		
1998	7	24,406	10.103	0.653		
1999	8	85,275	11.354	3.494		
2000	9	30,381	10.322	0.356	n =	27
2001	10	26,076	10.169	0.858	S(x) =	54,135
2002	11	28,013	10.240	1.074	S(x-sq) =	108,542,313
2003	12	24,232	10.095	0.865	S(xy) =	565,471
2004	13	32,198	10.380	1.329	S(y) =	282
2005	14	42,136	10.649	1.309	D =	44,226
2006	15	33,882	10.431	0.804	slope =	-0.096
2007	16	22,266	10.011	0.657	Avg Trend =	0.904
2008	17	32,986	10.404	1.481		
2009	18	25,370	10.141	0.769		
2010	19	25,142	10.132	0.991		
2011	20	28,691	10.264	1.141		
2012	21	24,383	10.102	0.850		
2013	22	32,108	10.377	1.317		
2014	23	47,672	10.772	1.485		
2015	24	38,942	10.570	0.817		
2016	25	11,822	9.378	0.304		
2017	26	3,150	8.055	0.266		
2018	27	3,240	8.083	1.028		
					Selected Trend:	**0.925**

NOTES:

(3) 2018 provided by Commonwealth of Massachusetts. Prior years from Aon analysis as of June 30, 2017

(4) LN [(3)]

(5) Eg. 2018: 1.028 = 3240 / 3150

Commonwealth of Massachusetts Workers Compensation
All Other - Clusters 5-17 & 95
MEDICAL
Paid Loss Development
Paid Loss (Excluding Lump Sum)

Acc Yr Ending	12	24	36	48	60	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324	336	348	360	372	384	396	408	420	432
June-83	27,370	65,800	95,928	121,026	146,374	172,082	195,518	223,519	270,937	291,319	312,256	316,614	336,461	401,393	453,214	453,179	457,283	457,468	457,468	457,468	458,118	472,628	476,174	480,561	485,930	491,063	495,741	498,237	501,473	504,586	508,182	512,140	512,140	512,140	512,140	512,140
June-84	73,019	172,377	253,637	324,243	391,630	438,262	505,877	586,886	610,938	636,458	664,679	683,784	693,120	716,886	724,043	734,862	745,334	749,852	758,667	762,583	783,107	784,865	788,687	788,743	790,813	790,813	790,813	790,813	790,813	790,813	790,813	790,813	795,278	797,778		
June-85	91,462	222,608	324,021	409,170	488,686	592,053	702,853	747,423	785,283	911,116	929,832	957,391	968,422	980,992	1,009,751	1,031,712	1,051,061	1,066,218	1,077,726	1,088,791	1,096,356	1,103,232	1,110,832	1,116,052	1,122,649	1,123,312	1,123,581	1,123,581	1,123,821	1,123,821	1,123,821	1,123,956	1,123,956	1,123,956		
June-86	197,516	482,005	708,037	875,864	1,053,127	1,211,316	1,370,683	1,467,692	1,572,492	1,608,200	1,631,069	1,655,833	1,672,723	1,699,156	1,716,974	1,724,323	1,731,547	1,743,355	1,755,277	1,764,089	1,780,012	1,796,528	1,802,048	1,808,935	1,832,489	1,867,039	1,872,692	1,877,988	1,882,106	1,887,118	1,891,823	1,892,840	1,893,204			
June-87	199,777	488,687	761,278	928,992	1,116,174	1,247,272	1,326,215	1,394,678	1,416,827	1,433,554	1,451,102	1,461,072	1,470,676	1,482,961	1,498,691	1,507,156	1,517,732	1,527,729	1,533,186	1,539,237	1,545,443	1,554,224	1,564,621	1,590,009	1,608,659	1,628,722	1,648,308	1,667,330	1,680,369	1,698,600	1,716,165	1,724,666				
June-88	390,619	1,150,212	1,830,796	2,204,311	2,429,489	2,580,235	2,679,602	2,758,965	2,816,870	2,872,713	2,895,135	2,917,336	2,938,306	2,953,260	2,965,159	2,980,478	3,005,909	3,019,968	3,040,247	3,060,774	3,075,967	3,084,408	3,098,971	3,111,109	3,123,843	3,135,852	3,148,456	3,164,976	3,184,694	3,200,620	3,213,256					
June-89	348,632	1,379,611	1,965,598	2,380,914	2,616,790	2,882,836	2,988,159	3,078,524	3,143,724	3,188,707	3,222,672	3,251,157	3,271,467	3,290,603	3,312,237	3,338,112	3,358,373	3,385,594	3,459,727	3,477,288	3,487,596	3,504,078	3,526,921	3,535,629	3,542,709	3,552,709	3,555,290	3,559,769	3,573,237	3,580,657						
June-90	597,392	1,787,214	2,367,627	2,727,013	2,917,488	3,052,042	3,170,650	3,294,118	3,385,084	3,460,338	3,498,784	3,525,521	3,559,539	3,594,665	3,616,129	3,673,092	3,699,660	3,720,191	3,743,464	3,756,545	3,772,853	3,783,930	3,792,543	3,806,458	3,820,503	3,839,007	3,851,508	3,861,755	3,867,795							
June-91	708,625	1,924,338	2,444,979	2,785,515	2,902,296	3,018,419	3,064,528	3,074,954	3,092,506	3,113,710	3,131,050	3,142,716	3,165,865	3,200,123	3,230,691	3,265,408	3,303,782	3,334,465	3,363,420	3,385,556	3,405,270	3,425,312	3,448,838	3,464,204	3,476,999	3,488,529	3,497,516	3,505,736								
June-92	588,418	1,588,370	1,986,839	2,229,495	2,290,208	2,325,875	2,375,312	2,430,547	2,462,691	2,497,761	2,542,769	2,553,772	2,574,534	2,586,268	2,593,937	2,607,986	2,617,238	2,623,319	2,642,357	2,693,544	2,703,064	2,761,452	2,777,670	2,779,948	2,784,822	2,786,796	2,789,160									
June-93	415,674	1,315,738	1,611,871	1,719,235	1,836,642	1,871,759	1,907,504	1,930,526	1,977,226	2,009,894	2,048,320	2,106,226	2,144,269	2,190,485	2,240,879	2,296,700	2,349,467	2,390,884	2,414,691	2,428,953	2,450,534	2,469,958	2,483,916	2,492,925	2,498,702	2,512,155										
June-94	598,740	1,383,736	1,705,173	1,941,862	2,012,247	2,200,199	2,290,696	2,346,328	2,406,956	2,509,745	2,549,583	2,601,202	2,677,455	2,727,826	2,785,899	2,804,943	2,822,448	2,841,619	2,860,084	2,875,638	2,893,152	2,905,592	2,927,997	2,943,707	2,962,553											
June-95	625,005	1,262,191	1,500,916	1,627,990	1,716,166	1,770,565	1,843,652	1,919,317	2,018,626	2,068,939	2,105,461	2,177,442	2,207,352	2,235,130	2,265,454	2,289,441	2,313,135	2,411,441	2,435,367	2,459,756	2,489,028	2,513,597	2,542,669	2,570,487												
June-96	442,026	1,106,672	1,298,637	1,506,086	1,588,152	1,626,688	1,672,734	1,723,992	1,784,200	1,838,291	1,904,595	1,938,999	1,973,969	1,990,646	2,023,635	2,041,150	2,054,604	2,061,273	2,065,137	2,075,119	2,079,457	2,083,737	2,087,948													
June-97	490,343	1,177,901	1,656,955	1,851,037	1,939,610	2,054,998	2,100,197	2,157,406	2,207,438	2,247,927	2,302,138	2,315,796	2,338,520	2,350,446	2,367,170	2,457,338	2,600,718	2,743,595	2,748,674	2,758,408	2,763,943	2,770,748														
June-98	326,869	974,658	1,226,365	1,350,342	1,476,983	1,551,929	1,637,433	1,716,707	1,747,491	1,769,878	1,797,150	1,821,161	1,842,103	1,916,231	1,958,225	1,973,933	1,982,909	2,010,395	2,020,135	2,025,376	2,030,306															
June-99	484,930	1,204,187	1,456,433	1,645,438	1,757,364	1,866,452	1,932,933	2,065,834	2,135,187	2,187,567	2,264,558	2,353,171	2,390,481	2,459,300	2,488,986	2,506,545	2,552,168	2,570,732	2,592,302	2,615,954																
June-00	687,002	1,407,750	1,709,714	1,905,283	2,094,421	2,260,264	2,375,651	2,506,812	2,566,510	2,618,716	2,644,619	2,679,121	2,756,324	2,834,813	2,909,495	3,010,320	3,057,706	3,114,564	3,186,632																	
June-01	555,924	1,355,841	1,668,220	1,965,335	2,137,275	2,265,629	2,333,456	2,389,586	2,477,500	2,581,034	2,640,810	2,693,375	2,747,068	2,824,207	2,893,237	3,047,261	3,122,934	3,182,178																		
June-02	456,844	1,259,496	1,683,493	1,908,166	2,029,871	2,101,432	2,140,880	2,212,890	2,279,178	2,337,107	2,491,961	2,573,704	2,652,321	2,714,782	2,788,520	2,860,506	2,939,983																			
June-03	314,443	1,423,035	2,006,147	2,291,763	2,403,958	2,513,521	2,608,269	2,678,105	2,752,202	2,844,031	2,880,263	2,981,766	3,064,242	3,166,021	3,234,764	3,289,330																				
June-04	598,148	1,733,246	2,216,316	2,434,141	2,548,142	2,669,710	2,729,591	2,840,027	2,905,967	2,953,758	3,003,620	3,047,300	3,076,253	3,140,203	3,175,883																					
June-05	744,557	2,314,627	3,030,458	3,409,706	3,640,720	3,806,314	3,993,880	4,101,306	4,226,019	4,303,783	4,353,333	4,401,412	4,435,668	4,481,807																						
June-06	971,841	2,207,952	2,611,952	2,837,745	3,016,501	3,153,780	3,240,647	3,314,422	3,376,156	3,410,796	3,444,369	3,469,314	3,515,073																							
June-07	1,118,370	3,111,007	3,990,645	4,226,540	4,465,130	4,612,091	4,787,482	4,860,001	4,924,584	4,996,891	5,070,176	5,100,951																								
June-08	1,399,818	2,842,788	3,291,021	3,540,051	3,665,019	3,833,245	3,900,241	3,955,805	3,989,261	4,012,733	4,048,757																									
June-09	1,326,874	2,783,994	3,440,192	3,757,225	3,955,223	4,076,333	4,189,281	4,222,784	4,377,822	4,407,183																										
June-10	1,396,833	3,068,894	3,532,579	3,829,758	4,051,519	4,138,029	4,249,098	4,308,361	4,342,050																											
June-11	1,591,468	3,339,318	3,962,771	4,360,928	4,611,079	4,788,257	4,948,871	5,039,589																												
June-12	1,578,463	3,469,608	4,122,296	4,485,953	4,743,217	4,835,420	4,914,674																													
June-13	1,503,155	3,061,873	3,660,432	3,906,111	4,088,215	4,176,679																														
June-14	1,466,358	3,390,257	4,222,870	4,548,827	4,770,478																															
June-15	1,879,802	3,553,784	4,190,765	4,739,997																																
June-16	2,006,652	3,783,256	4,707,647																																	
June-17	1,780,241	3,788,337																																		
June-18	1,793,068																																			

Age-to-Age Factors

Acc Yr Ending	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432
June-83	2.404	1.458	1.262	1.209	1.176	1.136	1.143	1.212	1.075	1.072	1.014	1.063	1.193	1.129	1.000	1.009	1.000	1.000	1.000	1.001	1.032	1.008	1.009	1.011	1.011	1.010	1.005	1.006	1.006	1.007	1.008	1.000	1.000	1.000	1.000
June-84	2.361	1.471	1.278	1.208	1.119	1.154	1.160	1.041	1.042	1.044	1.029	1.014	1.034	1.010	1.015	1.014	1.006	1.012	1.005	1.027	1.002	1.005	1.000	1.003	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.006	1.003	
June-85	2.434	1.456	1.263	1.194	1.212	1.187	1.063	1.051	1.160	1.021	1.030	1.012	1.013	1.029	1.022	1.019	1.014	1.011	1.010	1.007	1.006	1.007	1.005	1.006	1.001	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		
June-86	2.440	1.469	1.237	1.202	1.150	1.132	1.071	1.071	1.023	1.014	1.015	1.010	1.016	1.010	1.004	1.004	1.007	1.007	1.005	1.009	1.009	1.003	1.004	1.013	1.019	1.003	1.003	1.002	1.003	1.002	1.001	1.000			
June-87	2.446	1.558	1.220	1.201	1.117	1.063	1.052	1.016	1.012	1.012	1.007	1.007	1.008	1.011	1.006	1.007	1.007	1.004	1.004	1.004	1.006	1.007	1.016	1.012	1.012	1.012	1.012	1.008	1.011	1.010	1.005				
June-88	2.945	1.592	1.204	1.102	1.062	1.039	1.030	1.021	1.020	1.008	1.008	1.007	1.005	1.004	1.005	1.009	1.005	1.007	1.007	1.005	1.003	1.005	1.004	1.004	1.004	1.004	1.005	1.006	1.005	1.004					
June-89	3.957	1.425	1.211	1.099	1.102	1.037	1.030	1.021	1.014	1.011	1.009	1.006	1.006	1.007	1.008	1.006	1.008	1.022	1.005	1.003	1.005	1.007	1.002	1.002	1.003	1.001	1.001	1.004	1.002						
June-90	2.992	1.325	1.152	1.070	1.046	1.039	1.039	1.028	1.022	1.011	1.008	1.010	1.010	1.006	1.016	1.007	1.006	1.006	1.003	1.004	1.003	1.002	1.004	1.004	1.005	1.003	1.003	1.002							
June-91	2.716	1.271	1.139	1.042	1.040	1.015	1.003	1.006	1.007	1.006	1.004	1.007	1.011	1.010	1.011	1.012	1.009	1.009	1.007	1.006	1.006	1.007	1.004	1.004	1.003	1.003	1.002								
June-92	2.699	1.251	1.122	1.027	1.016	1.021	1.023	1.013	1.014	1.018	1.004	1.008	1.005	1.003	1.005	1.004	1.002	1.007	1.019	1.004	1.022	1.006	1.001	1.002	1.001	1.001									
June-93	3.165	1.225	1.067	1.068	1.019	1.019	1.012	1.024	1.017	1.019	1.028	1.018	1.022	1.023	1.025	1.023	1.018	1.010	1.006	1.009	1.008	1.006	1.004	1.002	1.005										
June-94	2.311	1.232	1.139	1.036	1.093	1.041	1.024	1.026	1.043	1.016	1.020	1.029	1.019	1.021	1.007	1.006	1.007	1.006	1.005	1.006	1.004	1.008	1.005	1.006											
June-95	2.019	1.189	1.085	1.054	1.032	1.041	1.041	1.052	1.025	1.018	1.034	1.014	1.013	1.014	1.011	1.010	1.042	1.010	1.010	1.012	1.010	1.012	1.011												
June-96	2.504	1.173	1.160	1.054	1.024	1.028	1.031	1.035	1.030	1.036	1.018	1.018	1.008	1.017	1.009	1.007	1.003	1.002	1.005	1.002	1.002	1.002													
June-97	2.402	1.407	1.117	1.048	1.059	1.022	1.027	1.023	1.018	1.024	1.006	1.010	1.005	1.007	1.038	1.058	1.055	1.002	1.004	1.002	1.002														
June-98	2.982	1.258	1.101	1.094	1.051	1.055	1.048	1.018	1.013	1.015	1.013	1.011	1.040	1.022	1.008	1.005	1.014	1.005	1.003	1.002															
June-99	2.483	1.209	1.130	1.068	1.062	1.036	1.069	1.034	1.025	1.035	1.039	1.016	1.029	1.012	1.007	1.018	1.007	1.008	1.009																
June-00	2.049	1.215	1.114	1.099	1.079	1.051	1.055	1.024	1.020	1.010	1.013	1.029	1.028	1.026	1.035	1.016	1.019	1.023																	
June-01	2.439	1.230	1.178	1.087	1.060	1.030	1.024	1.037	1.042	1.023	1.020	1.020	1.028	1.024	1.053	1.025	1.019																		
June-02	2.757	1.337	1.133	1.064	1.035	1.019	1.034	1.030	1.025	1.066	1.033	1.031	1.024	1.027	1.026	1.028																			
June-03	4.526	1.410	1.142	1.049	1.046	1.038	1.027	1.028	1.033	1.013	1.035	1.028	1.033	1.022	1.017																				
June-04	2.898	1.279	1.098	1.047	1.048	1.022	1.040	1.023	1.016	1.017	1.015	1.010	1.021	1.011																					
June-05	3.109	1.309	1.125	1.068	1.045	1.049	1.027	1.030	1.018	1.012	1.011	1.008	1.010																						
June-06	2.272	1.183	1.086	1.063	1.046	1.028	1.023	1.019	1.010	1.010	1.007	1.013																							
June-07	2.782	1.283	1.059	1.056	1.033	1.038	1.015	1.013	1.015	1.015	1.006																								
June-08	2.031	1.158	1.076	1.035	1.046	1.017	1.014	1.008	1.006	1.009																									
June-09	2.098	1.236	1.092	1.053	1.031	1.028	1.008	1.037	1.007																										
June-10	2.197	1.151	1.084	1.058	1.021	1.027	1.014	1.008																											
June-11	2.098	1.187	1.100	1.057	1.038	1.034	1.018																												
June-12	2.198	1.188	1.088	1.057	1.019	1.016																													
June-13	2.037	1.195	1.067	1.047	1.022																														
June-14	2.312	1.246	1.077	1.049																															
June-15	1.891	1.179	1.131																																
June-16	1.885	1.244																																	
June-17	2.128																																		

Averages	12-24	24-36	36-48	48-60	60-72	72-84	84-96	96-108	108-120	120-132	132-144	144-156	156-168	168-180	180-192	192-204	204-216	216-228	228-240	240-252	252-264	264-276	276-288	288-300	300-312	312-324	324-336	336-348	348-360	360-372	372-384	384-396	396-408	408-420	420-432	To Ult
Simple Avg																																				
All Yrs	2.542	1.294	1.138	1.083	1.063	1.049	1.040	1.034	1.028	1.021	1.017	1.017	1.025	1.020	1.016	1.014	1.013	1.008	1.006	1.006	1.008	1.006	1.005	1.006	1.006	1.004	1.003	1.004	1.004	1.004	1.003	1.000	1.002	1.002	1.000	
Latest 5	2.051	1.211	1.093	1.054	1.026	1.024	1.014	1.017	1.011	1.012	1.015	1.018	1.023	1.022	1.028	1.018	1.023	1.008	1.006	1.005	1.005	1.007	1.005	1.004	1.003	1.002	1.005	1.004	1.004	1.003	1.003					
Latest 3	1.968	1.223	1.092	1.051	1.027	1.026	1.013	1.018	1.009	1.011	1.008	1.010	1.021	1.020	1.032	1.023	1.015	1.012	1.005	1.002	1.005	1.007	1.007	1.003	1.003	1.002	1.002	1.004	1.006	1.006	1.002	1.000	1.002			
Volume Wtd																																				
All Yrs	2.344	1.250	1.114	1.064	1.047	1.035	1.028	1.025	1.021	1.017	1.015	1.015	1.018	1.015	1.017	1.015	1.014	1.009	1.007	1.006	1.007	1.006	1.005	1.005	1.005	1.003	1.003	1.004	1.004	1.004	1.002	1.000	1.002	1.002	1.000	
Latest 5	2.035	1.211	1.093	1.054	1.026	1.024	1.014	1.017	1.011	1.012	1.013	1.016	1.022	1.022	1.028	1.019	1.023	1.009	1.006	1.005	1.005	1.007	1.005	1.004	1.003	1.002	1.004	1.004	1.004	1.004	1.002					
Latest 3	1.963	1.223	1.093	1.051	1.027	1.026	1.014	1.018	1.009	1.012	1.008	1.010	1.020	1.020	1.031	1.023	1.015	1.013	1.005	1.002	1.005	1.007	1.007	1.004	1.003	1.002	1.002	1.004	1.005	1.005	1.002	1.000	1.002			

Dev Factor Selection																																				
Industry 1	1.952	1.145	1.055	1.025	1.015	1.012	1.012	1.013	1.010	1.009	1.011	1.010	1.009	1.008	1.009	1.007	1.007	1.006																		
Industry 2		1.268	1.086	1.037	1.014	1.010	1.014	1.010	1.007	1.010	1.011	1.009	1.008	1.009	1.010	1.007	1.007	1.009	1.006	1.006																
Prior	2.301	1.234	1.100	1.064	1.041	1.036	1.023	1.025	1.017	1.013	1.020	1.020	1.025	1.015	1.026	1.019	1.013	1.005	1.008	1.008	1.006	1.005	1.005	1.005	1.005	1.005	1.003	1.003	1.003	1.003	1.003	1.003	1.002	1.002	1.005	
Selected	2.301	1.243	1.107	1.063	1.039	1.033	1.023	1.023	1.016	1.012	1.015	1.020	1.025	1.015	1.028	1.016	1.013	1.008	1.008	1.008	1.006	1.005	1.005	1.005	1.005	1.005	1.003	1.003	1.003	1.003	1.003	1.003	1.002	1.002	1.002	1.004
FacToUlt	4.807	2.089	1.681	1.518	1.429	1.376	1.332	1.303	1.274	1.253	1.238	1.220	1.196	1.167	1.150	1.119	1.101	1.087	1.078	1.070	1.061	1.055	1.050	1.044	1.039	1.034	1.029	1.026	1.023	1.020	1.017	1.013	1.010	1.008	1.006	1.004
Percent of Ult	20.8%	47.9%	59.5%	65.9%	70.0%	72.7%	75.1%	76.8%	78.5%	79.8%	80.8%	82.0%	83.6%	85.7%	87.0%	89.4%	90.8%	92.0%	92.7%	93.5%	94.2%	94.8%	95.3%	95.8%	96.2%	96.7%	97.2%	97.5%	97.8%	98.1%	98.4%	98.7%	99.0%	99.2%	99.4%	99.6%

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Workers Compensation
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All Other - Clusters 5-17 & 95
Medical

Comparison of Ultimate Losses

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Ultimate Loss		Ultimate Loss		Change in Ultimate Loss		Change in Ultimate Loss	
Accident	As of 6/17		As of 6/18		(Dollar)	(Percent)	(Dollar)	(Percent)
Year	Low	High	Low	High	Low	Low	High	High
All Prior Yrs	3,113,503	3,201,142	3,087,426	3,135,570	(26,077)	-0.8%	(65,572)	-2.0%
6/30/82-83	512,140	519,607	512,140	519,538	0	0.0%	(69)	0.0%
6/30/83-84	800,000	808,487	803,000	810,920	3,000	0.4%	2,434	0.3%
6/30/84-85	1,123,956	1,144,910	1,123,956	1,144,757	0	0.0%	(152)	0.0%
6/30/85-86	1,905,425	1,934,150	1,903,435	1,932,130	(1,990)	-0.1%	(2,020)	-0.1%
6/30/86-87	1,732,295	1,758,410	1,738,265	1,765,480	5,970	0.3%	7,070	0.4%
6/30/87-88	3,240,715	3,291,590	3,249,670	3,300,680	8,955	0.3%	9,090	0.3%
6/30/88-89	3,647,000	3,686,500	3,651,000	3,689,530	4,000	0.1%	3,030	0.1%
6/30/89-90	3,954,000	3,997,580	3,955,000	3,998,590	1,000	0.0%	1,010	0.0%
6/30/90-91	3,593,000	3,628,930	3,595,000	3,631,960	2,000	0.1%	3,030	0.1%
6/30/91-92	2,877,000	2,905,770	2,869,000	2,898,700	(8,000)	-0.3%	(7,070)	-0.2%
6/30/92-93	2,592,000	2,618,930	2,597,000	2,622,970	5,000	0.2%	4,040	0.2%
6/30/93-94	3,068,000	3,100,700	3,077,000	3,108,780	9,000	0.3%	8,080	0.3%
6/30/94-95	2,664,000	2,691,650	2,683,000	2,710,840	19,000	0.7%	19,190	0.7%
6/30/95-96	2,195,000	2,216,950	2,191,000	2,213,920	(4,000)	-0.2%	(3,030)	-0.1%
6/30/96-97	2,929,000	2,958,290	2,923,000	2,952,230	(6,000)	-0.2%	(6,060)	-0.2%
6/30/97-98	2,163,000	2,189,680	2,154,000	2,179,580	(9,000)	-0.4%	(10,100)	-0.5%
6/30/98-99	2,791,000	2,821,940	2,798,000	2,829,010	7,000	0.3%	7,070	0.3%
6/30/99-00	3,371,000	3,440,460	3,436,000	3,504,720	65,000	1.9%	64,260	1.9%
6/30/00-01	3,423,000	3,494,520	3,458,000	3,529,200	35,000	1.0%	34,680	1.0%
6/30/01-02	3,195,000	3,267,060	3,237,000	3,307,860	42,000	1.3%	40,800	1.2%
6/30/02-03	3,706,000	3,784,200	3,680,000	3,756,660	(26,000)	-0.7%	(27,540)	-0.7%
6/30/03-04	3,652,000	3,731,160	3,651,000	3,730,140	(1,000)	0.0%	(1,020)	0.0%
6/30/04-05	5,100,000	5,393,000	5,100,000	5,335,000	0	0.0%	(58,000)	-1.1%
6/30/05-06	4,200,000	4,388,000	4,200,000	4,363,000	0	0.0%	(25,000)	-0.6%
6/30/06-07	6,000,000	6,415,000	6,000,000	6,348,000	0	0.0%	(67,000)	-1.0%
6/30/07-08	5,000,000	5,212,000	5,000,000	5,173,000	0	0.0%	(39,000)	-0.7%
6/30/08-09	5,500,000	5,765,000	5,500,000	5,690,000	0	0.0%	(75,000)	-1.3%
6/30/09-10	5,600,000	5,830,000	5,500,000	5,721,000	(100,000)	-1.8%	(109,000)	-1.9%
6/30/10-11	6,500,000	6,833,000	6,400,000	6,762,000	(100,000)	-1.5%	(71,000)	-1.0%
6/30/11-12	6,500,000	6,916,000	6,400,000	6,743,000	(100,000)	-1.5%	(173,000)	-2.5%
6/30/12-13	5,900,000	6,173,000	5,700,000	6,013,000	(200,000)	-3.4%	(160,000)	-2.6%
6/30/13-14	6,900,000	7,348,000	6,700,000	7,194,000	(200,000)	-2.9%	(154,000)	-2.1%
6/30/14-15	7,100,000	7,618,000	7,100,000	7,638,000	0	0.0%	20,000	0.3%
6/30/15-16	7,700,000	8,288,000	7,600,000	8,311,000	(100,000)	-1.3%	23,000	0.3%
6/30/16-17	7,400,000	8,973,000	7,400,000	8,311,000	0	0.0%	(662,000)	-7.4%
6/30/17-18								
Total	141,648,034	148,344,614	140,972,892	146,875,765	(675,142)	-0.5%	(1,468,850)	-1.0%

NOTES:

(2), (3) From prior Aon analysis as of June 30, 2017

(4), (5) From Section 8, Exhibit 2, Page 1, Columns 6, 7

(6) = (4) - (2)

(7) = (4) / (2) - 1

(8) = (5) - (3)

(9) = (5) / (3) - 1

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Other - Clusters 5-17 & 95
Medical

Calculation of Discount Factors

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Maturity	Cumulative Paid Loss Development	Incremental Paid Loss Development	Percent Unpaid	Pres Value of Increm. Pmts (4%)	Pres Value of Increm. Pmts (6%)	Discount Factor At: 4%	6%
444	100.0%	0.4%	0.0%	0.1%	0.1%	1.000	1.000
432	99.6%	0.2%	0.4%	0.0%	0.0%	0.981	0.971
420	99.4%	0.2%	0.6%	0.1%	0.0%	0.955	0.933
408	99.2%	0.2%	0.8%	0.1%	0.0%	0.933	0.902
396	99.0%	0.3%	1.0%	0.1%	0.0%	0.913	0.874
384	98.7%	0.3%	1.3%	0.1%	0.0%	0.901	0.857
372	98.4%	0.3%	1.6%	0.1%	0.0%	0.887	0.838
360	98.1%	0.3%	1.9%	0.1%	0.1%	0.872	0.819
348	97.8%	0.3%	2.2%	0.1%	0.1%	0.858	0.799
336	97.5%	0.3%	2.5%	0.1%	0.1%	0.843	0.779
324	97.2%	0.5%	2.8%	0.2%	0.1%	0.828	0.760
312	96.7%	0.5%	3.3%	0.2%	0.1%	0.824	0.754
300	96.2%	0.5%	3.8%	0.2%	0.1%	0.816	0.745
288	95.8%	0.5%	4.2%	0.2%	0.1%	0.807	0.733
276	95.3%	0.5%	4.7%	0.2%	0.1%	0.796	0.720
264	94.8%	0.6%	5.2%	0.2%	0.2%	0.785	0.706
252	94.2%	0.7%	5.8%	0.3%	0.2%	0.777	0.696
240	93.5%	0.7%	6.5%	0.3%	0.2%	0.774	0.692
228	92.7%	0.7%	7.3%	0.4%	0.3%	0.769	0.686
216	92.0%	1.2%	8.0%	0.6%	0.4%	0.761	0.677
204	90.8%	1.5%	9.2%	0.8%	0.6%	0.764	0.682
192	89.4%	2.4%	10.6%	1.3%	1.0%	0.768	0.688
180	87.0%	1.3%	13.0%	0.7%	0.6%	0.783	0.708
168	85.7%	2.1%	14.3%	1.2%	1.0%	0.774	0.695
156	83.6%	1.6%	16.4%	1.0%	0.8%	0.774	0.696
144	82.0%	1.2%	18.0%	0.8%	0.6%	0.766	0.685
132	80.8%	1.0%	19.2%	0.7%	0.5%	0.751	0.667
120	79.8%	1.3%	20.2%	0.9%	0.7%	0.735	0.646
108	78.5%	1.8%	21.5%	1.3%	1.1%	0.723	0.630
96	76.8%	1.7%	23.2%	1.3%	1.1%	0.717	0.623
84	75.1%	2.4%	24.9%	1.9%	1.6%	0.709	0.614
72	72.7%	2.7%	27.3%	2.2%	2.0%	0.708	0.614
60	70.0%	4.1%	30.0%	3.5%	3.2%	0.708	0.614
48	65.9%	6.4%	34.1%	5.6%	5.2%	0.717	0.627
36	59.5%	11.6%	40.5%	10.5%	10.0%	0.735	0.651
24	47.9%	27.1%	52.1%	25.5%	24.8%	0.768	0.694
12	20.8%	20.8%	79.2%	20.4%	20.2%	0.821	0.763
Total		100.0%					

NOTES:

(2) = 1 / Section 8, Exhibit 2, Page 2, Column 4

(3) Incremental % based on (2)

(4) = 1 - (2)

(5) = [(3) / 1.04] ^ {[(1) - 6] / 12}

(6) = [(3) / 1.06] ^ {[(1) - 6] / 12}

(7), (8) Discount factor based on (5), (6)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Other - Clusters 5-17 & 95
Medical

Outstanding Loss Discounting - 4.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	4.0%	(Low)	(High)
All Prior Yrs	29,574	77,718		26,858	70,581
6/30/82-83	0	7,398	0.981	0	7,254
6/30/83-84	5,222	13,142	0.955	4,985	12,546
6/30/84-85	0	20,801	0.933	0	19,403
6/30/85-86	10,231	38,926	0.913	9,340	35,537
6/30/86-87	13,599	40,814	0.901	12,249	36,762
6/30/87-88	36,414	87,424	0.887	32,295	77,535
6/30/88-89	70,343	108,873	0.872	61,365	94,977
6/30/89-90	87,205	130,795	0.858	74,788	112,172
6/30/90-91	89,264	126,224	0.843	75,236	106,387
6/30/91-92	79,840	109,540	0.828	66,142	90,747
6/30/92-93	84,845	110,815	0.824	69,884	91,275
6/30/93-94	114,447	146,227	0.816	93,398	119,334
6/30/94-95	112,513	140,353	0.807	90,775	113,236
6/30/95-96	103,052	125,972	0.796	82,074	100,328
6/30/96-97	152,252	181,482	0.785	119,579	142,536
6/30/97-98	123,694	149,274	0.777	96,150	116,034
6/30/98-99	182,046	213,056	0.774	140,943	164,952
6/30/99-00	249,368	318,088	0.769	191,666	244,485
6/30/00-01	275,822	347,022	0.761	209,999	264,208
6/30/01-02	297,017	367,877	0.764	226,979	281,130
6/30/02-03	390,670	467,330	0.768	300,196	359,103
6/30/03-04	475,117	554,257	0.783	372,161	434,152
6/30/04-05	618,193	853,193	0.774	478,239	660,037
6/30/05-06	684,927	847,927	0.774	530,154	656,321
6/30/06-07	899,049	1,247,049	0.766	688,437	954,914
6/30/07-08	951,243	1,124,243	0.751	714,858	844,867
6/30/08-09	1,092,817	1,282,817	0.735	803,430	943,116
6/30/09-10	1,157,950	1,378,950	0.723	837,165	996,942
6/30/10-11	1,360,411	1,722,411	0.717	975,003	1,234,447
6/30/11-12	1,485,326	1,828,326	0.709	1,052,960	1,296,115
6/30/12-13	1,523,321	1,836,321	0.708	1,078,231	1,299,778
6/30/13-14	1,929,522	2,423,522	0.708	1,365,256	1,714,791
6/30/14-15	2,360,003	2,898,003	0.717	1,691,221	2,076,761
6/30/15-16	2,892,353	3,603,353	0.735	2,125,876	2,648,460
6/30/15-16	3,611,663	4,522,663	0.768	2,772,709	3,472,092
6/30/17-18	5,706,932	7,256,932	0.821	4,685,437	5,957,999
Total	29,256,243	36,709,116		22,156,038	27,851,314
			(7) Total Discount Factor:	0.757	0.759

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	29,574	77,718
(9) Projected Number of Years:	5	5
(10) Projected Paid Loss per Year:	5,915	15,544
(11) Discounted Value at 4%:	26,858	70,581

NOTES:

(2), (3) From Section 8, Exhibit 2, Page 1, Columns 8, 9

(4) From Section 8, Exhibit 2, Page 9, Column 7

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June 30, 2018

All Other - Clusters 5-17 & 95
Medical

Outstanding Loss Discounting - 6.0%

(1)	(2)	(3)	(4)	(5)	(6)
	Undiscounted		Discount	Discounted	
Accident	Outstanding Losses		Factor at	Outstanding Losses	
Year	(Low)	(High)	6.0%	(Low)	(High)
All Prior Yrs	29,574	77,718		25,663	67,440
6/30/82-83	0	7,398	0.971	0	7,185
6/30/83-84	5,222	13,142	0.933	4,875	12,268
6/30/84-85	0	20,801	0.902	0	18,765
6/30/85-86	10,231	38,926	0.874	8,943	34,026
6/30/86-87	13,599	40,814	0.857	11,658	34,990
6/30/87-88	36,414	87,424	0.838	30,526	73,288
6/30/88-89	70,343	108,873	0.819	57,577	89,115
6/30/89-90	87,205	130,795	0.799	69,641	104,452
6/30/90-91	89,264	126,224	0.779	69,522	98,308
6/30/91-92	79,840	109,540	0.760	60,661	83,227
6/30/92-93	84,845	110,815	0.754	63,995	83,582
6/30/93-94	114,447	146,227	0.745	85,234	108,902
6/30/94-95	112,513	140,353	0.733	82,461	102,865
6/30/95-96	103,052	125,972	0.720	74,162	90,657
6/30/96-97	152,252	181,482	0.706	107,430	128,055
6/30/97-98	123,694	149,274	0.696	86,050	103,845
6/30/98-99	182,046	213,056	0.692	126,065	147,539
6/30/99-00	249,368	318,088	0.686	171,026	218,156
6/30/00-01	275,822	347,022	0.677	186,723	234,924
6/30/01-02	297,017	367,877	0.682	202,461	250,762
6/30/02-03	390,670	467,330	0.688	268,761	321,499
6/30/03-04	475,117	554,257	0.708	336,508	392,560
6/30/04-05	618,193	853,193	0.695	429,896	593,317
6/30/05-06	684,927	847,927	0.696	476,865	590,351
6/30/06-07	899,049	1,247,049	0.685	616,209	854,729
6/30/07-08	951,243	1,124,243	0.667	634,309	749,670
6/30/08-09	1,092,817	1,282,817	0.646	705,726	828,426
6/30/09-10	1,157,950	1,378,950	0.630	730,058	869,393
6/30/10-11	1,360,411	1,722,411	0.623	847,796	1,073,392
6/30/11-12	1,485,326	1,828,326	0.614	911,886	1,122,464
6/30/12-13	1,523,321	1,836,321	0.614	934,573	1,126,602
6/30/13-14	1,929,522	2,423,522	0.614	1,184,861	1,488,211
6/30/14-15	2,360,003	2,898,003	0.627	1,478,929	1,816,075
6/30/15-16	2,892,353	3,603,353	0.651	1,883,192	2,346,120
6/30/16-17	3,611,663	4,522,663	0.694	2,505,573	3,137,575
6/30/17-18	5,706,932	7,256,932	0.763	4,352,835	5,535,063
Total	29,256,243	36,709,116		19,822,650	24,937,792
			(7) Total Discount Factor:	0.678	0.679

	Discount Calculation for All Prior Years	
	(Low)	(High)
(8) Estimated Total Reserve:	29,574	77,718
(9) Projected Number of Years:	5	5
(10) Projected Paid Loss per Year:	5,915	15,544
(11) Discounted Value at 6%:	25,663	67,440

NOTES:

(2), (3) From Section 8, Exhibit 2, Page 1, Columns 8, 9

(4) From Section 8, Exhibit 2, Page 9, Column 8

(5) = (2) x (4)

(6) = (3) x (4)

(7) = Sum of (5) / Sum of (2) and Sum of (6) / Sum of (3)

(10) = (8) / (9)

Commonwealth of Massachusetts
Workers Compensation
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Medical

Allocation of Outstanding Reserve to MassDOT Agencies

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
		Aon	Aon	Outstanding	Outstanding		**MassDOT Allocation - Method 1**					**MassDOT Allocation - Method 2**					**MassDOT Allocation - Method 3**				MassDOT	MassDOT	All Other	All Other
Accident		Selected Ult	Selected Ult	Losses	Losses	Paid Counts	MassDOT	MassDOT /	MassDOT OS	MassDOT OS	Total Paid	MassDOT	MassDOT /	MassDOT OS	MassDOT OS	Total Payroll	MassDOT	MassDOT /	MassDOT OS	MassDOT OS	Outstanding	Outstanding	Outstanding	Outstanding
Year	Paid Loss	(Low)	(High)	(Low)	(High)	7/1/17-18	7/1/17-18	Paid Counts	(Low)	(High)	7/1/17-18	7/1/17-18	Total Paid	(Low)	(High)	($000)	($000)	Total Payroll	(Low)	(High)	(Low)	(High)	(Low)	(High)
All Prior Yrs	3,057,851	3,087,426	3,135,570	29,574	77,718	3					3,240								1,931	5,074	1,931	5,074	27,643	72,644
6/30/82-83	512,140	512,140	519,538	0	7,398	0					0								0	483	0	483	0	6,915
6/30/83-84	797,778	803,000	810,920	5,222	13,142	1					2,500								341	858	114	286	5,108	12,856
6/30/84-85	1,123,956	1,123,956	1,144,757	0	20,801	0					0								0	1,358	0	453	0	20,348
6/30/85-86	1,893,204	1,903,435	1,932,130	10,231	38,926	1					364								668	2,541	223	847	10,008	38,078
6/30/86-87	1,724,666	1,738,265	1,765,480	13,599	40,814	2					8,501								888	2,665	296	888	13,303	39,926
6/30/87-88	3,213,256	3,249,670	3,300,680	36,414	87,424	4					12,636								2,378	5,708	793	1,903	35,622	85,522
6/30/88-89	3,580,657	3,651,000	3,689,530	70,343	108,873	3					7,421								4,593	7,108	1,531	2,369	68,812	106,503
6/30/89-90	3,867,795	3,955,000	3,998,590	87,205	130,795	5					6,040								5,694	8,540	1,898	2,847	85,307	127,948
6/30/90-91	3,505,736	3,595,000	3,631,960	89,264	126,224	5	1	20.0%	17,853	25,245	8,221	1,120	13.6%	12,162	17,197				5,828	8,241	11,948	16,894	77,316	109,329
6/30/91-92	2,789,160	2,869,000	2,898,700	79,840	109,540	3					2,364								5,213	7,152	1,738	2,384	78,103	107,156
6/30/92-93	2,512,155	2,597,000	2,622,970	84,845	110,815	3					13,452								5,540	7,235	1,847	2,412	82,999	108,404
6/30/93-94	2,962,553	3,077,000	3,108,780	114,447	146,227	5	1	20.0%	22,889	29,245	18,846	3,879	20.6%	23,557	30,099				7,472	9,547	7,472	9,547	106,975	136,680
6/30/94-95	2,570,487	2,683,000	2,710,840	112,513	140,353	8	1	12.5%	14,064	17,544	27,818	3,489	12.5%	14,112	17,604				7,346	9,164	11,841	14,771	100,672	125,582
6/30/95-96	2,087,948	2,191,000	2,213,920	103,052	125,972	2					4,211								6,728	8,225	2,243	2,742	100,809	123,230
6/30/96-97	2,770,748	2,923,000	2,952,230	152,252	181,482	4					6,805								9,941	11,849	4,970	5,925	147,282	175,558
6/30/97-98	2,030,306	2,154,000	2,179,580	123,694	149,274	3					4,930					1,917,994	137,500	7.2%	8,868	10,701	8,868	10,701	114,827	138,573
6/30/98-99	2,615,954	2,798,000	2,829,010	182,046	213,056	6	1	16.7%	30,341	35,509	23,651	997	4.2%	7,672	8,979	2,081,524	136,688	6.6%	11,954	13,991	21,148	24,750	160,898	188,306
6/30/99-00	3,186,632	3,436,000	3,504,720	249,368	318,088	13	2	15.4%	38,364	48,937	72,067	31,960	44.3%	110,589	141,064	2,207,243	137,892	6.2%	15,579	19,872	15,579	19,872	233,790	298,217
6/30/00-01	3,182,178	3,458,000	3,529,200	275,822	347,022	9					59,244					2,201,008	145,149	6.6%	18,189	22,885	6,063	7,628	269,759	339,394
6/30/01-02	2,939,983	3,237,000	3,307,860	297,017	367,877	12	1	8.3%	24,751	30,656	79,477	30	0.0%	113	140	2,292,592	140,223	6.1%	18,167	22,501	14,344	17,766	282,674	350,112
6/30/02-03	3,289,330	3,680,000	3,756,660	390,670	467,330	11	1	9.1%	35,515	42,485	54,566	11,820	21.7%	84,628	101,234	2,260,534	140,250	6.2%	24,238	28,995	48,127	57,571	342,543	409,759
6/30/03-04	3,175,883	3,651,000	3,730,140	475,117	554,257	16	2	12.5%	59,390	69,282	35,680	7,976	22.4%	106,210	123,902	2,255,942	137,408	6.1%	28,939	33,759	44,164	51,521	430,953	502,736
6/30/04-05	4,481,807	5,100,000	5,335,000	618,193	853,193	10	1	10.0%	61,819	85,319	46,139	947	2.1%	12,683	17,504	2,309,083	145,033	6.3%	38,829	53,589	37,777	52,137	580,416	801,056
6/30/05-06	3,515,073	4,200,000	4,363,000	684,927	847,927	14	1	7.1%	48,923	60,566	45,760	99	0.2%	1,478	1,830	2,480,693	156,390	6.3%	43,180	53,456	46,052	57,011	638,875	790,916
6/30/06-07	5,100,951	6,000,000	6,348,000	899,049	1,247,049	18	6	33.3%	299,683	415,683	30,776	18,298	59.5%	534,535	741,441	2,612,577	157,146	6.0%	54,077	75,010	54,077	75,010	844,971	1,172,039
6/30/07-08	4,048,757	5,000,000	5,173,000	951,243	1,124,243	14	1	7.1%	67,946	80,303	36,024	910	2.5%	24,029	28,399	2,783,717	168,663	6.1%	57,635	68,117	62,790	74,210	888,453	1,050,033
6/30/08-09	4,407,183	5,500,000	5,690,000	1,092,817	1,282,817	17	2	11.8%	128,567	150,920	29,362	1,556	5.3%	57,931	68,003	2,750,907	180,456	6.6%	71,687	84,151	100,127	117,535	992,690	1,165,281
6/30/09-10	4,342,050	5,500,000	5,721,000	1,157,950	1,378,950	21	2	9.5%	110,281	131,329	33,690	10,463	31.1%	359,610	428,244	2,806,048	203,138	7.2%	83,827	99,826	97,054	115,577	1,060,896	1,263,372
6/30/10-11	5,039,589	6,400,000	6,762,000	1,360,411	1,722,411	32	1	3.1%	42,513	53,825	90,718	-42	0.0%	-624	-789	2,942,638	196,775	6.7%	90,971	115,178	66,742	84,502	1,293,669	1,637,909
6/30/11-12	4,914,674	6,400,000	6,743,000	1,485,326	1,828,326	41	5	12.2%	181,137	222,967	79,254	5,252	6.6%	98,428	121,158	3,006,849	207,250	6.9%	102,378	126,019	127,314	156,715	1,358,012	1,671,611
6/30/12-13	4,176,679	5,700,000	6,013,000	1,523,321	1,836,321	41	2	4.9%	74,308	89,577	88,464	752	0.8%	12,943	15,602	3,138,905	218,884	7.0%	106,225	128,052	64,492	77,744	1,458,829	1,758,577
6/30/13-14	4,770,478	6,700,000	7,194,000	1,929,522	2,423,522	65	10	15.4%	296,849	372,849	221,651	50,747	22.9%	441,761	554,862	3,311,947	231,765	7.0%	135,025	169,594	213,118	267,681	1,716,403	2,155,840
6/30/14-15	4,739,997	7,100,000	7,638,000	2,360,003	2,898,003	103	8	7.8%	183,301	225,088	549,232	57,714	10.5%	247,994	304,528	3,511,622	252,444	7.2%	169,656	208,332	192,652	236,570	2,167,351	2,661,433
6/30/15-16	4,707,647	7,600,000	8,311,000	2,892,353	3,603,353	215	21	9.8%	282,509	351,955	924,390	86,278	9.3%	269,956	336,317	3,491,558	239,716	6.9%	198,577	247,392	198,577	247,392	2,693,776	3,355,961
6/30/16-17	3,788,337	7,400,000	8,311,000	3,611,663	4,522,663	636	57	9.0%	323,687	405,333	2,008,096	255,481	12.7%	459,496	575,398	3,338,327	202,091	6.1%	218,638	273,787	218,638	273,787	3,393,025	4,248,876
6/30/17-18	1,793,068	7,500,000	9,050,000	5,706,932	7,256,932	942	62	6.6%	375,615	477,632	1,793,068	98,606	5.5%	313,842	399,081	3,401,479	204,258	6.0%	342,700	435,777	342,700	435,777	5,364,232	6,821,155
Total	119,216,649	148,472,892	155,925,765	29,256,243	36,709,116	2,288	189	8.3%	2,720,308	3,422,250	6,428,659	648,332	10.1%	3,193,105	4,031,796						2,029,246	2,531,280	27,226,997	34,177,836

Sel. FY97 & Prior	6.53%

NOTES:

(2), (7), (8), (12), (13), (17). (18) Provided by Commonwealth of Massachusetts
(3) From Section 8, Exhibit 2, Page 1, Column 6
(4) From Section 8, Exhibit 2, Page 1, Column 7
(5) = (3) - (2)
(6) = (4) - (2)
(9) = (8) / (7)
(10) = (9) * (5)
(11) = (9) * (6)

(14) = (13) / (12)
(15) = (14) * (5)
(16) = (14) * (6)
(19) = (18) / (17)
(20) = (19) * (5)
(21) = (19) * (6)

(22) Selected judgementally based on (10), (15), (20)
(23) Selected judgementally based on (11), (16). (21)
(24) = (5) - (22)
(25) = (6) - (23)

Commonwealth of Massachusetts
Workers Compensation
Reserve Analysis at June, 30, 2017

All Other - Clusters 5-17 & 95
Medical

Allocation of Outstanding Reserve to MassDOT Agencies

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
		Aon	Aon	Outstanding	Outstanding		**MassDOT Allocation - Method 1**					**MassDOT Allocation - Method 2**					**MassDOT Allocation - Method 3**				MassDOT	MassDOT	All Other	All Other
Accident		Selected Ult	Selected Ult	Losses	Losses	Paid Counts	MassDOT	MassDOT /	MassDOT OS	MassDOT OS	Total Paid	MassDOT	MassDOT /	MassDOT OS	MassDOT OS	Total Payroll	MassDOT	MassDOT /	MassDOT OS	MassDOT OS	Outstanding	Outstanding	Outstanding	Outstanding
Year	Paid Loss	(Low)	(High)	(Low)	(High)	7/1/16-17	7/1/16-17	Paid Counts	(Low)	(High)	7/1/16-17	7/1/16-17	Total Paid	(Low)	(High)	($000)	($000)	Total Payroll	(Low)	(High)	(Low)	(High)	(Low)	(High)
All Prior Yrs	3,054,611	3,113,503	3,201,142	58,891	146,530	3					3,150								3,861	9,606	3,861	9,606	55,031	136,925
6/30/82-83	512,140	512,140	519,607	0	7,467	0					0								0	489	0	489	0	6,977
6/30/83-84	795,278	800,000	808,487	4,722	13,209	1					4,465								310	866	103	289	4,619	12,920
6/30/84-85	1,123,956	1,123,956	1,144,910	0	20,953	0					0								0	1,374	0	458	0	20,495
6/30/85-86	1,892,840	1,905,425	1,934,150	12,585	41,310	2					1,018								825	2,708	275	903	12,310	40,407
6/30/86-87	1,716,165	1,732,295	1,758,410	16,130	42,245	2					17,565								1,057	2,769	352	923	15,778	41,322
6/30/87-88	3,200,620	3,240,715	3,291,590	40,095	90,970	4					15,927								2,628	5,963	876	1,988	39,219	88,982
6/30/88-89	3,573,237	3,647,000	3,686,500	73,763	113,263	5					13,468								4,835	7,425	1,612	2,475	72,151	110,788
6/30/89-90	3,861,755	3,954,000	3,997,580	92,245	135,825	7					10,247								6,047	8,904	2,016	2,968	90,229	132,857
6/30/90-91	3,497,516	3,593,000	3,628,930	95,484	131,414	6					8,987								6,259	8,615	2,086	2,872	93,398	128,543
6/30/91-92	2,786,796	2,877,000	2,905,770	90,205	118,975	3					1,974								5,913	7,799	1,971	2,600	88,233	116,375
6/30/92-93	2,498,702	2,592,000	2,618,930	93,298	120,228	2					5,777								6,116	7,881	2,039	2,627	91,259	117,601
6/30/93-94	2,943,707	3,068,000	3,100,700	124,293	156,993	5	1	20.0%	24,859	31,399	15,710	250	1.6%	1,978	2,498				8,148	10,291	8,148	10,291	116,145	146,701
6/30/94-95	2,542,669	2,664,000	2,691,650	121,331	148,981	8	1	12.5%	15,166	18,623	29,072	2,927	10.1%	12,217	15,001				7,954	9,766	11,779	14,463	109,552	134,518
6/30/95-96	2,083,737	2,195,000	2,216,950	111,263	133,213	2					4,281								7,294	8,733	2,431	2,911	108,831	130,302
6/30/96-97	2,763,943	2,929,000	2,958,290	165,057	194,347	4					5,535								10,820	12,740	5,410	6,370	159,647	187,977
6/30/97-98	2,025,376	2,163,000	2,189,680	137,624	164,304	5					5,242					1,917,994	137,500	7.2%	9,866	11,779	9,866	11,779	127,758	152,525
6/30/98-99	2,592,302	2,791,000	2,821,940	198,698	229,638	7	1	14.3%	28,385	32,805	21,570	68	0.3%	626	724	2,081,524	136,688	6.6%	13,048	15,080	20,717	23,943	177,981	205,695
6/30/99-00	3,114,564	3,371,000	3,440,460	256,436	325,896	12	2	16.7%	42,739	54,316	56,859	21,996	38.7%	99,205	126,077	2,207,243	137,892	6.2%	16,020	20,360	16,020	20,360	240,415	305,536
6/30/00-01	3,122,934	3,423,000	3,494,520	300,066	371,586	11	2	18.2%	54,557	67,561	75,672	304	0.4%	1,204	1,491	2,201,008	145,149	6.6%	19,788	24,505	25,183	31,186	274,883	340,400
6/30/01-02	2,860,506	3,195,000	3,267,060	334,494	406,554	14	1	7.1%	23,892	29,040	71,985	493	0.7%	2,291	2,785	2,292,592	140,223	6.1%	20,459	24,866	15,548	18,897	318,947	387,657
6/30/02-03	3,234,764	3,706,000	3,784,200	471,236	549,436	17	1	5.9%	27,720	32,320	68,742	22,980	33.4%	157,530	183,671	2,260,534	140,250	6.2%	29,237	34,089	71,495	83,360	399,741	466,076
6/30/03-04	3,140,203	3,652,000	3,731,160	511,797	590,957	17	2	11.8%	60,211	69,524	63,951	2,381	3.7%	19,054	22,001	2,255,942	137,408	6.1%	31,173	35,995	45,692	52,760	466,105	538,197
6/30/04-05	4,435,668	5,100,000	5,393,000	664,332	957,332	10	1	10.0%	66,433	95,733	34,256	2,777	8.1%	53,862	77,617	2,309,083	145,033	6.3%	41,727	60,130	54,007	77,827	610,325	879,506
6/30/05-06	3,469,314	4,200,000	4,388,000	730,686	918,686	16	1	6.3%	45,668	57,418	24,945	1,327	5.3%	38,882	48,886	2,480,693	156,390	6.3%	46,065	57,917	45,866	57,667	684,820	861,019
6/30/06-07	5,070,176	6,000,000	6,415,000	929,824	1,344,824	23	5	21.7%	202,136	292,353	73,285	52,871	72.1%	670,809	970,205	2,612,577	157,146	6.0%	55,929	80,891	55,929	80,891	873,896	1,263,934
6/30/07-08	4,012,733	5,000,000	5,212,000	987,267	1,199,267	18	1	5.6%	54,848	66,626	23,472	720	3.1%	30,285	36,788	2,783,717	168,663	6.1%	59,818	72,662	57,333	69,644	929,934	1,129,623
6/30/08-09	4,377,822	5,500,000	5,765,000	1,122,178	1,387,178	23	3	13.0%	146,371	180,936	155,037	2,862	1.8%	20,718	25,611	2,750,907	180,456	6.6%	73,613	90,997	109,992	135,967	1,012,186	1,251,212
6/30/09-10	4,308,361	5,600,000	5,830,000	1,291,639	1,521,639	24	1	4.2%	53,818	63,402	59,263	11,196	18.9%	244,022	287,475	2,806,048	203,138	7.2%	93,505	110,156	73,662	86,779	1,217,977	1,434,861
6/30/10-11	4,948,871	6,500,000	6,833,000	1,551,129	1,884,129	41	1	2.4%	37,832	45,954	160,614	66	0.0%	637	773	2,942,638	196,775	6.7%	103,724	125,992	70,778	85,973	1,480,351	1,798,156
6/30/11-12	4,835,420	6,500,000	6,916,000	1,664,580	2,080,580	49	6	12.2%	203,826	254,765	92,203	7,400	8.0%	133,598	166,986	3,006,849	207,250	6.9%	114,733	143,406	150,719	188,386	1,513,861	1,892,194
6/30/12-13	4,088,215	5,900,000	6,173,000	1,811,785	2,084,785	59	4	6.8%	122,833	141,341	182,105	4,401	2.4%	43,788	50,386	3,138,905	218,884	7.0%	126,341	145,378	97,654	112,368	1,714,131	1,972,416
6/30/13-14	4,548,827	6,900,000	7,348,000	2,351,173	2,799,173	103	15	14.6%	342,404	407,647	325,957	48,029	14.7%	346,438	412,450	3,311,947	231,765	7.0%	164,531	195,882	224,495	267,271	2,126,678	2,531,903
6/30/14-15	4,190,765	7,100,000	7,618,000	2,909,235	3,427,235	211	23	10.9%	317,120	373,585	636,982	43,707	6.9%	199,621	235,164	3,511,622	252,444	7.2%	209,139	246,377	233,755	275,376	2,675,480	3,151,859
6/30/15-16	3,783,256	7,700,000	8,288,000	3,916,744	4,504,744	715	57	8.0%	312,244	359,119	1,776,605	196,910	11.1%	434,111	499,282	3,491,558	239,716	6.9%	268,908	309,278	268,908	309,278	3,647,836	4,195,466
6/30/16-17	1,780,241	7,400,000	8,973,000	5,619,759	7,192,759	968	81	8.4%	470,248	601,873	1,780,241	152,365	8.6%	480,976	615,604	3,338,327	202,091	6.1%	340,202	435,426	340,202	435,426	5,279,557	6,757,333
Total	112,787,990	141,648,034	148,344,614	28,860,044	35,556,625	2,397	210	8.8%	2,653,313	3,276,340	5,826,159	576,031	9.9%	2,991,853	3,781,475						2,030,780	2,487,366	26,829,264	33,069,258

Sel. FY97 & Prior	6.56%

NOTES:

(2), (7), (8), (12), (13), (17). (18) Provided by Commonwealth of Massachusetts
(3) From Prior Analysis - Section 8, Exhibit 2, Page 1, Column 6
(4) From Prior Analysis - Section 8, Exhibit 2, Page 1, Column 7
(5) = (3) - (2)
(6) = (4) - (2)
(9) = (8) / (7)
(10) = (9) * (5)
(11) = (9) * (6)

(14) = (13) / (12)
(15) = (14) * (5)
(16) = (14) * (6)
(19) = (18) / (17)
(20) = (19) * (5)
(21) = (19) * (6)

(22) Selected judgementally based on (10), (15), (20)
(23) Selected judgementally based on (11), (16). (21)
(24) = (5) - (22)
(25) = (6) - (23)