

RULES – IMPLEMENTATION

DECEMBER 19, 2018

COMMERCIAL MULTIPLE LINE

LI-ML-2018-059

## **MICHIGAN COMMERCIAL PACKAGE POLICY REVISED PACKAGE MODIFICATION FACTOR REVISION TO BE IMPLEMENTED; EXCEL WORKBOOK NEWLY INCLUDED**

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### **KEY MESSAGE**

Revised Commercial Package Policy package modification factors for an overall statewide change of -1.8% to be implemented.

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### **BACKGROUND**

In circular [LI-ML-2018-044](#), we provided you with information about the Commercial Package Policy modification factor experience review.

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### **ISO ACTION**

We are implementing ML-2018-RLA1, which presents a review of Commercial Package Policy modification factors experience. Refer to the attachment(s) for complete details.

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### **EFFECTIVE DATE**

The ISO revision is subject to the following rule of application:

These changes are applicable to all policies written on or after May 1, 2019.

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### **COMPANY ACTION**

If you have authorized us to file on your behalf and decide:

- To use our revision and effective date, you are not required to file anything with the Insurance Department.
- To use our revision with a different effective date, to use our revision with modification, or to not use our revision, you must make an appropriate submission with the Insurance Department.

For guidance on submission requirements, consult the ISO State Filing Handbook.

WE WILL SUBMIT THIS REVISION TO THE INSURANCE DEPARTMENT ON APRIL 19, 2019. IF STATE FILING REQUIREMENTS DICTATE THAT YOU MAKE A SUBMISSION WITH THE INSURANCE DEPARTMENT, DO NOT SUBMIT IT PRIOR TO THIS DATE.

In all correspondence with the Insurance Department on this revision, you should refer to ISO Filing Designation Number ML-2018-RLA1, NOT this circular number. Communications with the regulator concerning a filing affecting multiple lines of business (i.e., CL, PL, AL filing designation) should specify the line(s) of business that you are addressing.

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## RATING SOFTWARE IMPACT

No new attributes are being introduced with this revision.

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## POLICYHOLDER NOTIFICATION

If you decide to implement this revision, you should check all applicable laws for the state(s) to which this revision applies, to determine whether or not a specific policyholder notice requirement may apply. Please note that circular [LI-CL-2018-044](#) contains the ISO Guide To Renewals With Changed Conditions For Commercial Lines, which is available only as a guide to assist participating companies in complying with various conditional renewal statutes or regulations, for the major commercial lines of insurance serviced by ISO. The information in the Guide does not necessarily reflect all requirements or exceptions that may apply, and it is not intended as a substitute for your review of all applicable statutes and regulations concerning policyholder notification.

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## REVISION DISTRIBUTION

We will issue a Notice to Manualholders with an edition date of 5-19 (or the earliest possible subsequent date), along with any new and/or revised manual pages.

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## REFERENCE(S)

- [LI-CL-2018-044](#) (11/27/2018) Revised Lead Time Requirements Listing
- [LI-ML-2018-044](#) (10/30/2018) Commercial Package Policy Experience Reviewed By Staff

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## ATTACHMENT(S)

- Filing [ML-2018-RLA1](#)
- Excel Workbook

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## FILES AVAILABLE FOR DOWNLOAD

To download all files associated with this circular, including attachments in the full circular PDF and/or any additional files not included in the PDF, search for the circular number on [ISOnet Circulars](#). Then click the Word/Excel link under the Full Circular column on the Search Results screen.

Please note that in some instances, not all files listed in the Attachment(s) block (if applicable) are included in the PDF.

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## ACKNOWLEDGMENT OF ACTUARIAL QUALIFICATIONS

The American Academy of Actuaries' "Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States" requires that an actuary issuing a Statement of Actuarial Opinion should include an acknowledgment with the opinion that he/she has met the qualification standards of the AAA. ISO considers this rule revision a Statement of Actuarial Opinion; therefore we are including the following acknowledgment:

I, Rimma Maasbach, am an Actuarial Consultant in Actuarial Operations for ISO, and I, Bei Zhou, am an Actuarial Product Director for Commercial Property for ISO. We are jointly responsible for the content of this Statement of Actuarial Opinion. We are both members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

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Callers outside the United States, Canada, and the Caribbean may contact us using our global toll-free number (International Access Code + 800 48977489). For information on all ISO products, visit us at [www.verisk.com/iso](http://www.verisk.com/iso). To keep abreast of the latest Insurance Lines Services updates, view [www.verisk.com/ils](http://www.verisk.com/ils).

MICHIGAN  
ADVISORY PACKAGE MODIFICATION FACTOR REVIEW  
COMMERCIAL PACKAGE POLICY  
ML-2018-RLA1  
EXECUTIVE SUMMARY

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PURPOSE

This document:

- presents a review of advisory Package Modification Factors (PMFs). PMFs are relativity factors used to adjust monoline loss costs as appropriate for multiline risks.
  - provides the analyses used to derive these advisory PMFs.
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PMF CHANGES

The proposed Commercial Package Policy (CPP) Package Modification Factor changes are:

<u>Type of Policy</u>	<u>Property</u>	<u>Liability</u>	<u>Prop. &amp; Liab. Total</u>
Motel/Hotel	-2.0%	5.8%	1.1%
Apartment	-10.0%	-2.0%	-8.2%
Office	-4.0%	0.0%	-2.0%
Mercantile	0.0%	0.0%	0.0%
Institutional	-5.0%	0.0%	-4.3%
Services	0.0%	0.0%	0.0%
Indust./Proc.	-7.0%	1.2%	-4.3%
Contractors	<u>-5.0%</u>	<u>2.2%</u>	<u>0.7%</u>
Statewide	-3.5%	0.8%	-1.8%

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INDICATED  
VS. CAPPED

Indicated PMF changes are based on standard ISO methodology. Differences between indicated and capped PMF changes are caused by rounding each indicated PMF to the nearest one percent and applying an upper cap of 1.00, where necessary.

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MICHIGAN  
ADVISORY PACKAGE MODIFICATION FACTOR REVIEW  
COMMERCIAL PACKAGE POLICY  
ML-2018-RLA1  
EXECUTIVE SUMMARY

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HISTORICAL  
SOURCE DATA

The data used in this review is from ISO reporting companies for:

- Basic Group I: five fiscal accident years ending 06/30/17.
  - Basic Group II: ten fiscal accident years ending 06/30/17.
  - Special Causes of Loss: five fiscal accident years ending 06/30/17.
  - Crime: calendar year ending 06/30/16.
  - Inland Marine: five calendar accident years ending 12/31/16.
  - Fidelity: policy year ending 12/31/15.
  - Owners, Landlords, and Tenants: five fiscal accident years ending 06/30/17.
  - Manufacturers and Contractors: five fiscal accident years ending 06/30/17.
  - Products: three calendar accident years ending 12/31/16.
  - Local Products and Completed Operations: three calendar accident years ending 12/31/16.
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PRIOR ISO  
REVISIONS

The latest revisions in this state are:

<u>Filing</u>	ML-15-RLA1	ML-13-RLA1	ML-11-RLA1
<u>Dates</u>			
Implemented	06/01/16	02/01/14	01/01/12
<u>Changes</u>			
Indicated	+3.7%	+7.4%	+3.8%
Filed	+3.7%	+7.4%	+3.8%
Implemented	+3.7%	+7.4%	+3.8%

MICHIGAN

ADVISORY PACKAGE MODIFICATION FACTOR REVIEW

COMMERCIAL PACKAGE POLICY

ML-2018-RLA1

EXECUTIVE SUMMARY

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ADJUSTMENTS  
TO REPORTED  
EXPERIENCE

Standard actuarial procedures have been used in the reviews underlying the calculation of the PMFs, including adjusting the fire and liability losses to ultimate settlement level and, for all coverages, reflecting all loss adjustment expenses and trend. Specific procedures vary by subline.

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TEN LARGEST  
GROUPS IN  
ISO DATA BASE

Insurers are listed in descending order based on the percent of statewide written premium volume from Annual Statement Page 15 for the year ending 12/31/17 for the Annual Statement Line of Business (ASLOB) indicated.

COMMERCIAL MULTI PERIL (ASLOB 51 & 52)

1. Travelers Indemnity Company
  2. Hanover Insurance Company
  3. Cincinnati Insurance Company
  4. Frankenmuth Mutual Insurance Company
  5. Tokio Marine Companies
  6. Hartford Accident & Indemnity Company
  7. Continental Casualty Company
  8. Liberty Mutual Insurance Company
  9. Westfield Insurance Company
  10. Zurich American Insurance Company
- 

SIZE OF ISO  
DATA BASE

The market share of ISO participating insurers as measured by Annual Statement Page 15 written premium for the year ending 12/31/17 is:

Commercial Multi Peril (ASLOB 51 & 52). 46.0%.

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ADDITIONAL  
SUPPORTING  
MATERIAL

Additional supporting material underlying the calculation of the experience review indications used in this PMF analysis may be found in the respective monoline experience review documents for each line.

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MICHIGAN  
ADVISORY PACKAGE MODIFICATION FACTOR REVIEW  
COMMERCIAL PACKAGE POLICY  
ML-2018-RLA1  
EXECUTIVE SUMMARY

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COMPANY DECISION

We encourage each insurer to decide independently whether the judgments made and the procedures or data used by ISO in developing the PMFs contained herein are appropriate for your use. We have included within this document the information upon which ISO relied in order to enable companies to make such independent judgments. The data underlying the enclosed material comes from companies reporting to Insurance Services Office, Inc. Therefore, the ISO experience permits the establishment of a much broader statistical ratemaking base than could be employed by using any individual company's data. A broader data base enhances the validity of ratemaking analysis derived therefrom.

At the same time, however, an individual company may benefit from a comparison of its own experience to the aggregate ISO experience, and may reach valid conclusions with respect to the manner in which its own costs can be expected to differ from ISO's projection based on the aggregate data.

Some calculations included in this document involve areas of ISO staff judgment. Each company should carefully review and evaluate whether the ISO selected PMFs are appropriate for its use.

The material has been developed exclusively by the staff of Insurance Services Office, Inc.

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## COMMERCIAL PACKAGE POLICY

### TABLE OF CONTENTS

#### SECTION A - SCOPE OF PMF REVISION

Methodology Overview .....	A-2
Summary of Package Modification Factor (PMF) Review (Table 1) .....	A-3
Calculation of Revised Package Modification Factors (Table 2) .....	A-4-12

#### SECTION B - CALCULATION OF PROPOSED CHANGES

##### PROPERTY COVERAGES

Commercial Fire & Allied Lines	
Distribution of Advisory Loss Cost Level Change (Tables 3-7) .....	B-2-20
Crime and Fidelity.....	B-21
Commercial Inland Marine (Tables 8-9).....	B-22-26

##### LIABILITY COVERAGES

Distribution of Advisory Loss Cost Level Change (Tables 10-18) .....	B-27-44
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#### SECTION C - REVISED CLM DIVISION NINE

Commercial Package Policy Package Modification Factors (Revised MLCP-PMF-1).....	C-2
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COMMERCIAL PACKAGE POLICY

TABLE OF CONTENTS

SECTION A - SCOPE OF PMF REVISION

Methodology Overview .....	A-2
Summary of Package Modification Factor (PMF) Review (Table 1) .....	A-3
Calculation of Revised Package Modification Factors (Table 2) .....	A-4-12

## COMMERCIAL PACKAGE POLICY METHODOLOGY OVERVIEW

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### OBJECTIVE

A Commercial Package Policy (CPP) is essentially a combination of monoline coverages. CPP pricing employs monoline loss costs modified by Package Modification Factors (PMFs). These factors vary by the eight CPP types of policy and are reviewed annually. Monoline and multiline experience are combined and reviewed via a monoline/multiline relativity analysis. The resulting indicated PMFs represent the loss cost for a CPP relative to that for monoline policies providing the same coverages.

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### STEP 1: THE RELATIVITY ANALYSES

Each line of insurance develops indicated changes to monoline and multiline aggregate loss costs based on an experience ratio relativity analysis for that coverage. The monoline indication represents the needed change to monoline loss costs. The multiline indication represents the needed change to multiline aggregate loss costs, which is implemented through changes to the PMFs. For this PMF analysis, multiline indications are developed for each line of insurance and Type of Policy. Relativity analyses are explained in Section B.

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### STEP 2: CALCULATION OF THE PMFs

The procedure described above generates indicated Implicit PMFs (IPMFs) which vary by the various lines of insurance and by type of policy. IPMFs represent what the PMF would be for the CPP risk if only a single coverage were written. For each Type of Policy, IPMFs are weighted by CPP aggregate loss costs to determine the indicated property and liability PMFs. These PMFs may be capped, or rounded to the nearest one percent, and certain component IPMFs appropriately adjusted for this change. These calculations are explained in the remainder of Section A.

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MICHIGAN

TABLE 1  
COMMERCIAL PACKAGE POLICY

SUMMARY OF THIS REVIEW

The display below summarizes the review and shows the capped Package Modification Factors for Property and Liability. For each type of risk, the PMFs are determined to be those factors which when applied to the monoline loss costs produce the appropriate CPP aggregate loss cost level as determined by an analysis of the CPP experience.

TYPE OF POLICY	PROPERTY PMFS			LIABILITY PMFS			PROP. & LIAB. TOTAL
	CURRENT	CAPPED	% CHANGE	CURRENT	CAPPED	% CHANGE	% CHANGE
MOTEL/HOTEL (31)	1.00	0.98	-2.0%	0.86	0.91	5.8%	1.1%
APARTMENT (32)	1.00	0.90	-10.0%	1.00	0.98	-2.0%	-8.2%
OFFICE (33)	1.00	0.96	-4.0%	0.96	0.96	0.0%	-2.0%
MERCANTILE (34)	1.00	1.00	0.0%	1.00	1.00	0.0%	0.0%
INSTITUTION (35)	1.00	0.95	-5.0%	0.94	0.94	0.0%	-4.3%
SERVICES (36)	1.00	1.00	0.0%	1.00	1.00	0.0%	0.0%
IND/PROC (37)	1.00	0.93	-7.0%	0.83	0.84	1.2%	-4.3%
CONTRACTORS (38)	1.00	0.95	-5.0%	0.93	0.95	2.2%	0.7%
STATEWIDE			-3.5%			0.8%	-1.8%

MICHIGAN  
TABLE 2  
COMMERCIAL PACKAGE POLICY  
CALCULATION OF REVISED CPP PACKAGE MODIFICATION FACTORS (PMF)

MOTEL/HOTEL (31) *****	(1) AGGREG- ATE LOSS COSTS	(2) CURRENT IMPLICIT PMF	(3) NET INDICATION	(4) INDIC. PMF	(5) CAPPED PMF
<u>COVERAGE</u>					
PROPERTY-					
BASIC GRP I	953,852	0.941	-4.2%	0.901	0.913
BASIC GRP II	149,290	0.838	9.8	0.920	0.932
SP CAUSE/LOSS	290,906	1.483	-6.5	1.387	1.404
*CRIME	1,697	0.908	0.0	0.908	0.908
*INL. MAR.	782	0.850	7.1	0.910	0.910
*FIDELITY	7,894	1.000	0.0	1.000	1.000
<u>TOTAL</u>	<u>1,404,421</u>	<u>1.00</u>	<u>-2.8%</u>	<u>0.972</u>	<u>0.98</u>
LIABILITY-					
OL&T	925,423	0.862	5.4%	0.909	0.909
<u>TOTAL</u>	<u>925,423</u>	<u>0.86</u>	<u>5.6%</u>	<u>0.909</u>	<u>0.91</u>
-----	-----	-----	-----	-----	-----
PROP. & LIAB. TOTAL	2,329,844		0.6%		

  

APARTMENT (32) *****	(1) AGGREG- ATE LOSS COSTS	(2) CURRENT IMPLICIT PMF	(3) NET INDICATION	(4) INDIC. PMF	(5) CAPPED PMF
<u>COVERAGE</u>					
PROPERTY-					
BASIC GRP I	4,914,140	1.000	-10.8%	0.892	0.903
BASIC GRP II	939,919	0.608	8.1	0.657	0.666
SP CAUSE/LOSS	2,083,688	1.382	-17.6	1.139	1.153
*CRIME	739	0.908	0.0	0.908	0.908
*INL. MAR.	3,372	0.850	7.1	0.910	0.910
*FIDELITY	9,452	1.000	0.0	1.000	1.000
<u>TOTAL</u>	<u>7,951,310</u>	<u>1.00</u>	<u>-10.7%</u>	<u>0.893</u>	<u>0.90</u>
LIABILITY-					
OL&T	2,329,306	1.000	-1.9%	0.981	0.981
<u>TOTAL</u>	<u>2,329,306</u>	<u>1.00</u>	<u>-1.9%</u>	<u>0.981</u>	<u>0.98</u>
-----	-----	-----	-----	-----	-----
PROP. & LIAB. TOTAL	10,280,616		-8.7%		

\* indicates coverage for which reviews are on a MULTISTATE basis.

MICHIGAN  
TABLE 2  
COMMERCIAL PACKAGE POLICY  
CALCULATION OF REVISED CPP PACKAGE MODIFICATION FACTORS (PMF)

OFFICE (33) *****	(1)	(2)	(3)	(4)	(5)
	AGGREGATE <u>LOSS COSTS</u>	CURRENT IMPLICIT <u>PMF</u>	NET <u>INDICATION</u>	INDIC. <u>PMF</u>	CAPPED <u>PMF</u>
COVERAGE					
PROPERTY-					
BASIC GRP I	2,125,772	1.046	-2.0%	1.025	1.038
BASIC GRP II	642,811	0.523	8.1	0.565	0.573
SP CAUSE/LOSS	1,957,732	1.375	-15.9	1.156	1.171
*CRIME	5,825	0.908	0.0	0.908	0.908
*INL. MAR.	47,220	0.850	7.1	0.910	0.910
*FIDELITY	22,125	1.000	0.0	1.000	1.000
TOTAL	4,801,485	1.00	-5.6%	0.944	0.96
LIABILITY-					
OL&T	4,172,941	0.950	-0.4%	0.946	0.946
M&C	798,413	1.000	0.9	1.009	1.009
TOTAL	4,971,354	0.96	-0.4%	0.956	0.96
-----	-----	-----	-----	-----	-----
PROP. & LIAB. TOTAL	9,772,839		-3.0%		
MERCANTILE (34) *****	(1)	(2)	(3)	(4)	(5)
	AGGREGATE <u>LOSS COSTS</u>	CURRENT IMPLICIT <u>PMF</u>	NET <u>INDICATION</u>	INDIC. <u>PMF</u>	CAPPED <u>PMF</u>
COVERAGE					
PROPERTY-					
BASIC GRP I	13,250,083	1.108	2.8%	1.139	1.104
BASIC GRP II	4,541,731	0.815	13.8	0.927	0.899
SP CAUSE/LOSS	6,450,744	0.981	-4.0	0.942	0.913
*CRIME	74,201	0.908	0.0	0.908	0.908
*INL. MAR.	1,026,990	0.850	7.1	0.910	0.910
*FIDELITY	445,351	1.000	0.0	1.000	1.000
TOTAL	25,789,100	1.00	2.9%	1.029	1.00
LIABILITY-					
OL&T	8,944,001	1.003	-2.2%	0.981	0.980
M&C	2,187,831	1.278	1.3	1.295	1.294
LOCAL PRODUCT	823,363	1.073	2.5	1.100	1.099
*MULTI PRODUCT	2,444,652	0.831	3.8	0.862	0.862
TOTAL	14,399,847	1.00	0.0%	1.000	1.00
-----	-----	-----	-----	-----	-----
PROP. & LIAB. TOTAL	40,188,947		1.9%		

\* indicates coverage for which reviews are on a MULTISTATE basis.

MICHIGAN  
TABLE 2  
COMMERCIAL PACKAGE POLICY  
CALCULATION OF REVISED CPP PACKAGE MODIFICATION FACTORS (PMF)

INSTITUTION (35) *****	(1)	(2)	(3)	(4)	(5)
	AGGREGATE	CURRENT	NET	INDIC.	CAPPED
COVERAGE	<u>LOSS COSTS</u>	<u>IMPLICIT</u>	<u>INDICATION</u>	<u>PMF</u>	<u>PMF</u>
PROPERTY-					
BASIC GRP I	5,330,696	0.928	-7.7%	0.857	0.868
BASIC GRP II	2,801,384	0.697	4.0	0.725	0.734
SP CAUSE/LOSS	5,221,211	1.500	-13.1	1.304	1.320
*CRIME	68,519	0.908	0.0	0.908	0.908
*INL. MAR.	28,495	0.850	7.1	0.910	0.910
*FIDELITY	276,777	1.000	0.0	1.000	1.000
TOTAL	13,727,082	1.00	-6.5%	0.935	0.95
LIABILITY-					
OL&T	2,235,025	0.950	0.6%	0.956	0.956
M&C	95,625	0.636	5.4	0.670	0.670
TOTAL	2,330,650	0.94	-0.2%	0.939	0.94
-----	-----	-----	-----	-----	-----
PROP. & LIAB. TOTAL	16,057,732		-5.6%		
 SERVICES (36) *****	(1)	(2)	(3)	(4)	(5)
	AGGREGATE	CURRENT	NET	INDIC.	CAPPED
COVERAGE	<u>LOSS COSTS</u>	<u>IMPLICIT</u>	<u>INDICATION</u>	<u>PMF</u>	<u>PMF</u>
PROPERTY-					
BASIC GRP I	5,711,076	0.801	-2.6%	0.780	0.792
BASIC GRP II	3,598,512	1.056	13.5	1.199	1.217
SP CAUSE/LOSS	5,165,994	1.344	-13.0	1.169	1.187
*CRIME	31,127	0.908	0.0	0.908	0.908
*INL. MAR.	36,898	0.850	7.1	0.910	0.910
*FIDELITY	240,460	1.000	0.0	1.000	1.000
TOTAL	14,784,067	1.00	-1.7%	0.983	1.00
LIABILITY-					
OL&T	2,413,475	0.913	-4.6%	0.871	0.866
M&C	3,102,377	1.038	3.7	1.076	1.071
LOCAL PRODUCT	976,056	1.204	0.5	1.210	1.204
*MULTI PRODUCT	252,139	0.941	-2.8	0.914	0.914
TOTAL	6,744,047	1.00	0.5%	1.005	1.00
-----	-----	-----	-----	-----	-----
PROP. & LIAB. TOTAL	21,528,114		-1.0%		

\* indicates coverage for which reviews are on a MULTISTATE basis.

MICHIGAN  
TABLE 2  
COMMERCIAL PACKAGE POLICY  
CALCULATION OF REVISED CPP PACKAGE MODIFICATION FACTORS (PMF)

IND/PROC (37) *****	(1)	(2)	(3)	(4)	(5)
	AGGREGATE <u>LOSS COSTS</u>	CURRENT IMPLICIT <u>PMF</u>	NET <u>INDICATION</u>	INDIC. <u>PMF</u>	CAPPED <u>PMF</u>
COVERAGE					
PROPERTY-					
BASIC GRP I	10,139,180	1.289	-9.2%	1.170	1.185
BASIC GRP II	2,431,928	0.594	1.0	0.600	0.608
SP CAUSE/LOSS	4,340,167	0.819	-5.5	0.774	0.784
*CRIME	10,797	0.908	0.0	0.908	0.908
*INL. MAR.	10,217	0.850	7.1	0.910	0.910
*FIDELITY	149,325	1.000	0.0	1.000	1.000
TOTAL	17,081,614	1.00	-8.6%	0.914	0.93
LIABILITY-					
M&C	4,277,698	0.827	0.8	0.834	0.834
LOCAL PRODUCT	122,505	0.654	-1.5	0.644	0.644
*MULTI PRODUCT	4,107,581	0.841	2.2	0.860	0.860
TOTAL	8,507,784	0.83	1.5%	0.843	0.84
-----	-----	-----	-----	-----	-----
PROP. & LIAB. TOTAL	25,589,398		-5.2%		
CONTRACTORS (38) *****	(1)	(2)	(3)	(4)	(5)
	AGGREGATE <u>LOSS COSTS</u>	CURRENT IMPLICIT <u>PMF</u>	NET <u>INDICATION</u>	INDIC. <u>PMF</u>	CAPPED <u>PMF</u>
COVERAGE					
PROPERTY-					
BASIC GRP I	1,827,828	0.900	-1.1%	0.890	0.901
BASIC GRP II	724,163	0.729	11.2	0.811	0.821
SP CAUSE/LOSS	1,946,055	1.339	-17.8	1.101	1.115
*CRIME	5,229	0.908	0.0	0.908	0.908
*INL. MAR.	13,133	0.850	7.1	0.910	0.910
*FIDELITY	102,793	1.000	0.0	1.000	1.000
TOTAL	4,619,201	1.00	-5.8%	0.942	0.95
LIABILITY-					
M&C	10,696,584	0.942	4.2	0.982	0.982
LOCAL PRODUCT	7,187,003	0.924	-1.4	0.911	0.911
TOTAL	17,883,587	0.93	2.5%	0.953	0.95
-----	-----	-----	-----	-----	-----
PROP. & LIAB. TOTAL	22,502,788		0.8%		

\* indicates coverage for which reviews are on a MULTISTATE basis.



MICHIGAN  
TABLE 2  
COMMERCIAL PACKAGE POLICY  
CALCULATION OF REVISED CPP PACKAGE MODIFICATION FACTORS (PMF)

STATEWIDE *****	(1)	(2)	(3)	(4)	(5)
	AGGREGATE	CURRENT	NET	INDIC.	CAPPED
COVERAGE	<u>LOSS COSTS</u>	<u>IMPLICIT</u>	<u>INDICATION</u>	<u>PMF</u>	<u>PMF</u>
PROPERTY-		PMF			
BASIC GRP I	44,252,627	1.037	-4.0%	0.996	0.995
BASIC GRP II	15,829,738	0.752	9.3	0.822	0.823
SP CAUSE/LOSS	27,456,497	1.155	-10.5	1.033	1.035
*CRIME	198,134	0.908	0.0	0.908	0.908
*INL. MAR.	1,167,107	0.850	7.1	0.910	0.910
*FIDELITY	1,254,177	1.000	0.0	1.000	1.000
TOTAL	90,158,280	0.999	-3.5%	0.964	0.964
LIABILITY-					
OL&T	21,020,171	0.968	-1.5%	0.954	0.954
M&C	21,158,528	0.954	3.0	0.983	0.982
LOCAL PRODUCT	9,108,927	0.954	-0.8	0.946	0.946
*MULTI PRODUCT	6,804,372	0.841	2.6	0.862	0.862
TOTAL	58,091,998	0.943	0.9%	0.951	0.951
-----	-----	-----	-----	-----	-----
PROP. & LIAB. TOTAL	148,250,278		-1.8%		

\* indicates coverage for which reviews are on a MULTISTATE basis.

MICHIGAN

TABLE 2

COMMERCIAL PACKAGE POLICY

COMBINED PMFs

<u>TYPE OF POLICY</u>	<u>CURRENT COMBINED</u>	<u>INDICATED COMBINED</u>	<u>CAPPED COMBINED</u>
MOTEL/HOTEL (31)	0.95	0.945	0.95
APARTMENT (32)	1.00	0.913	0.92
OFFICE (33)	0.97	0.950	0.96
MERCANTILE (34)	1.00	1.019	1.00
INSTITUTION (35)	0.99	0.936	0.95
SERVICES (36)	1.00	0.990	1.00
IND/PROC (37)	0.93	0.888	0.89
CONTRACTORS (38)	0.94	0.951	0.95

NOTE: Combined PMFs are provided for informational purposes only.

## EXPLANATORY NOTES TO TABLE 2

### CALCULATION OF REVISED PACKAGE MODIFICATION FACTORS

OBJECTIVE	<p>Commercial package policies were introduced in the 1960's as a convenient tool for both insurer and insured to have the many types of insurance needed by commercial risks packaged under one cover. Thus fire, extended coverage, crime, liability insurance, etc. could be written using a single policy instead of several. Today, virtually any type of monoline coverage can also be purchased as part of a package policy such as the CPP.</p> <p>The types of insured which can be written under a CPP are generally categorized into the following Types of Policy:</p> <ul style="list-style-type: none"><li>. Motels and Hotels (TOP 31)</li><li>. Apartments (TOP 32)</li><li>. Offices (TOP 33)</li><li>. Mercantile Operations (TOP 34)</li><li>. Institutions (TOP 35)</li><li>. Service Operations (TOP 36)</li><li>. Industrial and Processing Operations (TOP 37)</li><li>. Contractors (TOP 38)</li></ul>
PRICING OF POLICIES	<p>Since a CPP is essentially a combination of monoline coverages, CPP pricing employs monoline loss costs modified by PMFs (Package Modification Factors). These factors vary by the categories shown above and are reviewed annually.</p>
CPP PMF REVIEW PROCEDURE	<p>The CPP review of Package Modification Factors, which appears in Table 2 of this document, determines the appropriate PMF loss cost level for each of the eight CPP categories. This is done by combining the indications of the simultaneous reviews of monoline and multiline experience for the various lines (or coverages).</p> <p>A detailed explanation of the calculation of the revised PMFs follows.</p>

## EXPLANATORY NOTES TO TABLE 2 (Cont'd)

### LINES OF INSURANCE (COVERAGES) INCLUDED

The CPP review reflects the contribution from each significant coverage which can be written on a CPP. Included are:

#### Property Coverages

- . Basic Group I (BGI) - the predominant property coverage included.
- . Basic Group II (BGII) - both Basic Group I and Basic Group II must be purchased under a CPP contract.
- . Special Causes of Loss (SCL) - typically a type of insurance which is purchased in addition to Basic Group I and Basic Group II in order to provide "all risk" property coverage for the insured.
- . Crime (CRIME) - Crime insurance is a commonly purchased CPP coverage.
- . Inland Marine (INL. MAR.) - A highly specialized line of property insurance, Inland Marine coverages can be purchased as part of a package policy.
- . Fidelity (FIDELITY) - Certain forms of fidelity insurance can be part of the CPP package. Various forms of employee dishonesty coverage are available.

#### Liability Coverages

- . Owners, Landlords and Tenants (OL&T) Liability - this is the prevalent type of Premises/Operations liability for CPP insureds.
- . Manufacturers and Contractors Liability (M&C) - this is the type of Premises/Operations liability insurance for risks whose liability exposure is more heavily off-premises than on.
- . Products/Completed Operations Liability (PROD) - this type of insurance protects against claims for damages arising from products/completed operations in conjunction with an insured's business. For review purposes, this line of insurance is split into the following two categories:
  - Products: experience for this category is reviewed on a multistate basis.
  - Local Products/ Completed Operations: experience for this category reflects an exposure to loss which is local in nature; therefore, individual state experience is used.

## EXPLANATORY NOTES TO TABLE 2 (Cont'd)

### THE IMPLICIT PACKAGE MODIFICATION FACTOR

For each applicable coverage listed under each of the eight (8) CPP categories, a "current implicit PMF" is shown in column (2). The definition of this factor follows:

For a given CPP category (e.g., apartments) the published Package Modification Factor (PMF) represents the loss cost for a CPP relative to that for monoline policies providing the same coverages. Thus a property (liability) PMF of .80 represents a 20% lower aggregate loss cost for a CPP than for the comparable monoline policies. This PMF, however, represents the CPP "loss cost" for all property (liability) coverages combined. Based on CPP experience, it has been determined that this CPP "loss cost" can differ significantly if it is determined for each property (liability) coverage individually. The IPMF represents what the PMF would be for that CPP risk if only a single coverage were written. The use of the IPMF in monoline/multiline ratemaking and in the determination of revised CPP Package Modification Factors is significant in that it appropriately identifies how different the component parts of the multiline "loss cost" are.

### THE MULTILINE INDICATION

Under the CPP ratemaking procedures, monoline and multiline experience are combined for each coverage. The results of these coverage analyses are indicated changes to monoline loss costs and also indicated CPP aggregate loss cost level changes. The CPP indications by coverage are then incorporated in the CPP PMF review. These indications (shown in column (3)) represent the needed adjustments to the IPMFs (shown in column (2)) described above.

The development of these indications is detailed in Section B.

### THE INDICATED PMF

For each CPP category (and for property vs. liability), the indicated PMF is calculated as follows:

Each of the current IPMFs in column (2) is multiplied by the indicated percent change shown in column (3). A weighted average of the indicated IPMFs, using weights based on latest year aggregate loss costs at current ISO loss cost level (column (1) divided by column (2)), yields the indicated PMF at the bottom of column (4).

### THE CAPPED PMF

The indicated PMF for each category (and for property vs. liability) shown at the bottom of column (4) is limited to a maximum of 1.00 in arriving at the proposed PMF (bottom of column (5)). All indicated PMFs which are below 1.00 are rounded to the nearest .01 in determining the proposed PMF. To the extent that any indicated PMFs are capped at 1.00, indicated PMFs below this value are adjusted in order to minimize any revenue changes which would result from capping.

In addition to the adjustments just described, the IPMFs (for property and liability) shown in column (4) are subject to minimum and maximum values and adjusted in column (5) so that they average to the proposed PMF shown at the bottom of column (5).

## COMMERCIAL PACKAGE POLICY

### TABLE OF CONTENTS

#### SECTION B - CALCULATION OF PROPOSED CHANGES

##### PROPERTY COVERAGES

###### Commercial Fire & Allied Lines

Distribution of Advisory Loss Cost Level Change (Tables 3-7) .....	B-2-20
--	--------

Crime and Fidelity .....	B-21
--------------------------	------

###### Commercial Inland Marine

Revision of Implicit Package Modification Factor (Tables 8-9) .....	B-22-26
---	---------

##### LIABILITY COVERAGES

Distribution of Advisory Loss Cost Level Change (Tables 10-18).....	B-27-44
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MICHIGAN

TABLE 3 - BASIC GROUP I RELATIVITY ANALYSIS

	(1)	(2)	(3)	(4)	(5)
TOP	\$ LST SQ FORMULA RELATIVITY	CREDIBILITY Z	Z-WTD. RELATIVITY	BALANCED RELATIVITY	INDICATED CHANGE *
-----					
10	1.340	0.119	1.035	1.039	
31	0.865	0.054	0.992	0.995	-4.2%
32	0.644	0.180	0.924	0.927	-10.8%
33	1.199	0.079	1.014	1.018	-2.0%
34	1.177	0.387	1.065	1.068	2.8%
35	0.813	0.219	0.956	0.959	-7.7%
36	1.038	0.228	1.009	1.012	-2.6%
37	0.838	0.347	0.941	0.943	-9.2%
38	1.352	0.081	1.025	1.028	-1.1%
RATING GROUP					
01	1.067	0.261	1.017	1.018	
02	1.530	0.182	1.080	1.081	
03	0.589	0.247	0.877	0.878	
04	1.076	0.578	1.043	1.044	
05	1.509	0.020	1.008	1.009	
06	0.626	0.288	0.874	0.875	
07	0.776	0.091	0.977	0.978	
08	0.900	0.338	0.965	0.966	
09	1.204	0.191	1.036	1.037	
10	0.976	0.127	0.997	0.998	
11	1.410	0.076	1.026	1.027	
13	0.988	0.268	0.997	0.998	
14	0.974	0.205	0.995	0.995	
15	0.620	0.151	0.930	0.931	
17	0.961	0.121	0.995	0.996	
18	1.004	0.075	1.000	1.001	
19	1.048	0.014	1.001	1.002	
20	1.039	0.025	1.001	1.002	
21	1.056	0.425	1.023	1.024	
22	1.238	0.197	1.043	1.044	

	(1)	(2)	(3)	(4)
TERRITORY	\$ LST SQ FORMULA RELATIVITY	CREDIBILITY Z	Z-WTD. RELATIVITY	BALANCED RELATIVITY
-----				
Detroit	0.877	0.286	0.963	0.958
Balance of State (Michigan)	1.013	0.793	1.010	1.005

\* INDICATED CHANGE = (BALANCED RELATIVITY FOR TOP) / (MONOLINE RELATIVITY (TOP 10)) - 1

MICHIGAN

TABLE 4 - SPECIAL CAUSES OF LOSS RELATIVITY ANALYSIS

	(1)	(2)	(3)	(4)	(5)
	\$ LST SQ FORMULA RELATIVITY	CREDIBILITY Z	Z-WTD. RELATIVITY	BALANCED RELATIVITY	INDICATED CHANGE *
TOP					
10	1.933	0.152	1.105	1.111	
31	2.281	0.040	1.034	1.039	-6.5%
32	0.621	0.198	0.910	0.915	-17.6%
33	0.632	0.161	0.929	0.934	-15.9%
34	1.147	0.432	1.061	1.067	-4.0%
35	0.907	0.405	0.961	0.966	-13.1%
36	0.906	0.397	0.962	0.967	-13.0%
37	1.134	0.347	1.045	1.050	-5.5%
38	0.598	0.187	0.908	0.913	-17.8%
CATEGORY					
01	1.000	0.857	1.000	1.003	
02	0.902	0.149	0.985	0.987	
03	0.815	0.185	0.963	0.965	
04	1.671	0.232	1.126	1.129	
05	0.880	0.255	0.968	0.970	
06	0.931	0.128	0.991	0.993	
07	0.468	0.026	0.980	0.983	
08	0.665	0.212	0.917	0.919	
09	0.710	0.214	0.929	0.932	
10	1.568	0.041	1.019	1.021	
11	0.986	0.360	0.995	0.997	
12	0.827	0.320	0.941	0.943	
13	1.123	0.205	1.024	1.027	
14	1.425	0.235	1.087	1.090	

\* INDICATED CHANGE = (BALANCED RELATIVITY FOR TOP) / (MONOLINE RELATIVITY (TOP 10)) - 1



## EXPLANATORY NOTES TO TABLES 3 AND 4

### BASIC GROUP I AND SPECIAL CAUSES OF LOSS RELATIVITY ANALYSIS

#### OBJECTIVE

The explanations which follow clarify Tables 3 and 4, the Basic Group I Relativity Analysis and the Special Causes of Loss Relativity Analysis, respectively. The purpose of these analyses is to:

- (1) determine monoline classification and territorial loss cost level needs for Basic Group I;
- (2) determine monoline category loss cost level need for Special Causes of Loss;
- (3) determine indicated changes to the eight property CPP Package Modification Factors based on Basic Group I/Special Causes of Loss experience.

#### COLUMN (1)

#### LEAST SQUARES FORMULA RELATIVITIES

The Least Squares Formula Relativities are the marginal relativities which result from the application of the simultaneous review procedure to the raw experience (where marginal refers to the relativities for a given rating variable, e.g. type of policy, across all subsets of any other rating variables, i.e. rating group and territory for Basic Group I, and category for Special Causes of Loss).

The purpose of such a simultaneous review procedure is to arrive at a set of type of policy relativities (which will serve to price CPP policies relative to monoline policies via the PMF); a set of rating group/territory relativities for Basic Group I; and a set of category relativities for Special Causes of Loss that best represent the experience. This procedure is in contrast to a review of each rating variable's experience separately. Such one-way types of review do not take into account differing percentages of monoline and multiline experience in each rating variable, or differing percentages of a particular rating variable's experience in the monoline and multiline types of policy. The simultaneous relativity procedure accounts for these different distributions in generating relativities for the various rating variables.

EXPLANATORY NOTES TO TABLES 3 AND 4 (Cont'd)

COLUMN (1)  
(Cont'd)

The procedure uses an iterative technique to determine a set of marginal relativities by rating variable that is a best fit to the individual cell relativities, with each cell being defined as the cross-section of specific values of each rating variable. The process uses the relativity of the five year experience ratios by rating cell to the overall statewide experience ratio and the latest year aggregate loss costs for each rating cell. (This experience is shown in Table 5 for Basic Group I and Table 6 for Special Causes of Loss). Specifically, the iteration procedure uses the following formulas:

BASIC GROUP I:

$$TOP_i = \frac{\sum_{j=1}^n \sum_{k=1}^t W_{ijk}^2 R_{ijk} RG_j TER_k}{\sum_{j=1}^n \sum_{k=1}^t W_{ijk}^2 RG_j^2 TER_k^2}, \text{ where } 1 \leq i \leq m;$$

$$RG_j = \frac{\sum_{k=1}^t \sum_{i=1}^m W_{ijk}^2 R_{ijk} TOP_i TER_k}{\sum_{k=1}^t \sum_{i=1}^m W_{ijk}^2 TOP_i^2 TER_k^2}, \text{ where } 1 \leq j \leq n$$

$$TER_k = \frac{\sum_{j=1}^n \sum_{i=1}^m W_{ijk}^2 R_{ijk} TOP_i RG_j}{\sum_{j=1}^n \sum_{i=1}^m W_{ijk}^2 TOP_i^2 RG_j^2}, \text{ where } 1 \leq k \leq t$$

EXPLANATORY NOTES TO TABLES 3 AND 4 (Cont'd)

COLUMN (1)  
(Cont'd)

SPECIAL CAUSES OF LOSS:

$$TOP_i = \frac{\sum_{j=1}^n W_{ij}^2 R_{ij} CAT_j}{\sum_{j=1}^n W_{ij}^2 CAT_j^2}, \text{ where } 1 \leq i \leq m;$$

$$CAT_j = \frac{\sum_{i=1}^m W_{ij}^2 R_{ij} TOP_i}{\sum_{i=1}^m W_{ij}^2 TOP_i^2}, \text{ where } 1 \leq j \leq n$$

- $TOP_i$  is the relativity for the  $i$ th Type of Policy;
- $RG_j$  is the relativity for the  $j$ th Rating Group;
- $CAT_j$  is the relativity for the  $j$ th Category;
- $TER_k$  is the relativity for the  $k$ th Territory;
- $W_{ijk}$  is the loss cost volume at current level for the  $i$ th Type of Policy,  $j$ th Rating Group or Category and  $k$ th Territory;
- $R_{ijk}$  is the experience ratio relativity for the  $i$ th Type of Policy,  $j$ th Rating Group or Category and  $k$ th Territory;
- $R_{ij}$  is the experience ratio relativity for the  $i$ th Type of Policy,  $j$ th Rating Group or Category;

EXPLANATORY NOTES TO TABLES 3 AND 4 (Cont'd)

COLUMN (1)  
(Cont'd)

- m is the number of Types of Policy in the analysis;
- n is the number of Rating Groups or Categories in the analysis;
- t is the number of Territories in the analysis.

The procedure determines m Type of Policy relativities using the above formulas. Then, using those results, a set of n Rating Group and t Territory relativities are determined. These steps form an iterative process which continues until there is no appreciable difference in results from one iteration to the next.

COLUMN (2)

CREDIBILITY

The credibility of the experience for each rating variable is determined from the formula:

$$Z = \frac{P}{P + K}$$

where P is the 5-year adjusted aggregate loss costs for a given rating variable, and K is a constant value. For Basic Group I, K equals an aggregate loss cost volume of \$55,000,000 for territory, \$40,000,000 for rating group, and \$100,000,000 for type of policy. For Special Causes of Loss, K equals an aggregate loss cost volume of \$15,000,000.

COLUMN (3)

CREDIBILITY-WEIGHTED RELATIVITIES

Credibility-weighted relativities are calculated based on the formula

$$W = R^Z$$

where Z is the credibility, R is the least squares formula relativity and W is the credibility-weighted relativity for a given rating variable.

This formula implicitly assigns the complement of credibility to a relativity of unity.

EXPLANATORY NOTES TO TABLES 3 AND 4 (Cont'd)

COLUMN (4)

BALANCED RELATIVITIES

The credibility-weighted relativities are balanced to assure that the average relativity across all rating variables remains at unity.

MULTILINE  
CONSIDERATIONS

The type of policy (TOP) relativities are used to generate multiline indications which apply to the current Implicit Package Modification Factors (IPMFs). The indicated IPMFs are calculated as follows:

$$\text{TOP y indicated IPMF} = \frac{(\text{TOP y current IPMF}) \times (\text{TOP y relativity})}{\text{monoline relativity}}$$

For each CPP Type of Policy the indicated IPMF is subject to a minimum value of 0.50 and a maximum value of 1.50. If an indicated IPMF falls outside one of those limits, it is capped at that amount, the aggregate loss costs for that Type of Policy are adjusted to the capped IPMF level, and the entire relativity review as described above is re-performed to take this into account. If an IPMF has been capped it is so noted at the bottom of Table 3 and Table 4.

Loss cost changes for each TOP are calculated as described on Tables 3 and 4.

ENTIRE STATE

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MICHIGAN

BASIC GROUP I RELATIVITY ANALYSIS  
TABLE 5 - SUMMARY OF EXPERIENCE USED IN SIMULTANEOUS REVIEW

TYPE OF POLICY	CATEGORY	(1) ACCIDENT YEAR ENDING 06/30/17 AGGREGATE LOSS COSTS	(2) 5 - YEAR AGGREGATE LOSS COSTS	(3) 5 - YEAR EXPERIENCE RATIO	(4) Z-WEIGHTED EXPERIENCE RATIO	(5) Z-WEIGHTED RELATIVITY
10 MONOLINE	01 APARTMENTS	103,746	524,409	0.232	1.420	1.296
	02 OTHER HABITATIONAL	87,161	431,291	6.733	2.416	2.204
	03 RESTAURANTS & BARS	54,434	287,001	0.315	1.444	1.318
	04 OTHER MERCANTILE RS	654,152	3,354,324	0.206	1.331	1.215
	05 PUBLIC BUILDINGS	4,490	52,817	0.322	1.375	1.255
	06 CHURCHES	8,767	50,260	2.182	1.704	1.555
	07 SCHOOLS	26,557	148,047	5.873	2.103	1.919
	08 OFFICES AND BANKS	283,822	1,527,719	2.912	1.734	1.582
	09 REC. FACILITIES	128,900	817,541	2.704	1.786	1.630
	10 HOTELS AND MOTELS	23,258	136,038	0.248	1.435	1.309
	11 HOSPITALS/NURS HOME	135,247	506,857	0.092	1.346	1.228
	13 MOTOR VEHICLE RISKS	126,534	654,921	0.279	1.336	1.219
	14 OTHER NON-MANUF.	396,288	2,371,213	0.727	1.469	1.340
	15 STORAGE	124,022	482,671	6.529	2.272	2.073
	17 FOOD MANUFACTURING	16,992	64,456	3.411	1.577	1.439
	18 WOOD MANUFACTURING	16,654	97,700	0.000	1.398	1.276
	19 WEARING APPAREL	11,119	31,129	0.000	1.399	1.276
	20 CHEM. MANUFACTURING	11,965	30,398	0.000	1.399	1.276
	21 METAL MANUFACTURING	329,185	1,570,765	2.820	1.823	1.663
	22 OTHER MANUFACTURING	70,912	364,263	0.722	1.485	1.354
	TOTAL*	2,614,205	13,503,820	1.646	1.585	1.446
31 MULTILINE MOTEL/HOTEL	10 HOTELS AND MOTELS	953,852	5,684,839	0.846	0.917	0.837
	TOTAL*	953,852	5,684,839	0.846	0.917	0.837
32 MULTILINE APARTMENT	01 APARTMENTS	3,135,048	13,581,314	0.673	0.757	0.691
	02 OTHER HABITATIONAL	1,779,092	8,356,712	1.073	1.054	0.962
	TOTAL*	4,914,140	21,938,026	0.818	0.865	0.789
33 MULTILINE OFFICE	08 OFFICES AND BANKS	2,125,772	8,537,424	1.402	1.192	1.088
	TOTAL*	2,125,772	8,537,424	1.402	1.192	1.088
34 MULTILINE MERCANTILE	03 RESTAURANTS & BARS	2,499,597	12,116,711	0.801	0.786	0.717
	04 OTHER MERCANTILE RS	7,810,481	38,266,725	1.423	1.345	1.227
	08 OFFICES AND BANKS	559,886	2,243,318	1.104	1.043	0.951
	13 MOTOR VEHICLE RISKS	964,897	3,756,416	1.575	1.285	1.173
	14 OTHER NON-MANUF.	320,708	1,619,093	0.806	0.865	0.790
	15 STORAGE	1,094,514	5,181,081	0.425	0.734	0.670
	TOTAL*	13,250,083	63,183,344	1.206	1.160	1.059

ENTIRE STATE

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MICHIGAN

BASIC GROUP I RELATIVITY ANALYSIS  
TABLE 5 - SUMMARY OF EXPERIENCE USED IN SIMULTANEOUS REVIEW

TYPE OF POLICY	CATEGORY	(1) ACCIDENT YEAR ENDING 06/30/17 AGGREGATE LOSS COSTS	(2) 5 - YEAR AGGREGATE LOSS COSTS	(3) 5 - YEAR EXPERIENCE RATIO	(4) Z-WEIGHTED EXPERIENCE RATIO	(5) Z-WEIGHTED RELATIVITY
<hr/>						
35 MULTILINE	02 OTHER HABITATIONAL	22,792	109,724	0.000	0.817	0.746
INSTITUTIONAL	05 PUBLIC BUILDINGS	157,960	756,963	2.161	1.287	1.174
	06 CHURCHES	2,995,421	16,122,192	0.321	0.581	0.530
	07 SCHOOLS	638,556	3,841,629	0.468	0.722	0.659
	08 OFFICES AND BANKS	497,827	2,057,982	0.094	0.710	0.648
	09 REC. FACILITIES	229,858	1,156,379	0.297	0.799	0.729
	11 HOSPITALS/NURS HOME	533,265	2,780,903	1.636	1.280	1.167
	13 MOTOR VEHICLE RISKS	17,179	89,402	0.000	0.818	0.746
	14 OTHER NON-MANUF.	237,838	1,204,951	0.331	0.795	0.725
	TOTAL*	5,330,696	28,120,125	0.501	0.721	0.658
36 MULTILINE	03 RESTAURANTS & BARS	139,672	697,926	0.815	1.109	1.012
SERVICES	04 OTHER MERCANTILE RS	553,161	2,908,728	0.812	1.084	0.989
	08 OFFICES AND BANKS	546,785	3,062,262	0.344	1.028	0.938
	09 REC. FACILITIES	1,481,730	7,445,331	1.746	1.371	1.251
	13 MOTOR VEHICLE RISKS	1,880,225	9,957,040	1.185	1.156	1.055
	14 OTHER NON-MANUF.	633,485	3,213,890	2.378	1.360	1.241
	15 STORAGE	213,624	1,103,511	3.007	1.470	1.341
	21 METAL MANUFACTURING	103,537	450,279	0.043	1.062	0.968
	22 OTHER MANUFACTURING	158,857	757,034	4.691	1.750	1.596
	TOTAL*	5,711,076	29,596,001	1.482	1.241	1.132
37 MULTILINE	04 OTHER MERCANTILE RS	736,208	3,980,037	0.832	1.091	0.995
INDUST/PROCESS	08 OFFICES AND BANKS	191,985	962,248	0.474	1.042	0.950
	13 MOTOR VEHICLE RISKS	11,666	171,321	2.190	1.281	1.169
	14 OTHER NON-MANUF.	224,780	1,341,087	0.193	1.002	0.914
	15 STORAGE	72,110	352,675	7.132	2.036	1.858
	17 FOOD MANUFACTURING	1,211,847	5,430,411	0.155	0.931	0.850
	18 WOOD MANUFACTURING	672,078	3,151,337	0.215	0.928	0.847
	19 WEARING APPAREL	92,245	535,066	0.000	0.966	0.881
	20 CHEM. MANUFACTURING	228,961	1,002,772	0.000	0.989	0.903
	21 METAL MANUFACTURING	5,014,347	27,569,917	0.830	1.003	0.915
	22 OTHER MANUFACTURING	1,682,953	8,715,464	1.590	1.219	1.112
	TOTAL*	10,139,180	53,212,335	0.834	1.039	0.948

ENTIRE STATE

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MICHIGAN

BASIC GROUP I RELATIVITY ANALYSIS

TABLE 5 - SUMMARY OF EXPERIENCE USED IN SIMULTANEOUS REVIEW

TYPE OF POLICY	CATEGORY	(1) ACCIDENT YEAR ENDING 06/30/17 AGGREGATE LOSS COSTS	(2) 5 - YEAR AGGREGATE LOSS COSTS	(3) 5 - YEAR EXPERIENCE RATIO	(4) Z-WEIGHTED EXPERIENCE RATIO	(5) Z-WEIGHTED RELATIVITY
38 MULTILINE CONTRACTORS	04 OTHER MERCANTILE RS	1,306,080	6,214,737	2.501	1.587	1.448
	08 OFFICES AND BANKS	402,759	1,987,983	1.881	1.308	1.193
	14 OTHER NON-MANUF.	118,989	562,831	0.883	1.162	1.060
	TOTAL*	1,827,828	8,765,551	2.259	1.498	1.366
TOTAL ALL TOPS*	01 APARTMENTS	3,238,794	14,105,723	0.659	0.778	0.710
	02 OTHER HABITATIONAL	1,889,045	8,897,727	1.321	1.114	1.017
	03 RESTAURANTS & BARS	2,693,703	13,101,638	0.792	0.816	0.745
	04 OTHER MERCANTILE RS	11,060,082	54,724,551	1.408	1.342	1.225
	05 PUBLIC BUILDINGS	162,450	809,780	2.110	1.289	1.176
	06 CHURCHES	3,004,188	16,172,452	0.327	0.584	0.533
	07 SCHOOLS	665,113	3,989,676	0.684	0.777	0.709
	08 OFFICES AND BANKS	4,608,836	20,378,936	1.195	1.140	1.040
	09 REC. FACILITIES	1,840,488	9,419,251	1.632	1.329	1.212
	10 HOTELS AND MOTELS	977,110	5,820,877	0.832	0.929	0.848
	11 HOSPITALS/NURS HOME	668,512	3,287,760	1.324	1.293	1.179
	13 MOTOR VEHICLE RISKS	3,000,501	14,629,100	1.269	1.204	1.098
	14 OTHER NON-MANUF.	1,932,088	10,313,065	1.180	1.177	1.074
	15 STORAGE	1,504,270	7,119,938	1.617	1.028	0.938
	17 FOOD MANUFACTURING	1,228,839	5,494,867	0.200	0.940	0.858
	18 WOOD MANUFACTURING	688,732	3,249,037	0.210	0.939	0.857
	19 WEARING APPAREL	103,364	566,195	0.000	1.012	0.923
	20 CHEM. MANUFACTURING	240,926	1,033,170	0.000	1.010	0.921
	21 METAL MANUFACTURING	5,447,069	29,590,961	0.935	1.053	0.961
	22 OTHER MANUFACTURING	1,912,722	9,836,761	1.815	1.273	1.161
	TOTAL*	46,866,832	232,541,465	1.105	1.096	1.000

\* TOTALS IN COLUMNS (3), (4) & (5) ARE AVERAGES USING COLUMN (1) AS WEIGHTS.



MICHIGAN

SPECIAL CAUSES OF LOSS RELATIVITY ANALYSIS  
TABLE 6 - SUMMARY OF EXPERIENCE USED IN SIMULTANEOUS REVIEW

TYPE OF POLICY	CATEGORY	(1) ACCIDENT YEAR ENDING 06/30/17 AGGREGATE LOSS COSTS	(2) 5 - YEAR AGGREGATE LOSS COSTS	(3) 5 - YEAR EXPERIENCE RATIO	(4) RELATIVITY
10 MONOLINE	01 BUILDINGS	929,889	4,431,519	1.806	2.055
	02 RES. APTS. AND COND	5,849	39,600	0.139	0.158
	03 OFFICES	77,197	432,223	0.631	0.718
	04 MERCANTILE - HIGH	106,188	545,968	1.439	1.637
	05 MERCANTILE - MEDIUM	34,530	199,127	0.585	0.666
	06 MERCANTILE - LOW	30,331	145,454	0.358	0.407
	07 MOTELS AND HOTELS	3,133	22,596	0.209	0.238
	08 INSTITUTIONAL - HIG	15,050	82,917	1.669	1.899
	09 INSTITUTIONAL - LOW	17,262	107,743	2.047	2.329
	10 INDUST-PROC - HIGH	8,537	30,982	0.957	1.089
	11 INDUST-PROC - LOW	130,002	602,677	0.612	0.696
	12 SERVICE - HIGH	29,238	181,448	0.350	0.398
	13 SERVICE - LOW	50,487	274,705	0.644	0.733
	14 CONTRACTORS	19,448	68,085	0.164	0.187
	TOTAL*	1,457,141	7,165,044	1.446	1.645
31 MULTILINE MOTEL/HOTEL	01 BUILDINGS	218,260	1,299,918	2.052	2.334
	07 MOTELS AND HOTELS	72,646	375,207	0.962	1.094
	TOTAL*	290,906	1,675,125	1.780	2.025
32 MULTILINE APARTMENT	01 BUILDINGS	1,488,641	7,261,211	0.559	0.636
	02 RES. APTS. AND COND	595,047	2,582,998	0.505	0.575
	TOTAL*	2,083,688	9,844,209	0.544	0.619
33 MULTILINE OFFICE	01 BUILDINGS	1,197,201	4,914,820	0.560	0.637
	03 OFFICES	756,372	2,771,318	0.489	0.556
	04 MERCANTILE - HIGH	4	64	0.000	0.000
	08 INSTITUTIONAL - HIG	977	3,470	0.000	0.000
	11 INDUST-PROC - LOW	0	7	0.000	0.000
	12 SERVICE - HIGH	3,018	9,747	0.000	0.000
	14 CONTRACTORS	160	2,797	0.000	0.000
	TOTAL*	1,957,732	7,702,223	0.531	0.604

MICHIGAN

SPECIAL CAUSES OF LOSS RELATIVITY ANALYSIS  
TABLE 6 - SUMMARY OF EXPERIENCE USED IN SIMULTANEOUS REVIEW

TYPE OF POLICY	CATEGORY	(1) ACCIDENT YEAR ENDING 06/30/17 AGGREGATE LOSS COSTS	(2) 5 - YEAR AGGREGATE LOSS COSTS	(3) 5 - YEAR EXPERIENCE RATIO	(4) RELATIVITY
34 MULTILINE MERCANTILE	01 BUILDINGS	4,187,222	19,716,692	1.029	1.171
	03 OFFICES	9,628	32,818	0.261	0.297
	04 MERCANTILE - HIGH	707,074	3,564,230	1.786	2.032
	05 MERCANTILE - MEDIUM	1,034,779	4,884,313	0.910	1.035
	06 MERCANTILE - LOW	445,390	1,989,922	0.971	1.105
	08 INSTITUTIONAL - HIG	165	390	0.000	0.000
	10 INDUST-PROC - HIGH	0	2,969	0.000	0.000
	11 INDUST-PROC - LOW	371	957	0.000	0.000
	12 SERVICE - HIGH	31,943	140,898	0.279	0.317
	13 SERVICE - LOW	26,030	96,795	0.467	0.531
	14 CONTRACTORS	8,142	38,243	0.145	0.165
	TOTAL*	6,450,744	30,468,227	1.081	1.230
35 MULTILINE INSTITUTIONAL	01 BUILDINGS	3,612,045	19,519,183	0.816	0.928
	03 OFFICES	2,793	11,744	12.475	14.192
	08 INSTITUTIONAL - HIG	738,827	3,796,811	0.543	0.618
	09 INSTITUTIONAL - LOW	863,881	3,907,417	0.579	0.659
	12 SERVICE - HIGH	2,001	20,589	0.000	0.000
	13 SERVICE - LOW	95	420	0.000	0.000
	14 CONTRACTORS	1,569	9,458	0.000	0.000
	TOTAL*	5,221,211	27,265,622	0.744	0.846
36 MULTILINE SERVICES	01 BUILDINGS	3,058,799	15,533,413	0.814	0.926
	03 OFFICES	16,131	57,345	0.221	0.251
	04 MERCANTILE - HIGH	37,018	155,168	0.124	0.141
	05 MERCANTILE - MEDIUM	6,020	41,818	0.969	1.102
	06 MERCANTILE - LOW	2,577	16,434	0.244	0.278
	08 INSTITUTIONAL - HIG	28,468	149,233	0.000	0.000
	09 INSTITUTIONAL - LOW	16,132	70,314	0.000	0.000
	10 INDUST-PROC - HIGH	0	432	0.000	0.000
	11 INDUST-PROC - LOW	16,442	40,465	0.937	1.066
	12 SERVICE - HIGH	1,273,260	6,685,360	0.676	0.769
	13 SERVICE - LOW	696,378	3,483,853	0.931	1.059
	14 CONTRACTORS	14,769	49,290	0.146	0.166
	TOTAL*	5,165,994	26,283,125	0.780	0.887

MICHIGAN

SPECIAL CAUSES OF LOSS RELATIVITY ANALYSIS  
TABLE 6 - SUMMARY OF EXPERIENCE USED IN SIMULTANEOUS REVIEW

TYPE OF POLICY	CATEGORY	(1) ACCIDENT YEAR ENDING 06/30/17 AGGREGATE LOSS COSTS	(2) 5 - YEAR AGGREGATE LOSS COSTS	(3) 5 - YEAR EXPERIENCE RATIO	(4) RELATIVITY
37 MULTILINE INDUST/PROC	01 BUILDINGS	2,619,783	12,788,899	1.016	1.156
	03 OFFICES	3,964	12,222	0.534	0.608
	04 MERCANTILE - HIGH	11,491	45,672	0.033	0.038
	05 MERCANTILE - MEDIUM	357	2,214	0.000	0.000
	06 MERCANTILE - LOW	0	986	0.000	0.000
	08 INSTITUTIONAL - HIG	0	104	0.000	0.000
	10 INDUST-PROC - HIGH	129,962	611,894	1.614	1.836
	11 INDUST-PROC - LOW	1,569,659	7,787,388	1.020	1.160
	12 SERVICE - HIGH	984	10,150	1.271	1.446
	13 SERVICE - LOW	769	3,291	0.000	0.000
	14 CONTRACTORS	3,198	8,505	0.217	0.247
	TOTAL*	4,340,167	21,271,325	1.032	1.174
38 MULTILINE CONTRACTORS	01 BUILDINGS	906,966	4,396,034	0.536	0.610
	03 OFFICES	19,686	80,328	0.209	0.238
	04 MERCANTILE - HIGH	56,820	221,998	0.376	0.428
	05 MERCANTILE - MEDIUM	1,196	5,083	0.000	0.000
	06 MERCANTILE - LOW	7,413	41,926	0.379	0.431
	11 INDUST-PROC - LOW	146	265	0.000	0.000
	12 SERVICE - HIGH	3,114	3,956	0.430	0.489
	13 SERVICE - LOW	1,539	5,032	0.000	0.000
	14 CONTRACTORS	949,175	4,423,082	0.771	0.877
	TOTAL*	1,946,055	9,177,704	0.641	0.729
TOTAL ALL TOPS*	01 BUILDINGS	18,218,806	89,861,689	0.907	1.032
	02 RES. APTS. AND COND	600,896	2,622,598	0.501	0.570
	03 OFFICES	885,771	3,397,998	0.526	0.598
	04 MERCANTILE - HIGH	918,595	4,533,100	1.570	1.786
	05 MERCANTILE - MEDIUM	1,076,882	5,132,555	0.899	1.023
	06 MERCANTILE - LOW	485,711	2,194,722	0.920	1.047
	07 MOTELS AND HOTELS	75,779	397,803	0.931	1.059
	08 INSTITUTIONAL - HIG	783,487	4,032,925	0.544	0.619
	09 INSTITUTIONAL - LOW	897,275	4,085,474	0.597	0.679
	10 INDUST-PROC - HIGH	138,499	646,277	1.574	1.791
	11 INDUST-PROC - LOW	1,716,620	8,431,759	0.988	1.124
	12 SERVICE - HIGH	1,343,558	7,052,148	0.657	0.747
	13 SERVICE - LOW	775,298	3,864,096	0.894	1.017
	14 CONTRACTORS	996,461	4,599,460	0.742	0.844
	TOTAL*	28,913,638	140,852,604	0.879	1.000

\* TOTALS IN COLUMNS (3) & (4) ARE AVERAGES USING COLUMN (1) AS WEIGHTS.

## EXPLANATORY NOTES TO TABLES 5 AND 6

### BASIC GROUP I/SPECIAL CAUSES OF LOSS RELATIVITY ANALYSIS SUMMARY OF EXPERIENCE USED IN SIMULTANEOUS REVIEW

**INTRODUCTION**      The experience used in the relativity analysis and displayed in Tables 5 and 6 is the latest five years of accident year data as reported under the Commercial Statistical Plan. As in the overall review, loss costs have been adjusted to current ISO loss cost and prospective amount of insurance levels (with multiline aggregate loss costs adjusted additionally by the current implicit package modification factors). Incurred losses are adjusted to prospective cost levels, and are further adjusted by the Basic Group I large loss procedure and the Special Causes of Loss excess procedure. Losses have also been developed to their ultimate settlement value by application of loss development factors.

**COLUMN (1)**      AGGREGATE LOSS COSTS

The latest year adjusted aggregate loss costs (adjusted as described above) are used as weights both in the calculation of any totals shown in this table and in the iterative formulae used in the simultaneous review procedure.

**COLUMN (2)**      5 - YEAR AGGREGATE LOSS COSTS

The combined five-year adjusted aggregate loss costs (adjusted as described above) are used to calculate the experience ratios in column (3).

**COLUMN (3)**      FIVE-YEAR EXPERIENCE RATIOS

These are the ratio of the combined five-year adjusted incurred losses (adjusted as described above) to the combined five-year adjusted aggregate loss costs as shown in Column (2). Any totals which are shown are weighted averages using the adjusted aggregate loss costs in Column (1).

**COLUMN (4)**      CREDIBILITY (Z) WEIGHTED EXPERIENCE RATIO

A credibility procedure is applied to the initial experience ratios in column (3) on a cell-by-cell basis prior to the simultaneous review procedure. The credibility values are calculated using an empirical Bayesian credibility procedure. In the following discussion, cell refers to an individual combination of TOP, rating group or category, and territory (where applicable).

EXPLANATORY NOTES TO TABLES 5 AND 6 (Cont'd)

COLUMN (4)  
(Cont'd)

The important concept underlying empirical Bayesian credibility is that the credibility should depend both on the overall variation of the group of which the cell is a member, in addition to the variation of the yearly experience ratios for each cell. Therefore, if a cell's data is itself very stable then we would assign a relatively high credibility value, and vice versa.

The empirical Bayesian credibility formula for individual cell credibility is  $Z = ((C-3)/C) (P/(P+K)) + (3/C)$ . P equals the cell's five-year adjusted aggregate loss costs and C equals the number of unique combinations of rating variables (Territory, TOP and Rating Group/Category) within a class group. The K value is estimated from the underlying data using the empirical Bayes method and varies by TOP group and by territory where applicable. The three TOP groups used in this analysis are: Monoline (TOP 10), Premises (TOP's 31-35), and Operations (TOP's 36-38). The 3/C term corrects for the statistical bias associated with the credibility process. The minimum credibility that is possible is 3/C.

The calculated credibility (Z) is then applied to the five-year experience ratio with the complement of credibility applied to the credibility-weighted average of the individual experience ratios of the group, where group refers to the specified TOP/territory group. In a non-territory state, K values would be determined for the three TOP groups on an entire state basis.

COLUMN (5)

WEIGHTED RELATIVITIES

The relativities are the ratios of the five-year credibility-weighted experience ratios shown in column (4) to the average five-year credibility-weighted experience ratio for all TOP's, rating groups and territories (where applicable) combined. These relativities represent how much better or worse than average the experience for a given cell is. They are used along with the aggregate loss costs in column (1) as input for the simultaneous review procedure.

MICHIGAN

TABLE 7 - BASIC GROUP II RELATIVITY ANALYSIS

	(1) ACCIDENT YEAR ENDING 03/31/17 AGGR. LOSS COSTS AT CURRENT IMPLICIT PMF	(2) ACCIDENT YEARS 2008-2017 EXPER. RATIO AT CURRENT PMF	(3) FORMULA RELATIVITY (2) / 1.135	(4) CREDI- BILITY Z C	(5) Z WEIGHTED RELA- TIVITY D	(6) BALANCED FORMULA RELA- TIVITY E	(7) NORMALIZED FORMULA RELA- TIVITY F	(8) INDICATED CHANGE G
MONOLINE	1,358,695	0.877	0.768	0.307	0.929	0.929	0.9214	
MULTILINE	15,829,738	1.165	1.020	0.760	1.015	1.015	1.0069	
COVERAGE	17,188,433	1.142	1.000			1.0082	B	1.0001
MULTILINE TOP								
31 MOTEL/HOTEL	149,290	1.622	1.420	0.034	1.014	1.020	1.0117	9.8%
32 APARTMENT	939,919	1.128	0.988	0.145	0.998	1.004	0.9958	8.1%
33 OFFICE	642,811	1.121	0.982	0.087	0.998	1.004	0.9958	8.1%
34 MERCANTILE	4,541,731	1.271	1.113	0.449	1.051	1.057	1.0484	13.8%
35 INSTITUTIONAL	2,801,384	1.031	0.903	0.412	0.960	0.966	0.9581	4.0%
36 SERVICES	3,598,512	1.270	1.112	0.430	1.048	1.054	1.0454	13.5%
37 INDUST/PROCESS	2,431,928	0.897	0.785	0.314	0.932	0.938	0.9304	1.0%
38 CONTRACTORS	724,163	1.391	1.218	0.126	1.027	1.033	1.0246	11.2%
	15,829,738	1.165 B	1.020		1.009 B	1.015 B	1.0069 B	

B - AVERAGE WEIGHTED BY COLUMN (1)

C - CREDIBILITY =  $P / (P + K)$  WHERE P REPRESENTS THE TOTAL 10 YEAR ADJUSTED LOSS COSTS AND K = 45,000,000

D -  $(5) = (3) * (4) + (1.000 - (4))$

E -  $(6) = (5) * (1.015 / 1.009)$

F -  $(7) = (6) / 1.0082$

G -  $(8) = (NORMALIZED RELATIVITY FOR TOP) / (NORMALIZED MONOLINE RELATIVITY (TOP 10)) - 1$

## EXPLANATORY NOTES TO TABLE 7

### BASIC GROUP II RELATIVITY ANALYSIS

#### OBJECTIVE

The explanations which follow clarify Table 7, the Basic Group II (BG II) relativity analysis. The purpose of this analysis is to:

- (1) determine the monoline loss cost level need;
- (2) determine indicated changes to the eight property Commercial Package Policy (CPP) Package Modification Factors (PMFs) based on Basic Group II experience.

#### COLUMN (1)

##### AGGREGATE LOSS COSTS

The latest accident year adjusted aggregate loss costs (adjusted in the same manner as in the overall review, i.e. to current manual loss cost and prospective amount of insurance levels, with multiline aggregate loss costs further adjusted to current IPMF level) are used as weights in the calculation of any totals shown in this table.

#### COLUMN (2)

##### 10 - YEAR EXPERIENCE RATIO

These experience ratios are the ratio of the combined ten year CSP adjusted incurred losses (adjusted to current deductible and prospective cost levels including loss development, and also adjusted to reflect the BGII excess loss procedure) to the combined ten year CSP adjusted aggregate loss costs. Any totals which are shown are weighted averages using the aggregate loss costs in Column (1). When a dash is displayed in the column, it indicates that the indicated IPMF which resulted from this procedure was capped. The procedure which follows when capping occurs is described below.

#### COLUMN (3)

##### FORMULA RELATIVITY

The formula relativities are the ratios of the ten year experience ratios for the type of policy (either monoline vs. multiline or individual multiline programs) to the average ten year experience ratio for monoline and multiline combined. These relativities represent how much better or worse than average the experience for a given type of policy is. Again, any totals which are shown are weighted averages and the display of a dash indicates that the resulting IPMF was capped.

EXPLANATORY NOTES TO TABLE 7 (Cont'd)

COLUMN (3)  
(Cont'd)

Unlike the BGI and SCL relativity analyses, the BGII analysis does not employ a simultaneous review procedure since a one way review is involved. That is, the overall loss cost change is only distributed across type of policy; no other rating variables are considered.

COLUMN (4)

CREDIBILITY

The credibility of the experience for each type of policy is determined from the formula:

$$Z = \frac{P}{P + K}$$

where P is the ten year adjusted aggregate loss costs for a given type of policy, and K is a constant loss cost volume of \$45,000,000.

COLUMN (5)

Z - WEIGHTED RELATIVITY

The weighted relativity is a weighted average of the individual TOP formula relativity and the overall (coverage) formula relativity using credibility and its complement as the respective weights. Therefore, to the extent that the indication for a type of policy is not fully credible, the complement of credibility is assigned to the statewide coverage level change.

COLUMN (6)

BALANCED FORMULA RELATIVITY

The individual multiline weighted relativities are balanced to the multiline weighted relativity level by applying a factor equal to the overall multiline relativity (i.e. the weighted relativity for all multiline combined which is shown on the top of the exhibit directly under the corresponding monoline relativity) divided by the average multiline relativity (i.e. the weighted average of the individual multiline weighted relativities which is shown on the bottom of the exhibit). When the indicated IPMF for a type of policy is capped, the balanced relativity is set equal to the product of the capped IPMF and the monoline balanced formula relativity, divided by the current IPMF.



EXPLANATORY NOTES TO TABLE 7 (Cont'd)

COLUMN (7)

NORMALIZED FORMULA RELATIVITY

The normalized relativity is equal to the balanced formula relativity divided by the average monoline/multiline combined relativity. This balances the average monoline/multiline relativity to unity.

COLUMN (8)

INDICATED LOSS COST CHANGES

The indicated multiline (by TOP) changes are calculated by taking the ratio of the TOP relativity (Column 7) to the monoline relativity.

For each type of policy the indicated IPMF is subject to a minimum value of 0.50 and a maximum value of 1.50. If an indicated IPMF falls outside one of those limits, it is capped at that amount, the aggregate loss costs for that type of policy are adjusted to the capped IPMF level, and the entire relativity review as described above is redone to take this into account. If an IPMF has been capped it is so noted in footnote A.

## CRIME AND FIDELITY

The reviews for Burglary and Theft and for Fidelity are done on a multistate basis, combining both multiline and monoline experience. However, unlike other coverages included in a Commercial Package Policy, there is no simultaneous review procedure for either Burglary and Theft or for Fidelity in which separate loss cost level changes can be determined for multiline and monoline experience. In the absence of a simultaneous review procedure, we are unable to determine Type of Policy relativities with which to price CPP policies relative to monoline policies and therefore have assumed a multiline change of 0.0% and thus no change to the historic Crime or Fidelity IPMFs.

MICHIGAN

TABLE 8

COMMERCIAL I.M. RELATIVITY ANALYSIS

(1)	(2)	(3)	(4)	(5)
<u>TOP</u>	<u>BALANCED</u>	<u>CURRENT</u>	<u>INDICATED</u>	<u>SELECTED</u>
<u>10</u>	<u>RELATIVITY</u>	<u>IPMF</u>	<u>IPMF*</u>	<u>IPMF</u>
10	1.000	0.850	0.910	0.910
3X & 7X	1.071			

CLASSIFICATION

150	0.922
191	1.085
192	0.770
220	0.771
221	0.736
234	1.226
235	1.069
240	0.770
241	0.695
327	0.738
328	0.913
340	0.629
341	0.738
342	0.733
343	0.748
403	0.630
451	0.928
452	0.761
453	0.794
454	0.700
460	0.485
482	0.876
510	0.646
514	0.612
530	0.627
534	0.738

\*COLUMN (4) = COLUMN (3) \* (TOP 3X & 7X COLUMN (2) / TOP 10 COLUMN (2) )

MICHIGAN

COMMERCIAL INLAND MARINE RELATIVITY ANALYSIS  
TABLE 9 - SUMMARY OF EXPERIENCE USED IN SIMULTANEOUS REVIEW

<u>TYPE OF POLICY</u>	<u>RATING</u>	(1) <u>2016 AGGREGATE</u>	(2) <u>2012 - 2016</u>	(3) <u>FIVE-YEAR</u>	(4) <u>RELATIVITY</u>
<u>MONOLINE 10</u>	<u>GROUP</u>	<u>LOSS COSTS</u>	<u>AGGREGATE LOSS COSTS</u>	<u>EXP RATIO</u>	
	150	311,633	1,898,096	1.151	1.317
	191	5,446,492	15,816,054	1.032	1.181
	192	862,002	2,760,886	0.627	0.717
	220	5,112	87,903	5.716	6.540
	221	1,491	2,853	1.199	1.372
	234	5,224,155	20,144,072	0.600	0.686
	235	8,439,000	24,407,283	0.761	0.871
	240	928,183	3,685,254	0.656	0.751
	241	15,553	114,739	0.053	0.061
	327	18,917	91,546	0.000	0.000
	328	2,319,887	11,908,665	0.792	0.906
	340	40,688	87,993	0.000	0.000
	341	0	0	0.000	0.000
	342	19,188	65,375	0.555	0.635
	343	589	3,417	343.665	537.374
	403	1,600,852	5,771,545	0.345	0.395
	451	3,309,677	12,953,836	0.855	0.978
	452	34,702	137,467	1.628	1.863
	453	45,575	212,456	3.203	3.665
	454	164,836	745,300	0.734	0.840
	460	790,198	3,687,530	0.415	0.475
	482	839,364	2,841,134	0.986	1.128
	510	3,252	39,977	0.020	0.023
	514	446,469	1,612,361	0.339	0.388
	530	504,434	2,697,004	0.489	0.559
	534	0	0	0.000	0.000
	TOTAL#	31,372,249	111,772,746	0.785	0.898

MICHIGAN

COMMERCIAL INLAND MARINE RELATIVITY ANALYSIS  
TABLE 9 - SUMMARY OF EXPERIENCE USED IN SIMULTANEOUS REVIEW

TYPE OF POLICY	RATING GROUP	(1) 2016 AGGREGATE LOSS COSTS	(2) 2012 - 2016 AGGREGATE LOSS COSTS	(3) FIVE-YEAR EXP RATIO	(4) RELATIVITY
MULTILINE ## 3X & 7X	150	672,616	3,113,454	0.851	0.974
	191	563,797	2,525,777	0.829	0.949
	192	189,431	731,833	0.885	1.013
	220	6,015	26,632	1.634	1.870
	221	5,236	25,229	0.276	0.316
	234	11,834,095	49,066,751	1.244	1.423
	235	446,644	2,223,407	3.082	3.526
	240	10,883	56,101	2.123	2.429
	241	4,696	14,357	0.021	0.024
	327	2,748	17,618	0.000	0.000
	328	370	2,570	180.609	206.646
	340	30,664	123,865	0.017	0.019
	341	0	0	0.000	0.000
	342	5,681	28,532	0.000	0.000
	343	2,213	7,469	0.000	0.000
	403	448,230	2,257,894	0.791	0.905
	451	89,055	409,714	0.386	0.442
	452	35,584	193,026	0.573	0.656
	453	32,109	98,037	0.158	0.181
	454	213,119	919,292	0.293	0.335
	460	3,375,538	14,121,292	0.340	0.389
	482	119,090	710,788	0.742	0.849
	510	21,754	113,808	0.000	0.000
	514	59,004	281,029	0.078	0.089
	530	1,055,097	4,464,828	0.443	0.507
	534	0	0	0.000	0.000
	TOTAL#	19,223,669	81,533,303	1.019	1.166

## REFLECTS CURRENT IPMF OF 0.850.

MICHIGAN

COMMERCIAL INLAND MARINE RELATIVITY ANALYSIS  
TABLE 9 - SUMMARY OF EXPERIENCE USED IN SIMULTANEOUS REVIEW

<u>TYPE OF POLICY</u>	<u>RATING</u>	(1)	(2)	(3)	(4)
<u>TOTAL ALL TOPS#</u>	<u>GROUP</u>	<u>2016 AGGREGATE LOSS COSTS</u>	<u>2012 - 2016 AGGREGATE LOSS COSTS</u>	<u>FIVE-YEAR EXP RATIO</u>	<u>RELATIVITY</u>
	150	984,249	5,011,550	0.946	1.082
	191	6,010,289	18,341,831	1.013	1.159
	192	1,051,433	3,492,719	0.673	0.770
	220	11,127	114,535	3.509	4.015
	221	6,727	28,082	0.481	0.550
	234	17,058,250	69,210,823	1.047	1.198
	235	8,885,644	26,630,690	0.878	1.005
	240	939,066	3,741,355	0.673	0.770
	241	20,249	129,096	0.046	0.053
	327	21,665	109,164	0.000	0.000
	328	2,320,257	11,911,235	0.821	0.939
	340	71,352	211,858	0.007	0.008
	341	0	0	0.000	0.000
	342	24,869	93,907	0.428	0.490
	343	2,802	10,886	282.448	323.167
	403	2,049,082	8,029,439	0.443	0.507
	451	3,398,732	13,363,550	0.843	0.965
	452	70,286	330,493	1.094	1.252
	453	77,684	310,493	1.944	2.224
	454	377,955	1,664,592	0.485	0.555
	460	4,165,736	17,808,822	0.354	0.405
	482	958,454	3,551,922	0.956	1.094
	510	25,006	153,785	0.003	0.003
	514	505,473	1,893,390	0.309	0.354
	530	1,559,531	7,161,832	0.458	0.524
	534	0	0	0.000	0.000
	TOTAL#	50,595,918	193,306,049	0.874	1.000

# TOTAL IN COLUMN (3) IS AN AVERAGE USING COLUMN (1) AS WEIGHTS.

## EXPLANATORY NOTES TO TABLES 8 AND 9

### COMMERCIAL INLAND MARINE RELATIVITY ANALYSIS

#### EXPERIENCE BASE

The Commercial Inland Marine IPMF review presented in the attached exhibits is based on a review of the latest available five years of monoline and multiline experience through accident year 2016 for all companies reporting data to Insurance Services Office under the Inland Marine Module of the Commercial Statistical Plan (CSP) and the Intermediate Level of the Commercial Minimum Statistical Plan (CMSP).

#### ADJUSTMENT OF DATA

Aggregate loss costs for each year in the review period have been adjusted to the levels which would have been earned had the current loss costs applied throughout the experience period. Reported premiums are adjusted to current level on an individual policy basis by applying a factor equal to all loss cost level changes that have been implemented subsequent to the policy being written. These adjusted premiums are then converted to a loss cost at current level. In order to eliminate the impact of company deviations from the manual level and individual risk modifications which were in effect at the time the policy was written, aggregate loss costs are further adjusted based on reported Rate Modification and Rate Departure Factors/Loss Cost Multipliers. Multiline aggregate loss costs are further adjusted to the level of the current Implicit Package Modification Factor (IPMF). Incurred losses are loaded for all loss adjustment expenses by applying a factor of 1.105.

#### RELATIVITY ANALYSIS

For Inland Marine coverage, a multistate IPMF level is determined via a two-way relativity analysis similar to the analysis used in Basic Group I. The experience for all reviewed classes is used to form class group relativities. These relativities for monoline and multiline (all programs combined) are determined through an iterative procedure. The ratio of the multiline relativity to the monoline relativity is multiplied by the current IPMF to yield the indicated IPMF. The indicated IPMF is subject to a minimum value of 0.500 and a maximum value of 1.500. If an indicated IPMF falls outside one of those limits, it is capped at that amount, the premiums for that Type of Policy (i.e., TOP 10 versus TOP 3X) are adjusted to the capped IPMF level, and the entire relativity review is performed again to take this into account.

TABLE 10  
MICHIGAN  
OWNERS, LANDLORDS AND TENANTS  
BASIC LIMIT RELATIVE CHANGE ANALYSIS  
-----

	(1) BAILEY FORMULA RELATIV.	(2) CREDIBILITY Z	(3) Z-WTD RELATIV.	(4) BALANCED RELATIV.	(5) INDICATED CHANGE *
TOP					
10	1.043	0.227	1.010	1.010	
31	1.861	0.100	1.064	1.065	5.4%
32	0.930	0.131	0.990	0.991	-1.9%
33	1.028	0.210	1.006	1.006	-0.4%
34	0.958	0.285	0.988	0.988	-2.2%
35	1.077	0.205	1.015	1.016	0.6%
36	0.795	0.163	0.963	0.964	-4.6%

CLASS  
GROUP

01	0.937	0.159	0.990	0.987	
02	1.023	0.184	1.004	1.002	
03	0.975	0.105	0.997	0.995	
04	0.701	0.029	0.990	0.987	
05	0.817	0.039	0.992	0.990	
06	0.739	0.100	0.970	0.968	
07	1.437	0.153	1.057	1.055	
08	0.932	0.048	0.997	0.994	
09	0.629	0.127	0.943	0.941	
10	0.940	0.199	0.988	0.986	
11	0.938	0.153	0.990	0.988	
12	1.099	0.283	1.027	1.025	
13	1.485	0.066	1.026	1.024	
16	0.141	0.031	0.941	0.939	

	(1) BAILEY FORMULA RELATIV.	(2) CREDIBILITY Z	(3) Z-WTD RELATIV.	(4) BALANCED RELATIV.
TERRITORY				
1	0.917	0.179	0.985	0.985
3	1.086	0.272	1.023	1.023
4	1.024	0.227	1.005	1.005
5	0.935	0.340	0.978	0.978

\* INDICATED CHANGE = (BALANCED RELATIVITY FOR TOP) / (MONOLINE RELATIVITY (TOP 10)) - 1



TABLE 11  
MICHIGAN  
MANUFACTURERS AND CONTRACTORS  
BASIC LIMIT RELATIVE CHANGE ANALYSIS  
-----

TOP	(1) BAILEY FORMULA RELATIV.	(2) CREDIBILITY Z	(3) Z-WTD RELATIV.	(4) BALANCED RELATIV.	(5) INDICATED CHANGE *
10	0.914	0.209	0.981	0.978	
33	0.780	0.038	0.991	0.987	0.9%
34	0.951	0.111	0.994	0.991	1.3%
35	2.750	0.033	1.034	1.031	5.4%
36	1.116	0.153	1.017	1.014	3.7%
37	0.916	0.119	0.990	0.986	0.8%
38	1.080	0.291	1.023	1.019	4.2%
CLASS GROUP					
30	0.954	0.123	0.994	0.992	
31	1.218	0.187	1.038	1.035	
32	1.040	0.268	1.010	1.008	
33	0.940	0.103	0.994	0.991	
34	0.927	0.143	0.989	0.987	
35	1.256	0.042	1.010	1.007	
36	0.556	0.084	0.952	0.950	
37	0.958	0.072	0.997	0.994	
38	1.096	0.116	1.011	1.008	

\* INDICATED CHANGE = (BALANCED RELATIVITY FOR TOP) / (MONOLINE RELATIVITY (TOP 10)) - 1

TABLE 12  
MICHIGAN  
OWNERS, LANDLORDS AND TENANTS  
BASIC LIMIT RELATIVE CHANGE ANALYSIS  
-----

SUMMARY OF EXPERIENCE USED IN RELATIVE CHANGE ANALYSIS

TERRITORY	ALL	(1)	(2)	(3)	(4)	(5)	(6)
		FISCAL A.Y.E. 06/30/2017 AGGREGATE	FISCAL A.Y.E. 2013 - 2017	FIVE YEAR EXPERIENCE		NUMBER OF	BAL CELL
TYPE OF POLICY	CLASS GROUP	LOSS COSTS AT CURRENT LEVEL	AGG LOSS COST CURRENT LEVEL	RATIO	RELATIV.	OCCURRENCES	RELATIV.
10 MONOLINE	01 FOOD&BEV. (RETAIL)	\$57,330	\$191,923	1.441		17	
	02 RESTAURANTS	171,955	530,929	1.977		72	
	03 STORES	61,056	252,459	0.966		28	
	04 VENDING & RENTAL	5,514	68,666	0.000		0	
	05 FOOD & BEV. DIST.	62,299	265,575	0.036		2	
	06 NON-FOOD&BEV.DIST	244,070	577,850	0.497		28	
	07 CLUBS, AMSMT&SPRTS	254,150	1,354,586	2.855		146	
	08 HEALTH CARE FACIL	59,846	248,300	0.357		2	
	09 HOTELS AND MOTELS	193,666	1,377,271	0.677		102	
	10 SCHLS & CHURCHES	227,628	1,170,585	1.086		54	
	11 APARTMENTS	1,554,560	4,939,335	1.089		134	
	12 BUILDINGS&OFFICES	1,302,866	6,098,697	1.130		330	
	13 MISC. PREMISES	38,095	204,349	1.860		18	
	16 GOVT SUBDIVISIONS	265	265	0.000		0	
	TOTAL *	\$4,233,300	\$17,280,790	1.173		933	
31 MULT MOTEL/HOTEL	09 HOTELS AND MOTELS	\$581,296	\$2,575,969	1.296		182	
	TOTAL *	\$581,296	\$2,575,969	1.296		182	
32 MULT APARTMENT	11 APARTMENTS	\$1,382,120	\$6,989,648	0.992		289	
	12 BUILDINGS&OFFICES	81,012	367,560	0.791		23	
	TOTAL *	\$1,463,132	\$7,357,208	0.981		312	
33 MULT OFFICE	12 BUILDINGS&OFFICES	\$2,589,139	\$11,953,677	1.281		796	
	13 MISC. PREMISES	32,055	102,788	0.175		4	
	TOTAL *	\$2,621,194	\$12,056,465	1.267		800	
34 MULT MERCANTILE	01 FOOD&BEV. (RETAIL)	\$1,278,559	\$5,167,842	0.974		441	
	02 RESTAURANTS	2,211,434	8,696,851	1.016		544	
	03 STORES	621,606	2,411,366	1.021		133	
	04 VENDING & RENTAL	11,825	44,248	0.012		1	
	05 FOOD & BEV. DIST.	150,270	776,268	1.235		26	
	06 NON-FOOD&BEV.DIST	678,574	3,008,849	0.945		155	
	12 BUILDINGS&OFFICES	665,341	3,051,084	1.217		167	
	13 MISC. PREMISES	482	874	0.000		0	
	TOTAL *	\$5,618,091	\$23,157,382	1.026		1,467	

TABLE 12  
MICHIGAN  
OWNERS, LANDLORDS AND TENANTS  
BASIC LIMIT RELATIVE CHANGE ANALYSIS  
-----

SUMMARY OF EXPERIENCE USED IN RELATIVE CHANGE ANALYSIS

TERRITORY	ALL	(1) FISCAL A.Y.E. 06/30/2017 AGGREGATE LOSS COSTS AT CURRENT LEVEL	(2) FISCAL A.Y.E. 2013 - 2017 AGG LOSS COST CURRENT LEVEL	(3) FIVE YEAR EXPERIENCE RATIO	(4) RELATIV.	(5) NUMBER OF OCCURRENCES	(6) BAL CELL RELATIV.
TYPE OF POLICY	CLASS GROUP						
35 MULT INSTITUT.	07 CLUBS,AMSMT&SPRTS	\$66,658	\$271,611	0.793		31	
	08 HEALTH CARE FACIL	213,238	1,004,782	1.326		40	
	10 SCHLS & CHURCHES	941,717	4,816,642	1.103		659	
	12 BUILDINGS&OFFICES	12,394	56,563	2.141		14	
	13 MISC. PREMISES	4,601	21,040	0.000		0	
	16 GOVT SUBDIVISIONS	165,302	743,115	0.167		18	
	TOTAL *	\$1,403,910	\$6,913,753	1.017		762	
36 MULT SERVICES	03 STORES	\$91,835	\$410,364	1.128		41	
	04 VENDING & RENTAL	44,318	188,809	0.916		15	
	07 CLUBS,AMSMT&SPRTS	879,252	3,788,501	1.008		245	
	08 HEALTH CARE FACIL	1,972	6,316	0.000		0	
	09 HOTELS AND MOTELS	58,090	414,194	0.890		8	
	10 SCHLS & CHURCHES	9,821	78,016	0.246		3	
	12 BUILDINGS&OFFICES	267,825	1,294,721	1.498		112	
	13 MISC. PREMISES	162,889	712,380	1.610		57	
	TOTAL *	\$1,516,002	\$6,893,301	1.153		481	
TOTAL ALL	TOP						
	01 FOOD&BEV. (RETAIL)	\$1,335,889	\$5,359,765	0.994		458	
	02 RESTAURANTS	2,383,389	9,227,780	1.086		616	
	03 STORES	774,497	3,074,189	1.029		202	
	04 VENDING & RENTAL	61,657	301,723	0.661		16	
	05 FOOD & BEV. DIST.	212,569	1,041,843	0.883		28	
	06 NON-FOOD&BEV.DIST	922,644	3,586,699	0.826		183	
	07 CLUBS,AMSMT&SPRTS	1,200,060	5,414,698	1.387		422	
	08 HEALTH CARE FACIL	275,056	1,259,398	1.106		42	
	09 HOTELS AND MOTELS	833,052	4,367,434	1.124		292	
	10 SCHLS & CHURCHES	1,179,166	6,065,243	1.092		716	
	11 APARTMENTS	2,936,680	11,928,983	1.044		423	
	12 BUILDINGS&OFFICES	4,918,577	22,822,302	1.238		1,442	
	13 MISC. PREMISES	238,122	1,041,431	1.422		79	
	16 GOVT SUBDIVISIONS	165,567	743,380	0.166		18	
	TOTAL *	\$17,436,925	\$76,234,868	1.114		4,937	

\* TOTALS IN COLUMN (3) ARE AVERAGES USING COLUMN (1) AS WEIGHTS.

TABLE 13  
MICHIGAN  
MANUFACTURERS AND CONTRACTORS  
BASIC LIMIT RELATIVE CHANGE ANALYSIS  
-----

SUMMARY OF EXPERIENCE USED IN RELATIVE CHANGE ANALYSIS

TYPE OF POLICY	CLASS GROUP	(1) FISCAL A.Y.E. 06/30/2017 AGGREGATE LOSS COSTS AT CURRENT LEVEL	(2) FISCAL A.Y.E. 2013 - 2017 AGG LOSS COST CURRENT LEVEL	(3) FIVE YEAR EXPERIENCE RATIO	(4) RELATIV.	(5) NUMBER OF OCCURRENCES	(6) BAL CELL RELATIV.
10 MONOLINE	30 SERVICE	\$206,810	\$764,150	1.164	1.254	37	0.970
	31 LIGHT CONTRACTING	345,316	1,409,901	1.048	1.129	117	1.012
	32 MEDIUM CONTRCTING	2,684,413	12,976,417	0.796	0.858	476	0.986
	33 HEAVY CONTRACTING	306,152	1,472,872	1.121	1.208	48	0.970
	34 DEALER OR DISTRIB	190,341	618,010	0.549	0.591	22	0.965
	35 LGT. MANUFACTURER	113,255	315,245	0.549	0.591	6	0.985
	36 MED. MANUFACTURER	493,841	2,344,232	0.311	0.335	21	0.929
	37 HVY. MANUFACTURER	134,005	654,411	1.192	1.284	11	0.973
	38 MISC. OPERATION	276,015	1,189,760	1.605	1.729	53	0.986
	TOTAL *	\$4,750,148	\$21,744,998	0.844		791	
33 MULT OFFICE	31 LIGHT CONTRACTING	\$17,315	\$68,414	0.469	0.505	4	1.022
	32 MEDIUM CONTRCTING	24,690	124,363	0.000	0.000	0	0.995
	33 HEAVY CONTRACTING	157,591	638,131	1.523	1.640	7	0.979
	38 MISC. OPERATION	301,920	1,492,614	0.439	0.473	16	0.995
	TOTAL *	\$501,516	\$2,323,522	0.759		27	
34 MULT MERCANTILE	30 SERVICE	\$50,477	\$223,451	0.133	0.143	5	0.983
	32 MEDIUM CONTRCTING	107,117	548,924	2.959	3.187	22	0.999
	34 DEALER OR DISTRIB	1,123,714	5,411,082	0.655	0.705	168	0.978
	38 MISC. OPERATION	92,958	353,367	0.975	1.050	30	0.999
	TOTAL *	\$1,374,266	\$6,536,824	0.837		225	
35 MULT INSTITUT.	31 LIGHT CONTRACTING	\$19,802	\$97,398	6.719	7.236	7	1.067
	32 MEDIUM CONTRCTING	40,264	182,545	0.880	0.947	13	1.039
	TOTAL *	\$60,066	\$279,943	2.805		20	
36 MULT SERVICES	30 SERVICE	\$76,475	\$356,668	1.842	1.984	40	1.005
	31 LIGHT CONTRACTING	186,301	911,924	0.543	0.585	34	1.049
	32 MEDIUM CONTRCTING	204,983	974,649	0.382	0.411	19	1.022
	33 HEAVY CONTRACTING	53,201	367,966	1.331	1.433	5	1.005
	34 DEALER OR DISTRIB	747,421	3,374,243	1.289	1.388	175	1.000
	36 MED. MANUFACTURER	30,822	142,821	1.032	1.112	7	0.962
	38 MISC. OPERATION	649,526	2,625,690	1.033	1.112	142	1.022
	TOTAL *	\$1,948,729	\$8,753,961	1.056		422	

TABLE 13  
MICHIGAN  
MANUFACTURERS AND CONTRACTORS  
BASIC LIMIT RELATIVE CHANGE ANALYSIS  
-----

SUMMARY OF EXPERIENCE USED IN RELATIVE CHANGE ANALYSIS

TYPE OF POLICY	CLASS GROUP	(1) FISCAL A.Y.E. 06/30/2017 AGGREGATE LOSS COSTS AT CURRENT LEVEL	(2) FISCAL A.Y.E. 2013 - 2017 AGG LOSS COST CURRENT LEVEL	(3) FIVE YEAR EXPERIENCE RATIO	(4) RELATIV.	(5) NUMBER OF OCCURRENCES	(6) BAL CELL RELATIV.
37 MULT INDUST/PROC.	31 LIGHT CONTRACTING	\$707	\$2,737	0.277	0.298	0	1.021
	32 MEDIUM CONTRCTING	159,180	703,061	0.428	0.461	26	0.994
	33 HEAVY CONTRACTING	104,485	518,629	1.054	1.135	11	0.978
	34 DEALER OR DISTRIB	27,218	128,918	0.190	0.205	6	0.973
	35 LGT. MANUFACTURER	195,052	930,402	1.368	1.473	26	0.993
	36 MED. MANUFACTURER	984,812	4,286,490	0.539	0.581	102	0.937
	37 HVY. MANUFACTURER	1,204,239	5,250,118	0.772	0.832	83	0.981
	38 MISC. OPERATION	11,303	68,134	0.014	0.015	1	0.994
	TOTAL *	\$2,686,996	\$11,888,489	0.711		255	
38 MULT CONTRACTORS	30 SERVICE	\$878,270	\$3,742,828	0.839	0.904	192	1.011
	31 LIGHT CONTRACTING	1,379,030	5,706,111	1.269	1.367	473	1.055
	32 MEDIUM CONTRCTING	3,417,752	15,444,588	1.136	1.223	738	1.028
	33 HEAVY CONTRACTING	1,035,071	4,539,447	0.676	0.728	121	1.010
	38 MISC. OPERATION	8,837	36,784	0.765	0.823	1	1.028
	TOTAL *	\$6,718,960	\$29,469,758	1.053		1,525	
TOTAL ALL TOP	30 SERVICE	\$1,212,032	\$5,087,097	0.929		274	
	31 LIGHT CONTRACTING	1,948,471	8,196,485	1.209		635	
	32 MEDIUM CONTRCTING	6,638,399	30,954,547	0.982		1,294	
	33 HEAVY CONTRACTING	1,656,500	7,537,045	0.884		192	
	34 DEALER OR DISTRIB	2,088,694	9,532,253	0.866		371	
	35 LGT. MANUFACTURER	308,307	1,245,647	1.067		32	
	36 MED. MANUFACTURER	1,509,475	6,773,543	0.475		130	
	37 HVY. MANUFACTURER	1,338,244	5,904,529	0.814		94	
	38 MISC. OPERATION	1,340,559	5,766,349	1.003		243	
	TOTAL *	\$18,040,681	\$80,997,495	0.928		3,265	

\* TOTALS IN COLUMN (3) ARE AVERAGES USING COLUMN (1) AS WEIGHTS.

TABLE 14  
MICHIGAN  
PRODUCTS  
BASIC LIMIT RELATIVE CHANGE ANALYSIS  
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	(1) BAILEY FORMULA RELATIV.	(2) CREDIBILITY Z	(3) Z-WTD RELATIV.	(4) BALANCED RELATIV.	(5) INDICATED CHANGE *
TOP					
10	0.908	0.385	0.964	0.961	
34	1.062	0.394	1.024	1.021	+ 6.2%
36	0.945	0.198	0.989	0.986	+ 2.6%
37	1.036	0.541	1.019	1.017	+ 5.8%
CLASS GROUP					
3	0.939	0.535	0.967	0.971	
4	1.062	0.425	1.026	1.029	
5	1.158	0.132	1.020	1.023	
6	0.984	0.341	0.995	0.998	
7	0.957	0.186	0.992	0.995	

\* INDICATED CHANGE =  
(BALANCED RELATIVITY FOR TOP) / (BALANCED MONOLINE (TOP 10) RELATIVITY) - 1

NOTE: THE INDICATED CHANGES BY TOP WERE FURTHER ADJUSTED BY THE FOLLOWING  
DIFFERENTIALS: TOP 34: 0.977  
TOP 36: 0.947  
TOP 37: 0.966

TABLE 15  
MULTISTATE  
PRODUCTS  
BASIC LIMIT RELATIVE CHANGE ANALYSIS

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SUMMARY OF EXPERIENCE USED IN RELATIVE CHANGE ANALYSIS

TYPE OF POLICY	CLASS GROUP	(1) CALENDAR A.Y.E. 12/31/2016 AGGREGATE LOSS COSTS AT CURRENT LEVEL	(2) CALENDAR A.Y.E. 2012 - 2016 AGG LOSS COST CURRENT LEVEL	(3) FIVE YEAR EXPERIENCE RATIO	(4) RELATIV.	(5) NUMBER OF OCCURRENCES	(6) BAL CELL RELATIV.
10 MONOLINE	03 MAN,DLR,DSTFD/DRG	\$21,602,530	\$83,447,793	0.852	0.787	1,581	0.933
	04 DLR,DST-NOTFD/DRG	9,679,270	41,811,675	1.278	1.182	666	0.990
	05 MAN.NTFD/DRG (LOW)	1,692,267	7,299,063	0.767	0.709	64	0.984
	06 MAN.NTFD/DRG (MED)	10,333,678	44,740,395	0.937	0.867	509	0.960
	07 MAN.NTFD/DRG (HGH)	2,805,495	12,365,722	1.011	0.935	148	0.957
	TOTAL *	\$46,113,240	\$189,664,648	0.967		2,968	
34 MULT MERCANTILE	03 MAN,DLR,DSTFD/DRG	\$5,884,889	\$28,782,063	1.470	1.359	936	0.991
	04 DLR,DST-NOTFD/DRG	32,124,091	153,045,789	1.148	1.061	2,174	1.051
	06 MAN.NTFD/DRG (MED)	15,743	64,180	0.000	0.000	0	1.019
	TOTAL *	\$38,024,723	\$181,892,032	1.197		3,110	
36 MULT SERVICES	04 DLR,DST-NOTFD/DRG	\$3,789,140	\$17,974,549	1.089	1.007	780	1.016
	06 MAN.NTFD/DRG (MED)	60,544	302,132	0.755	0.698	8	0.985
	TOTAL *	\$3,849,684	\$18,276,681	1.084		788	
37 MULT INDUST/PROC.	03 MAN,DLR,DSTFD/DRG	\$18,758,762	\$92,830,487	1.011	0.935	3,210	0.987
	05 MAN.NTFD/DRG (LOW)	3,999,375	22,161,197	1.454	1.345	287	1.040
	06 MAN.NTFD/DRG (MED)	30,062,799	137,041,119	1.114	1.030	1,814	1.015
	07 MAN.NTFD/DRG (HGH)	8,087,615	39,304,471	1.047	0.968	549	1.012
	TOTAL *	\$60,908,551	\$291,337,274	1.096		5,860	
TOTAL ALL TOP	03 MAN,DLR,DSTFD/DRG	\$46,246,181	\$205,060,343	0.995		5,727	
	04 DLR,DST-NOTFD/DRG	45,592,501	212,832,013	1.171		3,620	
	05 MAN.NTFD/DRG (LOW)	5,691,642	29,460,260	1.250		351	
	06 MAN.NTFD/DRG (MED)	40,472,764	182,147,826	1.068		2,331	
	07 MAN.NTFD/DRG (HGH)	10,893,110	51,670,193	1.038		697	
	TOTAL *	\$148,896,198	\$681,170,635	1.082		12,726	

\* TOTALS IN COLUMN (3) ARE AVERAGES USING COLUMN (1) AS WEIGHTS.

TABLE 16  
MICHIGAN  
LOCAL PRODUCTS/COMPLETED OPERATIONS  
BASIC LIMIT RELATIVE CHANGE ANALYSIS  
-----

	(1) BAILEY FORMULA RELATIV.	(2) CREDIBILITY Z	(3) Z-WTD RELATIV.	(4) BALANCED RELATIV.	(5) INDICATED CHANGE *
TOP					
10	1.007	0.764	1.005	1.004	
34	1.052	0.588	1.030	1.029	2.5%
36	1.019	0.533	1.010	1.009	0.5%
37	0.934	0.146	0.990	0.989	-1.5%
38	0.991	1.000	0.991	0.990	-1.4%
CLASS GROUP					
1	0.852	0.596	0.909	0.903	
2	1.029	0.508	1.015	1.008	
11	1.067	0.341	1.022	1.015	
12	1.022	1.000	1.022	1.015	
13	0.802	0.282	0.940	0.933	

\* INDICATED CHANGE =  
(BALANCED RELATIVITY FOR TOP) / (BALANCED MONOLINE (TOP 10) RELATIVITY) - 1



TABLE 16C  
MULTISTATE  
LOCAL PRODUCTS/COMPLETED OPERATIONS  
BASIC LIMIT RELATIVE CHANGE ANALYSIS \*

STATE	(1) BAILEY FORMULA RELATIV	(2) CREDIBILITY Z	(3) Z-WTD RELATIV	(4) BALANCED RELATIV.
	1.324	0.399	1.119	1.116
	1.182	0.648	1.114	1.111
	1.139	0.606	1.082	1.079
	1.138	0.577	1.078	1.075
	1.449	0.200	1.077	1.074
	1.178	0.429	1.073	1.070
	1.279	0.243	1.062	1.059
	1.106	0.442	1.045	1.043
	1.134	0.344	1.044	1.041
	1.097	0.371	1.035	1.032
Michigan	1.093	0.381	1.034	1.032
	1.132	0.256	1.032	1.029
	1.211	0.162	1.031	1.029
	1.122	0.206	1.024	1.021
	1.042	0.508	1.021	1.018
	1.131	0.166	1.021	1.018
	1.046	0.224	1.010	1.007
	1.036	0.251	1.009	1.006
	1.009	0.291	1.003	1.000
	1.009	0.228	1.002	0.999
	1.001	0.274	1.000	0.998
	0.971	0.150	0.996	0.993
	0.983	0.474	0.992	0.989
	0.962	0.229	0.991	0.988
	0.975	0.363	0.991	0.988
	0.970	0.333	0.990	0.987
	0.957	0.247	0.989	0.987
	0.890	0.104	0.988	0.985
	0.966	0.347	0.988	0.985
	0.971	0.428	0.988	0.985
	0.955	0.336	0.985	0.982
	0.943	0.307	0.982	0.980
	0.951	0.462	0.977	0.975
	0.775	0.097	0.976	0.973
	0.841	0.161	0.973	0.970
	0.926	0.385	0.971	0.968
	0.938	0.512	0.968	0.965
	0.882	0.281	0.965	0.963
	0.904	0.382	0.962	0.960
	0.835	0.230	0.959	0.957
	0.749	0.166	0.953	0.951
	0.527	0.076	0.952	0.950
	0.760	0.206	0.945	0.943
	0.841	0.337	0.943	0.941
	0.702	0.168	0.942	0.940
	0.682	0.164	0.939	0.937
	0.475	0.085	0.939	0.936
	0.853	0.407	0.937	0.935
	0.708	0.188	0.937	0.935
	0.812	0.350	0.930	0.927
	0.791	0.594	0.870	0.868
	0.714	0.502	0.844	0.842

\* Sorted by balanced relative change

TABLE 17  
MICHIGAN  
LOCAL PRODUCTS/COMPLETED OPERATIONS  
BASIC LIMIT RELATIVE CHANGE ANALYSIS

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SUMMARY OF EXPERIENCE USED IN RELATIVE CHANGE ANALYSIS

TYPE OF POLICY	CLASS GROUP	(1) CALENDAR A.Y.E. 12/31/2016 AGGREGATE LOSS COSTS AT CURRENT LEVEL	(2) CALENDAR A.Y.E. 2012 - 2016 AGG LOSS COST CURRENT LEVEL	(3) FIVE YEAR EXPERIENCE RATIO	(4) RELATIV.	(5) NUMBER OF OCCURRENCES	(6) BAL CELL RELATIV.
10 MONOLINE	01 RET.STRS-FOOD/DRG	\$23,844	\$74,385	4.212	4.387	13	0.935
	02 RET.STRS-NTFD/DRG	45,361	155,095	1.028	1.070	8	1.044
	11 COMP. OPS. (LOW)	71,415	277,365	0.358	0.373	9	1.052
	12 COMP. OPS. (MED)	1,239,074	5,121,319	0.896	0.933	115	1.052
	13 COMP. OPS. (HGH)	175,222	937,107	0.498	0.518	7	0.967
	TOTAL *	\$1,554,916	\$6,565,271	0.881		152	
34 MULT MERCANTILE	01 RET.STRS-FOOD/DRG	\$296,247	\$1,038,437	1.363	1.419	110	0.958
	02 RET.STRS-NTFD/DRG	143,636	559,218	0.727	0.757	16	1.070
	12 COMP. OPS. (MED)	43,879	207,426	1.201	1.251	3	1.078
	TOTAL *	\$483,762	\$1,805,081	1.159		129	
36 MULT SERVICES	01 RET.STRS-FOOD/DRG	\$20,464	\$91,554	3.258	3.393	4	0.939
	02 RET.STRS-NTFD/DRG	332,206	1,305,444	1.566	1.631	87	1.049
	11 COMP. OPS. (LOW)	76,265	350,705	0.863	0.899	25	1.057
	12 COMP. OPS. (MED)	95,544	452,475	2.060	2.146	20	1.057
	13 COMP. OPS. (HGH)	48,997	214,675	1.318	1.373	15	0.971
	TOTAL *	\$573,476	\$2,414,853	1.594		151	
37 MULT INDUST/PROC.	01 RET.STRS-FOOD/DRG	\$7	\$467	0.000	0.000	0	0.921
	11 COMP. OPS. (LOW)	3,741	16,227	0.580	0.604	0	1.036
	12 COMP. OPS. (MED)	67,997	276,523	2.334	2.430	11	1.036
	13 COMP. OPS. (HGH)	232	1,524	0.000	0.000	0	0.952
	TOTAL *	\$71,977	\$294,741	2.235		11	
38 MULT CONTRACTORS	11 COMP. OPS. (LOW)	\$222,764	\$955,118	0.695	0.724	19	1.037
	12 COMP. OPS. (MED)	3,662,302	15,533,709	0.954	0.994	306	1.037
	13 COMP. OPS. (HGH)	337,615	1,654,937	1.734	1.806	34	0.953
	TOTAL *	\$4,222,681	\$18,143,764	1.003		359	
TOTAL ALL TOP	01 RET.STRS-FOOD/DRG	\$340,562	\$1,204,843	1.676		127	
	02 RET.STRS-NTFD/DRG	521,203	2,019,757	1.288		111	
	11 COMP. OPS. (LOW)	374,185	1,599,415	0.664		53	
	12 COMP. OPS. (MED)	5,108,796	21,591,452	0.981		455	
	13 COMP. OPS. (HGH)	562,066	2,808,243	1.312		56	
	TOTAL *	\$6,906,812	\$29,223,710	1.048		802	

\* TOTALS IN COLUMN (3) ARE AVERAGES USING COLUMN (1) AS WEIGHTS.

TABLE 18  
MULTISTATE  
LOCAL PRODUCTS/COMPLETED OPERATIONS  
BASIC LIMIT RELATIVE CHANGE ANALYSIS

-----  
SUMMARY OF EXPERIENCE USED IN RELATIVE CHANGE ANALYSIS

TYPE OF POLICY	CLASS GROUP	(1) CALENDAR A.Y.E. 12/31/2016 AGGREGATE LOSS COSTS AT CURRENT LEVEL	(2) CALENDAR A.Y.E. 2012 - 2016 AGG LOSS COST CURRENT LEVEL	(3) FIVE YEAR EXPERIENCE RATIO	(4) RELATIV.	(5) NUMBER OF OCCURRENCES	(6) BAL CELL RELATIV.
10 MONOLINE	01 RET. STRS-FOOD/DRG	\$3,182,470	\$12,836,961	0.802		767	
	02 RET. STRS-NTFD/DRG	2,924,031	13,338,270	1.084		529	
	11 COMP. OPS. (LOW)	4,590,082	20,152,490	1.003		479	
	12 COMP. OPS. (MED)	89,807,887	402,728,315	1.020		6,697	
	13 COMP. OPS. (HGH)	9,315,286	47,098,800	0.569		288	
	TOTAL *	\$109,819,756	\$496,154,836	0.977		8,760	
34 MULT MERCANTILE	01 RET. STRS-FOOD/DRG	\$11,237,823	\$48,248,320	0.852		4,326	
	02 RET. STRS-NTFD/DRG	6,276,333	28,286,473	0.989		731	
	12 COMP. OPS. (MED)	2,175,660	11,035,192	1.187		135	
	TOTAL *	\$19,689,816	\$87,569,985	0.932		5,192	
36 MULT SERVICES	01 RET. STRS-FOOD/DRG	\$987,041	\$4,702,276	0.977		241	
	02 RET. STRS-NTFD/DRG	12,282,390	51,445,436	0.994		2,617	
	11 COMP. OPS. (LOW)	3,800,013	17,251,395	1.019		578	
	12 COMP. OPS. (MED)	4,607,097	22,619,676	0.874		739	
	13 COMP. OPS. (HGH)	1,134,525	6,178,738	1.015		99	
	TOTAL *	\$22,811,066	\$102,197,521	0.974		4,274	
37 MULT INDUST/PROC.	01 RET. STRS-FOOD/DRG	\$21,424	\$92,620	4.539		1	
	11 COMP. OPS. (LOW)	149,163	688,925	0.443		17	
	12 COMP. OPS. (MED)	4,495,367	21,801,280	0.926		305	
	13 COMP. OPS. (HGH)	51,766	453,230	0.413		1	
	TOTAL *	\$4,717,720	\$23,036,055	0.921		324	
38 MULT CONTRACTORS	11 COMP. OPS. (LOW)	\$9,456,335	\$43,962,865	1.026		677	
	12 COMP. OPS. (MED)	171,965,665	815,820,275	0.958		13,853	
	13 COMP. OPS. (HGH)	17,646,239	82,295,884	0.866		809	
	TOTAL *	\$199,068,239	\$942,079,024	0.953		15,339	
TOTAL ALL TOP	01 RET. STRS-FOOD/DRG	\$15,428,758	\$65,880,177	0.854		5,335	
	02 RET. STRS-NTFD/DRG	21,482,754	93,070,179	1.005		3,877	
	11 COMP. OPS. (LOW)	17,995,593	82,055,675	1.014		1,751	
	12 COMP. OPS. (MED)	273,051,676	1,274,004,738	0.978		21,729	
	13 COMP. OPS. (HGH)	28,147,816	136,026,652	0.773		1,197	
	TOTAL *	\$356,106,597	\$1,651,037,421	0.960		33,889	

\* TOTALS IN COLUMN (3) ARE AVERAGES USING COLUMN (1) AS WEIGHTS.

EXPLANATORY NOTES TO GENERAL LIABILITY  
RELATIVITY ANALYSIS - TABLES 10 THROUGH 18.

OBJECTIVES

The objectives of this procedure are to:

- 1) determine monoline loss cost level needs for the appropriate rating variables;
- 2) determine indicated changes to the eight liability Commercial Package Policy (CPP) Package Modification Factors (PMFs) based on Premises/Operations and Products/Completed Operations data.

EXPERIENCE  
BASE

The experience used in this relativity analysis is the latest five (5) years of accident year data, as reported under the Commercial Statistical Plan with aggregate loss costs adjusted to current loss cost level (multiline aggregate loss costs adjusted additionally by the current Implicit Package Modification Factors). Losses have been trended and developed in the Relativity Analysis. ALCCCL have been trended.

SIMULTANEOUS  
DETERMINATION  
OF RATING  
VARIABLE  
RELATIVITIES

Once the aggregate loss costs at current level and incurred losses used in the analysis have been appropriately adjusted, the 5-year experience ratios are calculated for each combination of the appropriate rating variables. From these ratios, relativities to the statewide 5-year experience ratio are calculated. These relativities are then used in a minimum bias iterative review procedure, which simultaneously determines the relativities for each rating variable.

The purpose of a simultaneous review procedure is to arrive at a set of relativities for each rating variable that best represent the experience. For example, the type of policy relativities will serve to derive the relationship of CPP policies relative to monoline policies, via the PMF, while the class group and territory (if applicable) relativities will serve to derive the relationship of the various classification and territories relative to one another. An iterative technique is used to derive relativities for each rating variable. This procedure is in contrast to a one-way type of review, wherein relativities for each rating variable would each be reviewed separately.

Such one-way types of review do not take into account differing percentages of experience of each rating variable within the other rating variables. The simultaneous review procedure accounts for these different distributions in generating relativities for each rating variable.

RATING  
VARIABLES  
USED

For Premises/Operations and Products/Completed Operations, the rating variables used in the relativity analysis are as follows:

Manufacturers and Contractors -	type of policy and class group
Owners, Landlords and Tenants -	type of policy, territory and class group
Products -	type of policy and class group
Local Products/Completed Operations-	type of policy, state and class group

EXPLANATORY NOTES TO GENERAL LIABILITY  
RELATIVITY ANALYSIS - TABLES 10 THROUGH 18.

ITERATIVE  
PROCEDURE

The iterative technique referred to in the previous paragraph solves for a set of relativities for each rating variable based on the experience for the cells; that is, based on the experience ratio and latest year adjusted aggregate loss cost volume for each combination of rating variables relative to the experience ratio and adjusted aggregate loss cost volume for all combinations of rating variables combined. Specifically, the iterative procedure uses the following formulas:

For Owners, Landlords and Tenants:

$$TOP_i = \frac{\sum_j \sum_k W_{ijk} r_{ijk}}{\sum_j \sum_k W_{ijk} CG_j TER_k} \quad \text{where } 1 \leq i \leq m$$

$$CG_j = \frac{\sum_i \sum_k W_{ijk} r_{ijk}}{\sum_i \sum_k W_{ijk} TOP_i TER_k} \quad \text{where } 1 \leq j \leq n$$

$$TER_k = \frac{\sum_i \sum_j W_{ijk} r_{ijk}}{\sum_i \sum_j W_{ijk} TOP_i CG_j} \quad \text{where } 1 \leq k \leq p$$

$TOP_i$  is the relative change for the  $i^{th}$  type of policy;

$CG_j$  is the relative change for the  $j^{th}$  class group;

$TER_k$  is the relative change for the  $k^{th}$  territory;

$W_{ijk}$  is the aggregate loss costs at current level for the  $i^{th}$

type of policy,  $j^{th}$  class group and  $k^{th}$  territory;

$r_{ijk}$  is the relative change for the  $i^{th}$  type of policy,

$j^{th}$  class group and  $k^{th}$  territory;

$m$  is the number of types of policy in the analysis;

$n$  is the number of class groups in the analysis;

$p$  is the number of territories in the analysis;

EXPLANATORY NOTES TO GENERAL LIABILITY  
RELATIVITY ANALYSIS - TABLES 10 THROUGH 18.

For Manufacturers and Contractors, and Products:

$$TOP_i = \frac{\sum_j W_{ij} r_{ij}}{\sum_j W_{ij} CG_j} \quad \text{where } 1 \leq i \leq m$$

$$CG_j = \frac{\sum_i W_{ij} r_{ij}}{\sum_i W_{ij} TOP_i} \quad \text{where } 1 \leq j \leq n$$

$TOP_i$  is the relative change for the  $i^{th}$  type of policy;

$CG_j$  is the relative change for the  $j^{th}$  class group;

$W_{ij}$  is the aggregate loss costs at current level for the  $i^{th}$

type of policy and  $j^{th}$  class group;

$r_{ij}$  is the relative change for the  $i^{th}$  type of policy

and  $j^{th}$  class group;

$m$  is the number of types of policy in the analysis;

$n$  is the number of class groups in the analysis;

EXPLANATORY NOTES TO GENERAL LIABILITY  
RELATIVITY ANALYSIS - TABLES 10 THROUGH 18.

For Local Products/Completed Operations:

$$TOP_i = \frac{\sum_j \sum_k W_{ijk} r_{ijk}}{\sum_j \sum_k W_{ijk} CG_j ST_k} \quad \text{where } 1 \leq i \leq m$$

$$CG_j = \frac{\sum_i \sum_k W_{ijk} r_{ijk}}{\sum_i \sum_k W_{ijk} TOP_i ST_k} \quad \text{where } 1 \leq j \leq n$$

$$ST_k = \frac{\sum_i \sum_j W_{ijk} r_{ijk}}{\sum_i \sum_j W_{ijk} TOP_i CG_j} \quad \text{where } 1 \leq k \leq p$$

$TOP_i$  is the relative change for the  $i^{\text{th}}$  type of policy;

$CG_j$  is the relative change for the  $j^{\text{th}}$  class group;

$ST_k$  is the relative change for the  $k^{\text{th}}$  state;

$W_{ijk}$  is the aggregate loss costs at current level for the  $i^{\text{th}}$

type of policy,  $j^{\text{th}}$  class group and  $k^{\text{th}}$  state;

$r_{ijk}$  is the relative change for the  $i^{\text{th}}$  type of policy,

$j^{\text{th}}$  class group and  $k^{\text{th}}$  state;

$m$  is the number of types of policy in the analysis;

$n$  is the number of class groups in the analysis;

$p$  is the number of states in the analysis;

EXPLANATORY NOTES TO GENERAL LIABILITY  
RELATIVITY ANALYSIS - TABLES 10 THROUGH 18.

ITERATIVE  
PROCEDURE  
(Cont'd)

For example, for Owners, Landlords and Tenants, the procedure starts by inserting the actual relativities for type of policy and class group into the third formula to get a territory relativity. This result is then used with the class group relativity in the first formula to get a new type of policy relativity, which in turn is substituted along with the territory relativity into the second formula to get a new class group relativity. The process continues on in that fashion until there is no appreciable difference from one iteration to the next.

APPLICATION OF  
CREDIBILITY

Consideration is then given to the credibility of the experience for each rating variable. The credibility of each of these categories is based on the formula  $Z = \sqrt{P/18,000}$  for Owners, Landlords and Tenants,  $Z = \sqrt{P/18,000}$  for Manufacturers and Contractors and  $Z = \sqrt{P/20,000}$  for Products, where P is the 5 year occurrence total for a given class group, territory or type of policy. For Local Products/Completed Operations, separate formulas are used to calculate the credibility of the experience for each type of policy and class group versus the credibility of the experience for each state, namely  $Z = \sqrt{P/15,000}$  for type of policy and class group, and  $Z = \sqrt{P/5,500}$  for state (in this case, P is the 5 year occurrence total for a given state). Credibility-weighted relativities are then calculated as follows:

$$W = R^Z \quad \text{where:}$$

Z is the class group, territory, state or type of policy credibility;

R is the class group, territory, state or type of policy relativity;

W is the credibility-weighted relativity.

The resulting credibility-weighted relativities are then balanced to assure that the average relativity remains at unity.



EXPLANATORY NOTES TO GENERAL LIABILITY  
RELATIVITY ANALYSIS - TABLES 10 THROUGH 18.

MULTILINE  
CONSIDERATIONS

The monoline relativities and the class group, territory (if applicable) and state relativities which result from the aforementioned procedures are then used to generate indicated monoline classification loss cost changes. The multiline relativities are used to generate multiline indications that apply to the current Implicit Package Modification Factors. The indicated IPMFs are calculated as follows:

$$\text{TOP y indicated IPMF} = \frac{(\text{TOP y current IPMF}) \times (\text{TOP y relativity})}{(\text{monoline relativity})}$$

For each CPP Type of Policy the indicated IPMF is subject to a minimum value of 0.50 and a maximum value of 1.50. If an indicated IPMF falls outside one of those limits, it is capped at that amount, the aggregate loss costs for that Type of Policy are adjusted to the capped IPMF level, and the entire relativity review as described above is re-performed to take this into account.

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COMMERCIAL PACKAGE POLICY

TABLE OF CONTENTS

SECTION C - REVISED CLM DIVISION NINE

Commercial Package Policy Package Modification Factors (Revised MLCP-PMF-1) ..... C-2

COMMERCIAL LINES MANUAL  
DIVISION NINE – MULTIPLE LINE  
COMMERCIAL PACKAGE POLICY  
PACKAGE MODIFICATION FACTORS

MICHIGAN (21)

**PACKAGE MODIFICATION FACTORS**

<b>Package Modification Assignment (PMA)</b>	<b>Premium From CLM Division</b>			
	<b>Two</b>	<b>Three, Four, Five, Eight Property</b>	<b>Four, Six Liability</b>	<b>All Other Divisions</b>
Apartment House	.90	.90	.98	1.00
Contractors	.90	.95	.95	1.00
Industrial & Processing	.90	.93	.84	1.00
Institutional	.90	.95	.94	1.00
Mercantile	.90	1.00	1.00	1.00
Motel/Hotel	.90	.98	.91	1.00
Office	.90	.96	.96	1.00
Service	.90	1.00	1.00	1.00

**Table 1. Package Modification Factors**