

RULES – IMPLEMENTATION

SEPTEMBER 9, 2024

COMMERCIAL PROPERTY

LI-CF-2024-116

MONTANA REVISION AND EXPANSION OF DEDUCTIBLE INSURANCE PLAN – RULE 81. AND WINDSTORM OR HAIL PERCENTAGE DEDUCTIBLES – RULE 82. TO BE IMPLEMENTED

KEY MESSAGE

This circular announces implementation of Commercial Property rules filing [CF-2024-RDED1](#) in Montana.

ISO ACTION

We are implementing rules filing CF-2024-RDED1 which makes the following revisions:

- Rule **81.** is revised to reflect revised flat dollar deductible factors for Basic Group I, Basic Group II and Special Causes of Loss in Table 81.E.4. The amount of insurance groupings are revised, and the deductible factors are newly supported up to \$1,000,000.
- Rule **82.** is revised to reflect revised Basic Group II windstorm or hail percentage deductible factors in Table 82.D., and the amount of insurance groupings are revised to match the revisions to the flat dollar deductible groupings.

Refer to the attached explanatory material for complete details about the filing.

For more information on the status of filings in a particular state, including filed and approved documents, associated circulars and links to Print Ready Manuals and Commercial Lines Manual, please feel free to access our [Filings](#) feature within the ISOnet Circulars product.

EFFECTIVE DATE

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

These changes are applicable to all policies written on or after February 1, 2025.

IMPACT ON STATISTICAL REPORTING

ISO will introduce statistical reporting codes for the \$150,000 deductible which is supported under the new rule. All other supported deductible amounts already have statistical coding. A Statistical Plan Holders circular announcing revisions to the deductible codes in the Commercial Statistical Plans will be released to the industry allowing sufficient lead-time to implement any applicable changes.

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.

In all correspondence with the Insurance Department on this revision, you should refer to ISO Filing Number [CF-2024-RDED1](#) and SERFF Tracking Number [ISOF-G134233504](#), 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.

RATING SOFTWARE IMPACT

New attributes being introduced with this revision:

- New, additional factors are being introduced.
- Current factors are being revised.
- A calculation is being revised.

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-2024-016](#) 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.

REVISION DISTRIBUTION

We will issue a Notice to Manualholders with an edition date of 2-25 (or the earliest possible subsequent date), along with any new and/or revised manual pages.

RELATED LOSS COSTS REVISION

We are announcing in a separate circular the implementation of a corresponding loss costs revision, which implements the off-balances from the deductible changes so that implementation is on a revenue-neutral basis. Please refer to the Reference(s) block for identification of that circular.

REFERENCE(S)

- [LI-CF-2024-117](#) (09/09/2024) Montana Commercial Fire And Allied Lines Advisory Prospective Loss Cost Revision To Be Implemented
- [LI-CL-2024-016](#) (03/12/2024) Commercial Lines Revised Lead Time Requirements Listing

ATTACHMENT(S)Filing CF-2024-RDED1

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.

DATA QUALITY

Statistical plan data reported to ISO is first processed through a system of rigorous automated data verification procedures so that only valid data would be used for ratemaking. Subsequent to this initial data submission review, additional analyses on the statistical plan data involving an even more customized data review for this line were performed by staff. During these processes, various data records were excluded from the review. The ISO staff responsible for this circular also reviewed the data for reasonableness.

ACKNOWLEDGMENT OF ACTUARIAL QUALIFICATIONS

The American Academy of Actuaries' "Qualifications 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 rules filing a Statement of Actuarial Opinion; therefore, we are including the following acknowledgment:

I, Arthur DeGraw, am a Senior Actuarial Associate for Commercial Property and Actuary for ISO and I am a member of the American Academy of Actuaries and Casualty Actuarial Society. I, Ron Punnoose, am a Senior Actuarial Analyst for Commercial Property and Actuary for ISO and I am a member of the American Academy of Actuaries and Casualty Actuarial Society. We are jointly responsible for the content of this Statement of Actuarial Opinion and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

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CONTACT INFORMATION

If you have any questions concerning:

- The content of this circular, please contact:
Arthur DeGraw PhD, ACAS, ASA, MAAA
Commercial Property
Arthur.DeGraw@verisk.com
Or
Ron Punnoose ACAS, MAAA
Commercial Property
201-469-2275
Ron.Punnoose@verisk.com
- Other issues for this circular, please contact Customer Support:
E-mail: info@verisk.com
Phone: 800-888-4476

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Revision of Deductible Insurance Plan and Windstorm Or Hail Percentage Deductibles

About This Filing

This filing introduces higher flat deductible amounts and corresponding factors in addition to revising the factors for existing flat deductible amounts. This filing also revises the windstorm or hail percentage deductible factors.

Revised Rules

We are revising the following rules:

- ◆ Rule 81. Deductible Insurance Plan
- ◆ Rule 82. Windstorm or Hail Percentage Deductibles
- ◆ Rating Examples Appendix

We have used a format of ~~striking-through~~ deletions, underlining additions and inserting a revision bar in the left margin to indicate changes.

Related Filing(s)

The following loss cost filing will be a companion to this rules filing with a concurrent effective date and will contain the off balance factors to make this filing revenue neutral:

- ◆ CF-2024-RLA1

Refer to the companion loss cost filing titled Montana Commercial Fire And Allied Lines Advisory Prospective Loss Cost Level Revision.

Explanation of Changes

New State Exceptions

Rule 81. Deductible Insurance Plan

- ◆ Paragraph 81.A. is added to reflect the maximum deductible of \$1,000,000 in lieu of \$75,000.

Revised State Exceptions

Rule 81. Deductible Insurance Plan

- ◆ Table 81.E.4. Factors for Deductible Coverage is being revised to reflect the additional higher flat deductible amounts, updated amount of insurance bands/groupings and updated deductible factors for Basic Group I, Basic Group II and Special Causes of Loss.

Rule 82. Windstorm or Hail Percentage Deductible

- ◆ Table 82.D. Windstorm or Hail Rate Modification Factors is being revised to reflect the updated Basic Group II windstorm or hail percentage deductible factors.

Rating Examples Appendix

- ◆ The rating examples that apply to Rule 81.E.3. are updated to reflect the revised deductible factors.

Rating Impact

The rate impact is being handled by off-balancing the loss costs in the related loss cost filing. The rate impact due to these changes is included in the off-balance section of the actuarial support.

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81. DEDUCTIBLE INSURANCE PLAN

Paragraph A. is replaced by the following:

A. Description Of Plan

This Plan provides a method for writing direct property damage coverages with higher deductibles (\$1,000 minimum – \$1,000,000 maximum) on eligible covered property.

Paragraphs E.2. and E.4. are replaced by the following:

E. Rate Modification

2. Rate Modification

- Multiply the rates contemplating a base deductible of not more than \$500 by the factors in Table 81.E.4. Factors For Deductible Coverage.
- Do not apply the factors to the rates for any form contemplating a base deductible equal to or exceeding the amount of the deductible desired under this Plan.
- When the base deductible amount exceeds \$500, unless otherwise provided, increase the deductible factor from Table 81.E.4. Factors For Deductible Coverage by one half of the difference between 1.00 and the factor.

4. Factors For Deductible Coverage

Total Amount Of Insurance At Each Location	Deductible	Deductible Credit Factors		
		Basic Group I	Basic Group II	Other Causes Of Loss
More than \$250,000	\$1,000	.99	.96	.96
100,001— 250,000		.97	.93	.93
50,001— 100,000		.96	.92	.92
50,000 or Less		.94	.89	.89
More than \$500,000	\$2,500	.96	.89	.89
250,001— 500,000		.93	.82	.82
100,001— 250,000		.90	.79	.79
100,000 or Less		.84	.71	.71
More than \$1,000,000	\$5,000	.95	.84	.84
500,001— 1,000,000		.90	.74	.74
250,001— 500,000		.87	.69	.69
250,000 or Less		.79	.59	.59
More than \$5,000,000	\$10,000	.94	.81	.81
1,000,001— 5,000,000		.89	.69	.69
500,001— 1,000,000		.83	.60	.60
250,001— 500,000		.78	.54	.54
250,000 or Less		.67	.44	.44
More than \$10,000,000	\$25,000	.93	.71	.71
5,000,001— 10,000,000		.87	.60	.60
1,000,001— 5,000,000		.81	.52	.52
500,001— 1,000,000		.71	.42	.42
500,000 or Less		.60	.32	.32
More than \$10,000,000	\$50,000	.90	.60	.60
5,500,001— 10,000,000		.81	.48	.48
3,500,001— 5,500,000		.77	.44	.44
1,000,001— 3,500,000		.72	.39	.39
1,000,000 or Less		.53	.27	.27
More than \$10,000,000	\$75,000	.87	.54	.54
5,500,001— 10,000,000		.77	.42	.42
3,500,001— 5,500,000		.73	.38	.38
1,000,001— 3,500,000		.66	.33	.33
1,000,000 or Less		.50	.25	.25

Total Amount Of Insurance At Each Location	Deductible	Deductible Credit Factors		
		Basic Group I	Basic Group II	Other Causes Of Loss
More than \$500,000	\$ 1,000	0.99	0.99	0.99
\$ 175,001 – 500,000		0.99	0.98	0.98
50,001 – 175,000		0.98	0.98	0.97

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50,000 or Less		0.96	0.96	0.96
More than \$500,000	2,500	0.99	0.97	0.96
\$ 175,001 – 500,000		0.96	0.94	0.92
50,001 – 175,000		0.94	0.91	0.89
50,000 or Less		0.89	0.84	0.84
More than \$1,000,000	5,000	0.98	0.96	0.92
\$ 500,001 – 1,000,000		0.94	0.90	0.87
175,001 – 500,000		0.92	0.87	0.83
175,000 or Less		0.88	0.79	0.77
More than \$2,000,000	10,000	0.96	0.93	0.88
\$ 1,000,001 – 2,000,000		0.93	0.86	0.81
500,001 – 1,000,000		0.90	0.82	0.77
175,001 – 500,000		0.87	0.75	0.71
175,000 or Less		0.81	0.65	0.63
More than \$2,000,000	25,000	0.92	0.86	0.77
\$ 1,000,001 – 2,000,000		0.85	0.72	0.64
500,001 – 1,000,000		0.82	0.64	0.58
175,001 – 500,000		0.76	0.54	0.50
175,000 or Less		0.71	0.44	0.43
More than \$3,500,000	50,000	0.88	0.80	0.68
\$ 2,000,001 – 3,500,000		0.82	0.66	0.55
1,000,001 – 2,000,000		0.77	0.58	0.49
500,001 – 1,000,000		0.72	0.48	0.42
500,000 or Less		0.67	0.39	0.36
More than \$3,500,000	75,000	0.84	0.74	0.60
\$ 2,000,001 – 3,500,000		0.76	0.58	0.47
1,000,001 – 2,000,000		0.72	0.48	0.40
500,001 – 1,000,000		0.66	0.39	0.34
500,000 or Less		0.61	0.30	0.28
More than \$5,500,000	100,000	0.83	0.73	0.58
\$ 3,500,001 – 5,500,000		0.76	0.59	0.47
2,000,001 – 3,500,000		0.72	0.51	0.41
1,000,001 – 2,000,000		0.67	0.42	0.35
1,000,000 or Less		0.61	0.33	0.29
More than \$9,000,000	150,000	0.80	0.72	0.54
\$ 5,500,001 – 9,000,000		0.73	0.58	0.44
3,500,001 – 5,500,000		0.70	0.51	0.39
2,000,001 – 3,500,000		0.65	0.43	0.33
2,000,000 or Less		0.59	0.32	0.26
More than \$9,000,000	250,000	0.73	0.63	0.45
\$ 5,500,001 – 9,000,000		0.65	0.48	0.34
3,500,001 – 5,500,000		0.61	0.40	0.30
2,000,001 – 3,500,000		0.56	0.33	0.25
2,000,000 or Less		0.51	0.25	0.20
More than \$12,500,000	500,000	0.62	0.54	0.35
\$ 9,000,001 – 12,500,000		0.56	0.42	0.27
5,500,001 – 9,000,000		0.52	0.34	0.23
3,500,001 – 5,500,000		0.48	0.28	0.20
3,500,000 or Less		0.45	0.23	0.17
More than \$20,000,000	750,000	0.57	0.52	0.31
\$ 12,500,001 – 20,000,000		0.52	0.42	0.25
9,000,001 – 12,500,000		0.48	0.35	0.21
5,500,001 – 9,000,000		0.44	0.28	0.18
5,500,000 or Less		0.41	0.22	0.15
More than \$20,000,000	1,000,000	0.52	0.47	0.27
\$ 12,500,001 – 20,000,000		0.46	0.37	0.21
9,000,001 – 12,500,000		0.43	0.30	0.18
5,500,001 – 9,000,000		0.39	0.24	0.15
5,500,000 or Less		0.37	0.21	0.14

Table 81.E.4. Factors For Deductible Coverage

82. WINDSTORM OR HAIL PERCENTAGE DEDUCTIBLES

Paragraph D. is replaced by the following:

D. Rate Modification

Multiply the Group II rate by the appropriate factor from Table 82.D. Windstorm Or Hail Rate Modification Factors.

Windstorm Or Hail Rate Modification Factors

Windstorm Or Hail Deductible	Amount Of Insurance At Each Location	Factor
1%	\$ 2,500,001 and Over	.47
	1,000,001 – 2,500,000	.60
	250,001 – 1,000,000	.71
	100,001 – 250,000	.87
	100,000	.93
2%	\$ 2,500,001 and Over	.39
	1,000,001 – 2,500,000	.48
	250,001 – 1,000,000	.58
	100,001 – 250,000	.75
	50,000 – 100,000	.87
5%	\$ 2,500,001 and Over	.31
	1,000,001 – 2,500,000	.37
	250,001 – 1,000,000	.43
	100,001 – 250,000	.56
	20,000 – 100,000	.72

Windstorm Or Hail Deductible	Amount Of Insurance At Each Location	Factor
1 %	\$ 3,500,001 and Over	0.74
	1,000,001 – 3,500,000	0.81
	500,001 – 1,000,000	0.87
	175,001 – 500,000	0.91
	100,000 – 175,000	0.96
2	3,500,001 and Over	0.63
	1,000,001 – 3,500,000	0.70
	500,001 – 1,000,000	0.77
	175,001 – 500,000	0.84
	50,000 – 175,000	0.91
5	3,500,001 and Over	0.47
	1,000,001 – 3,500,000	0.53
	500,001 – 1,000,000	0.60
	175,001 – 500,000	0.68
	50,001 – 175,000	0.79
	20,000 – 50,000	0.92

Table 82.D. Windstorm Or Hail Rate Modification Factors

No further modification should be made to the Group II rate for deductible purposes, regardless of any deductible applicable to Group II causes of loss other than Windstorm or Hail.

RATING EXAMPLES APPENDIX

The following rating examples apply to Rule **81.E.3.**:

1. Example #1. Specific Insurance

Assume **CP 10 30** Causes Of Loss – Special Form (Including Theft) applies to all covered property at all locations.

Location #1. (A Mercantile Risk)

Building Limit	=	\$150,000
Your Business Personal		
Property Limit	=	15,000
Stock Limit	=	<u>35,000</u>
Total Limit for Location #1.	=	\$200,000

If a Deductible of \$2,500 is desired for all covered causes of loss, modify the rates applicable to Location #1. by the following factors:

Basic Group I	– Use a factor of	<u>.990.96</u>
Basic Group II	– Use a factor of	<u>.790.94</u>
Special Form	– Use a factor of	<u>.790.92</u>

Location #2. (An Office Risk)

Building Limit	=	\$500,000
Your Business Personal		
Property Limit	=	75,000
Personal Property of		
Others Limit	=	10,000
Tenants Improvements		
and Betterments	=	<u>25,000</u>
Total Limit for Location #2.	=	\$610,000

If a Deductible of \$2,500 is desired for Theft and \$1,000 for all remaining covered causes of loss, modify the rates applicable to Location #2. by the following factors:

Basic Group I	– Use a factor of	<u>.990.99</u>
Basic Group II	– Use a factor of	<u>.960.99</u>
Special Form	– Use a factor of	<u>.890.96</u>

Location #3. (A Mercantile Risk)

Building Limit	=	\$250,000
Your Business Personal		
Property Limit	=	85,000
Personal Property of		
Others Limit	=	<u>15,000</u>
Total Limit for Location #3.	=	\$350,000

If a Deductible of \$5,000 is desired for Windstorm or Hail, \$2,500 for Theft, and the standard deductible of \$500 is to apply to all remaining covered causes of loss, modify the rates applicable to Location #3. by the following factors:

Basic Group I	– No factor applies	
Basic Group II	– Use a factor of	<u>.690.87</u>
Special Form	– Use a factor of	<u>.820.92</u>

2. Example #2. Blanket Insurance

Assume all property (both building and contents) is written on a blanket basis and the sum of the 100% values of the property at each location is:

Location #1.	
(Industrial Occupancy)	– \$1,500,000
Location #2.	
(Mercantile Occupancy)	– \$450,000

Form **CP 10 30** applies to all covered property at these locations.

- a. If a \$5,000 deductible is applicable to all causes of loss, multiply the 80% coinsurance rates by the following factors:

Location #1.

Basic Group I	– Use a factor of <u>.950.98</u>
Basic Group II	– Use a factor of <u>.840.96</u>
Special Form	– Use a factor of <u>.840.92</u>

Location #2.

Basic Group I	– Use a factor of <u>.870.92</u>
Basic Group II	– Use a factor of <u>.690.87</u>
Special Form	– Use a factor of <u>.690.83</u>

- b. If a \$5,000 deductible is applicable to Windstorm or Hail, \$2,500 Deductible applicable to Theft and \$1,000 for all remaining causes of loss, multiply the 80% coinsurance rate by the following factors:

Location #1.

Basic Group I	– Use a factor of <u>.990.99</u>
Basic Group II	– Use a factor of <u>.840.96</u>
Special Form	– Use a factor of <u>.890.96</u>

Location #2.

Basic Group I	– Use a factor of <u>.990.99</u>
Basic Group II	– Use a factor of <u>.690.87</u>
Special Form	– Use a factor of <u>.820.92</u>

Basic Group I, Basic Group II, and Special Causes of Loss Deductible Factors Revisions

OVERVIEW OF DEDUCTIBLE FACTORS

The current Commercial Property deductible factors contained in Rules 81 and 82 are segmented by Subline, Region (where applicable) and Amount of Insurance bands. The purpose of this analysis is to update the existing deductible factors and provide factors for an expanded list of deductibles and Amounts of Insurance.

Using ten years of ratemaking filtered loss data ending 6/30/2022 and evaluated as of 9/30/2022, empirical deductible factors are determined via estimation of the survival function $S(x)=1-CDF(x)$. Use of the survival function, as described below, helps to reduce upward bias due to left truncated loss data at the various deductible amounts. The factors are then smoothed for each Subline and Region across deductible and Amount of Insurance, and grouped by Amount of Insurance band groups.

The flattening of the resulting deductible factors to account for fixed general expenses has not been considered within this analysis.

EXPERIENCE INCLUDED

The review of deductible factors used ten years of Multistate & D.C. ratemaking filtered data ending 6/30/2022, evaluated as of 9/30/2022 for Basic Group I, Basic Group II and Special Causes of Loss. For consistency with Commercial Fire and Allied Lines experience level reviews, the following experience was excluded from the analysis: Non-voluntary, Dwelling, Farm, countrywide rated risks, highly protected risks, policies with deductibles in excess of \$75,000.

LOSS ADJUSTMENTS / AGGREGATIONS

Transactional records were aggregated into occurrence level records. Deductible amount was added to obtain a ground-up loss which was then trended. Since when using the ISO deductible forms the deductible extends the limit, the deductible was also added to the Amount of Insurance (AOI) for a ground-up exposure reflecting the exposure layer from deductible to deductible + AOI. The ground-up losses were then grouped by deductible + AOI into AOI bands.

For example, if the Amount of Insurance is \$10,000,000, and the deductible is \$1,000,000, then the maximum possible loss for that coverage is \$10,000,000, not \$9,000,000. As such, the exposure amounts used at this point, as well as the final factors shown, have been adjusted so that the Amount of Insurance is shifted upward by the deductible amount.

Basic Group II was separated by region, Southeast vs non-Southeast.

CONSTRUCTION
 OF THE
 EMPIRICAL
 SURVIVAL
 DISTRIBUTIONS

The construction of the empirical survival distributions is based on the Product-Limit Estimator described in Loss Models: From Data to Decisions¹.

Losses and exposure amounts are aggregated to an occurrence level and trended to 6/1/2025 with trend information through 6/30/2023. Losses are then segmented into AOI bands based on the trended exposure and further into Subline and Region where applicable - South-East vs Non-South-East states for Basic Group II only. Because exposure is a necessary variable, data was excluded where the exposure amount was unavailable on the reported loss record.

A survival function using the Product-Limit Estimator is constructed for each AOI, Subline, & Region combination. Construction of the survival function is a two step process:

1. Compute the conditional survival probabilities. The probability that an occurrence exceeds the upper bound of a discrete loss layer given that it exceeds the lower bound of the layer is known as the conditional survival probability (CSP).
2. Compute the (unconditional) survival probabilities. The ground-up survival distribution is generated by multiplying the successive CSPs of the discrete layers.

This procedure allows for the inclusion of left truncated losses. Note that only those occurrences with deductibles less than or equal to the lower bound of the layer of loss are included in the calculation of the conditional survival probability in a particular layer of loss. This condition is necessary to avoid an upward severity bias since loss information below the deductible is unknown. It is assumed that insureds' losses are independent of deductible and only vary with AOI.

ILLUSTRATION

An illustration should aid in the conceptual understanding of this construction. Assume there are five occurrence level losses shown in the following table.

Illustrative Data		
i	Ground-Up Loss	Deductible
1	100	0
2	100	50
3	250	50
4	500	200
5	1000	400

An important note is that if one considers a loss of size 100, there are only three losses with deductibles less than 100, the other observations are left censored at values larger than 100.

Let $t_1 < t_2 < \dots < t_n$ be the distinct observed loss amounts, d_i the observed loss count at t_i and n_i the number of losses “alive” at t_i , ie the number of losses with deductible less than t_i .

¹ Klugman, S. A., H.H. Panjer, and G. E. Willmot, *Loss Models: From Data to Decisions*, John Wiley and Sons, New York, 2004

t_i	Interval	d_i	n_i	Observations Included	Conditional Survival Probability $1-d_i/n_i$	Survival Probability $S(t_i)$
0	[0,100)	n/a	n/a	n/a	1.000	1.000
100	[100,250)	2	3	1,2,3	0.333	0.333
250	[250,500)	1	2	3,4	0.500	0.167
500	[500,1000)	1	2	4,5	0.500	0.083
1000	1000+	1	1	5	0.000	0.000

Define the Conditional Survival Probability for loss X at x given survival to y as

$$CSP(x | y) = P(X > x | X > y) = 1 - P(X \leq x | X > y) = 1 - d_i / n_i$$

where we consider only loss amounts with deductible less than or equal to x . The resulting survival function S is defined as:

$$S(x) = \prod_{t_{i+1} \leq x} CSP(t_{i+1} | t_i)$$

For example, to determine $CSP(100 | 0)$ we would only consider losses $i=1,2,3$ as denoted in the *Observations Included* field (hence $n_i = 3$) as these are the only loss amounts with deductible ≤ 100 and two of these losses ($i=1,2$) do not exceed 100 so $d_i = 2$:

$$CSP(100 | 0) = 1 - 2/3 = 1/3$$

Since $[0,100)$ is the lowest interval $S(100) = 1/3$. With an un-adjusted empirical cdf, the survival would be $S(100) = 3/5$.

In this application for deductible factors, the step-wise survival function is smoothed by linearly interpolating between loss amounts.

SMOOTHING OF DEDUCTIBLE FACTORS

Using the survival function as previously described, for each Subline, Region (where applicable) and AOI band observed deductible factors are determined. Within each AOI band, the mean AOI is determined and used for smoothing.

To smooth observed deductible factors, a logistic function of deductible and mean AOI for each AOI band was used. The implemented logistic functions can be described as

$$d(aoi, ded) \rightarrow \frac{1}{1 + \exp(a_0 + a_1 \ln(ded) \ln(aoi) + a_2 \ln(aoi) + a_3 \ln(ded))}$$

with coefficients determined by minimizing the sum squared error between the observed deductible factors and d . The aoi denoted in function d is adjusted to compensate for the deductible extending the policy limit. The monotonicity of the function $d(aoi, ded)$ in each aoi and ded variable was verified once coefficient values were determined.

SELECTION OF
AOI BAND
GROUPINGS

Deductible factors have been smoothed from observed factors for 29 AOI bands. The current deductible factor table presents four/five AOI ranges depending on whether the deductible is below/at or above 10,000 respectively, groupings do not vary by Subline or Region.

Selecting Number of Groups:

All possible consecutive groupings of AOI bands to a maximum of eight groups were considered. For each AOI group, an occurrence count weighted average AOI was used to determine deductible factors via the previously fit logistic function. To compare AOI groupings, an error for a grouping was defined as the total claim count weighted squared difference between the AOI band deductible factors and the AOI group deductible factors. As the number of groups increased the minimum error decreased. The reduction in minimum error exhibited diminishing returns as the number of groups increased. The number of groupings currently used in Rule 81 was found to be appropriate.

Selection of Groups:

AOI band groupings were selected while considering grouping error and consistency of groupings across deductibles.

Tests for consistency of deductible factors by Subline and Region were performed. As the deductible factors are dependent on both deductible and AOI, the tests check that the deductible factors by deductible are decreasing at a decreasing rate for a fixed AOI and by AOI are increasing at a decreasing rate for a fixed deductible. The tests were performed at the AOI band level using first and second partial derivatives of the logistic function $d(aoi, ded)$ and results were found to be reasonable. Additionally, the test was performed on deductible factors for selected AOI groupings, using all selected AOI groupings for each deductible amount, and the results were found to be reasonable.

SELECTION OF
DEDUCTIBLE
FACTORS

After grouping the AOI bands and rounding the resulting factors, the deductible factors for Basic Group II South-East, at deductible amounts \$100,000 and \$150,000 for AOI groupings > \$5.5M and AOI groupings > \$9M respectively were equal. We therefore made a selection to the deductible factors for Basic Group II South-East for deductible \$150,000 and AOI > \$9M to ensure there would be an increase in credit applied for each increase in deductible amount.

BASIC GROUP II
WIND OR HAIL
PERCENTAGE
DEDUCTIBLES

The windstorm or hail percentage deductible factors of Rule 82 were also calculated using the results of the logistic smoothing method. The process was done in three steps. In the first step, the mean of each AOI interval was selected and deductible determined as a percentage of the mean AOI. The second step was to use the Basic Group II logistic functions to calculate deductible factors from the deductible amounts and mean AOI of each interval. Finally, since the windstorm or hail percentage deductibles do not apply to all Basic Group II perils, the credits were adjusted by a factor of 0.9, that is the credit of each deductible factor was reduced by 10%. Deductible factors by AOI range at the 1%, 2% and 5% levels for Basic Group II Southeast and Non-Southeast were determined.

Off-Balance Factors

OVERVIEW OF
OFF-BALANCE
FACTORS

Off-balance factors are used to adjust for changes in revenue due to the revisions of deductible relativities. These off-balance factors are intended to be applied to loss costs at the base deductible level so that there will be no change in overall loss cost level volume as a result of these changes.

The off-balance factors are calculated using data from the latest available year from the Commercial property data used in determining commercial property loss cost indications. This implies that policies with deductible levels in excess of \$75,000 are not considered. Exclusion of higher deductible levels in the calculation is further supported by the fact that they are absent from the current deductible structure. The off-balance factors are then obtained by dividing the earned aggregate loss costs using the current deductible factors by the earned aggregate loss costs using the revised deductible factors.

OFF-BALANCE
FACTORS
APPLICABLE TO
MONTANA

The off-balance factors applicable to Montana are below:

Basic Group I	Basic Group II	Other Causes of Loss
0.977	0.895	0.929

These will be included in the upcoming loss cost filing, so that the otherwise applicable indications are multiplied by each of these factors for each respective subline (Basic Group I, Basic Group II, and Special Causes of Loss).