CASUALTY ACTUARIAL AND STATISTICAL (C) TASK FORCE

Casualty Actuarial and Statistical (C) Task Force March 8, 2022, Minutes
  Casualty Actuarial and Statistical (C) Task Force Feb. 18, 2022, E-Vote Minutes (Attachment One)
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The Casualty Actuarial and Statistical (C) Task Force met March 8, 2022. The following Task Force members participated: Mike Kreidler, Chair, represented by Eric Slavich (WA); Grace Arnold, Vice Chair, represented by Phil Vigliaturo (MN); Jim L. Ridling represented by Daniel Davis (AL); Ricardo Lara represented by Lynne Wehmueller (CA); Michael Conway represented by Mitchell Bronson (CO); Andrew N. Mais represented by Wanchin Chou (CT); Karima M. Woods represented by David Christhilf (DC); David Altmaier represented by Greg Jaynes (FL); Colin M. Hayashida represented by Randy Jacobson (HI); Doug Ommen represented by Travis Grassel (IA); Dana Popish Severinghaus represented by Anthony Bredel and Judy Mottar (IL); Amy L. Beard represented by Larry Steinert (IN); Vicki Schmidt represented by Nicole Boyd (KS); James J. Donelon represented by Nicohle Torbla (LA); Kathleen A. Birrane represented by Walter Dabrowski (MD); Eric A. Cioppa represented by Sandra Darby (ME); Chlora Lindley-Myers represented by Julie Lederer (MO); Troy Downing represented by Mari Kindberg (MT); Mike Causey represented by Rick Cohen (NC); Chris Nicolopoulos represented by Christian Citarella (NH); Russell Toal and Anna Krylova (NM); Barbara D. Richardson represented by Gennady Stolyarov (NV); Judith L. French represented by Tom Botsko (OH); Glen Mulready represented by Kate Yang (OK); Andrew R. Stolfi represented by Michael Humphreys represented by Kevin Clark and Michael McKenney (PA); Raymond G. Farmer represented by Will Davis (SC); Cassie Brown represented by J’ne Byckovski (TX); Michael S. Pieciak represented by Mary Richter (VT); and Allan L. McVey represented by Juanita Wimmer (WV). Also participating was: Gordon Hay (NE).

1. Adopted its Feb. 18, 2022; Feb. 8, 2022; Jan. 24, 2022; Jan. 10, 2022; and 2021 Fall National Meeting Minutes

Mr. Slavich said the Task Force met Feb. 18, 2022; Feb. 8, 2022; Jan. 24, 2022; Jan. 10, 2022; and Dec. 7, 2021. During these meetings, the Task Force took the following action: 1) adopted the 2018/2019 Auto Insurance Database Report (Auto Report); 2) adopted the Dwelling, Fire, Homeowners Owner-Occupied, and Homeowners Tenant and Condominium/Cooperative Unit Owner’s Insurance Report (Homeowners Report); 3) adopted the 2020 Competition Database Report (Competition Report); 4) discussed comments received on Project #2019-49: Retroactive Reinsurance Exception; and 5) discussed comments received on the regulatory review of random forest models proposal.

The Task Force also met Feb. 15 in regulator-to-regulator session, pursuant to paragraph 3 (specific companies, entities or individuals) of the NAIC Policy Statement on Open Meetings, to discuss rate filing issues.

The Task Force held a Predictive Analytics Book Club meeting on Feb. 22. Liam McGrath (Willis Towers Watson—WTW) presented on the evaluation of models built in Emblem.

Mr. Botsko made a motion, seconded by Ms. Darby, to adopt the Task Force’s Feb. 18, 2022 (Attachment One); Feb. 8, 2022 (Attachment Two); Jan. 24, 2022 (Attachment Three); Jan. 10, 2022 (Attachment Four); and Dec. 7, 2021 (see NAIC Proceedings – Fall 2021, Casualty Actuarial and Statistical (C) Task Force) minutes. The motion passed unanimously.

2. Adopted the Report of the Actuarial Opinion (C) Working Group

Ms. Krylova said the Actuarial Opinion (C) Working Group adopted proposed changes to the Property/Casualty (P/C) Statement of Actuarial Opinion (SAO) instructions on March 1 and sent the proposal to the Blanks (E) Working Group. The changes were described during the Task Force’s Feb. 8 meeting.
Ms. Krylova made a motion, seconded by Ms. Lederer, to adopt the Actuarial Opinion (C) Working Group’s report, including its March 1, Feb. 1, and Jan. 18 minutes (Attachment Five). The motion passed unanimously.

3. **Adopted the Report of the Statistical Data (C) Working Group**

Ms. Darby said the Statistical Data (C) Working Group met Jan. 27 to discuss proposed changes to the Competition Report, the Homeowners Report, and the Auto Report. While no structural changes to the reports were adopted at that time, the Working Group voted to collect data for the Homeowners Report on a faster timeline. NAIC staff sent requests to collect 2020 and 2021 data this year to produce two reports and speed up the timeline of the average premium data. The Working Group plans to meet March 10 to look at a similar approach for the Auto Report. The Working Group will focus on updates to the *Statistical Handbook of Data Available to Insurance Regulators* and plans to meet monthly to discuss and adopt any changes that would improve the collection and use of statistical data. As for the 2019 data year reports, the 2019 Homeowners Report is being released to the public on March 10, and the 2018/2019 Auto Report was released Jan. 31.

Ms. Darby made a motion, seconded by Mr. Chou, to adopt the Statistical Data (C) Working Group’s report including its Jan. 27 minutes (Attachment Six). The motion passed unanimously.

4. **Discussed the Next Steps for Project #2019-49: Retroactive Reinsurance Exception**

Mr. Hay recapplied Project #2019-49: Retroactive Reinsurance Exception. Having heard comments from interested parties on Feb. 8, the Task Force discussed three options for next steps: 1) forward the completed work and let the Statutory Accounting Principles (E) Working Group decide any further action. In this option, the Task Force would write a memo describing the issue and summarizing the PowerPoint presentation that was exposed and attach the two comment letters; 2) do option #1 and draft proposed edits to instructions for both Schedule P and paragraphs 36 and 37 in *Statement of Statutory Accounting Principles (SSAP) No. 62R—Property and Casualty Reinsurance*; and 3) do additional research to dig deeper into the issue and consult experts.

Mr. Bredel questioned whether an exception needs to be added to SSAP No. 62R for pooling. To qualify for the existing exception, they need to include equal assets to the reserves ceded for the retrospective portion of the pool. Mr. Hay said the Interpretation (INT) 03-02: Modification to an Existing Intercompany Pooling Arrangement conclusion is that for changes in pool shares, there is a presumption that when pool shares are retroactively moved around, there is an offsetting asset transfer. That then would loop intercompany pools into paragraph 36d of SSAP No. 62R, and no further changes need to be made. Mr. Bredel said with a prospective agreement, the reinsurance ceded premium is known. With a retrospective arrangement, there needs to be premium ceded to offset the nominal, and not discounted, value of the reserves.

Deciding actuarial knowledge is needed to draft Schedule P instructions, the Task Force agreed to move forward with option #2, with the recognition that the Statutory Accounting Principles (E) Working Group may make changes to what the Task Force drafts for SSAP No. 62R if any changes are proposed. A subgroup of volunteers, including Mr. Hay, Mr. Chou, and Robin Marcotte (NAIC), will draft proposed revisions for future Task Force consideration.

5. **Adopted the Regulatory Review of Random Forest Rate Models Document**

Mr. Slavich said during the Feb. 8 meeting, Risk & Regulatory Consulting LLC and Allstate presented their comments about the random forest proposal, and he asked NAIC staff to consider submitted comments and suggest changes to the proposed documents. Sam Kloese (NAIC) presented the proposed revisions.
Mr. Slavich said he would like to have the Task Force adopt the amended document but postpone any decision to officially attach the document to the white paper until the Task Force has created the package of similar documents for other models.

Mr. Stolyarov made a motion, seconded by Ms. Darby, to adopt the random forest models and associated terminology document with non-substantive editing (Attachment Seven). The motion passed unanimously.

6. **Heard a Report About Coordination with the Innovation, Cybersecurity, and Technology (H) Committee and the Special (EX) Committee on Race and Insurance Workstream Three**

Mr. Slavich said he and Mr. Vigliaturo met with commissioner leaders of the Innovation, Cybersecurity, and Technology (H) Committee and Workstream Three of the Special (EX) Committee on Race and Insurance to discuss coordination around potential bias issues in P/C rating. He said this issue may require more of the Task Force’s attention. Cathy O’Neil, who wrote “Weapons of Math Destruction” and has expertise in the societal impacts of big data and algorithms, participated in the discussion.

Mr. Slavich said the discussion focused on possible racial bias in insurance and what state insurance regulators should do when reviewing rates, marketing, claims processing, and risk selection. He said there were six key points he would address: 1) one should start with an idea of which outcomes should be considered. Areas that might be a concern include rating; eligibility, risk selection, and marketing; claims payments (e.g., amounts and promptness); payment plan options; coverage terms; and company assignment; 2) there are algorithms that can take a consumer’s first name, last name, and address and use that information to infer the consumer’s race. This, combined with other insurer information, is one way to evaluate disparate impact; 3) it is known that racial inference algorithms are not perfect; however, the imperfection is at least known directionally, and the degree of racial bias tends to be understated with the algorithms; 4) racial bias, correlation, or disparate impact should not be evaluated as a binary “yes” or “no,” but it should be thought of as a matter of degree. Every rating variable is going to have some amount of correlation with race. The issue is how to come up with a threshold for acceptability and consider insurers relative to other insurers, as well as rating plans relative to other rating plans; 5) a predetermined, tight list of characteristics that make a rating element legitimate should be used; and 6) a rating variable’s correlation with race can be obscured by analyzing it in combination with other rating variables. If one looks at a variable in isolation, it may have a high level of correlation with race. One might then argue that one needs to control for other factors, since these other factors may have distributional differences by race. If one analyzes multiple variables simultaneously, some of the correlation between the subject rating variable and race will appear to go away because more than one variable might be significantly correlated with race. So, it is important to have constraints on what control variables should be included in any analysis looking for racial bias and to not allow the list of control variables to keep growing. Mr. Slavich suggested that a consideration is whether allowing a control variable would tend to perpetuate existing bias.

7. **Heard a Report from the Academy**

The American Academy of Actuaries (Academy) presented a report on its current activities.

Lauren Cavanaugh (Academy) said the Academy’s Casualty Practice Council sent comment letters to the Federal Insurance Office (FIO) regarding the availability and affordability of auto insurance, climate-related insurance, and financial risk in the insurance sector. Other projects include updating the cyber risk toolkit and cyber papers on different issues, including silent cyber, the cyberthreat landscape, cyber risk, accumulation cyber risk, reinsurance ransomware war, and cyber terrorism. A cyber risk resource guide is being drafted.
Draft Pending Adoption

Regarding diversity, equity, and inclusion (DE&I) efforts, Ms. Cavanaugh said the Academy established a Racial Equity Task Force and contributed to efforts with a letter provided to the Colorado Department of Insurance (DOI) on its law in place on unfair discrimination.

Ms. Cavanaugh reported that numerous papers are being drafted and published. Working with the Data Science and Analytics Committee, she said the plan is to publish a causation correlation issue brief this year and a data issue brief on the collection of protected class data. The Extreme Events Committee recently issued a wildfire risk issue paper that will be highlighted in a March 17 webinar. The Committee also plans to publish an Insurance-Linked Security Monograph in the next few months. The Property/Casualty Risk-Based Capital Committee is analyzing workspace capital. The Medical Professional Liability (MPL) Committee recently published an issue brief on the COVID-19 impacts related to MPL. The Workers’ Compensation Committee recently published on the opioid epidemic.

Derek Freihaut (Academy) said the Committee on Property and Liability Financial Reporting (COPLFR) submitted comments to the Blanks (E) Working Group on changes related to the disclosure agreements and losses. The P/C loss reserve opinions seminar was held; the 2021 practice note on opinions for P/C loss reserves and the P/C Loss Reserve Law Manual were both published in December 2021; and the risk transfer practice note is scheduled to be published in the second quarter of 2022 after a review by the certified public accountant (CPA).

8. Discussed Other Matters

Kris DeFrain (NAIC) said she was contacted by Mr. Steinert about the NAIC’s workers’ compensation loss cost multiplier (LCM) forms. The Task Force supported the idea of a drafting group proposing changes to the forms for future Task Force consideration.

Having no further business, the Casualty Actuarial and Statistical (C) Task Force adjourned.
Casualty Actuarial and Statistical (C) Task Force

E-Vote
February 18, 2022

The Casualty Actuarial and Statistical (C) Task Force conducted an e-vote that concluded Feb. 18, 2022. The following Task Force members participated: Mike Kreidler, Chair, represented by Eric Slavich (WA); Jim L. Ridling represented by Daniel Davis (AL); Ricardo Lara represented by Lynne Wehmueller (CA); Michael Conway represented by Mitchell Bronson (CO); Andrew N. Mais represented by Wanchin Chou (CT); Karima M. Woods represented by David Chrishtilf (DC); David Altmaier represented by Christina Huff (FL); Colin M. Hayashida represented by Randy Jacobson (HI); Doug Ommen represented by Travis Grassel (IA); Amy L. Beard represented by Scott Shover (IN); Vicki Schmidt represented by Nicole Boyd (KS); Eric A. Cioppa represented by Sandra Darby (ME); Troy Downing (MT); Mike Causey represented by Kevin Conley (NC); Marlene Caride represented by Carl Sorno (NJ); Russell Toal represented by Anna Krylova (NM); Barbara D. Richardson represented by Gennady Stolyarop (NV); Judith L. French represented by Tom Botso (OH); Glen Mulready represented by Andrew Schallhorn (OK); Andrew R. Stolfi represented by David Dahl (OR); Cassie Brown represented by J’ne Byckovski (TX); Michael S. Pieciak represented by Rosemary Rasza (VT); and Allan L. McVey and Juanita Wimmer (WV).

1. **Adopted the Homeowners Report**

The Task Force conducted an e-vote to consider adoption of the *Dwelling Fire, Homeowners Owner-Occupied, and Homeowners Tenant and Condominium/Cooperative Unit Owner’s Insurance Report* (Homeowners Report). The motion passed unanimously.

Having no further business, the Casualty Actuarial and Statistical (C) Task Force adjourned.

https://naiconline.sharepoint.com/sites/NAICSupportStaffHub/Member%20Meetings/2022%20NAIC%20Meetings/Spring%20National%20Meeting/Committee%20Meetings/PROPERTY%20and%20CASUALTY%20INS%20(C)%20COMMITTEE/Casualty%20Actuarial%20and%20Statistical%20(C)%20TF/02-18%20CASTF%20Evote%20HO%20min.docx
The Casualty Actuarial and Statistical (C) Task Force met Feb. 8, 2022. The following Task Force members participated: Mike Kreidler, Chair, represented by Eric Slavich (WA); Grace Arnold, Vice Chair, represented by Connor Meyer (MN); Jim L. Ridling represented by Daniel Davis (AL); Ricardo Lara represented by Lynne Wehmueller (CA); Michael Conway represented by Mitchell Bronson (CO); Andrew N. Mais represented by Qing He and Wanchin Chou (CT); David Altmairer represented by Greg Jaynes (FL); Colin M. Hayashida represented by Randy Jacobson (HI); Doug Ommen represented by Travis Grassel (IA); Dana Popish Severinghaus represented by Judy Mottar (IL); Amy L. Beard represented by Scott Shover (IN); Vicki Schmidt represented by Nicole Boyd (KS); Michael Conway represented by Mitchell Bronson (CO); Andrew N. Mais represented by Qing He and Wanchin Chou (CT); David Altmairer represented by Greg Jaynes (FL); Colin M. Hayashida represented by Randy Jacobson (HI); Doug Ommen represented by Travis Grassel (IA); Dana Popish Severinghaus represented by Judy Mottar (IL); Amy L. Beard represented by Scott Shover (IN); Vicki Schmidt represented by Nicole Boyd (KS); James J. Donelon represented by Nichole Torbla (LA); Kathleen A. Birrane represented by Ronald Coleman and Walter Dabrowski (MD); Eric A. Cioppa represented by Sandra Darby (ME); Chlora Lindley-Myers represented by Cynthia Amann and Julie Lederer (MO); Troy Downing represented by David Dombrowski (MT); Mike Causey represented by Rick Cohen (NC); Chris Nicolopoulos represented by Christian Citarella (NH); Russell Toal and Anna Krylova (NM); Barbara D. Richardson represented by Gennady Stolyarov (NV); Judith L. French represented by Tom Botsko (OH); Glen Mulready represented by Andrew Schallhorn (OK); Jessica K. Altman represented by Kevin Clark, Michael McKenney, and Dennis Sloan (PA); Cassie Brown represented by Miriam Fisk (TX); and Michael S. Pieciak represented by Rosemary Raszka (VT).

1. **Received a Report on its 2022 Task Force Charges**

Mr. Slavich described the Task Force’s 2022 charges. He said the Task Force will continue assisting other committee groups, as needed; monitor national casualty actuarial developments; hold regulator-only rate filing issues calls; and hold predictive analytic Book Club trainings. He said the two new charges proposed by the Task Force were adopted. Those charges are as follows: “D2. Review the completed work on artificial intelligence (AI) from other committee groups. Coordinate with the Innovation, Cybersecurity, and Technology (H) Committee on the tracking of new uses of AI, auditing algorithms, product development, and other emerging regulatory issues in as far as these issues contain a Task Force component” and “With NAIC staff assistance, discuss guidance for the regulatory review of tree-based models and generalized additive models (GAM) used in rate filings.” Mr. Slavich said the Property and Casualty Insurance (C) Committee adopted the following new charge for the Statistical Data (C) Working Group: “Implement the expedited reporting and publication of average auto and average homeowners premium portions of the annual Auto Insurance Database Report (Auto Report) and Dwelling, Fire, Homeowners Owner-Occupied, and Homeowners Tenant and Condominium/Cooperative Unit Owner’s Insurance Report (Homeowners Report).” Based on the Working Group’s 2021 research findings, the Committee decided to request that the Working Group move forward with implementation.

Mr. Slavich said leadership of the Task Force’s working groups were reappointed. Ms. Krylova is the chair of the Actuarial Opinion (C) Working Group, and Ms. Fisk is the vice chair. Ms. Darby is the chair of the Statistical Data (C) Working Group, and Mr. Chou is the vice chair.

2. **Adopted the Report of the Actuarial Opinion (C) Working Group**

Ms. Krylova said the Actuarial Opinion (C) Working Group is planning to submit a proposal to the Blanks (E) Working Group to change the Property/Casualty (P/C) Statement of Actuarial Opinion (SAO) instructions. She said the plan is to: 1) remove the paragraph about the continuing education (CE) logs, given the related project has concluded; 2) add guidance for situations where the parent board reviews the Appointed Actuary’s qualification...
documentation for all the member companies; and 3) clarify the signature block requirements. The Working Group will meet March 1 to consider adoption of the proposal.

Ms. Krylova made a motion, seconded by Ms. Lederer, to adopt the Actuarial Opinion (C) Working Group’s report. The motion passed unanimously.

3. **Adopted the Report of the Statistical Data (C) Working Group**

Ms. Darby said the Statistical Data (C) Working Group released the Auto Report to the public, and the Homeowners Report is being considered for adoption by the Task Force.

Ms. Darby said the Working Group met to discuss its new charge. The Working Group decided to include the accelerated average premium every year for the Homeowners Report. Ms. Darby said this will result in the production of two reports in 2022 but only one report in subsequent years. Also, due to its data collection requirements, the Homeowners Report for California will include detailed premium and exposure data one year and then summary information the next year. The Working Group will continue to discuss expedited reporting for the Auto Report.

Ms. Darby made a motion, seconded by Mr. Chou, to adopt the Statistical Data (C) Working Group’s report. The motion passed unanimously.

4. **Discussed Project #2019-29: Retroactive Reinsurance Exception**

Two comment letters were received regarding Project #2019-29 (Attachment Two-A). Mr. Chou and Joseph Sieverling (Reinsurance Association of America—RAA) summarized their comments. The Task Force will continue discussing this issue on its March 8 call. Ralph Blanchard (Travelers) said his initial concerns on this issue are related to risk-based capital (RBC) implications. Derek Freihaut (American Academy of Actuaries—Academy) said the Committee on Property and Liability Financial Reporting (COPLFR) discussed the proposal and had no concerns.

5. **Discussed the Regulatory Review of Random Forest Rate Models**

Two comment letters were received regarding Sam Kloese’s (NAIC) proposed glossary entries and information items concerning the regulatory review of random forest models (Attachment Two-B). David Heppen (Risk & Regulatory Consulting LLC) highlighted his comments. Mike Woods (Allstate) said his comments are detailed in nature.

Mr. Slavich said the Task Force needs to decide how to use the documents. He said at a minimum, the documents can be used by the NAIC rate model review team as it reviews random forest models upon states’ requests. Regarding publication, he said the Task Force could post any final product on its website and/or attach the work to the *Regulatory Review of Predictive Models* white paper. He said there would be no plan to modify any already-adopted white paper components but only a plan to attach random forest information to the white paper. Some Task Force members supported the idea to attach the additional glossary words and random forest information items to the already-adopted white paper, so long as the existing white paper is not open for modification. No one expressed opposition.

Mr. Slavich asked NAIC staff to review the comment letters and propose changes for Task Force discussion for its March 8 call.
6. **Discussed Other Matters**

Kris DeFrain (NAIC) said Roberto Perez (NAIC) will be demonstrating the shared model database in early March. Any state insurance regulator can attend.

Having no further business, the Casualty Actuarial and Statistical (C) Task Force adjourned.

https://naiconline.sharepoint.com/sites/NAICSupportStaffHub/Member%20Meetings/2022%20NAIC%20Meetings/Spring%20National%20Meeting/Committee%20Meetings/PROPERTY%20and%20CASUALTY%20INS%20(C)%20COMMITTEE/Casualty%20Actuarial%20and%20Statistical%20(C)%20TF/02-08%20min.docx
To: Kris DeFrain
From: Wanchin Chou, Chief Actuary
Date: January 20, 2022
Subject: Comment on Schedule P Reporting for Retroactive Reinsurance Accounting Exceptions

Thank you for the opportunity to comment on the proposed solutions to the problem of the mismatch between SSAP 62R and the Schedule P instructions as they pertain to the treatment of intercompany reinsurance arrangements.

Slide 18 points out that the Schedule P Instructions for intercompany pooling direct the company to record premiums and losses according to the pooling percentage and to restate the history if a change is made retroactively. SSAP 62R allows recording premiums and losses in this manner only if there is no surplus gain. In general, such pooling agreements result in some change in surplus. We find the current Schedule P instructions allow for valuable information regarding loss development and premium volume changes, and so we support the proposal to add intercompany pooling to the exceptions listed in SSAP 62R, paragraph 36.

Slide 20 points out that Schedule P are silent regarding treatment for the exceptions listed in SSAP 62R, paragraphs 36c and 36d. We support adding Schedule P instructions for the exceptions listed in SSAP62R, paragraphs 36c and 3d, including specifying a method for allocating premium to prior years.

We do not support adding a Schedule P line of business (one of the “Other Possible Actions” listed on slide 22) since this would include a mixture of insurance lines of business and claim ages. Such a mixture would not be useful in monitoring underwriting results.

Resolving the differences between SSAP 62R and Schedule P will make our system of accounting more uniform and transparent and benefit the public as a whole.
Via Electronic Mail

Commissioner Grace Arnold, Chair
Casualty Actuarial and Statistical Task Force
National Association of Insurance Commissioners
1100 Walnut Street, Suite 1500
Kansas City, MO 64106-2197

Ms. Kris DeFrain
Director, Research and Actuarial
National Association of Insurance Commissioners
1100 Walnut Street, Suite 1500
Kansas City, MO 64106-2197

RE: Comments on December 7, 2021 Draft Report on Retroactive Reinsurance Reporting

Dear Commissioner Arnold and Ms. DeFrain:

The Reinsurance Association of America (RAA), headquartered in Washington, D.C., is the leading trade association of property and casualty reinsurers doing business in the United States. The RAA is committed to promoting a regulatory environment that ensures the industry remains globally competitive and financially robust. RAA membership is diverse, including reinsurance underwriters and intermediaries licensed in the U.S. and those that conduct business on a cross border basis.

The RAA appreciates the opportunity to comment on the draft report, Schedule P Reporting for Retroactive Reinsurance Accounting Exceptions (the report), presented to the Casualty Actuarial and Statistical Task Force (CASTF) on December 7, 2021. First, we appreciate the comprehensiveness of the report and congratulate the members of the subgroup and NAIC staff for providing a thorough review of the current accounting and reporting implications of the paragraph 36 exceptions in SSAP No. 62R. Our brief comments have been informed by only one RAA member since the comment period encompassed both the annual reinsurance renewal season and year-end reporting. Nevertheless, we wished to provide these comments now, even though we may have more to add as this project develops.

**Retroactive Reinsurance Exception – Paragraph 36d**

This issue arose at the NAIC because of a diversity in practice that was noted by COPLFR in its May 2019, letter to the CASTF and Statutory Accounting Principles Working Group (SAPWG). In that letter, COPLFR describes two loss portfolio transfer (LPT) reinsurance transactions among affiliates that were reported differently in Schedule P. Company A reported the ceded LPT premium in the current calendar year of Schedule P, while Company G allocated the ceded LPT premium in the current calendar year of Schedule P, while Company G allocated the ceded LPT...
premium to prior years on Schedule P. These transactions were accounted for as prospective reinsurance under the Paragraph 36d. exception of SSAP No. 62R. In RAA’s view, there are two issues to note regarding this situation:

1. We agree with the report (page 20) that under current guidance there will be distortions in Schedule P when applying prospective accounting to retroactive reinsurance.
2. We also agree with the report (page 19) that the Schedule P instructions are clear that ceded premium in the above should be reported in the current calendar year on Schedule P.

Therefore, it appears that Company G simply did not follow the existing Schedule P instructions. Perhaps, this was a permitted practice or alternatively, the Company G concluded that this reporting was “better” because it distorted Schedule P to a lesser degree.

Response to Subgroup Proposal

Regarding the specific proposal in the report on page 20, the RAA does not believe that adding additional instructions to Schedule P for paragraphs 36c and 36d is strictly necessary. There is already specific guidance for the 36d exception, and in general, each of the exceptions listed in SSAP No. 62R already have clear guidance as to how the elements to the transaction should be treated in the financial statements; as premiums, losses, etc. Further, there already is clear guidance as to how to treat premiums or losses on Schedule P. For example – if consideration is treated as premium, one should follow the guidance on Sch P for Premiums, which currently does not provide for allocation of premium to related AY.

This does not solve the original and ongoing issue of distortions in the Schedule P data. These issues are not new and have existed for a very long time. It seems to us that in order to address that issue, a very comprehensive review of Schedule P reporting guidance may be necessary. For example, if allocating premium is viewed as preferable to the current guidance, then the current guidance on Schedule P should provide for the allocation of premium to AY for all items that can vary (other examples include reinstatement premium adjustments; audit premiums; retrospective rating provisions), and any such change should apply to direct, assumed and ceded premiums. This is a broader issue than retroactive reinsurance. The guidance, if provided, may list retroactive as one of the areas that might cause need for allocation of material amounts, but should not be the only type of transaction considered.

Thank you for the opportunity to provide these comments. We look forward to continued discussion of these issues at future meetings.

Sincerely,

Joseph B. Sieverling
Senior Vice President
February 4, 2022

Kris DeFrain, FCAS, MAAA, CPCU
Director, Research and Actuarial Services
National Association of Insurance Commissioners Central Office

Re: Best Practices for Regulatory Review of Random Forests

Dear Ms. DeFrain,

Thank you for the opportunity to comment on changes to the white paper “Regulatory Review of Predictive Models” that will address Random Forest models.

Below are suggested revisions to the white paper. Revisions are shown in blue font.

Section A.3.d

<table>
<thead>
<tr>
<th>Section</th>
<th>Information Element</th>
<th>Level of Importance</th>
<th>Comments</th>
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</table>
| A.3.d   | Determine how missing data was handled. | 1 | This is most relevant for variables that have been “scrubbed” or adjusted. The regulator should be aware of assumptions the modeler made in handling missing, null, or “not available” values in the data.

For example, it would be helpful to the reviewer if the modeler were to provide a statement as to whether there is any systemic reason for missing data. If adjustments or recoding of values were made, they should be explained. It may also be useful to the regulator if the percentage of exposures and premium for missing information from the model data are provided. This data can be displayed in either graphical or tabular formats.

The modeler should describe the way the tree fitting process handled missing values. The modeler should specify if missing values are treated before running the tree model or if they are allowed to be handled by the tree model.

When creating predictions on new datasets (such as hold out datasets), tree-based models may have different approaches for handling missing data or categorical levels not encountered in the

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training data for a predictor variable. The modeler should specify the process utilized when this occurs.

Comments: We suggest revising section A.3.d to expand the commentary on situations where the handling of missing value may be relevant.

Section B.1.h

<table>
<thead>
<tr>
<th>Section</th>
<th>Information Element</th>
<th>Level of Importance</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>B.1.h</td>
<td>In conjunction with variable selection, obtain a narrative on how the company determined the granularity of the rating variables during model development.</td>
<td>3</td>
<td>The narrative should include discussion of how credibility was considered in the process of determining the level of granularity of the variables selected. Minimum data volume constraints can be applied to a tree-based model, such that the trees will not create a split that would result in terminal nodes with volume below a set amount. The modeler should comment on how the threshold was chosen.</td>
</tr>
<tr>
<td>B.1.j</td>
<td>If adjustments to the model were made based on credibility considerations, obtain an explanation of the credibility considerations and how the adjustments were applied.</td>
<td>2</td>
<td>If there was no minimum data volume threshold applied to the trees, or if the threshold was very small, obtain an explanation of any post modeling adjustments the modeler made to address the credibility considerations and how the adjustments were applied.</td>
</tr>
<tr>
<td>New B.3.4</td>
<td>Obtain parameters that determined the volume of data in each tree node and a narrative of how parameters were chosen.</td>
<td>1</td>
<td>Minimum data volume constraints can be applied to a tree-based model, such that the trees will not create a split that would result in terminal nodes with volume below a set amount. The modeler should comment on how the threshold was chosen. If there was no minimum data volume threshold applied to the trees, or if the threshold was exceedingly small, obtain an explanation of any post modeling adjustments the modeler made to address the credibility considerations and how the adjustments were applied.</td>
</tr>
</tbody>
</table>
C.4.a

Determine what, if any, consideration was given to the credibility of the output data.

2

The regulator should determine at what level of granularity credibility is applied. If modeling was by coverage, by-form, or by-peril, the company should explain how these were handled when there was not enough credible data by coverage, form, or peril to model. The company should comment on the minimum data volume requirement at each node before splitting.

Comments:

We recommend that the comment on “minimum data volume” be removed from B.1.h and create a new section B.3.4 requesting that the minimum data volume in a leaf be provided as a level 1 request due to the basic nature of this information.

We also recommend removing section B.1.j and adding the commentary of B.1.j to the newly created B.3.4 section on the minimum data volume hyperparameter.

C.4.a contains discussion of data volume and we believe commentary on data volume can be removed from C.4.a since it is discussed in other sections.

### Section B.3.a

<table>
<thead>
<tr>
<th>Section</th>
<th>Information Element</th>
<th>Level of Importance</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.3.a</td>
<td>Obtain a complete data dictionary, including the names, types, definitions, and rationales for each variable.</td>
<td>1</td>
<td>Types of variables might be continuous, discrete, Boolean, etc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tree based models do not have offset or control variables, as all variables are treated the same way in the trees.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Identify any variable used as an offset or control in the random forest model and the offset factor that was applied for each level of the offset variable.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>For any variable(s) intended to function as a control or offset, obtain an explanation of its purpose and impact. Also, for any use of interaction between variables, obtain an explanation of its rationale and impact.</td>
</tr>
</tbody>
</table>

Comments:

Offsets and control variables can apply to tree-based models. Offsets may be applied to the starting prediction for a given record before a tree-based model is built. With proper
treatment, control variables can also exist in tree-based models if there are variables used in the model building process that are not part of the final rating plan.

**Section B.3.d**

<table>
<thead>
<tr>
<th>Section</th>
<th>Information Element</th>
<th>Level of Importance</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.3.d</td>
<td>Obtain plots describing the relationship between each predictor variable and the target variable. Obtain a rational explanation for why an increase in the observed relationship between each predictor variable should increase or decrease and the target variable (frequency, severity, loss costs, expenses, or any element or characteristic being predicted).</td>
<td>1</td>
<td>Partial dependence plots, accumulated local effects plots, or shapley plots will help improve model interpretability. The plots should be accompanied by commentary on why the visualized relationship is may be reasonable for variables of concern. Considering possible causation may be relevant, but proving causation is neither practical nor expected. If no rational explanation can be provided, greater scrutiny may be appropriate. For example, the regulator should look for unfamiliar predictor variables and, if found, the regulator should seek to understand the connection relationship that variable has to increasing or decreasing the target variable. The regulator should also consider that interpretability plots for tree-based models need to be reviewed with other considerations in mind. For example, partial dependence calculations assume independence with other variables in the model.</td>
</tr>
</tbody>
</table>

**Comments:**

We suggest removing the request that every plot be accompanied by commentary in the initial filing. Given that a loss model is built for each loss type and each model will contain tens of variables, this would require commentary on several hundred plots. We believe that asking for commentary on plots related to variables of concern would be more appropriate.

We also suggest adding some commentary to illustrate that each type of interpretability plot is imperfect and no plot should be completely relied upon.
### Section B.3.f

<table>
<thead>
<tr>
<th>Section</th>
<th>Information Element</th>
<th>Level of Importance</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.3.f</td>
<td>Obtain variable importance plots. Obtain a description of how variable importance was calculated.</td>
<td>1</td>
<td>Variable Importance Plots for tree-based methods highlight which variables contributed most to the model. There are multiple ways to calculate variable importance, and variable importance can be used to create an intuitive understanding of model operation. Variables with the lowest importance measures should be prioritized when reviewing predictor variables for significance. Credibility can be addressed through proper hyperparameter selection. Variables with highest importance should be prioritized when reviewing the model for appropriateness. Variables with lower importance may be evaluated objectively through their correlation with other variables in the model, and subjectively through how they may be interacting with other variables in the model to identify a subset of risks.</td>
</tr>
</tbody>
</table>

**Comments:**

We recommend changing the focus on low importance variables. In tree-based models, carefully selected hyperparameters should prevent the model from splitting erroneously on non-credible variables. For example, the minimum leaf count or minimum improvement threshold for a split should demonstrate sufficient credibility for the segment being identified. This commentary may erroneously guide a model reviewer to request the removal of a variable that demonstrates material signal through complex interactions with other variables.

### Section B.4.e

<table>
<thead>
<tr>
<th>Section</th>
<th>Information Element</th>
<th>Level of Importance</th>
<th>Comments</th>
</tr>
</thead>
</table>
| B.4.e   | Obtain evidence that the model fits the training data well and for                 | 2                  | The regulator should ask for the company to provide exhibits or plots that show the fitted average makes sense when compared to the observed average for variables of interest. Regulators would ideally review this comparison for every variable, but time constraints may }
the overall model.

limit the focus to just variables of interest. Variables of interest should include those with a low importance measure according to diagnostic tests, variables without an intuitive relationship to loss, or variables that may be a proxy for a protected class attribute. Variables of interest should include those with a high or medium importance measure according to diagnostic tests. Variables with low importance or without an intuitive relationship to loss may be evaluated objectively through their correlation with other variables in the model, and subjectively through how they may be interacting with other variables in the model to identify a subset of risks.

Comments:

We recommend changing the focus from variables with low importance to variables of high and medium importance. Variables of low importance provide low predictive power to the model and are therefore only mildly affecting any segment. Variables with low importance may only be meaningful in the tails of their distribution, and goodness of fit for most of the variable's range may be immaterial. Variables with lower importance may be better evaluated objectively through their correlation with other variables in the model, and subjectively through how they may be interacting with other variables in the model to identify a subset of risks.

Section B.4.h

<table>
<thead>
<tr>
<th>Section</th>
<th>Information Element</th>
<th>Level of Importance</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.4.h</td>
<td>Obtain a narrative on how potential concerns with overfitting were addressed.</td>
<td>2</td>
<td>Tree based models such as Random Forest models are notorious for over-fitting. The company should provide a narrative on how overfitting was addressed. The company should provide lift charts on training data and testing data that is separate from the training data.</td>
</tr>
<tr>
<td>New B.3.5</td>
<td>Obtain a narrative of the process to select all hyperparameters for the Random Forest. Detail how this process addressed potential</td>
<td>2</td>
<td>Hyperparameter tuning can be done in a variety of ways. The rigor of the tuning process should reflect the risk of overfitting on the specific dataset.</td>
</tr>
</tbody>
</table>
Comments:
Overfitting in tree-based models should be addressed through the hyperparameter selection process. We recommend that B.4.h request only a one-way lift chart against holdout data to demonstrate that the model is not overfit, and that an additional section B.3.5 be added to request a narrative of the hyperparameter tuning process and how this has addressed overfitting.

Section B.4.j

<table>
<thead>
<tr>
<th>Section</th>
<th>Information Element</th>
<th>Level of Importance</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.4.j</td>
<td>Obtain 5-10 sample records with corresponding output from the model for those records.</td>
<td>2 4</td>
<td>The company should provide 5-10 sample records with corresponding input variable values, the prediction from each component tree in the model, and the final ensemble model prediction. The company should describe how the final model prediction aggregates the individual tree model predictions.</td>
</tr>
</tbody>
</table>

Comments:
We suggest changing the level of importance of this item to level 4. A narrative describing how the predictions of each tree are combined for a final model prediction is essential information and is already requested in section B.2.e. However, we do not feel the request for sample records and sample calculations is part of a normal model review unless there are concerns about the model.

Section C.10.d
C.10.d | Obtain complete documentation of all component trees and how the individual predictions are aggregated together into a final prediction. | 14 | The company should provide either tree diagrams for each component tree or comprehensive if-else statements that would replicate the logic of the trees. The company should state how the individual component tree predictions are combined into a final prediction.

Comments:

We suggest changing the level of importance of this item to level 4. We do not feel the request for each tree is part of a regular model review unless there are concerns about the model. Tree diagrams are also of limited usefulness by a reviewer since there are generally hundreds of trees in one model and it is unlikely that a reviewer would have the time to review each tree.

General Comments

We recommend additional commentary to clarify that this guidance is for Random Forests and may not be appropriate for all other types of tree-based models. For example, while examining individual trees for a Random Forest may be enlightening, examining individual trees for a Gradient Boosting Machine (GBM) is much less intuitive as each tree’s interpretation depends on the results of the possibly substantial number of trees before it. Other such differences exist and are out of scope for this commentary. We also recommend that the committee provide additional guidance specific to other types of tree-based models such as GBMs to avoid potential misapplication of this guidance on other tree-based models.

Once again, thank you for the opportunity to comment.

Allstate Property & Casualty Actuarial Modeling Department

For any questions, please contact:

Mike Woods, FCAS, CSPA, MAAA
Allstate Insurance Company
mike.woods@allstate.com


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Hi Kris,

We wanted to provide you with the following comments on this exposure:

1. We thought the additional guidance on Random Forests was very well done, and we particularly thought items B.3.1-B.3.3, B.3.f, B.4.h, and B.4.k were helpful.

2. Regarding item B.2.a, we suggest adding guidance along the lines below:
   The narrative should include a description of each hyperparameter, document the values of the hyper parameters, specify the implication of using a higher or lower value for each hyper parameter, and discuss any sensitivity testing completed on the hyper parameters and observations from the sensitivity analysis.

3. Regarding consistency between the Appendix and the glossary, “pruning” is defined in the glossary but does not appear to be covered in the Appendix. We believe this term would fit well with B.4.h on overfitting; this could be accomplished with language along the lines below:
   If pruning was utilized to address overfitting, the narrative should provide commentary on the pruning process.

Thank you for the opportunity to comment on this!

Thanks,

Dave

David Heppen, FCAS, MAAA
Partner
Risk & Regulatory Consulting, LLC
20 Batterson Park Road / Suite 380 / Farmington, CT 06032
D: 610.247.8019 I E: dave.heppen@riskreg.com
Casualty Actuarial and Statistical (C) Task Force
E-Vote
January 24, 2022

The Casualty Actuarial and Statistical (C) Task Force conducted an e-vote that concluded Jan. 24, 2022. The following Task Force members participated: Mike Kreidler, Chair, represented by Eric Slavich (WA); Grace Arnold, Vice Chair, represented by Phil Vigliaturo (MN); Michael Conway represented by Mitchell Bronson (CO); Andrew N. Mais represented by Wanchin Chou (CT); Karima M. Woods represented by David Christhilf (DC); David Altmaier represented by Christina Huff (FL); Colin M. Hayashida represented by Randy Jacobson (HI); Dana Popish Severinghaus represented by Judy Mottar (IL); Vicki Schmidt represented by Nicole Boyd (KS); Eric A. Cioppa represented by Sandra Darby (ME); Chlora Lindley-Myers and Cynthia Amann (MO); Troy Downing represented by Mari Kindberg (MT); Marlene Caride represented by Carl Sornson (NJ); Russell Toal represented by Anna Krylova (NM); Judith L. French represented by Tom Botsko (OH); Andrew R. Stolfi represented by David Dahl (OR); Cassie Brown represented by J’ne Byckovski (TX); Michael S. Pieciak represented by Rosemary Raszka (VT); and Allan L. McVey and Juanita Wimmer (WV).

1. **Adopted the Competition Report**

The Task Force conducted an e-vote to consider adoption of the 2020 *Competition Database Report* (Competition Report). The motion passed unanimously.

Having no further business, the Casualty Actuarial and Statistical (C) Task Force adjourned.

https://naiconline.sharepoint.com/sites/NAICSupportStaffHub/Member%20Meetings/2022%20NAIC%20Meetings/Spring%20National%20Meeting/Committee%20Meetings/PROPERTY%20and%20CASUALTY%20INS%20(C)%20COMMITTEE/Casualty%20Actuarial%20and%20Statistical%20(C)%20TF/01-24%20CASTF%20Evote%20Comp%20min.docx
The Casualty Actuarial and Statistical (C) Task Force conducted an e-vote that concluded Jan. 10, 2022. The following Task Force members participated: Jim L. Ridling represented by Daniel Davis (AL); Ricardo Lara represented by Lynne Wehmueller (CA); Michael Conway represented by Mitchell Bronson (CO); Andrew N. Mais represented by Wanchin Chou (CT); Karima M. Woods represented by David Christhilf (DC); David Altmaier represented by Christina Huff (FL); Colin M. Hayashida represented by Randy Jacobson (HI); Dana Popish Severinghaus represented by Judy Mottar (IL); Vicki Schmidt represented by Nicole Boyd (KS); Kathleen A. Birrane represented by Robert Baron (MD); Eric A. Cioppa represented by Sandra Darby (ME); Anita G. Fox represented by Kevin Dyke (MI); Troy Downing represented by Mari Kindberg (MT); Mike Causey represented by Kevin Conley (NC); Chris Nicolopoulos represented by Christian Citarella (NH); Marlene Caride represented by Carl Sornson (NJ); Russell Toal represented by Anna Krylova (NM); Judith L. French represented by Tom Botsko (OH); Glen Mulready represented by Andrew Schallhorn (OK); Andrew R. Stolfi represented by David Dahl (OR); Raymond G. Farmer represented by Will Davis (SC); Michael S. Pieciak represented by Rosemary Raszka (VT); Mike Kreidler represented by Eric Slavich (WA); and Allan L. McVey and Juanita Wimmer (WV).

1. **Adopted the Auto Report**


Having no further business, the Casualty Actuarial and Statistical (C) Task Force adjourned.

https://naiconline.sharepoint.com/sites/NAICSupportStaffHub/Member%20Meetings/2022%20NAIC%20Meetings/Spring%20National%20Meeting/Committee%20Meetings/PROPERTY%20and%20CASUALTY%20INS%20(C)%20COMMITTEE/Casualty%20Actuarial%20and%20Statistical%20(C)%20TF/01-10%20CASTF%20Evote%20Auto%20min.docx
The Actuarial Opinion (C) Working Group of the Casualty Actuarial and Statistical (C) Task Force met Jan. 18, Feb. 1, and March 1, 2022. The following Working Group members participated: Anna Krylova, Chair (NM); Miriam Fisk, Vice Chair, and Rebecca Armon (TX); Amy Waldhauer (CT); David Christhilf (DC); Chantel Long and Judy Mottar (IL); Sandra Darby (ME); Julie Lederer (MO); Gordon Hay (NE); Tom Botsko (OH); Kate Yang (OK); and Kevin Clark, James Di Santo, and Michael McKenney (PA).

1. Adopted a Proposal for the P/C SAO Instructions

Ms. Krylova proposed revised 2022 Property/Casualty (P/C) Statement of Actuarial Opinion (SAO), P/C Actuarial Opinion Summary, and Title Statement of Actuarial Opinion instructions as a starting point for discussion during the Jan. 18 meeting (Attachment Five-A). Mr. Hay submitted additional proposed changes for the discussion (Attachment Five-B).

During its Feb. 1 meeting, the Working Group agreed to four changes to the P/C SAO instructions and decided to postpone any additional changes because more discussion and consultation would be needed, and there was no more time for deliberation in order to have an exposure and meet the Blanks (E) Working Group’s March 4 deadline.

The first change in the P/C SAO instructions is in Section 1. Guidance on continuing education (CE) logs is no longer required because the Casualty Actuarial and Statistical (C) Task Force’s CE log project will not be reoccurring, so the paragraph on the topic was removed. Ms. Krylova noted that actuaries will refer to their respective societies for guidance on CE logs.

The second change is also in Section 1. The change is to provide additional guidance on documentation of the board review of qualification documentation (QD) for companies that are part of a group whose parent board reviews QD on behalf of all subsidiaries. Guidance on this question was requested by the industry, and the Working Group consulted the Financial Examiners Handbook (E) Technical Group on the appropriate response.

The third change is in Section 3. An additional requirement has been added in the IDENTIFICATION paragraph for Appointed Actuaries to confirm that QD has been provided to the Board of Directors. This statement in the IDENTIFICATION paragraph will assist state insurance regulators in determining whether this requirement has been met.

The fourth change is in Section 8 and provides clarification that the signature block requirements apply to the SAO only. The actuarial report should reproduce the same information, though not necessarily in the same format. It has been reported that Appointed Actuaries often provide the required information in a slightly different format within the actuarial report, necessitating financial examiners to create meaningless findings/objections just because the information does not follow the exact format. The Working Group members agree that the prescribed format is applicable to the actuarial opinion only and that the format in the actuarial report may vary.

With a Blanks (E) Working Group deadline of March 4 looming, the Actuarial Opinion (C) Working Group’s chair exposed the amended proposed instructions for the P/C Statement of Actuarial Opinion for a 25-day public
comment period ending Feb. 27. No comments were received, and no additional comments were made during the Working Group’s March 1 meeting.

Ms. Lederer made a motion, seconded by Mr. Christhilf, to adopt the 2022 P/C SAO instructions and refer them to the Blanks (E) Working Group for consideration (Attachment Five-C). The motion passed unanimously.

Having no further business, the Actuarial Opinion (C) Working Group adjourned.
ACTUARIAL OPINION

1. There is to be included with or attached to Page 1 of the Annual Statement the statement of the Appointed Actuary, entitled “Statement of Actuarial Opinion” (Actuarial Opinion), setting forth his or her opinion relating to reserves specified in the SCOPE paragraph. The Actuarial Opinion, both the narrative and required Exhibits, shall be in the format of and contain the information required by this section of the Annual Statement Instructions – Property and Casualty.

Upon initial engagement, the Appointed Actuary must be appointed by the Board of Directors by Dec. 31 of the calendar year for which the opinion is rendered. The Company shall notify the domiciliary commissioner within five business days of the initial appointment with the following information:

a. Name and title (and, in the case of a consulting actuary, the name of the firm).

b. Manner of appointment of the Appointed Actuary (e.g., who made the appointment and when).

c. A statement that the person meets the requirements of a Qualified Actuary (or was approved by the domiciliary commissioner) and that documentation was provided to the Board of Directors.

Once this notification is furnished, no further notice is required with respect to this person unless the Board of Directors takes action to no longer appoint or retain the actuary or the actuary no longer meets the requirements of a Qualified Actuary.

If subject to the U.S. Qualification Standards, the Appointed Actuary shall annually attest to having met the continuing education requirements under Section 3 of the U.S. Qualification Standards for issuing Actuarial Opinions. As agreed with the actuarial organizations, the Casualty Actuarial Society (CAS) and Society of Actuaries (SOA) will determine the process for receiving the attestations for their respective members and make available the attestations to the public. An Appointed Actuary subject to the U.S. Qualification Standards and not a member of the CAS or SOA shall select one of the above organizations to submit their attestation.

In accordance with the CAS and SOA’s continuing education review procedures, an Appointed Actuary who is subject to the U.S. Qualification Standards and selected for review shall submit a log of their continuing education in a form determined by the CAS and SOA. The log shall include categorization of continuing education approved for use by the Casualty Actuarial and Statistical Task Force. As agreed with the actuarial organizations, the CAS and SOA will provide an annual consolidated report to the NAIC identifying the types and subject matter of continuing education being obtained by Appointed Actuaries. An Appointed Actuary subject to the U.S. Qualification Standards and not a member of the CAS or SOA shall follow the review procedures for the organization in which they submitted their attestation.

The Appointed Actuary shall provide to the Board of Directors qualification documentation on occasion of their appointment, and on an annual basis thereafter, directly or through company management. The documentation should include brief biographical information and a description of how the definition of “Qualified Actuary” is met or expected to be met (in the case of continuing education) for that year. The documentation should describe the Appointed Actuary’s responsible experience relevant to the subject of the Actuarial Opinion. The Board of Directors shall document the company’s review of those materials and any other information they may deem relevant, including information that may be requested directly from the Appointed Actuary. The qualification documentation shall be considered workpapers and be available for inspection upon regulator request or during a financial examination.
If an actuary who was the Appointed Actuary for the immediately preceding filed Actuarial Opinion is replaced by an action of the Board of Directors, the Insurer shall within five (5) business days notify the Insurance Department of the state of domicile of this event. The Insurer shall also furnish the domiciliary commissioner with a separate letter within ten (10) business days of the above notification stating whether in the twenty-four (24) months preceding such event there were any disagreements with the former Appointed Actuary regarding the content of the opinion on matters of the risk of material adverse deviation, required disclosures, scope, procedures, type of opinion issued, substantive wording of the opinion or data quality. The disagreements required to be reported in response to this paragraph include both those resolved to the former Appointed Actuary’s satisfaction and those not resolved to the former Appointed Actuary’s satisfaction. The letter should include a description of the disagreement and the nature of its resolution (or that it was not resolved). Within this same ten (10) business days, the Insurer shall in writing also request such former Appointed Actuary to furnish a letter addressed to the Insurer stating whether the Appointed Actuary agrees with the statements contained in the Insurer’s letter and, if not, stating the reasons for which he or she does not agree. The former Appointed Actuary shall provide a written response to the insurer within ten (10) business days of such request, and the Insurer shall furnish such responsive letter from the former Appointed Actuary to the domiciliary commissioner together with its own responses.

The Appointed Actuary must report to the Board of Directors each year on the items within the scope of the Actuarial Opinion. The Actuarial Opinion and the Actuarial Report must be made available to the Board of Directors. The minutes of the Board of Directors should indicate that the Appointed Actuary has presented such information to the Board of Directors and identify the manner of presentation (e.g., webinar, in-person presentation, written). A separate Actuarial Opinion is required for each company filing an Annual Statement. When there is an affiliated company pooling arrangement, one Actuarial Report for the aggregate pool is sufficient, but there must be addendums to the Actuarial Report to cover non-pooled reserves for individual companies.

The Actuarial Opinion and the supporting Actuarial Report and workpapers should be consistent with the appropriate Actuarial Standards of Practice (ASOPs), including, but not limited to, ASOP No. 23, ASOP No. 36, ASOP No. 41 and ASOP No. 43, as promulgated by the Actuarial Standards Board.

1A. Definitions

“Appointed Actuary” is a Qualified Actuary (or individual otherwise approved by the domiciliary commissioner) appointed by the Board of Directors in accordance with Section 1 of these instructions.

“Board of Directors” can include the designated Board of Directors, its equivalent or an appropriate committee directly reporting to the Board of Directors.

“Qualified Actuary” is a person who:

(i) Meets the basic education, experience and continuing education requirements of the Specific Qualification Standard for Statements of Actuarial Opinion, NAIC Property and Casualty Annual Statement, as set forth in the Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States (U.S. Qualifications Standards), promulgated by the American Academy of Actuaries (Academy):

(ii) Has obtained and maintains an Accepted Actuarial Designation; and

(iii) Is a member of a professional actuarial association that requires adherence to the same Code of Professional Conduct promulgated by the Academy, requires adherence to the U.S. Qualification Standards, and participates in the Actuarial Board for Counseling and Discipline when its members are practicing in the U.S.

An exception to parts (i) and (ii) of this definition would be an actuary evaluated by the Academy’s Casualty Practice Council and determined to be a Qualified Actuary for particular lines of business and business activities.
“Accepted Actuarial Designation” in item (ii) of the definition of a Qualified Actuary, is an actuarial designation accepted as meeting or exceeding the NAIC’s Minimum Property/Casualty (P/C) Actuarial Educational Standards for a P/C Appointed Actuary (published on the NAIC website). The following actuarial designations, with any noted conditions, are accepted as meeting or exceeding basic education minimum standards:

(i) Fellow of the CAS (FCAS) – Condition: basic education must include Exam 6 – Regulation and Financial Reporting (United States);

(ii) Associate of the CAS (ACAS) – Conditions: basic education must include Exam 6 – Regulation and Financial Reporting (United States) and Exam 7 – Estimation of Policy Liabilities, Insurance Company Valuation, and Enterprise Risk Management;

(iii) Fellow of the SOA (FSA) – Conditions: basic education must include completion of the general insurance track, including the following optional exams: the United States’ version of the Financial and Regulatory Environment Exam and the Advanced Topics in General Insurance Exam.

The table below provides some allowable exam substitutions for (i), (ii) and (iii) in the definition of “Accepted Actuarial Designation:” Noting that CAS exams have changed over time, exceptions for (i) and (ii) provide for FCAS/ACAS designations achieved before an exam was created (e.g. CAS Exam 6-US) or with an earlier version of an exam or exam topic (e.g., 2010 CAS Exam 6 instead of the current CAS Exam 7 Section A). FCAS/ACAS qualified under the 2018 and prior Statement of Actuarial Opinion instructions can use the noted substitution rules to achieve qualification under the new instructions by demonstrating basic and/or continuing education of the required topics including material in CAS Exam 6 (US) and section A of CAS Exam 7 (in the May 2019 CAS syllabus). Exceptions for (iii) for an FSA are also included in the table.

The SOA exams completed in the general insurance track in 2019 and prior should be supplemented with continuing education and experience to meet basic education requirements in the U.S. Qualification Standards. For purpose of these instructions only, the table also includes specific exams from other organizations that are accepted as substitutes.

<table>
<thead>
<tr>
<th>Exception for (i), (ii), or (iii)</th>
<th>Exam:</th>
<th>Exam Substitution Allowed*</th>
</tr>
</thead>
</table>
| (i) and (ii) CAS Exam 6 (US)    | 1. Any CAS version of a U.S. P/C statutory accounting and regulation exam administered prior to creation of the CAS Exam 6 (US) in 2011.  
2. An FCAS or ACAS earned prior to 2021 who did not pass CAS Exam 6 (US) or an allowable exam substitution, may substitute experience and/or continuing education for CAS Exam 6 (US) provided the Appointed Actuary explains in his/her qualification documentation how knowledge of U.S. financial reporting and regulation was obtained.  
3. SOA FREU (US) Exam |
| (ii) CAS Exam 7                 | 1. Any CAS version of an exam including advanced P/C reserving administered prior to creation of Exam 7 in 2011.  
2. An ACAS earned prior to 2021 who did not pass CAS Exam 7 or an allowable exam substitution, may substitute experience and/or continuing education for CAS Exam 7 provided the Appointed Actuary explains in his/her qualification documentation how knowledge of the additional reserving topics in CAS Exam 7 (Section A) in the May 2019 syllabus was obtained.  
3. SOA Advanced Topics Exam (Note: The ERM portion of Exam 7 is not needed to meet NAIC educational standards, therefore SOA ERM Exam is not needed for the substitution for this purpose.) |
| (iii) SOA FREU (US) Exam        | 1. CAS Exam 6 (US)  
| (iii) SOA Advanced Topics Exam  | 1. CAS Exam 7  
2. Any CAS version of an exam containing the advanced techniques to estimate policy liabilities (i.e., advanced reserving). |

*Note: These exam substitutions only apply to these instructions and are not applicable for CAS or SOA exam waivers.
“Insurer” or “Company” means an insurer or reinsurer authorized to write property and/or casualty insurance under the laws of any state and who files on the Property and Casualty Blank.

“Actuarial Report” means a document or other presentation prepared as a formal means of conveying to the state regulatory authority and the Board of Directors the Appointed Actuary’s professional conclusions and recommendations of recording and communicating the methods and procedures, of assuring that the parties addressed are aware of the significance of the Appointed Actuary’s opinion or findings, and of documenting the analysis underlying the opinion. The required content of the Actuarial Report is further described in paragraph 7. (Note that the inclusion of the Board of Directors as part of the intended audience for the Actuarial Report does not change the content of the Actuarial Report as described in paragraph 7. The Appointed Actuary should present findings to the Board of Directors in a manner deemed suitable for such audience.)

“Property and Casualty (P&C) Long Duration Contracts” refers to contracts (excluding financial guaranty contracts, mortgage guaranty contracts and surety contracts) that fulfill both of the following conditions: (1) the contract term is greater than or equal to 13 months; and (2) the insurer can neither cancel the contract nor increase the premium during the contract term. These contracts are subject to the three tests of SSAP No. 65—Property and Casualty Contracts of the NAIC Accounting Practices and Procedures Manual.

“Accident and Health (A&H) Long Duration Contracts” refers to A&H contracts in which the contract term is greater than or equal to 13 months and contract reserves are required. See Schedule H instructions for a description of categories of contract reserves, as well as policy features that give rise to contract reserves. Two specific examples of contracts that typically require contract reserves are long-term care and disability income insurance.

1B. Exemptions

An insurer who intends to file for one of the exemptions under this Section must submit a letter of intent to its domiciliary commissioner no later than December 1 of the calendar year for which the exemption is to be claimed. The commissioner may deny the exemption prior to December 31 of the same year if he or she deems the exemption inappropriate.

A copy of the approved exemption must be filed with the Annual Statement in all jurisdictions in which the company is authorized.

Exemption for Small Companies

An insurer that has less than $1,000,000 total direct plus assumed written premiums during a calendar year, and less than $1,000,000 total direct plus assumed loss and loss adjustment expense reserves at year-end, in lieu of the Actuarial Opinion required for the calendar year, may submit an affidavit under oath of an officer of the insurer that specifies the amounts of direct plus assumed written premiums and direct plus assumed loss and loss adjustment reserves.

Exemption for Insurers under Supervision or Conservatorship

Unless ordered by the domiciliary commissioner, an insurer that is under supervision or conservatorship pursuant to statutory provision is exempt from the filing requirements contained herein.

Exemption for Nature of Business

An insurer otherwise subject to the requirement and not eligible for an exemption as enumerated above may apply to its domiciliary commissioner for an exemption based on the nature of business written.
Financial Hardship Exemption

An insurer otherwise subject to this requirement and not eligible for an exemption as enumerated above may apply to the commissioner for a financial hardship exemption. Financial hardship is presumed to exist if the projected reasonable cost of the Actuarial Opinion would exceed the lesser of:

(i) One percent (1%) of the insurer’s capital and surplus reflected in the insurer’s latest quarterly statement for the calendar year for which the exemption is sought; or

(ii) Three percent (3%) of the insurer’s direct plus assumed premiums written during the calendar year for which the exemption is sought as projected from the insurer’s latest quarterly statements filed with its domiciliary commissioner.

1C. Reporting Requirements for Pooled Companies

For each company in the pool, the Appointed Actuary shall include a description of the pool, identification of the lead company and a listing of all companies in the pool, their state of domicile and their respective pooling percentages.

Exhibits A and B for each company in the pool should represent the company’s share of the pool and should reconcile to the financial statement for that company.

The following paragraph applies to companies that have a 0% share of the pool (no reported Schedule P data). The company shall submit an Actuarial Opinion that reads similar to that provided for the lead company. For example, the IRIS ratio and risk of material adverse deviation discussions, and other relevant comments shall relate to the risks of the lead company in the pool. The Exhibit B responses to question 5 should be $0 and to question 6 should be “not applicable.” Exhibits A and B of the lead company should be attached as an addendum to the PDF file and/or hard copy being filed (but would not be reported by the 0% companies in their data capture).

2. The Actuarial Opinion must consist of an IDENTIFICATION paragraph identifying the Appointed Actuary; a SCOPE paragraph identifying the subjects on which an opinion is to be expressed and describing the scope of the Appointed Actuary’s work; an OPINION paragraph expressing his or her opinion with respect to such subjects; and one or more additional RELEVANT COMMENTS paragraphs. These four sections must be clearly designated.

3. The IDENTIFICATION paragraph should indicate the Appointed Actuary’s relationship to the Company, qualifications for acting as Appointed Actuary and date of appointment and specify that the appointment was made by the Board of Directors.

If the Appointed Actuary was approved by the Academy to be a “Qualified Actuary,” with or without limitation, or if the Appointed Actuary is not a Qualified Actuary but was approved by the domiciliary commissioner, the company must attach, each year, the approval letter and reference such in the identification paragraph.

4. The SCOPE paragraph should contain a sentence such as the following:

“I have examined the actuarial assumptions and methods used in determining reserves listed in Exhibit A, as shown in the Annual Statement of the Company as prepared for filing with state regulatory officials, as of December 31, 20__, and reviewed information provided to me through XXX date.”

Exhibit A should list those items and amounts with respect to which the Appointed Actuary is expressing an opinion.

The Appointed Actuary should state that the items in the SCOPE, on which he or she is expressing an opinion, reflect Disclosure items 8 through 13.2 in Exhibit B.
The SCOPE paragraph should include a paragraph such as the following regarding the data used by the Appointed Actuary in forming the opinion:

“In forming my opinion on the loss and loss adjustment expense reserves, I relied upon data prepared by __________ (officer name and title at the Company). I evaluated that data for reasonableness and consistency. I also reconciled that data to Schedule P, Part 1 of the Company’s current Annual Statement. In other respects, my examination included such review of the actuarial assumptions and methods used and such tests of the calculations as I considered necessary.”

5. The OPINION paragraph should include a sentence that at least covers the points listed in the following illustration:

“In my opinion, the amounts carried in Exhibit A on account of the items identified:

A. Meet the requirements of the insurance laws of (state of domicile).
B. Are computed in accordance with accepted actuarial standards.
C. Make a reasonable provision for all unpaid loss and loss adjustment expense obligations of the Company under the terms of its contracts and agreements.”

If the Scope includes material Unearned Premium Reserves for P&C Long Duration Contracts or Other Loss Reserve items on which the Appointed Actuary is expressing an opinion, the Actuarial Opinion should contain language such as the following:

D. Make a reasonable provision for the unearned premium reserves for P&C Long Duration Contracts and/or <insert Other Loss Reserve item on which the Appointed Actuary is expressing an Opinion> of the Company under the terms of its contracts and agreements.

If there is any aggregation or combination of items in Exhibit A, the opinion language should clearly identify the combined items.

Insurance laws and regulations shall at all times take precedence over the actuarial standards.

If the Appointed Actuary has made use of the analysis of another actuary not within the Appointed Actuary’s control (such as for pools and associations, for a subsidiary or for special lines of business) for a material portion of the reserves, the other actuary must be identified by name, credential and affiliation within the OPINION paragraph. If the Appointed Actuary has made use of the work of a non-actuary (such as for modeling) for a material portion of the reserves, that individual must be identified by name and affiliation and a description of the type of analysis performed must be provided.

A Statement of Actuarial Opinion should be made in accordance with one of the following sections (1 through 5). The Appointed Actuary must explicitly identify in Exhibit B which type applies.

1. Determination of Reasonable Provision. When the carried reserve amount is within the Appointed Actuary’s range of reasonable reserve estimates, the Appointed Actuary should issue a Statement of Actuarial Opinion that the carried reserve amount makes a reasonable provision for the liabilities associated with the specified reserves.

2. Determination of Deficient or Inadequate Provision. When the carried reserve amount is less than the minimum amount that the Appointed Actuary believes is reasonable, the Appointed Actuary should issue a Statement of Actuarial Opinion that the carried reserve amount does not make a reasonable provision for the liabilities associated with the specified reserves. In addition, the Appointed Actuary should disclose the minimum amount that the Appointed Actuary believes is reasonable.

3. Determination of Redundant or Excessive Provision. When the carried reserve amount is greater than the maximum amount that the Appointed Actuary believes is reasonable, the Appointed Actuary should issue a Statement of Actuarial Opinion that the carried reserve amount does not make a reasonable provision for the liabilities associated with the specified reserves. In addition, the Appointed Actuary should disclose the maximum amount that the Appointed Actuary believes is reasonable.
4. **Qualified Opinion.** When, in the Appointed Actuary’s opinion, the reserves for a certain item or items are in question because they cannot be reasonably estimated or the Appointed Actuary is unable to render an opinion on those items, the Appointed Actuary should issue a qualified Statement of Actuarial Opinion. The Appointed Actuary should disclose the item (or items) to which the qualification relates, the reason(s) for the qualification and the amounts for such item(s), if disclosed by the Company. Such a qualified opinion should state whether the carried reserve amount makes a reasonable provision for the liabilities associated with the specified reserves, except for the item (or items) to which the qualification relates. The Appointed Actuary is not required to issue a qualified opinion if the Appointed Actuary reasonably believes that the item (or items) in question are not likely to be material.

5. **No Opinion.** The Appointed Actuary’s ability to give an opinion is dependent upon data, analyses, assumptions, and related information that are sufficient to support a conclusion. If the Appointed Actuary cannot reach a conclusion due to deficiencies or limitations in the data, analyses, assumptions, or related information, then the Appointed Actuary may issue a statement of no opinion. A statement of no opinion should include a description of the reasons why no opinion could be given.

6. The Appointed Actuary must provide RELEVANT COMMENT paragraphs to address the following topics of regulatory importance.

   A. **Company-Specific Risk Factors**

      The Appointed Actuary should include an explanatory paragraph to describe the major factors, combination of factors or particular conditions underlying the risks and uncertainties the Appointed Actuary considers relevant. The explanatory paragraph should not include general, broad statements about risks and uncertainties due to economic changes, judicial decisions, regulatory actions, political or social forces, etc., nor is the Appointed Actuary required to include an exhaustive list of all potential sources of risks and uncertainties.

   B. **Risk of Material Adverse Deviation**

      The Appointed Actuary must provide specific RELEVANT COMMENT paragraphs to address the risk of material adverse deviation. The Appointed Actuary must identify the materiality standard and the basis for establishing this standard. The materiality standard must also be disclosed in U.S. dollars in Exhibit B: Disclosures. The Appointed Actuary should explicitly state whether or not he or she reasonably believes that there are significant risks and uncertainties that could result in material adverse deviation. This determination is also to be disclosed in Exhibit B.

   C. **Other Disclosures in Exhibit B**

      RELEVANT COMMENT paragraphs should describe the significance of each of the remaining Disclosure items (8 through 14) in Exhibit B. The Appointed Actuary should address the items individually and in combination when commenting on a material impact.

   D. **Reinsurance**

      RELEVANT COMMENT paragraphs should address reinsurance collectability, retroactive reinsurance and financial reinsurance.

      The Appointed Actuary’s comments on reinsurance collectability should address any uncertainty associated with including potentially uncollectable amounts in the estimate of ceded reserves. Before commenting on reinsurance collectability, the Appointed Actuary should solicit information from management on any actual collectability problems, review ratings given to reinsurers by a recognized rating service and examine Schedule F for the current year for indications of regulatory action or reinsurance recoverable on paid losses over ninety (90) days past due. The comment should also reflect any other information the Appointed Actuary has received from management or that is publicly available about the capability or willingness of reinsurers to pay claims. The Appointed Actuary’s comments do not imply an opinion on the financial condition of any reinsurer.

Financial reinsurance refers to contracts referenced in SSAP No. 62R in which credit is not allowed for the ceding insurer because the arrangements do not include a transfer of both timing and underwriting risk that the reinsurer undertakes in fact to indemnify the ceding insurer against loss or liability by reason of the original insurance.

E. IRIS Ratios

If the Company’s reserves will create exceptional values under the NAIC IRIS Tests for One-Year Reserve Development to Policyholders’ Surplus, Two-Year Reserve Development to Policyholders’ Surplus or Estimated Current Reserve Deficiency to Policyholders’ Surplus, the Appointed Actuary must include RELEVANT COMMENT on the factors that led to the unusual value(s).

F. Methods and Assumptions

If there has been any significant change in the actuarial assumptions and/or methods from those previously employed, that change should be described in a RELEVANT COMMENT paragraph. If the Appointed Actuary is newly appointed and does not review the work of the prior Appointed Actuary, then the Appointed Actuary should disclose this.

7. The Actuarial Opinion must include assurance that an Actuarial Report and underlying actuarial workpapers supporting the Actuarial Opinion will be maintained at the Company and available for regulatory examination for seven (7) years. The Actuarial Report contains significant proprietary information. It is expected that the Actuarial Report be held confidential and not be intended for public inspection. The Actuarial Report must be available by May 1 of the year following the year-end for which the Actuarial Opinion was rendered or within two (2) weeks after a request from an individual state commissioner.

The Actuarial Report should be consistent with the documentation and disclosure requirements of ASOP No. 41, Actuarial Communications. The Actuarial Report must contain both narrative and technical components. The narrative component should provide sufficient detail to clearly explain to Company management, the Board of Directors, the regulator or other authority the findings, recommendations and conclusions, as well as their significance. The technical component should provide sufficient documentation and disclosure for another actuary practicing in the same field to evaluate the work. This technical component must show the analysis from the basic data (e.g., loss triangles) to the conclusions.

Actuarial Guideline LI—The Application of Asset Adequacy Testing to Long-Term Care Insurance Reserves (AG 51) in the NAIC Accounting Practices and Procedures Manual requires a company with over 10,000 in force lives covered by long-term care (LTC) insurance contracts as of the valuation date to perform a stand-alone asset adequacy analysis for its in force long-term care (LTC) contracts. The Actuarial Report and workpapers summarizing the results, assumptions and testing procedures for the asset adequacy testing of LTC business must be in compliance with AG 51 requirements. When referring to AG 51, the term “Actuarial Memorandum” is synonymous with Actuarial Report and workpapers.

The Actuarial Report should contain disclosure of all reserve amounts associated with A&H Long Duration Contracts reported by the Company; the reserve amounts in the Actuarial Report should tie to the Annual Statement.
The Actuarial Report must also include:

A. A description of the Appointed Actuary’s relationship to the Company, with clear presentation of the Appointed Actuary’s role in advising the Board of Directors and/or management regarding the carried reserves. The Actuarial Report should identify how and when the Appointed Actuary presents the analysis to the Board of Directors and, where applicable, to the officer(s) of the Company responsible for determining the carried reserves.

B. An exhibit that ties to the Annual Statement and compares the Appointed Actuary’s conclusions to the carried amounts consistent with the segmentation of exposure or liability groupings used in the analysis. The Appointed Actuary’s conclusions include the Appointed Actuary’s point estimate(s), range(s) of reasonable estimates or both.

C. An exhibit that reconciles and maps the data used by the Appointed Actuary, consistent with the segmentation of exposure or liability groupings used in the Appointed Actuary’s analysis, to the Annual Statement Schedule P line of business reporting. An explanation should be provided for any material differences.

D. An exhibit or appendix showing the change in the Appointed Actuary’s estimates from the prior Actuarial Report, including extended discussion of factors underlying any material changes. The exhibit or appendix should illustrate the changes on a net basis but should also include the changes on a gross basis, if relevant. If the Appointed Actuary is newly appointed and does not review the work of the prior Appointed Actuary, then the Appointed Actuary should disclose this.

E. Extended comments on trends that indicate the presence or absence of risks and uncertainties that could result in material adverse deviation.

F. Extended comments on factors that led to unusual IRIS ratios for One-Year Reserve Development to Policyholders’ Surplus, Two-Year Reserve Development to Policyholders’ Surplus or Estimated Current Reserve Deficiency to Policyholders’ Surplus, and how these factors were addressed in prior and current analyses.

8. Both the Actuarial Opinion and the Actuarial Report should conclude with the signature of the Appointed Actuary responsible for providing the Actuarial Opinion and the respective dates when the Actuarial Opinion was rendered and the Actuarial Report finalized. The signature and date should appear in the following format:

   _____________________________________
   Signature of Appointed Actuary
   Printed name of Appointed Actuary
   Employer’s name
   Address of Appointed Actuary
   Telephone number of Appointed Actuary
   Email address of Appointed Actuary
   Date opinion was rendered

9. The Insurer required to furnish an Actuarial Opinion shall require its Appointed Actuary to notify its Board of Directors or its audit committee in writing within five (5) business days after any determination by the Appointed Actuary that the Actuarial Opinion submitted to the domiciliary commissioner was in error as a result of reliance on data or other information (other than assumptions) that, as of the balance sheet date, was factually incorrect. The Actuarial Opinion shall be considered to be in error if the Actuarial Opinion would have not been issued or would have been materially altered had the correct data or other information been used. The Actuarial Opinion shall not be considered to be in error if it would have been materially altered or not issued solely because of data or information concerning events subsequent to the balance sheet date or because actual results differ from those projected. Notification is required when discovery is made between the issuance of the Actuarial Opinion and Dec. 31 of that year. Notification should include a summary of such findings.
If the Appointed Actuary learns that the data or other information relied upon was factually incorrect, but cannot immediately determine what, if any, changes are needed in the Actuarial Opinion, the Appointed Actuary and the Company should quickly undertake procedures necessary for the Appointed Actuary to make such determination. If the Insurer does not provide the necessary data corrections and other support (including financial support) within ten (10) business days, the Appointed Actuary should proceed with the notification to the Board of Directors and the domiciliary commissioner.

An Insurer who is notified pursuant to the preceding paragraphs shall forward a copy of the amended Actuarial Opinion to the domiciliary commissioner within five (5) business days of receipt of such and shall provide the Appointed Actuary making the notification with a copy of the letter and amended Actuarial Opinion submitted to the domiciliary commissioner. If the Appointed Actuary fails to receive such copy within the five (5) business day period referred to in the previous sentence, the Appointed Actuary shall notify the domiciliary commissioner within the next five (5) business days that an amended Actuarial Opinion has been finalized.

No Appointed Actuary shall be liable in any manner to any person for any statement made in connection with the above paragraphs if such statement is made in a good faith effort to comply with the above paragraphs.

10. Data in Exhibits A and B are to be filed in both print and data capture format.

### Exhibit A: SCOPE

DATA TO BE FILED IN BOTH PRINT AND DATA CAPTURE FORMATS

<table>
<thead>
<tr>
<th>Loss and Loss Adjustment Expense Reserves:</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Unpaid Losses (Liabilities, Surplus and Other Funds page, Col 1, Line 1)</td>
<td>$ ________</td>
</tr>
<tr>
<td>2. Unpaid Loss Adjustment Expenses (Liabilities, Surplus and Other Funds page, Col 1, Line 3)</td>
<td>$ ________</td>
</tr>
<tr>
<td>3. Unpaid Losses – Direct and Assumed (Should equal Schedule P, Part 1, Summary, Totals from Cols. 13 and 15, Line 12 * 1000)</td>
<td>$ ________</td>
</tr>
<tr>
<td>4. Unpaid Loss Adjustment Expenses – Direct and Assumed (Should equal Schedule P, Part 1, Summary, Totals from Cols. 17, 19 and 21, Line 12 * 1000)</td>
<td>$ ________</td>
</tr>
<tr>
<td>5. The Page 3 write-in item reserve, “Retroactive Reinsurance Reserve Assumed”</td>
<td>$ ________</td>
</tr>
<tr>
<td>6. Other Loss Reserve items on which the Appointed Actuary is expressing an Opinion (list separately, adding additional lines as needed)</td>
<td>$ ________</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Premium Reserves:</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Reserve for Direct and Assumed Unearned Premiums for P&amp;C Long Duration Contracts</td>
<td>$ ________</td>
</tr>
<tr>
<td>8. Reserve for Net Unearned Premiums for P&amp;C Long Duration Contracts</td>
<td>$ ________</td>
</tr>
<tr>
<td>9. Other Premium Reserve items on which the Appointed Actuary is expressing an Opinion (list separately, adding additional lines as needed)</td>
<td>$ ________</td>
</tr>
</tbody>
</table>
**Exhibit B: DISCLOSURES**

DATA TO BE FILED IN BOTH PRINT AND DATA CAPTURE FORMATS

NOTE: Exhibit B should be completed for Net dollar amounts included in the SCOPE. If an answer would be different for Direct and Assumed amounts, identify and discuss the difference within RELEVANT COMMENTS.

1. Name of the Appointed Actuary
   
2. The Appointed Actuary’s relationship to the Company
   
   Enter E or C based upon the following:
   
   E  if an Employee of the Company or Group
   
   C  if a Consultant

3. The Appointed Actuary’s Accepted Actuarial Designation
   (indicated by the letter code):
   
   F  if a Fellow of the Casualty Actuarial Society (FCAS)
   
   A  if an Associate of the Casualty Actuarial Society (ACAS)
   
   S  if a Fellow of the Society of Actuaries (FSA) through the General Insurance track
   
   M  if the actuary does not have an Accepted Actuarial Designation but is approved by the Academy’s Casualty Practice Council.
   
   O  for Other

4. Type of Opinion, as identified in the OPINION paragraph.
   
   Enter R, I, E, Q, or N based upon the following:
   
   R  if Reasonable
   
   I  if Inadequate or Deficient Provision
   
   E  if Excessive or Redundant Provision
   
   Q  if Qualified. Use Q when part of the OPINION is Qualified.
   
   N  if No Opinion

5. Materiality Standard expressed in U.S. dollars (used to Answer Question #6) $ _______

6. Are there significant risks that could result in Material Adverse Deviation? Yes [ ] No [ ] Not Applicable [ ]

7. Statutory Surplus (Liabilities, Surplus and Other Funds page, Col 1, Line 37) $ _______

8. Anticipated net salvage and subrogation included as a reduction to loss reserves as reported in Schedule P (should equal Part 1 Summary, Col 23, Line 12 * 1000) $ _______

9. Discount included as a reduction to loss reserves and loss adjustment expense reserves as reported in Schedule P
   
   9.1 Nontabular Discount [Notes, Line 32B23, (Amounts 1, 2, 3 & 4)], Electronic Filing Cols 1, 2, 3, & 4 $ _______
   
   9.2 Tabular Discount [Notes, Line 32A23, (Amounts 1 & 2)], Electronic Filing Col 1 & 2 $ _______

10. The net reserves for losses and loss adjustment expenses for the Company’s share of voluntary and involuntary underwriting pools’ and associations’ unpaid losses and loss adjustment expenses that are included in reserves shown on the Liabilities, Surplus and Other Funds page, Losses and Loss Adjustment Expenses lines $ _______
11. The net reserves for losses and loss adjustment expenses that the Company carries for the following liabilities included on the Liabilities, Surplus and Other Funds page, Losses and Loss Adjustment Expenses lines *

11.1 Asbestos, as disclosed in the Notes to Financial Statements (Notes, Line 33A03D, ending net asbestos reserves for current year) Electronic Filing Col 5 $ ________

11.2 Environmental, as disclosed in the Notes to Financial Statements (Notes, Line 33D03D, ending net environmental reserves for current year), Electronic Filing Col 5 $ ________

12. The total claims made extended loss and loss adjustment expense, and unearned premium reserves (Greater than or equal to Schedule P Interrogatories)

12.1 Amount reported as loss and loss adjustment expense reserves $ ________

12.2 Amount reported as unearned premium reserves $ ________

13. The net reserves for the A&H Long Duration Contracts that the Company carries on the following lines on the Liabilities, Surplus and Other Funds page:

13.1 Losses $ ________

13.2 Loss Adjustment Expenses $ ________

13.3 Unearned Premium $ ________

13.4 Write-In (list separately, adding additional lines as needed, and identify (e.g., “Premium Deficiency Reserves”, “Contract Reserves other than Premium Deficiency Reserves” or “AG 51 Reserves”)) $ ________

14. Other items on which the Appointed Actuary is providing relevant comment (list separately, adding additional lines as needed) $ ________

* The reserves disclosed in item 11 above, should exclude amounts relating to contracts specifically written to cover asbestos and environmental exposures. Contracts specifically written to cover these exposures include Environmental Impairment Liability (post 1986), Asbestos Abatement, Pollution Legal Liability, Contractor’s Pollution Liability, Consultant’s Environmental Liability, and Pollution and Remediation Legal Liability.
ACTUARIAL OPINION SUMMARY SUPPLEMENT

1. For all Companies that are required by their domiciliary state to submit a confidential document entitled Actuarial Opinion Summary (AOS), such document shall be filed with the domiciliary state by March 15 (or by a later date otherwise specified by the domiciliary state). This AOS shall be submitted to a non-domiciliary state within 15 days of request, but no earlier than March 15, provided that the requesting state can demonstrate, through the existence of law or some similar means, that it is able to preserve the confidentiality of the document.

2. The AOS should be consistent with the appropriate Actuarial Standards of Practice (ASOPs), including but not limited to ASOP No. 23, ASOP No. 41 and ASOP No. 43, as promulgated by the Actuarial Standards Board.

3. Exemptions for filing the AOS are the same as those for filing the Statement of Actuarial Opinion.

4. The AOS contains significant proprietary information. It is expected that the AOS be held confidential; it is not intended for public inspection. The AOS should not be filed with the NAIC and should be kept separate from any copy of the Statement of Actuarial Opinion (Actuarial Opinion) in order to maintain confidentiality of the AOS. The AOS can contain a statement that refers to the Actuarial Opinion and the date of that opinion.

5. The AOS should be signed and dated by the Appointed Actuary who signed the Actuarial Opinion and shall include at least the following:
   A. The Appointed Actuary’s range of reasonable estimates for loss and loss adjustment expense reserves, net and gross of reinsurance, when calculated;
   B. The Appointed Actuary’s point estimates for loss and loss adjustment expense reserves, net and gross of reinsurance, when calculated;
   C. The Company’s carried loss and loss adjustment expense reserves, net and gross of reinsurance;
   D. The difference between the Company’s carried reserves and the Appointed Actuary’s estimates calculated in A and B, net and gross of reinsurance; and
   E. Where there has been one-year adverse development in excess of 5% of the prior year-end’s policyholders’ surplus as measured by Schedule P, Part 2 Summary in three (3) or more of the past five (5) calendar years, an explicit description of the reserve elements or management decisions that were the major contributors.

6. The AOS for a pooled Company (as referenced in paragraph 1C of the instructions for the Actuarial Opinion) shall include a statement that the Company is a xx% pool participant. For a non-0% Company, the information provided for paragraph 5 should be numbers after the Company’s share of the pool has been applied; specifically, the point or range comparison should be for each statutory Company and should not be for the pool in total. For any 0% pool participant, the information provided for paragraph 5 should be that of the lead company.

7. The net and gross reserve values reported by the Appointed Actuary in the AOS should reconcile to the corresponding values reported in the Insurer’s Annual Statement, the Appointed Actuary’s Actuarial Opinion and the Actuarial Report. If not, the Appointed Actuary shall provide an explanation of the difference.
8. The Insurer required to furnish an AOS shall require its Appointed Actuary to notify its Board of Directors in writing within five (5) business days after any determination by the Appointed Actuary that the AOS submitted to the domiciliary commissioner was in error as a result of reliance on data or other information (other than assumptions) that, as of the balance sheet date, was factually incorrect. The AOS shall be considered to be in error if the AOS would have not been issued or would have been materially altered had the correct data or other information been used. The AOS shall not be considered to be in error if it would have been materially altered or not issued solely because of data or information concerning events subsequent to the balance sheet date or because actual results differ from those projected. Notification shall be required when discovery is made between the issuance of the AOS and Dec. 31 of that year. Notification should include a summary of such findings.

If the Appointed Actuary learns that the data or other information relied upon was factually incorrect, but cannot immediately determine what, if any, changes are needed in the AOS, the Appointed Actuary and the Company should quickly undertake procedures necessary for the Appointed Actuary to make such determination. If the Insurer does not provide the necessary data corrections and other support (including financial support) within ten (10) business days, the Appointed Actuary should proceed with the notification to the Board of Directors and the domiciliary commissioner.

An Insurer who is notified pursuant to the preceding paragraphs shall forward a copy of the amended AOS to the domiciliary commissioner within five (5) business days of receipt of such and shall provide the Appointed Actuary making the notification with a copy of the letter and amended AOS submitted to the domiciliary commissioner. If the Appointed Actuary fails to receive such copy within the five (5) business day period referred to in the previous sentence, the Appointed Actuary shall notify the domiciliary commissioner within the next five (5) business days that an amended AOS has been finalized.

9. No Appointed Actuary shall be liable in any manner to any person for any statement made in connection with the above paragraphs if such statement is made in a good faith effort to comply with the above paragraphs.
ACTUARIAL OPINION

1. There is to be included with or attached to Page 1 of the Annual Statement, the statement of a Qualified Actuary, entitled “Statement of Actuarial Opinion” (Actuarial Opinion) setting forth his or her opinion relating to reserves specified in the SCOPE paragraph. The Actuarial Opinion, both the narrative and required exhibits, shall be in the format of and contain the information required by this section of the Annual Statement Instructions – Title.

The Qualified Actuary must be appointed by the Board of Directors or its equivalent, or by a committee of the Board, by December 31 of the calendar year for which the opinion is rendered. Upon initial appointment (or “retention”), the Company shall notify the domiciliary commissioner within five business days of the appointment with the following information:

a. Name and title (and, in the case of a consulting actuary, the name of the firm).

b. Manner of appointment of the Appointed Actuary (e.g., who made the appointment and when).

c. A statement that the person meets the requirements of a Qualified Actuary.

Once this notification is furnished, no further notice is required with respect to this person unless the actuary ceases to be appointed or retained or ceases to meet the requirements of a Qualified Actuary.

If an actuary who was the Appointed Actuary for the immediately preceding filed Actuarial Opinion is replaced by an action of the Board of Directors, the Insurer shall within five (5) business days notify the Insurance Department of the state of domicile of this event. The Insurer shall also furnish the domiciliary commissioner with a separate letter within ten (10) business days of the above notification stating whether in the twenty-four (24) months preceding such event there were any disagreements with the former Appointed Actuary regarding the content of the opinion on matters of the risk of material adverse deviation, required disclosures, scope, procedures, type of opinion issued, substantive wording of the opinion or data quality. The disagreements required to be reported in response to this paragraph include both those resolved to the former actuary’s satisfaction and those not resolved to the former actuary’s satisfaction. The letter should include a description of the disagreements and the nature of its resolution (or that it was not resolved). The Insurer shall also request in writing such former actuary to furnish a letter addressed to the Insurer stating whether the actuary agrees with the statements contained in Insurer’s letter and, if not, stating the reasons for which he or she does not agree; and the Insurer shall furnish such responsive letter from the former actuary to the domiciliary commissioner together with its own.

The Appointed Actuary must report to the Board of Directors or the Audit Committee each year on the items within the scope of the Actuarial Opinion. The Actuarial Opinion and the Actuarial Report must be made available to the Board of Directors. The minutes of the Board of Directors should indicate that the Appointed Actuary has presented such information to the Board of Directors or the Audit Committee and that the Actuarial Opinion and the Actuarial Report were made available. A separate Actuarial Opinion is required for each company filing an Annual Statement. When there is an affiliated company pooling arrangement, one Actuarial Report for the aggregate pool is sufficient, but there must be addendums to the Actuarial Report to cover non-pooled reserves for individual companies.

The Actuarial Opinion and the supporting Actuarial Report and workpapers, should be consistent with the appropriate Actuarial Standards of Practice (ASOPs), including but not limited to ASOP No. 23, ASOP No. 36, ASOP No. 41 and ASOP No. 43, as promulgated by the Actuarial Standards Board.
1A. Definitions

“Qualified Actuary” is a person who is either:

(i) A member in good standing of the Casualty Actuarial Society; or

(ii) A member in good standing of the American Academy of Actuaries who has been approved as qualified for signing casualty loss reserve opinions by the Casualty Practice Council of the American Academy of Actuaries.

“Insurer” or “Company” means a reporting entity authorized to write title insurance under the laws of any state and who files on the Title Blank.

“Actuarial Report” means a document or other presentation, prepared as a formal means of conveying to the state regulatory authority and the Board of Directors, or its equivalent, the actuary’s professional conclusions and recommendations, of recording and communicating the methods and procedures, of assuring that the parties addressed are aware of the significance of the actuary’s opinion or findings and of documenting the analysis underlying the opinion. The expected content of the Actuarial Report is further described in paragraph 7. (Note that the inclusion of the Board of Directors as part of the intended audience for the Actuarial Report does not change the content of the Actuarial Report as described in paragraph 7. The Appointed Actuary should present findings to the Board of Directors in a manner deemed suitable for such audience.)

1B. Exemptions

An insurer who intends to file for one of the exemptions under this section must submit a letter of intent to its domiciliary commissioner no later than December 1 of the calendar year for which the exemption is to be claimed. The commissioner may deny the exemption prior to December 31 of the same year if the exemption is deemed inappropriate.

A copy of the approved exemption must be filed with the Annual Statement in all jurisdictions in which the company is authorized.

Exemption for Small Companies

An insurer that has less than $1,000,000 total direct plus assumed written premiums during a calendar year, and less than $1,000,000 total direct plus assumed loss and loss adjustment expense reserves at year-end, in lieu of the Actuarial Opinion required for the calendar year, may submit an affidavit under oath of an officer of the insurer that specifies the amounts of direct plus assumed written premiums and direct plus assumed loss and loss adjustment reserves.

Exemption for Insurers under Supervision or Conservatorship

Unless ordered by the domiciliary commissioner, an insurer that is under supervision or conservatorship pursuant to statutory provision is exempt from the filing requirements contained herein.

Exemption for Nature of Business

An insurer otherwise subject to the requirement and not eligible for an exemption as enumerated above may apply to its domiciliary commissioner for an exemption based on the nature of business written.
Financial Hardship Exemption

An insurer otherwise subject to this requirement and not eligible for an exemption as enumerated above may apply to the commissioner for a financial hardship exemption.

Financial hardship is presumed to exist if the projected reasonable cost of the opinion would exceed the lesser of:

(i) One percent (1%) of the insurer’s capital and surplus reflected in the insurer’s latest quarterly statement for the calendar year for which the exemption is sought; or

(ii) Three percent (3%) of the insurer’s direct plus assumed premiums written during the calendar year for which the exemption is sought as projected from the insurer’s latest quarterly statements filed with its domiciliary commissioner.

2. The Statement of Actuarial Opinion must consist of an IDENTIFICATION paragraph identifying the Appointed Actuary; a SCOPE paragraph identifying the subjects on which an opinion is to be expressed and describing the scope of the actuary’s work; an OPINION paragraph expressing his or her opinion with respect to such subjects and one or more additional RELEVANT COMMENTS paragraphs. These four sections must be clearly designated.

3. The IDENTIFICATION paragraph should indicate the Appointed Actuary’s relationship to the Company, qualifications for acting as Appointed Actuary, and date of appointment, and specify that the appointment was made by the Board of Directors (or its equivalent) or by a committee of the Board.

A member of the American Academy of Actuaries qualifying under paragraph 1A(ii) must attach, each year, a copy of the approval letter from the Academy.

These instructions require that a Qualified Actuary prepare the Actuarial Opinion. If a person who does not meet the definition of a Qualified Actuary has been approved by the insurance regulatory official of the domiciliary state, the Company must attach, each year, a letter from that official stating that the individual meets the state’s requirements for rendering the Actuarial Opinion.

4. The SCOPE paragraph should contain a sentence such as the following:

"I have examined the actuarial assumptions and methods used in determining reserves listed in Exhibit A, as shown in the Annual Statement of the Company as prepared for filing with state regulatory officials, as of December 31, 20__, and reviewed information provided to me through XXX date."

Exhibit A should list those items and amounts with respect to which the Appointed Actuary is expressing an opinion.

The Appointed Actuary should state that the items in the SCOPE paragraph, on which he or she is expressing an opinion, reflect the Disclosure items (8 through 14) in Exhibit B.

The SCOPE paragraph should include a paragraph such as the following regarding the data used by the Appointed Actuary in forming the opinion:

"In forming my opinion on the loss and loss adjustment expense reserves, I relied upon data prepared by _________ (name, affiliation and relation to Company). I evaluated that data for reasonableness and consistency. I also reconciled that data to Schedule P, Parts 1 and 2 of the Company’s current Annual Statement. In other respects, my examination included such review of the actuarial assumptions and methods used and such tests of the calculations as I considered necessary."
5. The OPINION paragraph should include a sentence that at least covers the points listed in the following illustration:

“In my opinion, the amounts carried in Exhibit A on account of the items identified:

A. Meet the requirements of the insurance laws of (state of domicile).
B. Are computed in accordance with accepted actuarial standards.
C. Make a reasonable provision for all unpaid loss and loss adjustment expense obligations of the Company under the terms of its contracts and agreements.”

If there is any aggregation or combination of items in Exhibit A, the opinion language should clearly identify the combined items.

Insurance laws and regulations shall at all times take precedence over the actuarial standards.

If the actuary has made use of the work of another actuary (such as for pools and associations, for a subsidiary or for special lines of business) for a material portion of the reserves, the other actuary must be identified by name and affiliation within the OPINION paragraph.

A Statement of Actuarial Opinion should be made in accordance with one of the following sections (a through e). The actuary must explicitly identify in Exhibit B which type applies.

a. Determination of Reasonable Provision. When the carried reserve amount is within the actuary’s range of reasonable reserve estimates, the actuary should issue a Statement of Actuarial Opinion that the carried reserve amount makes a reasonable provision for the liabilities associated with the specified reserves.

b. Determination of Deficient or Inadequate Provision. When the carried reserve amount is less than the minimum amount that the actuary believes is reasonable, the actuary should issue a statement of actuarial opinion that the carried reserve amount does not make a reasonable provision for the liabilities associated with the specified reserves. In addition, the actuary should disclose the minimum amount that the actuary believes is reasonable.

c. Determination of Redundant or Excessive Provision. When the carried reserve amount is greater than the maximum amount that the actuary believes is reasonable, the actuary should issue a Statement of Actuarial Opinion that the carried reserve amount does not make a reasonable provision for the liabilities associated with the specified reserves. In addition, the actuary should disclose the maximum amount that the actuary believes is reasonable.

d. Qualified Opinion. When, in the actuary’s opinion, the reserves for a certain item or items are in question because they cannot be reasonably estimated or the actuary is unable to render an opinion on those items, the actuary should issue a qualified Statement of Actuarial Opinion. The actuary should disclose the item (or items) to which the qualification relates, the reasons for the qualification, and the amounts for such item(s), if disclosed by the Company. Such a qualified opinion should state whether the stated reserve amount makes a reasonable provision for the liabilities associated with the specified reserves, except for the item (or items) to which the qualification relates. The actuary is not required to issue a qualified opinion if the actuary reasonably believes that the item (or items) in question are not likely to be material.

e. No Opinion. The actuary’s ability to give an opinion is dependent upon data, analyses, assumptions, and related information that are sufficient to support a conclusion. If the actuary cannot reach a conclusion due to deficiencies or limitations in the data, analyses, assumptions, or related information, then the actuary may issue a statement of no opinion. A statement of no opinion should include a description of the reasons why no opinion could be given.
6. The Appointed Actuary must provide RELEVANT COMMENT paragraphs to address the following topics of regulatory importance.

a. Risk of Material Adverse Deviation.

The Appointed Actuary must provide specific RELEVANT COMMENT paragraphs to address the risk of material adverse deviation. The Appointed Actuary must identify the materiality standard and the basis for establishing this standard with respect to the relevant characteristics of the Company. The materiality standard must also be disclosed in U.S. dollars in Exhibit B: Disclosures. The Appointed Actuary should include an explanatory paragraph to describe the major factors, combination of factors or particular conditions underlying the risks and uncertainties the actuary considers relevant. The explanatory paragraph should not include general, broad statements about risks and uncertainties due to economic changes, judicial decisions, regulatory actions, political or social forces, etc., nor is the Appointed Actuary required to include an exhaustive list of all potential sources of risks and uncertainties. The Appointed Actuary should explicitly state whether or not he or she reasonably believes that there are significant risks and uncertainties that could result in material adverse deviation. This determination is also to be disclosed in Exhibit B.

b. Other Disclosures in Exhibit B

RELEVANT COMMENT paragraphs should describe the significance of each of the remaining Disclosure items (8 through 14) in Exhibit B. The Appointed Actuary should address the items individually and in combination when commenting on a material impact.

If the Company’s reserves will cause the ratio of One-Year or Two-Year Known Claims Reserve Development (shown in Schedule P, Part 3) to the respective prior year’s Policyholders’ Surplus to be greater than 20%, the Appointed Actuary must include RELEVANT COMMENT on the factors that led to the exceptional reserve development.

c. Reinsurance

RELEVANT COMMENT paragraphs should address reinsurance collectability, retroactive reinsurance and financial reinsurance.

The Appointed Actuary’s comments on reinsurance collectability should address any uncertainty associated with including potentially-uncollectable amounts in the estimate of ceded reserves. Before commenting on reinsurance collectability, the Appointed Actuary should solicit information from management on any actual collectability problems, review ratings given to reinsurers by a recognized rating service, and examine Schedule F for the current year for indications of regulatory action or reinsurance recoverable on paid losses over ninety (90) days past due. The comment should also reflect any other information the actuary has received from management or that is publicly available about the capability or willingness of reinsurers to pay claims. The Appointed Actuary’s comments do not imply an opinion on the financial condition of any reinsurer.


Financial reinsurance refers to contracts referenced in SSAP No. 62R—Property and Casualty Reinsurance of the Accounting Practices and Procedures Manual in which credit is not allowed for the ceding insurer because the arrangements do not include a transfer of both timing and underwriting risk that the reinsurer undertakes in fact to indemnify the ceding insurer against loss or liability by reason of the original insurance.

d. Reserve Development

If the Company’s reserves will cause the ratio of One-Year or Two-Year Reserve Development (shown in Schedule P, Part 2) to the respective prior year’s Policyholders’ Surplus to be greater than 20%, the Appointed actuary must include RELEVANT COMMENT on the factors that led to the exceptional reserve development.
e. Methods and Assumptions

If there has been any significant change in the actuarial assumptions and/or methods from those previously employed, that change should be described in a RELEVANT COMMENT paragraph. If the Appointed Actuary is newly-appointed and does not review the work of the prior Appointed Actuary, then the Appointed Actuary should disclose this.

7. The Actuarial Opinion must include assurance that an Actuarial Report and underlying actuarial workpapers supporting the Actuarial Opinion will be maintained at the Company and available for examination for seven years. The Actuarial Report contains significant proprietary information. It is expected that the Actuarial Report be held confidential and not be intended for public inspection. The Actuarial Report must be available by May 1 of the year following the year-end for which the Opinion was rendered or within two (2) weeks after a request from an individual state commissioner.

The Actuarial Report should be consistent with the documentation and disclosure requirements of ASOP No. 41, Actuarial Communications. The Actuarial Report must contain both narrative and technical components. The narrative component should provide sufficient detail to clearly explain to company management, the Board of Directors, the regulator, or other authority the findings, recommendations and conclusions, as well as their significance. The technical component should provide sufficient documentation and disclosure for another actuary practicing in the same field to evaluate the work. This technical component must show the analysis from the basic data (e.g., loss triangles) to the conclusions.

The Actuarial Report must also include:

- A description of the Appointed Actuary’s relationship to the Company, with clear presentation of the Appointed Actuary’s role in advising the Board and/or management regarding the carried reserves. The Actuarial Report should identify how and when the Appointed Actuary presents the analysis to the Board and, where applicable, to the officer(s) of the Company responsible for determining the carried reserves.

- An exhibit that ties to the Annual Statement and compares the Appointed Actuary’s conclusions to the carried amounts consistent with the segmentation of exposure or liability groupings used in the analysis. The Appointed Actuary’s conclusions include the Appointed Actuary’s point estimate(s), range(s) of reasonable estimates or both.

- An exhibit that reconciles and maps the data used by the Appointed Actuary, consistent with the segmentation of exposure or liability groupings used in the Appointed Actuary’s analysis, to the Annual Statement Schedule P.

- An exhibit or appendix showing the change in the Appointed Actuary’s estimates from the prior Actuarial Report, including extended discussion of factors underlying any material changes. If the Appointed Actuary is newly-appointed and does not review the work of the prior Appointed Actuary, then the Appointed Actuary should disclose this.

- Extended comments on trends that indicate the presence or absence of risks and uncertainties that could result in material adverse deviation.

- Extended comments on factors that led to exceptional reserve development, as defined in 6C and 6D, and how these factors were addressed in prior and current analyses.
8. The statement should conclude with the signature of the Appointed Actuary responsible for providing the Actuarial Opinion and the date when the Opinion was rendered. The signature and date should appear in the following format:

___________________________________
Signature of Appointed Actuary

Printed name of Appointed actuary

Employer’s name

Address of Appointed Actuary

Telephone number of Appointed Actuary

Email address of Appointed Actuary

Date opinion was rendered

9. The Insurer required to furnish an Actuarial Opinion shall require its Appointed Actuary to notify its Board of Directors or its audit committee in writing within five (5) business days after any determination by the Appointed Actuary that the Opinion submitted to the domiciliary commissioner was in error as a result of reliance on data or other information (other than assumptions) that, as of the balance sheet date, was factually incorrect. The Opinion shall be considered to be in error if the Opinion would have not been issued or would have been materially altered had the correct data or other information been used. The Opinion shall not be considered to be in error if it would have been materially altered or not issued solely because of data or information concerning events subsequent to the balance sheet date or because actual results differ from those projected.

Notification shall be required for any such determination made between the issuance of the Actuarial Opinion and the balance sheet date for which the next Actuarial Opinion will be issued. The notification should include a summary of such findings and an amended Actuarial Opinion.

An Insurer who is notified pursuant to the preceding paragraphs shall forward a copy of the summary and the amended Actuarial Opinion to the domiciliary commissioner within five (5) business days of receipt of such and shall provide the Appointed Actuary making the notification with a copy of the summary and amended Actuarial Opinion being furnished to the domiciliary commissioner. If the Appointed Actuary fails to receive such copy within the five (5) business day period referred to in the previous sentence, the Appointed Actuary shall notify the domiciliary commissioner within the next five (5) business days that the submitted Actuarial Opinion should no longer be relied upon or such other notification recommended by the actuary’s attorney.

If the Appointed Actuary learns that the data or other information relied upon was factually incorrect, but cannot immediately determine what, if any, changes are needed in the Actuarial Opinion, the actuary and the Company should undertake as quickly as is reasonably practical those procedures necessary for the Appointed Actuary to make the determination discussed above. If the Insurer does not provide the necessary data corrections and other support (including financial support) within ten (10) business days, the actuary should proceed with the notification discussed above.

No Appointed Actuary shall be liable in any manner to any person for any statement made in connection with the above paragraphs if such statement is made in a good faith effort to comply with the above paragraphs.

10. Data in Exhibit A and Exhibit B are to be filed in both print and data capture format.
STATEMENT OF ACTUARIAL OPINION

**Exhibit A: SCOPE**
DATA TO BE FILED IN BOTH PRINT AND DATA CAPTURE FORMAT

<table>
<thead>
<tr>
<th>LOSS AND LOSS ADJUSTMENT EXPENSE RESERVES:</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Unpaid Losses and Loss Adjustment Expenses (Schedule P, Part 1, Total Column 24 or 34 if discounting is allowable under state law)</td>
<td>$ ________</td>
</tr>
<tr>
<td>2. Unpaid Losses and Loss Adjustment Expenses - Direct and Assumed (Should equal Schedule P, Part 1, Summary, Totals from Columns 17, 18, 20, 21, and 23, Line 12 x 1000)</td>
<td>$ ________</td>
</tr>
<tr>
<td>3. Other items on which the Appointed Actuary is expressing an Opinion (list separately, adding additional lines as needed)</td>
<td>$ ________</td>
</tr>
</tbody>
</table>

**Exhibit B: DISCLOSURES**
DATA TO BE FILED IN BOTH PRINT AND DATA CAPTURE FORMAT

NOTE: Exhibit B should be completed for Net dollar amounts included in the SCOPE. If an answer would be different for Direct and Assumed amounts, identify and discuss the difference within RELEVANT COMMENTS.

<table>
<thead>
<tr>
<th>Last Name</th>
<th>First Name</th>
<th>Middle Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Name of the Appointed Actuary

2. The Appointed Actuary’s relationship to the Company.
   Enter E or C based upon the following:
   E - If an Employee of the Company or Group
   C - If a Consultant

3. The Appointed Actuary has the following designation (indicated by the letter code):
   F - If a Fellow of the Casualty Actuarial Society (FCAS)
   A - If an Associate of the Casualty Actuarial Society (ACAS)
   M - If not a member of the Casualty Actuarial Society, but a Member of the American Academy of Actuaries (MAAA) approved by the Casualty Practice Council, as documented with the attached approval letter.
   O - For Other

   ________  ________  ________

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4. Type of Opinion, as identified in the OPINION paragraph. Enter R, I, E, Q, or N based upon the following:
   R - If Reasonable
   I - If Inadequate or Deficient Provision
   E - If Excessive or Redundant Provision
   Q - If Qualified (use Q when part of the OPINION is Qualified)
   N - If No Opinion

5. Materiality Standard expressed in U.S. dollars (used to answer question #6) $ 

6. Are there significant risks that could result in Material Adverse Deviation? 

7. Statutory Surplus (Liabilities, Surplus, and Other Funds Page, Line 32) $ 

8. Known claims reserve (Liabilities, Surplus, and Other Funds Page, Line 1) $ 

9. Statutory premium reserve (Liabilities, Surplus, and Other Funds Page, Line 2) $ 

10. Aggregate of other reserves required by law (Liabilities, Surplus, and Other Funds Page, Line 3) $ 

11. Supplemental reserve (Liabilities, Surplus, and Other Funds Page, Line 4) $ 

12. Anticipated net salvage and subrogation included as a reduction to loss reserves as reported in Schedule P $ 

13. Discount included as a reduction to loss reserves and loss adjustment expense reserves as reported in Schedule P $ 

14. Other items on which the Appointed Actuary is providing relevant comment (list separately, adding additional lines as needed) $ 

1. Remove the two sentences starting with "The log shall include categorization of CE approved for use by CASTF…" to eliminate the reference to the CE Log study.
2. Add deadline for submission of QD to the Board: “At least one month prior…”
3. Add language about documenting review of QD at the level of the holding company structure that is responsible for overseeing insurance operations.
4. Add reference to ASOP 56 (Modeling), 1 (Introductory ASOP), 20 (Discounting of PC Unpaid Claim Estimates) and 21 (Responding to or Assisting Auditors or Examiners in Connection with Financial Audits, Financial Reviews, and Financial Examinations).
5. Add assertion that the qualification documentation was provided to the BOD, “directly or through Company Management.”
6. Michelle made a point that hardly any actuarial reports follow this format exactly. Usually this information is provided in various spots throughout the report. Do we want to re-word this language just to ask that this information is included, but not mandate the format and location?
7. Gordon having some trouble getting an appointed actuary to understand the second paragraph in section 7, sentence by sentence.
8. What exactly are the actuary’s “conclusions”? Are they each prescribed SAO assertion, esp. that the carried amounts on Exhibit A meet state legal requirements, are based on or consistent with reserves based on good actuarial work, and make a provision that’s reasonable (or not)?

The Actuarial Report should be consistent with the documentation and disclosure requirements of ASOP No. 41, Actuarial Communications.

The Actuarial Report must contain both narrative and technical components.

The narrative component should provide sufficient detail to clearly explain to Company management, the Board of Directors, the regulator or other authority the actuary’s findings, recommendations and conclusions, as well as their significance.

The technical component should provide sufficient documentation and disclosure for another actuary practicing in the same field to evaluate the work.

This technical component must show the analysis from the basic data (e.g., loss triangles) to the actuary’s conclusions.
NAIC BLANKS (E) WORKING GROUP

Blanks Agenda Item Submission Form

DATE: March 1, 2022

CONTACT PERSON: Kris DeFrain
TELEPHONE: 816-783-8229
EMAIL ADDRESS: kdefrain@naic.org
ON BEHALF OF:

NAME: Anna Krylova
TITLE: Chair
AFFILIATION: Actuarial Opinion Working Group
ADDRESS: Anna.Krylova@state.nm.us

FOR NAIC USE ONLY
Agenda Item #
Year
Changes to Existing Reporting [ ]
New Reporting Requirement [ ]
REVIEWED FOR ACCOUNTING PRACTICES AND PROCEDURES IMPACT
No Impact [ ]
Modifies Required Disclosure [ ]

DISPOSITION
[ ] Rejected For Public Comment
[ ] Referred To Another NAIC Group
[ ] Received For Public Comment
[ ] Adopted Date
[ ] Rejected Date
[ ] Deferred Date
[ ] Other (Specify)

BLANK(S) TO WHICH PROPOSAL APPLIES
[ X ] ANNUAL STATEMENT
[ ] QUARTERLY STATEMENT
[ X ] INSTRUCTIONS
[ ] CROSSCHECKS

[ ] Life, Accident & Health/Fraternal
[ ] Property/Casualty
[ ] Health

[ X ] Separate Accounts
[ ] Protected Cell
[ ] Health (Life Supplement)

Anticipated Effective Date: Annual 2022

IDENTIFICATION OF ITEM(S) TO CHANGE
Changes and clarifying guidance in Sections 1, 3, and 8 of the Actuarial Opinion Instructions. Please see the attached red-line document for identification of each change.

REASON, JUSTIFICATION FOR AND/OR BENEFIT OF CHANGE**
Proposed changes include some clean-up and clarifications in the P/C Statement of Actuarial Opinion Instructions. Changes were adopted by Actuarial Opinion (C) Working Group on 3/1/2022.

Section 1:
- Guidance on continuing education (CE) logs is no longer required because the Casualty Actuarial and Statistical (C) Task Force’s CE Log project will not be reoccurring. Actuaries will refer to their respective societies for guidance on CE Logs.
- Additional guidance is provided on documentation of the board review of Qualification Documentation (QD) for companies that are part of a group whose parent board reviews QD on behalf of all subsidiaries. Guidance on this question has been requested by the industry and the Working Group has consulted the Financial Examination Handbook (E) Technical Group on the appropriate response.

Section 3: An additional requirement is added in the IDENTIFICATION paragraph for Appointed Actuaries to confirm that qualification documentation has been provided to the Board of Directors. This statement in the IDENTIFICATION paragraph will assist regulators in determining whether this requirement has been met.

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Section 8: Clarification that the signature block requirements apply to the Statement of Actuarial Opinion only. The Actuarial Report should reproduce the same information, though not necessarily in the same format. It has been reported that Appointed Actuaries often provide the required information in a slightly different format within the Actuarial Report, necessitating Financial Examiners to create meaningless findings/objections just because the information doesn’t follow the exact format. The Working Group members agree that the prescribed format is applicable to the Actuarial Opinion only and the format in the Actuarial Report may vary.

NAIC STAFF COMMENTS

Comment on Effective Reporting Date: ____________________________________________________________

Other Comments:

** This section must be completed on all forms. Revised 7/18/2018
1. There is to be included with or attached to Page 1 of the Annual Statement the statement of the Appointed Actuary, entitled “Statement of Actuarial Opinion” (Actuarial Opinion), setting forth his or her opinion relating to reserves specified in the SCOPE paragraph. The Actuarial Opinion, both the narrative and required Exhibits, shall be in the format of and contain the information required by this section of the Annual Statement Instructions – Property and Casualty.

Upon initial engagement, the Appointed Actuary must be appointed by the Board of Directors by Dec. 31 of the calendar year for which the opinion is rendered. The Company shall notify the domiciliary commissioner within five business days of the initial appointment with the following information:

a. Name and title (and, in the case of a consulting actuary, the name of the firm).

b. Manner of appointment of the Appointed Actuary (e.g., who made the appointment and when).

c. A statement that the person meets the requirements of a Qualified Actuary (or was approved by the domiciliary commissioner) and that documentation was provided to the Board of Directors.

Once this notification is furnished, no further notice is required with respect to this person unless the Board of Directors takes action to no longer appoint or retain the actuary or the actuary no longer meets the requirements of a Qualified Actuary.

If subject to the U.S. Qualification Standards, the Appointed Actuary shall annually attest to having met the continuing education requirements under Section 3 of the U.S. Qualification Standards for issuing Actuarial Opinions. As agreed with the actuarial organizations, the Casualty Actuarial Society (CAS) and Society of Actuaries (SOA) will determine the process for receiving the attestations for their respective members and make available the attestations to the public. An Appointed Actuary subject to the U.S. Qualification Standards and not a member of the CAS or SOA shall select one of the above organizations to submit their attestation.

In accordance with the CAS and SOA’s continuing education review procedures, an Appointed Actuary who is subject to the U.S. Qualification Standards and selected for review shall submit a log of their continuing education in a form determined by the CAS and SOA. The log shall include categorization of continuing education approved for use by the Casualty Actuarial and Statistical Task Force. As agreed with the actuarial organizations, the CAS and SOA will provide an annual consolidated report to the NAIC identifying the types and subject matter of continuing education being obtained by Appointed Actuaries. An Appointed Actuary subject to the U.S. Qualification Standards and not a member of the CAS or SOA shall follow the review procedures for the organization in which they submitted their attestation.

The Appointed Actuary shall provide to the Board of Directors qualification documentation on occasion of their appointment, and on an annual basis thereafter, directly or through company management. The documentation should include brief biographical information and a description of how the definition of “Qualified Actuary” is met or expected to be met (in the case of continuing education) for that year. The documentation should describe the Appointed Actuary’s responsible experience relevant to the subject of the Actuarial Opinion. The Board of Directors shall document the company’s their review of those materials and any other information they may deem relevant, including information that may be requested directly from the Appointed Actuary. It is generally expected that the review of the Appointed Actuary’s qualification documentation should take place at the level within a holding company structure that is responsible for overseeing insurance operations. If a statutory entity is a subsidiary or a non-lead pool member with an Appointed Actuary whose qualifications were reviewed by the pool lead or principal’s Board, the statutory entity’s Board can satisfy the review requirement by acknowledging the parent Board’s review. This can be done by noting in the meeting minutes the name of the principal or lead entity and the date the parent Board reviewed the qualification documentation, or by attaching a copy of the parent Board’s meeting minutes reflecting their review of the qualification documentation. The qualification documentation shall be considered workpapers and be available for inspection upon regulator request or during a financial examination.
If an actuary who was the Appointed Actuary for the immediately preceding filed Actuarial Opinion is replaced by an action of the Board of Directors, the Insurer shall within five (5) business days notify the Insurance Department of the state of domicile of this event. The Insurer shall also furnish the domiciliary commissioner with a separate letter within ten (10) business days of the above notification stating whether in the twenty-four (24) months preceding such event there were any disagreements with the former Appointed Actuary regarding the content of the opinion on matters of the risk of material adverse deviation, required disclosures, scope, procedures, type of opinion issued, substantive wording of the opinion or data quality. The disagreements required to be reported in response to this paragraph include both those resolved to the former Appointed Actuary’s satisfaction and those not resolved to the former Appointed Actuary’s satisfaction. The letter should include a description of the disagreement and the nature of its resolution (or that it was not resolved). Within this same ten (10) business days, the Insurer shall in writing also request such former Appointed Actuary to furnish a letter addressed to the Insurer stating whether the Appointed Actuary agrees with the statements contained in the Insurer’s letter and, if not, stating the reasons for which he or she does not agree. The former Appointed Actuary shall provide a written response to the insurer within ten (10) business days of such request, and the Insurer shall furnish such responsive letter from the former Appointed Actuary to the domiciliary commissioner together with its own responses.

The Appointed Actuary must report to the Board of Directors each year on the items within the scope of the Actuarial Opinion. The Actuarial Opinion and the Actuarial Report must be made available to the Board of Directors. The minutes of the Board of Directors should indicate that the Appointed Actuary has presented such information to the Board of Directors and identify the manner of presentation (e.g., webinar, in-person presentation, written). A separate Actuarial Opinion is required for each company filing an Annual Statement. When there is an affiliated company pooling arrangement, one Actuarial Report for the aggregate pool is sufficient, but there must be addendums to the Actuarial Report to cover non-pooled reserves for individual companies.

The Actuarial Opinion and the supporting Actuarial Report and workpapers should be consistent with the appropriate Actuarial Standards of Practice (ASOPs), including, but not limited to, ASOP No. 23, ASOP No. 36, ASOP No. 41 and ASOP No. 43, as promulgated by the Actuarial Standards Board.

### 1A. Definitions

“Appointed Actuary” is a Qualified Actuary (or individual otherwise approved by the domiciliary commissioner) appointed by the Board of Directors in accordance with Section 1 of these instructions.

“Board of Directors” can include the designated Board of Directors, its equivalent or an appropriate committee directly reporting to the Board of Directors.

“Qualified Actuary” is a person who:

(i) Meets the basic education, experience and continuing education requirements of the Specific Qualification Standard for Statements of Actuarial Opinion, NAIC Property and Casualty Annual Statement, as set forth in the Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion in the United States (U.S. Qualifications Standards), promulgated by the American Academy of Actuaries (Academy):

(ii) Has obtained and maintains an Accepted Actuarial Designation; and

(iii) Is a member of a professional actuarial association that requires adherence to the same Code of Professional Conduct promulgated by the Academy, requires adherence to the U.S. Qualification Standards, and participates in the Actuarial Board for Counseling and Discipline when its members are practicing in the U.S.

An exception to parts (i) and (ii) of this definition would be an actuary evaluated by the Academy’s Casualty Practice Council and determined to be a Qualified Actuary for particular lines of business and business activities.
“Accepted Actuarial Designation” in item (ii) of the definition of a Qualified Actuary, is an actuarial designation accepted as meeting or exceeding the NAIC’s Minimum Property/Casualty (P/C) Actuarial Educational Standards for a P/C Appointed Actuary (published on the NAIC website). The following actuarial designations, with any noted conditions, are accepted as meeting or exceeding basic education minimum standards:

(i) Fellow of the CAS (FCAS) – Condition: basic education must include Exam 6 – Regulation and Financial Reporting (United States);

(ii) Associate of the CAS (ACAS) – Conditions: basic education must include Exam 6 – Regulation and Financial Reporting (United States) and Exam 7 – Estimation of Policy Liabilities, Insurance Company Valuation, and Enterprise Risk Management;

(iii) Fellow of the SOA (FSA) – Conditions: basic education must include completion of the general insurance track, including the following optional exams: the United States’ version of the Financial and Regulatory Environment Exam and the Advanced Topics in General Insurance Exam.

The table below provides some allowable exam substitutions for (i), (ii) and (iii) in the definition of “Accepted Actuarial Designation:” Noting that CAS exams have changed over time, exceptions for (i) and (ii) provide for FCAS/ACAS designations achieved before an exam was created (e.g. CAS Exam 6-US) or with an earlier version of an exam or exam topic (e.g., 2010 CAS Exam 6 instead of the current CAS Exam 7 Section A). FCAS/ACAS qualified under the 2018 and prior Statement of Actuarial Opinion instructions can use the noted substitution rules to achieve qualification under the new instructions by demonstrating basic and/or continuing education of the required topics including material in CAS Exam 6 (US) and section A of CAS Exam 7 (in the May 2019 CAS syllabus). Exceptions for (iii) for an FSA are also included in the table. The SOA exams completed in the general insurance track in 2019 and prior should be supplemented with continuing education and experience to meet basic education requirements in the U.S. Qualification Standards. For purpose of these instructions only, the table also includes specific exams from other organizations that are accepted as substitutes.

<table>
<thead>
<tr>
<th>Exception for (i), (ii), or (iii)</th>
<th>Exam:</th>
<th>Exam Substitution Allowed*</th>
</tr>
</thead>
</table>
| (i) and (ii) CAS Exam 6 (US)    | 1. Any CAS version of a U.S. P/C statutory accounting and regulation exam administered prior to creation of the CAS Exam 6 (US) in 2011.  
2. An FCAS or ACAS earned prior to 2021 who did not pass CAS Exam 6 (US) or an allowable exam substitution, may substitute experience and/or continuing education for CAS Exam 6 (US) provided the Appointed Actuary explains in his/her qualification documentation how knowledge of U.S. financial reporting and regulation was obtained.  
3. SOA FREU (US) Exam |
| (ii) CAS Exam 7                 | 1. Any CAS version of an exam including advanced P/C reserving administered prior to creation of Exam 7 in 2011.  
2. An ACAS earned prior to 2021 who did not pass CAS Exam 7 or an allowable exam substitution, may substitute experience and/or continuing education for CAS Exam 7 provided the Appointed Actuary explains in his/her qualification documentation how knowledge of the additional reserving topics in CAS Exam 7 (Section A) in the May 2019 syllabus was obtained.  
3. SOA Advanced Topics Exam (Note: The ERM portion of Exam 7 is not needed to meet NAIC educational standards, therefore SOA ERM Exam is not needed for the substitution for this purpose.) |
| (iii) SOA FREU (US) Exam        | 1. CAS Exam 6 (US)  
| (iii) SOA Advanced Topics Exam   | 1. CAS Exam 7  
2. Any CAS version of an exam containing the advanced techniques to estimate policy liabilities (i.e., advanced reserving). |

*Note: These exam substitutions only apply to these instructions and are not applicable for CAS or SOA exam waivers.
“Insurer” or “Company” means an insurer or reinsurer authorized to write property and/or casualty insurance under the laws of any state and who files on the Property and Casualty Blank.

“Actuarial Report” means a document or other presentation prepared as a formal means of conveying to the state regulatory authority and the Board of Directors the Appointed Actuary’s professional conclusions and recommendations of recording and communicating the methods and procedures, of assuring that the parties addressed are aware of the significance of the Appointed Actuary’s opinion or findings, and of documenting the analysis underlying the opinion. The required content of the Actuarial Report is further described in paragraph 7. (Note that the inclusion of the Board of Directors as part of the intended audience for the Actuarial Report does not change the content of the Actuarial Report as described in paragraph 7. The Appointed Actuary should present findings to the Board of Directors in a manner deemed suitable for such audience.)

“Property and Casualty (P&C) Long Duration Contracts” refers to contracts (excluding financial guaranty contracts, mortgage guaranty contracts and surety contracts) that fulfill both of the following conditions: (1) the contract term is greater than or equal to 13 months; and (2) the insurer can neither cancel the contract nor increase the premium during the contract term. These contracts are subject to the three tests of SSAP No. 65—Property and Casualty Contracts of the NAIC Accounting Practices and Procedures Manual.

“Accident and Health (A&H) Long Duration Contracts” refers to A&H contracts in which the contract term is greater than or equal to 13 months and contract reserves are required. See Schedule H instructions for a description of categories of contract reserves, as well as policy features that give rise to contract reserves. Two specific examples of contracts that typically require contract reserves are long-term care and disability income insurance.

1B. Exemptions

An insurer who intends to file for one of the exemptions under this Section must submit a letter of intent to its domiciliary commissioner no later than December 1 of the calendar year for which the exemption is to be claimed. The commissioner may deny the exemption prior to December 31 of the same year if he or she deems the exemption inappropriate.

A copy of the approved exemption must be filed with the Annual Statement in all jurisdictions in which the company is authorized.

Exemption for Small Companies

An insurer that has less than $1,000,000 total direct plus assumed written premiums during a calendar year, and less than $1,000,000 total direct plus assumed loss and loss adjustment expense reserves at year-end, in lieu of the Actuarial Opinion required for the calendar year, may submit an affidavit under oath of an officer of the insurer that specifies the amounts of direct plus assumed written premiums and direct plus assumed loss and loss adjustment reserves.

Exemption for Insurers under Supervision or Conservatorship

Unless ordered by the domiciliary commissioner, an insurer that is under supervision or conservatorship pursuant to statutory provision is exempt from the filing requirements contained herein.

Exemption for Nature of Business

An insurer otherwise subject to the requirement and not eligible for an exemption as enumerated above may apply to its domiciliary commissioner for an exemption based on the nature of business written.
Financial Hardship Exemption

An insurer otherwise subject to this requirement and not eligible for an exemption as enumerated above may apply to the commissioner for a financial hardship exemption. Financial hardship is presumed to exist if the projected reasonable cost of the Actuarial Opinion would exceed the lesser of:

(i) One percent (1%) of the insurer’s capital and surplus reflected in the insurer’s latest quarterly statement for the calendar year for which the exemption is sought; or

(ii) Three percent (3%) of the insurer’s direct plus assumed premiums written during the calendar year for which the exemption is sought as projected from the insurer’s latest quarterly statements filed with its domiciliary commissioner.

1C. Reporting Requirements for Pooled Companies

For each company in the pool, the Appointed Actuary shall include a description of the pool, identification of the lead company and a listing of all companies in the pool, their state of domicile and their respective pooling percentages.

Exhibits A and B for each company in the pool should represent the company’s share of the pool and should reconcile to the financial statement for that company.

The following paragraph applies to companies that have a 0% share of the pool (no reported Schedule P data). The company shall submit an Actuarial Opinion that reads similar to that provided for the lead company. For example, the IRIS ratio and risk of material adverse deviation discussions, and other relevant comments shall relate to the risks of the lead company in the pool. The Exhibit B responses to question 5 should be $0 and to question 6 should be “not applicable.” Exhibits A and B of the lead company should be attached as an addendum to the PDF file and/or hard copy being filed (but would not be reported by the 0% companies in their data capture).

2. The Actuarial Opinion must consist of an IDENTIFICATION paragraph identifying the Appointed Actuary; a SCOPE paragraph identifying the subjects on which an opinion is to be expressed and describing the scope of the Appointed Actuary’s work; an OPINION paragraph expressing his or her opinion with respect to such subjects; and one or more additional RELEVANT COMMENTS paragraphs. These four sections must be clearly designated.

3. The IDENTIFICATION paragraph should indicate the Appointed Actuary’s relationship to the Company, qualifications for acting as Appointed Actuary and date of appointment and specify that the appointment was made by the Board of Directors. Additionally, the IDENTIFICATION paragraph should include a statement asserting that the Appointed Actuary has complied with the requirement to provide qualification documentation to the Board of Directors, either directly or through company management.

If the Appointed Actuary was approved by the Academy to be a “Qualified Actuary,” with or without limitation, or if the Appointed Actuary is not a Qualified Actuary but was approved by the domiciliary commissioner, the company must attach, each year, the approval letter and reference such in the identification paragraph.

4. The SCOPE paragraph should contain a sentence such as the following:

“I have examined the actuarial assumptions and methods used in determining reserves listed in Exhibit A, as shown in the Annual Statement of the Company as prepared for filing with state regulatory officials, as of December 31, 20__, and reviewed information provided to me through XXX date.”

Exhibit A should list those items and amounts with respect to which the Appointed Actuary is expressing an opinion.

The Appointed Actuary should state that the items in the SCOPE, on which he or she is expressing an opinion, reflect Disclosure items 8 through 13.2 in Exhibit B.
The SCOPE paragraph should include a paragraph such as the following regarding the data used by the Appointed Actuary in forming the opinion:

“In forming my opinion on the loss and loss adjustment expense reserves, I relied upon data prepared by ________ (officer name and title at the Company). I evaluated that data for reasonableness and consistency. I also reconciled that data to Schedule P, Part 1 of the Company’s current Annual Statement. In other respects, my examination included such review of the actuarial assumptions and methods used and such tests of the calculations as I considered necessary.”

5. The OPINION paragraph should include a sentence that at least covers the points listed in the following illustration:

“In my opinion, the amounts carried in Exhibit A on account of the items identified:

A. Meet the requirements of the insurance laws of (state of domicile).
B. Are computed in accordance with accepted actuarial standards.
C. Make a reasonable provision for all unpaid loss and loss adjustment expense obligations of the Company under the terms of its contracts and agreements.”

If the Scope includes material Unearned Premium Reserves for P&C Long Duration Contracts or Other Loss Reserve items on which the Appointed Actuary is expressing an opinion, the Actuarial Opinion should contain language such as the following:

D. Make a reasonable provision for the unearned premium reserves for P&C Long Duration Contracts and/or <insert Other Loss Reserve item on which the Appointed Actuary is expressing an Opinion> of the Company under the terms of its contracts and agreements.

If there is any aggregation or combination of items in Exhibit A, the opinion language should clearly identify the combined items.

Insurance laws and regulations shall at all times take precedence over the actuarial standards.

If the Appointed Actuary has made use of the analysis of another actuary not within the Appointed Actuary’s control (such as for pools and associations, for a subsidiary or for special lines of business) for a material portion of the reserves, the other actuary must be identified by name, credential and affiliation within the OPINION paragraph. If the Appointed Actuary has made use of the work of a non-actuary (such as for modeling) for a material portion of the reserves, that individual must be identified by name and affiliation and a description of the type of analysis performed must be provided.

A Statement of Actuarial Opinion should be made in accordance with one of the following sections (1 through 5). The Appointed Actuary must explicitly identify in Exhibit B which type applies.

1. Determination of Reasonable Provision. When the carried reserve amount is within the Appointed Actuary’s range of reasonable reserve estimates, the Appointed Actuary should issue a Statement of Actuarial Opinion that the carried reserve amount makes a reasonable provision for the liabilities associated with the specified reserves.

2. Determination of Deficient or Inadequate Provision. When the carried reserve amount is less than the minimum amount that the Appointed Actuary believes is reasonable, the Appointed Actuary should issue a Statement of Actuarial Opinion that the carried reserve amount does not make a reasonable provision for the liabilities associated with the specified reserves. In addition, the Appointed Actuary should disclose the minimum amount that the Appointed Actuary believes is reasonable.

3. Determination of Redundant or Excessive Provision. When the carried reserve amount is greater than the maximum amount that the Appointed Actuary believes is reasonable, the Appointed Actuary should issue a Statement of Actuarial Opinion that the carried reserve amount does not make a reasonable provision for the liabilities associated with the specified reserves. In addition, the Appointed Actuary should disclose the maximum amount that the Appointed Actuary believes is reasonable.
4. **Qualified Opinion.** When, in the Appointed Actuary’s opinion, the reserves for a certain item or items are in question because they cannot be reasonably estimated or the Appointed Actuary is unable to render an opinion on those items, the Appointed Actuary should issue a qualified Statement of Actuarial Opinion. The Appointed Actuary should disclose the item (or items) to which the qualification relates, the reason(s) for the qualification and the amounts for such item(s), if disclosed by the Company. Such a qualified opinion should state whether the carried reserve amount makes a reasonable provision for the liabilities associated with the specified reserves, **except for** the item (or items) to which the qualification relates. The Appointed Actuary is not required to issue a qualified opinion if the Appointed Actuary reasonably believes that the item (or items) in question are not likely to be material.

5. **No Opinion.** The Appointed Actuary’s ability to give an opinion is dependent upon data, analyses, assumptions, and related information that are sufficient to support a conclusion. If the Appointed Actuary cannot reach a conclusion due to deficiencies or limitations in the data, analyses, assumptions, or related information, then the Appointed Actuary may issue a statement of no opinion. A statement of no opinion should include a description of the reasons why no opinion could be given.

6. **RELEVANT COMMENT paragraphs** to address the following topics of regulatory importance.
   
   **A. Company-Specific Risk Factors**
   
   The Appointed Actuary should include an explanatory paragraph to describe the major factors, combination of factors or particular conditions underlying the risks and uncertainties the Appointed Actuary considers relevant. The explanatory paragraph should not include general, broad statements about risks and uncertainties due to economic changes, judicial decisions, regulatory actions, political or social forces, etc., nor is the Appointed Actuary required to include an exhaustive list of all potential sources of risks and uncertainties.

   **B. Risk of Material Adverse Deviation**
   
   The Appointed Actuary must provide specific **RELEVANT COMMENT paragraphs** to address the risk of material adverse deviation. The Appointed Actuary must identify the materiality standard and the basis for establishing this standard. The materiality standard must also be disclosed in U.S. dollars in Exhibit B: Disclosures. The Appointed Actuary should explicitly state whether or not he or she reasonably believes that there are significant risks and uncertainties that could result in material adverse deviation. This determination is also to be disclosed in Exhibit B.

   **C. Other Disclosures in Exhibit B**
   
   **RELEVANT COMMENT paragraphs** should describe the significance of each of the remaining Disclosure items (8 through 14) in Exhibit B. The Appointed Actuary should address the items individually and in combination when commenting on a material impact.

   **D. Reinsurance**
   
   **RELEVANT COMMENT paragraphs** should address reinsurance collectability, retroactive reinsurance and financial reinsurance.

   The Appointed Actuary’s comments on reinsurance collectability should address any uncertainty associated with including potentially uncollectable amounts in the estimate of ceded reserves. Before commenting on reinsurance collectability, the Appointed Actuary should solicit information from management on any actual collectability problems, review ratings given to reinsurers by a recognized rating service and examine Schedule F for the current year for indications of regulatory action or reinsurance recoverable on paid losses over ninety (90) days past due. The comment should also reflect any other information the Appointed Actuary has received from management or that is publicly available about the capability or willingness of reinsurers to pay claims. The Appointed Actuary’s comments do not imply an opinion on the financial condition of any reinsurer.

Financial reinsurance refers to contracts referenced in SSAP No. 62R in which credit is not allowed for the ceding insurer because the arrangements do not include a transfer of both timing and underwriting risk that the reinsurer undertakes in fact to indemnify the ceding insurer against loss or liability by reason of the original insurance.

E. IRIS Ratios

If the Company’s reserves will create exceptional values under the NAIC IRIS Tests for One-Year Reserve Development to Policyholders’ Surplus, Two-Year Reserve Development to Policyholders’ Surplus or Estimated Current Reserve Deficiency to Policyholders’ Surplus, the Appointed Actuary must include RELEVANT COMMENT on the factors that led to the unusual value(s).

F. Methods and Assumptions

If there has been any significant change in the actuarial assumptions and/or methods from those previously employed, that change should be described in a RELEVANT COMMENT paragraph. If the Appointed Actuary is newly appointed and does not review the work of the prior Appointed Actuary, then the Appointed Actuary should disclose this.

7. The Actuarial Opinion must include assurance that an Actuarial Report and underlying actuarial workpapers supporting the Actuarial Opinion will be maintained at the Company and available for regulatory examination for seven (7) years. The Actuarial Report contains significant proprietary information. It is expected that the Actuarial Report be held confidential and not be intended for public inspection. The Actuarial Report must be available by May 1 of the year following the year-end for which the Actuarial Opinion was rendered or within two (2) weeks after a request from an individual state commissioner.

The Actuarial Report should be consistent with the documentation and disclosure requirements of ASOP No. 41, Actuarial Communications. The Actuarial Report must contain both narrative and technical components. The narrative component should provide sufficient detail to clearly explain to Company management, the Board of Directors, the regulator or other authority the findings, recommendations and conclusions, as well as their significance. The technical component should provide sufficient documentation and disclosure for another actuary practicing in the same field to evaluate the work. This technical component must show the analysis from the basic data (e.g., loss triangles) to the conclusions.

Actuarial Guideline LI—The Application of Asset Adequacy Testing to Long-Term Care Insurance Reserves (AG 51) in the NAIC Accounting Practices and Procedures Manual requires a company with over 10,000 in force lives covered by long-term care (LTC) insurance contracts as of the valuation date to perform a stand-alone asset adequacy analysis for its in force long-term care (LTC) contracts. The Actuarial Report and workpapers summarizing the results, assumptions and testing procedures for the asset adequacy testing of LTC business must be in compliance with AG 51 requirements. When referring to AG 51, the term “Actuarial Memorandum” is synonymous with Actuarial Report and workpapers.

The Actuarial Report should contain disclosure of all reserve amounts associated with A&H Long Duration Contracts reported by the Company; the reserve amounts in the Actuarial Report should tie to the Annual Statement.
The Actuarial Report must also include:

A. A description of the Appointed Actuary’s relationship to the Company, with clear presentation of the Appointed Actuary’s role in advising the Board of Directors and/or management regarding the carried reserves. The Actuarial Report should identify how and when the Appointed Actuary presents the analysis to the Board of Directors and, where applicable, to the officer(s) of the Company responsible for determining the carried reserves.

B. An exhibit that ties to the Annual Statement and compares the Appointed Actuary’s conclusions to the carried amounts consistent with the segmentation of exposure or liability groupings used in the analysis. The Appointed Actuary’s conclusions include the Appointed Actuary’s point estimate(s), range(s) of reasonable estimates or both.

C. An exhibit that reconciles and maps the data used by the Appointed Actuary, consistent with the segmentation of exposure or liability groupings used in the Appointed Actuary’s analysis, to the Annual Statement Schedule P line of business reporting. An explanation should be provided for any material differences.

D. An exhibit or appendix showing the change in the Appointed Actuary’s estimates from the prior Actuarial Report, including extended discussion of factors underlying any material changes. The exhibit or appendix should illustrate the changes on a net basis but should also include the changes on a gross basis, if relevant. If the Appointed Actuary is newly appointed and does not review the work of the prior Appointed Actuary, then the Appointed Actuary should disclose this.

E. Extended comments on trends that indicate the presence or absence of risks and uncertainties that could result in material adverse deviation.

F. Extended comments on factors that led to unusual IRIS ratios for One-Year Reserve Development to Policyholders’ Surplus, Two-Year Reserve Development to Policyholders’ Surplus or Estimated Current Reserve Deficiency to Policyholders’ Surplus, and how these factors were addressed in prior and current analyses.

8. The Actuarial Opinion and the Actuarial Report should conclude with the signature of the Appointed Actuary responsible for providing the Actuarial Opinion and the respective dates of when the Actuarial Opinion was rendered and the Actuarial Report finalized. The signature and date should appear in the following format:

___________________________________  
Signature of Appointed Actuary 
Printed name of Appointed Actuary 
Employer’s name 
Address of Appointed Actuary 
Telephone number of Appointed Actuary 
Email address of Appointed Actuary 
Date opinion was rendered

The same information should be reproduced within the Actuarial Report, along with the date the Actuarial Report was finalized.

9. The Insurer required to furnish an Actuarial Opinion shall require its Appointed Actuary to notify its Board of Directors or its audit committee in writing within five (5) business days after any determination by the Appointed Actuary that the Actuarial Opinion submitted to the domiciliary commissioner was in error as a result of reliance on data or other information (other than assumptions) that, as of the balance sheet date, was factually incorrect. The Actuarial Opinion shall be considered to be in error if the Actuarial Opinion would have not been issued or would have been materially altered had the correct data or other information been used. The Actuarial Opinion shall not be considered to be in error if it would have been materially altered or not issued solely because of data or information concerning events subsequent to the balance sheet date or because actual results differ from those projected. Notification is required when discovery is made between the issuance of the Actuarial Opinion and Dec. 31 of that year. Notification should include a summary of such findings.
If the Appointed Actuary learns that the data or other information relied upon was factually incorrect, but cannot immediately determine what, if any, changes are needed in the Actuarial Opinion, the Appointed Actuary and the Company should quickly undertake procedures necessary for the Appointed Actuary to make such determination. If the Insurer does not provide the necessary data corrections and other support (including financial support) within ten (10) business days, the Appointed Actuary should proceed with the notification to the Board of Directors and the domiciliary commissioner.

An Insurer who is notified pursuant to the preceding paragraphs shall forward a copy of the amended Actuarial Opinion to the domiciliary commissioner within five (5) business days of receipt of such and shall provide the Appointed Actuary making the notification with a copy of the letter and amended Actuarial Opinion submitted to the domiciliary commissioner. If the Appointed Actuary fails to receive such copy within the five (5) business day period referred to in the previous sentence, the Appointed Actuary shall notify the domiciliary commissioner within the next five (5) business days that an amended Actuarial Opinion has been finalized.

No Appointed Actuary shall be liable in any manner to any person for any statement made in connection with the above paragraphs if such statement is made in a good faith effort to comply with the above paragraphs.

10. Data in Exhibits A and B are to be filed in both print and data capture format.

**Exhibit A: SCOPE**

**DATA TO BE FILED IN BOTH PRINT AND DATA CAPTURE FORMATS**

<table>
<thead>
<tr>
<th>Loss and Loss Adjustment Expense Reserves:</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Unpaid Losses (Liabilities, Surplus and Other Funds page, Col 1, Line 1)</td>
<td>$__________</td>
</tr>
<tr>
<td>2. Unpaid Loss Adjustment Expenses (Liabilities, Surplus and Other Funds page, Col 1, Line 3)</td>
<td>$__________</td>
</tr>
<tr>
<td>3. Unpaid Losses – Direct and Assumed (Should equal Schedule P, Part 1, Summary, Totals from Cols. 13 and 15, Line 12 * 1000)</td>
<td>$__________</td>
</tr>
<tr>
<td>4. Unpaid Loss Adjustment Expenses – Direct and Assumed (Should equal Schedule P, Part 1, Summary, Totals from Cols. 17, 19 and 21, Line 12 * 1000)</td>
<td>$__________</td>
</tr>
<tr>
<td>5. The Page 3 write-in item reserve, “Retroactive Reinsurance Reserve Assumed”</td>
<td>$__________</td>
</tr>
<tr>
<td>6. Other Loss Reserve items on which the Appointed Actuary is expressing an Opinion (list separately, adding additional lines as needed)</td>
<td>$__________</td>
</tr>
</tbody>
</table>

**Premium Reserves:**

<table>
<thead>
<tr>
<th>Premium Reserves:</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Reserve for Direct and Assumed Unearned Premiums for P&amp;C Long Duration Contracts</td>
<td>$__________</td>
</tr>
<tr>
<td>8. Reserve for Net Unearned Premiums for P&amp;C Long Duration Contracts</td>
<td>$__________</td>
</tr>
<tr>
<td>9. Other Premium Reserve items on which the Appointed Actuary is expressing an Opinion (list separately, adding additional lines as needed)</td>
<td>$__________</td>
</tr>
</tbody>
</table>
**Exhibit B: DISCLOSURES**
DATA TO BE FILED IN BOTH PRINT AND DATA CAPTURE FORMATS

NOTE: Exhibit B should be completed for Net dollar amounts included in the SCOPE. If an answer would be different for Direct and Assumed amounts, identify and discuss the difference within RELEVANT COMMENTS.

1. Name of the Appointed Actuary
   Last _______ First ______ Mid ______

2. The Appointed Actuary’s relationship to the Company
   Enter E or C based upon the following:
   - E if an Employee of the Company or Group
   - C if a Consultant

3. The Appointed Actuary’s Accepted Actuarial Designation (indicated by the letter code):
   - F if a Fellow of the Casualty Actuarial Society (FCAS)
   - A if an Associate of the Casualty Actuarial Society (ACAS)
   - S if a Fellow of the Society of Actuaries (FSA) through the General Insurance track
   - M if the actuary does not have an Accepted Actuarial Designation but is approved by the Academy’s Casualty Practice Council.
   - O for Other

4. Type of Opinion, as identified in the OPINION paragraph.
   Enter R, I, E, Q, or N based upon the following:
   - R if Reasonable
   - I if Inadequate or Deficient Provision
   - E if Excessive or Redundant Provision
   - Q if Qualified. Use Q when part of the OPINION is Qualified.
   - N if No Opinion

5. Materiality Standard expressed in U.S. dollars (used to Answer Question #6) $ ______

6. Are there significant risks that could result in Material Adverse Deviation? Yes [ ] No [ ] Not Applicable [ ]

7. Statutory Surplus (Liabilities, Surplus and Other Funds page, Col 1, Line 37) $ ______

8. Anticipated net salvage and subrogation included as a reduction to loss reserves as reported in Schedule P (should equal Part I Summary, Col 23, Line 12 * 1000) $ ______

9. Discount included as a reduction to loss reserves and loss adjustment expense reserves as reported in Schedule P
   9.1 Nontabular Discount [Notes, Line 32B23, (Amounts 1, 2, 3 & 4)], Electronic Filing Cols 1, 2, 3, & 4 $ ______
   9.2 Tabular Discount [Notes, Line 32A23, (Amounts 1 & 2)], Electronic Filing Col 1 & 2 $ ______

10. The net reserves for losses and loss adjustment expenses for the Company’s share of voluntary and involuntary underwriting pools’ and associations’ unpaid losses and loss adjustment expenses that are included in reserves shown on the Liabilities, Surplus and Other Funds page, Losses and Loss Adjustment Expenses lines $ ______
11. The net reserves for losses and loss adjustment expenses that the Company carries for the following liabilities included on the Liabilities, Surplus and Other Funds page, Losses and Loss Adjustment Expenses lines *

11.1 Asbestos, as disclosed in the Notes to Financial Statements (Notes, Line 33A03D, ending net asbestos reserves for current year) Electronic Filing Col 5 $ _______

11.2 Environmental, as disclosed in the Notes to Financial Statements (Notes, Line 33D03D, ending net environmental reserves for current year), Electronic Filing Col 5 $ _______

12. The total claims made extended loss and loss adjustment expense, and unearned premium reserves (Greater than or equal to Schedule P Interrogatories)

12.1 Amount reported as loss and loss adjustment expense reserves $ _______

12.2 Amount reported as unearned premium reserves $ _______

13. The net reserves for the A&H Long Duration Contracts that the Company carries on the following lines on the Liabilities, Surplus and Other Funds page:

13.1 Losses $ _______

13.2 Loss Adjustment Expenses $ _______

13.3 Unearned Premium $ _______

13.4 Write-In (list separately, adding additional lines as needed, and identify (e.g., “Premium Deficiency Reserves”, “Contract Reserves other than Premium Deficiency Reserves” or “AG 51 Reserves”) $ _______

14. Other items on which the Appointed Actuary is providing relevant comment (list separately, adding additional lines as needed) $ _______

* The reserves disclosed in item 11 above, should exclude amounts relating to contracts specifically written to cover asbestos and environmental exposures. Contracts specifically written to cover these exposures include Environmental Impairment Liability (post 1986), Asbestos Abatement, Pollution Legal Liability, Contractor’s Pollution Liability, Consultant’s Environmental Liability, and Pollution and Remediation Legal Liability.
The Statistical Data (C) Working Group of the Casualty Actuarial and Statistical (C) Task Force met Jan. 27, 2022. The following Task Force members participated: Sandra Darby, Chair (ME); Wanchin Chou, Vice Chair, and Qing He (CT); Cynthia Amann (MO); Christian Citarella (NH); Alexander Vajda (NY); Tom Botsko (OH); Andrew Schallhorn (OK); David Dahl (OR); and Brian Ryder (TX). Also participating were: Luciano Gobbo (CA); Randy Jacobson (HI); Anthony Bredel (IL); Nichole Torblaa (LA); Regan Hess (MT); Chris Aufenthie (ND).

1. Discussed Suggested Changes to NAIC Statistical Reports

Ms. Darby said Arthur Schwartz (NC) submitted potential changes to the *Competition Database Report* (Competition Report), the *Auto Database Report* (Auto Report), and the *Dwelling, Fire, Homeowners Owner-Occupied, and Homeowners Tenant and Condominium/Cooperative Unit Owner's Insurance Report* (Homeowners Report).

Ms. Darby said for the Competition Report, there were questions about the market share data. She said it was unclear whether these suggestions were a replacement or a supplement for the current report. Mr. Botsko said he would like to know why certain columns were eliminated in this spreadsheet.

Ms. Darby said for the Auto Report, the submitting statistical agents would need to clarify if they can provide the data by metropolitan statistical area (MSA). She said it is unclear what the data source would be for elements like median car value and median per capita income.

Ms. Darby said for the Homeowners Report, it is unclear what the data source would be for median home value and what the difference is between new homes and all homes. She said mobile home coverage may not be able to be broken out and reported separately as requested.

Ms. Darby said she would compile a list of questions about these proposed changes to send to Mr. Schwartz. She said these suggestions would be discussed on a future call for Mr. Schwartz to address the questions.

2. Discussed the Timeline of Data Collection for NAIC Statistical Reports

Ms. Darby said the Working Group has a charge from the Casualty Actuarial and Statistical (C) Task Force to adopt a faster timeline for the publication of auto insurance and homeowners insurance average premiums. She said the Auto Report could not include loss and claims data on a sped-up timeline, and the Homeowners Report would not include California detailed data every year, as that data is collected by the California Department of Insurance (DOI) only every other year. Mr. Citarella said the Working Group should consider adopting a sped-up timeline for the Homeowners Report. He said if California data can only be collected every other year, then the report should still be published, and it can include California data in the years that it is available. Mr. Gobbo said California can provide high level information every year, but it can only provide the homeowners data by insurance range every other year.

Libby Crews (NAIC) said the Working Group would need to produce two reports in one year to catch up to the desired timeline.
Due to this change, Mr. Chou asked for a longer exposure period to review the reports when they are completed for the year.

Mr. Chou made a motion, seconded by Mr. Citarella, to speed up the timeline of the Homeowners Report by collecting data from the most recent data year and collect two years of data in 2022 to catch up to the new timeline. The motion passed unanimously.

Ms. Darby said a sped-up timeline for the Auto Report would not include loss and claims data, as that cannot be collected on a faster timeline.

Birny Birnbaum (Center for Economic Justice—CEJ) said more recent average premium data can be added to the report along with historical loss information. Ms. Darby asked if the more recent average premium data should be added to the report as an appendix. Mr. Birnbaum said the information should not be in an appendix. He said the report would just have one more recent year of average premium data than the loss data. Mr. Dahl said it would be better to have the more recent premium information in a separate table so that readers are not trying to compare premium and loss information for different years.

Mr. Citarella asked if NAIC staff could provide mock-ups of the more recent average premium data added into the current tables and added as a separate table.

3. Discussed Initiating a Review of the Statistical Handbook

Ms. Darby said the Working Group should begin a review of the Statistical Handbook (Handbook). She said the Handbook has not been updated since 2012. She asked any Working Group member that would like to lead the review of a section of the Handbook to reach out. She said the Working Group would work on updating the Handbook throughout the year.

Having no further business, the Statistical Data (C) Working Group adjourned.

APPENDIX B-RF – INFORMATION ELEMENTS AND GUIDANCE FOR A REGULATOR TO MEET BEST PRACTICES’ OBJECTIVES (WHEN REVIEWING RANDOM FORESTS)

This appendix identifies the information a state insurance regulator may need to review a Random Forest predictive model used by an insurer to support a personal automobile or home insurance rating plan. The list is lengthy but not exhaustive. It is not intended to limit the authority of a regulator to request additional information in support of the model or filed rating plan. Nor is every item on the list intended to be a requirement for every filing. However, the items listed should help guide a regulator to sufficient information that helps determine if the rating plan meets state-specific filing and legal requirements. Documentation of the design and operational details of the model will help ensure the business continuity and transparency of the models used. Documentation should be sufficiently detailed and complete to enable a qualified third party to form a sound judgment on the suitability of the model for the intended purpose. The theory, assumptions, methodologies, software, and empirical bases should be explained, as well as the data used in developing and implementing the model. Relevant testing and ongoing performance testing need to be documented. Key model limitations and overrides need to be pointed out so that stakeholders understand the circumstances under which the model does not work effectively. End-user documentation should be provided and key reports using the model results described. Major changes to the model need to be documented and shared with regulators in a timely and appropriate manner. Information technology (IT) controls should be in place, such as a record of versions, change control, and access to the model.

Many information elements listed below are probably confidential, proprietary, or trade secret and should be treated as such, in accordance with state laws and/or regulations. Regulators should be aware of their state laws and/or regulations on confidentiality when requesting data from insurers that may be proprietary or trade secret. For example, some proprietary models may have contractual terms (with the insurer) that prevent disclosure to the public. Without clear necessity, exposing this data to additional dissemination may compromise the model’s protection. Although the list of information is long, the insurer should already have internal documentation on the model for more than half of the information listed. The remaining items on the list require either minimal analysis (approximately 25%) or deeper analysis to generate for a regulator (approximately 25%).

The “Level of Importance to the Regulator’s Review” is a ranking of information a regulator may need to review which is based on the following level criteria:

- **Level 1** – This information is necessary to begin the review of a predictive model. These data elements pertain to basic information about the type and structure of the model, the data and variables used, the assumptions made, and the goodness of fit. Ideally, this information would be included in the filing documentation with the initial submission of a filing made based on a predictive model.

- **Level 2** – This information is necessary to continue the review of all but the most basic models, such as those based only on the filer’s internal data and only including variables that are in the filed rating plan. These data elements provide more detailed information about the model and address questions arising from review of the information in Level 1. Insurers concerned with speed to market may also want to include this information in the filing documentation.

- **Level 3** – This information is necessary to continue the review of a model where concerns have been raised and not resolved based on review of the information in Level 1 and Level 2. These data elements address even more detailed aspects of the model. This information does not necessarily need to be included with the initial submission, unless specifically requested by a particular state, as it is typically requested only if the reviewer has concerns that the model may not comply with state laws and/or regulations.

- **Level 4** – This information is necessary to continue the review of a model where concerns have been raised and not resolved based on the information in Level 1, Level 2, and Level 3. This most granular level of detail is addressing

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2 There are some models that are made public by the vendor and would not result in a hindrance of the model’s protection.
the basic building blocks of the model and does not necessarily need to be included by the filer with the initial submission, unless specifically requested by a particular state. It is typically requested only if the reviewer has serious concerns that the model may produce rates or rating factors that are excessive, inadequate, and/or unfairly discriminatory.

Appendix B-RF is focused on Random Forest models and should not be referenced in the review of other model types. Random Forest models are a tree-based approach with many significant differences from GLMs. This Appendix B-RF is intended to provide state guidance for the review of rate filings based on Random Forest models.
# A. SELECTING MODEL INPUT

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| 1.       | 1. Available Data Sources                                                            |                                               |                                                                                       | Request details of data sources, whether internal to the company or from external sources. For insurance experience (policy or claim), determine whether data are aggregated by calendar, accident, fiscal, or policy year and when it was last evaluated. For each data source, get a list of all data elements used as input to the model that came from that source. For insurance data, get a list all companies whose data is included in the datasets.  
Request details of any non-insurance data used (customer-provided or other), whether the data was collected by use of a questionnaire/checklist, whether data was voluntarily reported by the applicant, and whether any of the data is subject to the federal Fair Credit Reporting Act (FCRA). If the data is from an outside source, find out what steps were taken to verify the data was accurate, complete, and unbiased in terms of relevant and representative time frame, representative of potential exposures, and lacking in obvious correlation to protected classes.  
Note: Reviewing source details should not make a difference when the model is new or refreshed; refreshed models would report the prior version list with the incremental changes due to the refresh. |
| A.1.a    | Review the details of sources for both insurance and non-insurance data used as input to the model (only need sources for filed input characteristics included in the filed model). | 1                                             | Accuracy of insurance data should be reviewed. It is assumed that the data in the insurer’s data banks is subject to routine internal company audits and reconciliation. “Aggregated data” is straight from the insurer’s data banks without further modification (i.e., not scrubbed or transformed for the purposes of modeling). In other words, the data would not have been specifically modified for the purpose of model building. The company should provide some form of reasonability check that the data makes sense when checked against other audited sources. |
| A.1.b    | Reconcile aggregated insurance data underlying the model with available external insurance reports. | 4                                             |                                                                                                                                                                                                                                                                                                           |
### Section Information Element

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<td>2</td>
<td>Many models are developed using a countrywide or a regional dataset. The company should explain how the data used to build the model makes sense for a specific state. The regulator should inquire which states were included in the data underlying the model build, testing, and validation. The company should explain why any states were excluded from the countrywide data. The company should provide an explanation where the data came from geographically and that it is a good representation for a state; i.e., the distribution by state should not introduce a geographic bias. However, there could be a bias by peril or wind-resistant building codes. Evaluate whether the data is relevant to the loss potential for which it is being used. For example, verify that hurricane data is only used where hurricanes can occur. The company should provide a demonstration that the model fits well on the specific state or surrounding region.</td>
</tr>
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</table>

| 3                                           | Check if the same variables/datasets were used in the model, a sub-model, or as stand-alone rating characteristics. Random Forest models handle redundant variables by splitting on only one of the variables within each component tree. By contrast, GLMs struggle with redundant variables as they try to include redundant variables simultaneously. However, best actuarial practice is to keep models as parsimonious as possible and only include additional variables that contribute significant additional predictive power. |

| 1                                           | If the sub-model was previously approved/accepted, that may reduce the extent of the sub-model’s review. If approved, obtain the tracking number(s) (e.g., state, SERFF) and verify when and if it was the same model currently under review. |

Note: A previous approval does not necessarily confer a guarantee of ongoing approval; e.g., when statutes and/or regulations have changed or if a model’s indications have been undermined by subsequent empirical experience. However, knowing whether a model has been previously approved can help focus the regulator’s efforts and determine whether the prior decision needs to be revisited. In some circumstances, direct dialogue with the vendor could be quicker and more useful. |
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<tr>
<td>A.2.c</td>
<td>Determine if the sub-model output was used as input to the Random Forest; obtain the vendor name, as well as the name and version of the sub-model.</td>
<td>1</td>
<td>To accelerate the review of the filing, it may be desirable to request (from the company), the name and contact information for a vendor representative. The company should provide the name of the third-party vendor and a contact in the event the regulator has questions. The “contact” can be an intermediary at the insurer (e.g., a filing specialist), who can place the regulator in direct contact with a subject-matter expert (SME) at the vendor. Examples of such sub-models include credit/financial scoring algorithms and household composite score models. Sub-models can be evaluated separately and in the same manner as the primary model under evaluation. A sub-model contact for additional information should be provided. Sub-model SMEs may need to be brought into the conversation with regulators (whether in-house or third-party sub-models are used).</td>
</tr>
<tr>
<td>A.2.d</td>
<td>If using catastrophe model output, identify the vendor and the model settings/assumptions used when the model was run.</td>
<td>1</td>
<td>To accelerate the review of the filing, get contact information for the SME that ran the model and an SME from the vendor. The “SME” can be an intermediary at the insurer (e.g., a filing specialist), who can place the regulator in direct contact with the appropriate SMEs at the insurer or model vendor. For example, it is important to know hurricane model settings for storm surge, demand surge, and long-term/short-term views.</td>
</tr>
<tr>
<td>A.2.e</td>
<td>Obtain an explanation of how catastrophe models are integrated into the model to ensure no double-counting.</td>
<td>1</td>
<td>If a weather-based sub-model is input to the Random Forest under review, loss data used to develop the model should not include loss experience associated with the weather-based sub-model. Doing so could cause distortions in the modeled results by double-counting such losses when determining relativities or loss loads in the filed rating plan. For example, redundant losses in the data may occur when non-hurricane wind losses are included in the data while also using a severe convective storm model in the actuarial indication. Such redundancy may also occur with the inclusion of fluvial or pluvial flood losses when using a flood model or inclusion of freeze losses when using a winter storm model.</td>
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<tr>
<td>A.2.f</td>
<td>If using output of any scoring algorithms, obtain a list of the variables used to determine the score and provide the source of the data used to calculate the score.</td>
<td>1</td>
<td>Any sub-model should be reviewed in the same manner as the primary model that uses the sub-model’s output as input. Depending on the result of item A.2.b, the importance of this item may be decreased.</td>
</tr>
<tr>
<td>A.3.a</td>
<td>Determine if premium, exposure, loss, or expense data were adjusted (e.g., on-leveled, developed, trended, adjusted for catastrophe experience, or capped). If so, how? Do the adjustments vary for different segments of the data? If so, identify the segments and how the data was adjusted.</td>
<td>2</td>
<td>The rating plan or indications underlying the rating plan may provide special treatment of large losses and non-modeled large loss events. If such treatments exist, the company should provide an explanation how they were handled. These treatments need to be identified and the company/regulator needs to determine whether model data needs to be adjusted. For example, should large bodily injury (BI) liability losses in the case of personal automobile insurance be excluded, or should large non-catastrophe wind/hail claims in home insurance be excluded from the model’s training, test and validation data? Look for anomalies in the data that should be addressed. For example, is there an extreme loss event in the data? If other processes were used to load rates for specific loss events, how is the impact of those losses considered? Examples of losses that can contribute to anomalies in the data are large losses or flood, hurricane, or severe convective storm losses for personal automobile comprehensive or home insurance. Premium should be brought to current rate level if the target variable is calculated with a premium metric, such as loss ratio. Premium can be brought to current rate level with the extension of exposures method or the parallelogram method. Note that the premium must be on-leveled at a granular variable level for each variable included in the new model if the parallelogram method is used. Statewide on-level factors by coverage are typically sufficient for statewide rate indication development but not sufficient for models that determine rates by variable level.</td>
</tr>
<tr>
<td>A.3.b</td>
<td>Identify adjustments that were made to aggregated data (e.g., transformations, binning and/or categorizations). If any, identify the name of the characteristic/variable and obtain a description of the adjustment.</td>
<td>1</td>
<td>Pre-modeling binning may be unnecessary in a random forest model. The tree model will naturally segment numerical values in the splitting process of the trees. However, if the insurer does bin variables before modeling, the reason should be understood.</td>
</tr>
<tr>
<td>A.3.c</td>
<td>Ask for aggregated data (one dataset of pre-adjusted/scrubbed data and one dataset of post-adjusted/scrubbed data) that allows the regulator to focus on the univariate distributions and compare raw data to adjusted/binned/transformed/etc. data.</td>
<td>4</td>
<td>This is most relevant for variables that have been “scrubbed” or adjusted. Though most regulators may never ask for aggregated data and do not plan to rebuild any models, a regulator may ask for this aggregated data or subsets of it. It would be useful to the regulator if the percentage of exposures and premium for missing information from the model data by category are provided. This data can be displayed in either graphical or tabular formats.</td>
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<tr>
<td>A.3.d</td>
<td>Determine how missing data was handled.</td>
<td>1</td>
<td>This is most relevant for variables that have been “scrubbed” or adjusted. The regulator should be aware of assumptions the modeler made in handling missing, null, or “not available” values in the data. For example, it would be helpful to the reviewer if the modeler were to provide a statement as to whether there is any systemic reason for missing data. If adjustments or recoding of values were made, they should be explained. It may also be useful to the regulator if the percentage of exposures and premium for missing information from the model data are provided. This data can be displayed in either graphical or tabular formats. The modeler should describe the way the tree fitting process handled missing values. The modeler should specify if missing values are treated before running the tree model or if they are allowed to be handled by the tree model. When creating predictions on new datasets (such as hold out datasets), tree-based models may have different approaches for handling missing data or categorical levels not encountered in the training data for a predictor variable. The modeler should specify the process utilized when this occurs.</td>
</tr>
<tr>
<td>A.3.e</td>
<td>If duplicate records exist, determine how they were handled.</td>
<td>1</td>
<td>Look for a discussion of how outliers were handled. If necessary, the regulator may want to investigate further by getting a list (with description) of the types of outliers and determine what adjustments were made to each type of outlier. To understand the filer’s response, the regulator should ask for the filer’s materiality standard.</td>
</tr>
<tr>
<td>A.3.f</td>
<td>Determine if there were any material outliers identified and subsequently adjusted during the scrubbing process.</td>
<td>3</td>
<td></td>
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<td></td>
<td>Obtain documentation on the insurer’s process for reviewing the appropriateness, reasonableness, consistency, and comprehensiveness of the data, including a discussion of the rational relationship the data has to the predicted variable.</td>
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<td>2</td>
<td>An example is when by-peril or by-coverage modeling is performed; the documentation should be for each peril/coverage and make rational sense. For example, if “murder” or “theft” data are used to predict the wind peril, the company should provide support and a rational explanation for their use.</td>
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<tr>
<td>A.4.c</td>
<td>Identify material findings the company had during its data review and obtain an explanation of any potential material limitations, defects, bias, or unresolved concerns found or believed to exist in the data. If issues or limitations in the data influenced modeling analysis and/or results, obtain a description of those concerns and an explanation how modeling analysis was adjusted and/or results were impacted.</td>
<td>1</td>
<td>“None” or “N/A” may be an appropriate response.</td>
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### B. BUILDING THE MODEL

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<tbody>
<tr>
<td>1. High-Level Narrative for Building the Model</td>
<td>Identify the type of model underlying the rate filing (e.g., Random Forest, GLM, decision tree, Bayesian GLM, gradient-boosting machine, neural network, etc.). Understand the model’s role in the rating system and provide the reasons why that type of model is an appropriate choice for that role.</td>
<td>1</td>
<td>It is important to understand if the model in question is a Random Forest and, therefore, these information elements are applicable; or if it is some other model type, in which case other reasonable review approaches may be considered. There should be an explanation of why the model (using the variables included in it) is appropriate for the line of business. If by-peril or by-coverage modeling is used, the explanation should be by-peril/by-coverage. <strong>Note:</strong> If the model is not a Random Forest, the information elements in this white paper may not apply in their entirety.</td>
</tr>
<tr>
<td>B.1.a</td>
<td>Identify the software used for model development. Obtain the name of the software vendor/developer, software product, and a software version reference used in model development.</td>
<td>3</td>
<td>Changes in software from one model version to the next may explain if such changes, over time, contribute to changes in the modeled results. The company should provide the name of the third-party vendor and a “contact” in the event the regulator has questions. The “contact” can be an intermediary at the insurer (e.g., a filing specialist) who can place the regulator in direct contact with the appropriate SME at the vendor. Open-source software/programs used in model development should be identified by name and version the same as if from a vendor.</td>
</tr>
<tr>
<td>Section</td>
<td>Information Element</td>
<td>Level of Importance to Regulator’s Review</td>
<td>Comments</td>
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<tr>
<td>B.1.c</td>
<td>Obtain a description how the available data was divided between model training, test, and/or validation datasets. The description should include an explanation why the selected approach was deemed most appropriate, whether the company made any further subdivisions of available data, and reasons for the subdivisions (e.g., a portion separated from training data to support testing of components during model building). Determine if the validation data was accessed before model training was completed and, if so, obtain an explanation of why that came to occur. Obtain a discussion of whether the model was rebuilt using all the data or if it was only based on the training data.</td>
<td>1</td>
<td>The reviewer should be aware that modelers may break their data into three or just two datasets. Although the term “training” is used with little ambiguity, “test” and “validation” are terms that are sometimes interchanged, or the word “validation” may not be used at all. The reviewer should note whether a company employed cross-validation techniques instead of a training/test/validation dataset approach. If cross-validation techniques were used, the reviewer should request a description of how cross-validation was done and confirm that the final model was not built on any particular subset of the data, but rather the full dataset. The discussion of training, test, and/or validation datasets is a separate discussion from the % of observations (rows of data) or % of features (columns of data) used within each tree. These splits are based on hyperparameters and are commented on in other sections.</td>
</tr>
<tr>
<td>B.1.d</td>
<td>Obtain a brief description of the development process, from initial concept to final model and filed rating plan.</td>
<td>1</td>
<td>The narrative should have the same scope as the filing.</td>
</tr>
<tr>
<td>B.1.e</td>
<td>Obtain a narrative on whether loss ratio, pure premium, or frequency/severity analyses were performed and, if separate frequency/severity modeling was performed, how pure premiums were determined.</td>
<td>1</td>
<td>A clear description of the target variable is key to understanding the purpose of the model. It may also prove useful to obtain a sample calculation of the target variable in Excel format, starting with the “raw” data for a policy, or a small sample of policies, depending on the complexity of the target variable calculation.</td>
</tr>
<tr>
<td>B.1.f</td>
<td>Identify the model's target variable.</td>
<td>1</td>
<td>Candidate variables are the variables used as input to the modeling process. Certain variables may not end up used in the final model if none of the component trees of the model split on the variable. The narrative regarding the candidate variable selection process may address matters such as the criteria upon which variables were selected or omitted, identification of the number of preliminary variables considered in developing the model versus the number of variables that remained, and any statutory or regulatory limitations that were taken into account when making</td>
</tr>
<tr>
<td>B.1.g</td>
<td>Obtain a description of the candidate variable selection process prior to the model building.</td>
<td>1</td>
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<p>| | the decisions regarding candidate variable selection. The modeler should comment on the use of automated feature selection algorithms to choose candidate predictor variables and explain how potential overfitting that can arise from these techniques was addressed. | |</p>
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<tr>
<td>B.1.h</td>
<td>In conjunction with variable selection, obtain a narrative on how the company determined the granularity of the rating variables during model development.</td>
<td>3</td>
<td>The narrative should include discussion of how credibility was considered in the process of determining the level of granularity of the variables selected.</td>
</tr>
<tr>
<td>B.1.i</td>
<td>Determine if model input data was segmented in any way (e.g., by-coverage, by-peril, or by-form basis). If so, obtain a description of data segmentation and the reasons for data segmentation.</td>
<td>1</td>
<td>The regulator would use this to follow the logic of the modeling process.</td>
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2. Medium-Level Narrative for Building the Model

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<tbody>
<tr>
<td>B.2.a</td>
<td>At crucial points in model development, if selections were made among alternatives regarding model assumptions, techniques, or hyperparameters, obtain a narrative on the judgment used to make those selections.</td>
<td>2</td>
<td>Evaluate the addition or removal of variables and the model fitting. It is not necessary for the company to discuss each iteration of adding and subtracting variables, but the regulator should gain a general understanding of how these adjustments were done, including any statistical improvement measures relied upon.</td>
</tr>
<tr>
<td>B.2.b</td>
<td>If post-model adjustments were made to the data and the model was rerun, obtain an explanation on the details and the rationale for those adjustments.</td>
<td>2</td>
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<tr>
<td>B.2.d</td>
<td>Identify which distribution was used for the model (e.g., Regression based on Poisson, Gamma, Logistic, or Tweedie are common choices). Obtain an explanation of why the distribution was chosen. Certain distribution assumptions will involve numerical parameters, for example regression with a Tweedie assumed distribution will have a p power value. Obtain the specific numerical parameters associated with the distribution.</td>
<td>1</td>
<td>Tree-based methods combine predictions from multiple component trees and aggregate them into a final prediction for each observation. Common methods for combining random forest model predictions include the arithmetic or geometric mean of all the component trees.</td>
</tr>
<tr>
<td>B.2.e</td>
<td>Obtain a narrative on how the predictions from the component trees are combined to arrive at a final model prediction.</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>B.2.f</td>
<td>If there were data situations in which weights were used, obtain an explanation of how and why they were used.</td>
<td>3</td>
<td>Investigate whether identical records were combined to build the model.</td>
</tr>
<tr>
<td>B.3.1</td>
<td>Obtain the number of component trees comprising the Random Forest model. Obtain a narrative on how this number was chosen.</td>
<td>1</td>
<td>Random Forest models should contain enough trees to reduce error to an acceptable level. Random forest models should balance this with the concept of parsimony. A model with fewer trees that achieves relatively similar reduction in error is preferable to a model with more trees. Checking the error on a test dataset or out of bag error for different numbers of trees can reveal at what value the error on test data starts to level off. Modelers might rely on early stopping rules within modeling software to arrive at the final number of trees. The narrative on the number of trees should discuss the stopping criterion, which defines what condition is met when the model stopped adding more trees.</td>
</tr>
<tr>
<td>B.3.2</td>
<td>Obtain the sampling parameters that apply to both the percent of observations used in each component tree and the number of features tested for each split within each tree. Obtain a narrative on how the sampling parameters were selected.</td>
<td>1</td>
<td>Random forest models often sample both the observations (typically rows of modeling data) with replacement and sample the features (typically columns of modeling data) This means that each tree has a bootstrapped dataset. The company should discuss the bagging fraction (a.k.a. sample size) applied to observations (typically rows of data). This is often expressed as a percent. For example: perhaps each tree is based on a bootstrapped sample which is 50% of the original dataset. The company should discuss the number of features</td>
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<tr>
<td>B.3.3</td>
<td>Obtain the maximum depth that applies to the component trees in the model. Obtain a narrative on how this number was chosen.</td>
<td>The depth of a tree is the number of splits that are allowed to occur between the root node and the terminal nodes. This number can be set explicitly in modeling software or may be implicitly set if the company applies a splitting constraint, such as a minimum observations per node. Maximum tree depths of 8 or higher are considered extremely high.</td>
</tr>
<tr>
<td>B.3.4</td>
<td>Obtain parameters that determined the volume of data in each tree node and a narrative of how parameters were chosen.</td>
<td>Minimum data volume constraints can be applied to a tree-based model, such that the trees will not create a split that would result in terminal nodes with volume below a set amount. The modeler should comment on how the threshold was chosen.</td>
</tr>
<tr>
<td>B.3.5</td>
<td>Obtain a narrative of the process to select all hyperparameters for the Random Forest. Detail how this process addressed potential overfitting in the model.</td>
<td>The narrative should include a description of each hyperparameter, document the values of the hyperparameters, specify the implication of using a higher or lower value for each hyperparameter, and discuss any sensitivity testing completed on the hyperparameters and observations from the sensitivity analysis. Hyperparameter tuning can be done in a variety of ways. The rigor of the tuning process should reflect the risk of overfitting on the specific dataset.</td>
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<tr>
<td>3. Predictor Variables</td>
<td>Obtain a complete data dictionary, including the names, types, definitions, and rationales for each variable.</td>
<td>1</td>
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<tr>
<td>B.3.a</td>
<td></td>
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<tr>
<td>B.3.b</td>
<td>Obtain a list of predictor variables considered but not used in the final model, and the rationale for their removal.</td>
<td>4</td>
</tr>
<tr>
<td>B.3.c</td>
<td>Obtain a correlation matrix for all predictor variables included in the model and sub-model(s).</td>
<td>3</td>
</tr>
<tr>
<td>B.3.d</td>
<td>Obtain plots describing the relationship between each predictor variable and the target variable. Obtain a rational explanation for the observed relationship between each predictor variable and the target variable (frequency, severity, loss costs, expenses, or any element or characteristic being predicted).</td>
<td>1</td>
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seek to understand the relationship that variable has to the target variable.

The regulator should also consider that interpretability plots for tree-based models need to be reviewed with other considerations in mind. For example, partial dependence calculations assume independence with other variables in the model.
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<tr>
<td>B.3.e</td>
<td>If the modeler made use of one or more dimensionality reduction techniques, such as a principal component analysis (PCA), obtain a narrative about that process, an explanation why that technique was chosen, and a description of the step-by-step process used to transform observations (usually correlated) into a set of linearly uncorrelated variables. In each instance, obtain a list of the pre-transformation and post-transformation variable names, as well as an explanation of how the results of the dimensionality reduction technique was used within the model.</td>
<td>2</td>
<td>Variable Importance Plots for tree-based methods highlight which variables contributed most to the model. There are multiple ways to calculate variable importance. Variables with the lowest importance measures should be prioritized when identifying variables that may not be contributing significantly to the model. Variables may have a low importance measure due to high correlation with other variables, but may still prove useful if they interact with other variables to identify unique subsets of risks. Variables with the highest importance measures should be prioritized when determining which variables have the largest impact on predictions.</td>
</tr>
<tr>
<td>B.3.f</td>
<td>Obtain variable importance plots. Obtain a description of how variable importance was calculated.</td>
<td>1</td>
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<tr>
<td>B.4.a</td>
<td>Obtain a description of the methods used to assess the statistical significance/goodness-of-fit of the model to validation data, such as lift charts and statistical tests. Compare the model’s projected results to historical actual results and verify that modeled results are reasonably similar to actual results from validation data.</td>
<td>1</td>
<td>For models that are built using multistate data, validation data for some segments of risk is likely to have low credibility in individual states. Nevertheless, some regulators require model validation on state-only data, especially when analysis using state-only data contradicts the countrywide results. State-only data might be more applicable but could also be impacted by low credibility for some segments of risk. <strong>Note:</strong> It may be useful to consider geographic stability measures for territories within the state.</td>
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<tr>
<td>B.4.e</td>
<td>Obtain evidence that the model fits the training data well by variable and for the overall model.</td>
<td>2</td>
<td>The regulator should ask for the company to provide exhibits or plots that show the fitted average makes sense when compared to the observed average for variables of interest. Regulators would ideally review this comparison for every variable, but time constraints may limit the focus to just variables of interest. Variables of interest should include those with a high importance measure (which will have the most material impact on rates), those with a low importance measure (which may not be contributing significantly to the model), variables without an intuitive relationship to loss, or variables that may be proxies for a protected class attribute.</td>
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| B.4.g   | Obtain a description how the model was tested for stability over time.                | 2                                        | Evaluate the build/test/validation datasets for potential time-sensitive model distortions (e.g., a winter storm in year 3 of 5 can distort the model in both the testing and validation datasets).  
Obsolescence over time is a model risk (e.g., old data for a variable or a variable itself may no longer be relevant). If a model being introduced now is based on losses from years ago, the reviewer should be interested in knowing whether that model would be predictive in the proposed context. Validation using recent data from the proposed context might be requested. Obsolescence is a risk even for a new model based on recent and relevant loss data.  
The reviewer may want to inquire as to the following: What steps, if any, were taken during modeling to prevent or delay obsolescence? What controls exist to measure the rate of obsolescence? What is the plan and timeline for updating and ultimately replacing the model?  
The reviewer should also consider that as newer technologies enter the market (e.g., personal automobile) their impact may change claim activity over time (e.g., lower frequency of loss). So, it is not necessarily a bad thing that the results are not stable over time. |
<p>| B.4.h   | Obtain a narrative on how potential concerns with overfitting were addressed.         | 2                                        | Tree-based models such as Random Forest models are notorious for overfitting. The company should provide a narrative on how overfitting was addressed. The company should provide a lift chart on training data used to fit the model and a lift chart on testing data which was not used to fit the model. If pruning was utilized to address overfitting, the narrative should provide commentary on the pruning process. |</p>
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<tr>
<td>B.4.i</td>
<td>Obtain support demonstrating that the Random Forest assumptions are appropriate.</td>
<td>3</td>
<td>A visual review of plots of actual errors is usually sufficient. The reviewer should look for a conceptual narrative covering these topics: How does this particular Random Forest work? Why did the rate filer do what it did? Why employ this design instead of alternatives? Why choose this particular distribution function and this particular link function? A company response may be at a fairly high level and reference industry practices. If the reviewer determines that the model makes no assumptions that are considered to be unreasonable, the importance of this item may be reduced.</td>
</tr>
<tr>
<td>B.4.j</td>
<td>Obtain 5-10 sample records with corresponding output from the model for those records.</td>
<td>2</td>
<td>The company should provide comprehensive documentation of the rating algorithm such that a rate can be reproduced for any theoretical risk. The company should demonstrate the comprehensiveness of the documentation by providing 5-10 sample records with corresponding input variable values and the final model prediction. The company should describe how the final model prediction aggregates the individual tree model predictions. The company should describe how to use other filing exhibits to reproduce the final model prediction for each sample record.</td>
</tr>
<tr>
<td>B.4.k</td>
<td>Obtain a deviance analysis by number of trees.</td>
<td>2</td>
<td>The company should provide a plot showing that the deviance of the overall model decreases after each iteration (each additional tree).</td>
</tr>
<tr>
<td>5. “Old Model” Versus “New Model”</td>
<td></td>
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<tr>
<td>B.5.a</td>
<td>Obtain an explanation of why this model is an improvement to the current rating plan.</td>
<td>2</td>
<td>The regulator should expect to see improvement in the new class plan’s predictive ability or other sufficient reason for the change.</td>
</tr>
<tr>
<td>B.5.b</td>
<td>Determine if two Gini coefficients were compared and obtain a narrative on the conclusion drawn from this comparison.</td>
<td>3</td>
<td>This information element requests a comparison of the Lorenz curve and Gini coefficient from the prior model to the Gini coefficient of proposed model. It is expected that there should be improvement in the Gini coefficient. A higher Gini coefficient indicates greater differentiation produced by the model and how well the model fits the data. This is relevant when one model is being updated or replaced. The regulator should expect to see improvement in the new class plan’s predictive ability. One example of a comparison might be sufficient. Note: This comparison is not applicable to initial model introduction. Reviewer can look to CAS monograph, “Generalized Linear Models for Insurance Rating.”</td>
</tr>
<tr>
<td>B.5.c</td>
<td>Determine if double-lift charts were analyzed and obtain a narrative on the conclusion drawn from this analysis.</td>
<td>3</td>
<td>One example of a comparison might be sufficient. Note: “Not applicable” is an acceptable response.</td>
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<tr>
<td>B.5.d</td>
<td>If replacing an existing model, obtain a list of any predictor variables used in the old model that are not used in the new model as candidate variables. Obtain an explanation of why these variables were dropped from the new model. Obtain a list of all new predictor variables in the new model that were not in the prior old model.</td>
<td>2</td>
<td>It is useful to differentiate between old and new variables, so the regulator can prioritize more time on variables not yet reviewed.</td>
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<td>6. Modeler Software</td>
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<tr>
<td>B.6.a</td>
<td>Request access to SMEs (e.g., modelers) who led the project, compiled the data, and/or built the model.</td>
<td>4</td>
<td>The filing should contain a contact that can put the regulator in touch with appropriate SMEs and key contributors to the model development to discuss the model.</td>
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## C. THE FILED RATING PLAN

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<td>C.1.a</td>
<td>In the actuarial memorandum or explanatory memorandum, for each model and sub-model (including external models), look for a narrative that explains each model and its role (i.e., how it was used) in the rating system.</td>
<td>1</td>
<td>The “role of the model” relates to how the model integrates into the rating plan as a whole and where the effects of the model are manifested within the various components of the rating plan. This is not intended as an overarching statement of the model’s goal, but rather a description of how specifically the model is used. This item is particularly important, if the role of the model cannot be immediately discerned by the reviewer from a quick review of the rate and/or rule pages. (Importance is dependent on state requirements and ease of identification by the first layer of review and escalation to the appropriate review staff.)</td>
</tr>
<tr>
<td>C.1.b</td>
<td>Obtain an explanation of how the model was used to adjust the filed rating algorithm.</td>
<td>1</td>
<td>The regulator should consider asking for an explanation of how the model was used to adjust the rating algorithm.</td>
</tr>
<tr>
<td>C.1.c</td>
<td>Obtain a complete list of characteristics/variables used in the proposed rating plan, including those used as input to the model (including sub-models and composite variables) and all other characteristics/variables (not input to the model) used to calculate a premium. For each characteristic/variable, determine if it is only input to the model, whether it is only a separate univariate rating characteristic, or whether it is both input to the model and a separate univariate rating characteristic. The list should include transparent descriptions (in plain language) of each listed characteristic/variable.</td>
<td>1</td>
<td>Examples of variables used as inputs to the model and used as separate univariate rating characteristics might be criteria used to determine a rating tier or household composite characteristic.</td>
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| 2. Relevance of Variables and Relationship to Risk of Loss | Obtain a narrative regarding how the characteristics/rating variables included in the filed rating plan relate to the risk of insurance loss (or expense) for the type of insurance product being priced. | 2 | The narrative should include a discussion of the relevance each characteristic/rating variable has on consumer behavior that would lead to a difference in risk of loss (or expense). The narrative should include a rational relationship to cost, and model visualization plots (such as partial dependence plots, accumulated local effects plots, or Shapley plots) should be consistent with the expected direction of the relationship.  
**Note:** This explanation would not be needed if the connection between variables and risk of loss (or expense) has already been illustrated. |
| 3. Comparison of Model Outputs to Current and Selected Rating Factors | Obtain documentation and support for all calculations, judgments, or adjustments that connect the model’s indicated values to the selected rates filed in the rating plan. | 1 | The documentation should include explanations for the necessity of any such adjustments and each significant difference between the model’s indicated values and the selected values. This applies even to models that produce scores, tiers, or ranges of values for which indications can be derived.  
**Note:** This information is especially important if differences between model-indicated values and selected values are material and/or impact one consumer population more than another. |
| | For each characteristic/variable used as both input to the model (including sub-models and composite variables) and as a separate univariate rating characteristic, obtain a narrative regarding how each characteristic/variable was tempered or adjusted to account for possible overlap or redundancy in what the characteristic/variable measures. | 2 | The insurer should address this possibility or other considerations; e.g., tier placement models often use risk characteristics/variables that are also used elsewhere in the rating plan.  
One way to do this would be to model the loss ratios resulting from a process that already uses univariate rating variables. Then the model/composite variables would be attempting to explain the residuals. |
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<tr>
<td>4. Responses to Data, Credibility, and Granularity Issues</td>
<td>Determine what, if any, consideration was given to the credibility of the output data.</td>
<td>2</td>
<td>The regulator should determine at what level of granularity credibility is applied. If modeling was by-coverage, by-form, or by-peril, the company should explain how these were handled when there was not enough credible data by coverage, form, or peril to model.</td>
</tr>
<tr>
<td>C.4.a</td>
<td>If the rating plan is less granular than the model, obtain an explanation of why.</td>
<td>2</td>
<td>This is applicable if the company had to combine modeled output in order to reduce the granularity of the rating plan.</td>
</tr>
<tr>
<td>C.4.b</td>
<td>If the rating plan is more granular than the model, obtain an explanation of why.</td>
<td>2</td>
<td>A more granular rating plan may imply that the company had to extrapolate certain rating treatments, especially at the tails of a distribution of attributes, in a manner not specified by the model indications. It may be necessary to extrapolate due to data availability or other considerations.</td>
</tr>
<tr>
<td>5. Definitions of Rating Variables</td>
<td>Obtain a narrative regarding adjustments made to model output (e.g., transformations, binning and/or categorizations). If adjustments were made, obtain the name of the characteristic/variable and a description of the adjustment.</td>
<td>2</td>
<td>If rating tiers or other intermediate rating categories are created from model output, the rate and/or rule pages should present these rating tiers or categories. The company should provide an explanation of how model output was translated into these rating tiers or intermediate rating categories.</td>
</tr>
<tr>
<td>C.5.a</td>
<td>Obtain aggregated state-specific, book-of-business-specific univariate historical experience data, separately for each year included in the model, consisting of loss ratio or pure premium relativities and the data underlying those calculations for each category of model output(s) proposed to be used within the rating plan. For each data element, obtain an explanation of whether it is raw or adjusted and, if the latter, obtain a detailed explanation for the adjustments.</td>
<td>4</td>
<td>For example, were losses developed/undeveloped, trended/untrended, capped/uncapped, etc.? Univariate indications should not necessarily be used to override more sophisticated multivariate indications. However, they do provide additional context and may serve as a useful reference.</td>
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<td>Consumer Impacts</td>
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<td>C.7.a</td>
<td>Obtain a listing of the top five rating variables that contribute the most to large swings in renewal premium, both as increases and decreases, as well as the top five rating variables with the largest spread of impact for both new and renewal business.</td>
<td>4</td>
<td>These rating variables may represent changes to rating factors, be newly introduced to the rating plan, or have been removed from the rating plan.</td>
</tr>
<tr>
<td>C.7.b</td>
<td>Determine if the company performed sensitivity testing to identify significant changes in premium due to small or incremental change in a single risk characteristic. If such testing was performed, obtain a narrative that discusses the testing and provides the results of that testing.</td>
<td>3</td>
<td>One way to see sensitivity is to analyze a graph of each risk characteristic’s/variable’s average fitted model prediction. Look for significant variation between the average fitted model predictions for adjacent rating variable levels and evaluate if such variation is reasonable and credible.</td>
</tr>
<tr>
<td>C.7.c</td>
<td>For the proposed filing, obtain the impacts on renewal business and describe the process used by management, if any, to mitigate those impacts.</td>
<td>2</td>
<td>Some mitigation efforts may substantially weaken the connection between premium and expected loss and expense and, hence, may be viewed as unfairly discriminatory by some states.</td>
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<tr>
<td>C.7.d</td>
<td>Obtain a rate disruption/dislocation analysis, demonstrating the distribution of percentage and/or dollar impacts on renewal business (created by rerating the current book of business) and sufficient information to explain the disruptions to individual consumers.</td>
<td>2</td>
<td>The analysis should include the largest dollar and percentage impacts arising from the filing, including the impacts arising specifically from the adoption of the model or changes to the model as they translate into the proposed rating plan. While the default request would typically be for the distribution/dislocation of impacts at the overall filing level, the regulator may need to delve into the more granular variable-specific effects of rate changes if there is concern about particular variables having extreme or disproportionate impacts, or significant impacts that have otherwise yet to be substantiated. See Appendix D for an example of a disruption analysis.</td>
</tr>
<tr>
<td>C.7.e</td>
<td>Obtain exposure distributions for the model’s output variables and show the effects of rate changes at granular and summary levels, including the overall impact on the book of business.</td>
<td>3</td>
<td>See Appendix D for an example of an exposure distribution.</td>
</tr>
<tr>
<td>C.7.f</td>
<td>Identify policy characteristics, used as input to a model or sub-model, that remain “static” over a policy’s lifetime versus those that will be updated periodically. Obtain a narrative on how the company handles policy characteristics that are listed as “static,” yet change over time.</td>
<td>3</td>
<td>Some examples of “static” policy characteristics are prior carrier tenure, prior carrier type, prior liability limits, claim history over past X years, or lapse of coverage. These are specific policy characteristics usually set at the time new business is written, used to create an insurance score or to place the business in a rating/underwriting tier, and often fixed for the life of the policy. The reviewer should be aware, and possibly concerned, how the company treats an insured over time when the insured’s risk profile based on “static” variables changes over time but the rate charged, based on a new business insurance score or tier assignment, no longer reflect the insured’s true and current risk profile. A few examples of “non-static” policy characteristics are age of driver, driving record, and credit information (FCRA-related). These are updated automatically by the company on a periodic basis, usually at renewal, with or without the policyholder explicitly informing the company.</td>
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<tr>
<td>Section</td>
<td>Information Element</td>
<td>Level of Importance to Regulator’s Review</td>
<td>Comments</td>
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<td>C.7.g</td>
<td>Obtain a means to calculate the rate charged a consumer.</td>
<td>3</td>
<td>The filed rating plan should contain enough information for a regulator to be able to validate policy premium. However, for a complex model or rating plan, a score or premium calculator via Excel or similar means would be ideal, but this could be elicited on a case-by-case basis. The ability to calculate the rate charged could allow the regulator to perform sensitivity testing when there are small changes to a risk characteristic/variable. <strong>Note:</strong> This information may be proprietary. For the rating plan, the rate order of calculation rule may be sufficient. However, it may not be feasible for a regulator to get all the input data necessary to reproduce a model’s output. Credit and telematics models are examples of model types where model output would be readily available, but the input data would not be readily available to the regulator.</td>
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<tr>
<td>C.7.h</td>
<td>In the filed rating plan, be aware of any non-insurance data used as input to the model (customer-provided or other). In order to respond to consumer inquiries, it may be necessary to inquire as to how consumers can verify their data and correct errors.</td>
<td>1</td>
<td>If the data is from a third-party source, the company should provide information on the source. Depending on the nature of the data, it may need to be documented with an overview of who owns it. The topic of consumer verification may also need to be addressed, including how consumers can verify their data and correct errors.</td>
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### 8. Accurate Translation of Model into a Rating Plan

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<tr>
<th>Section</th>
<th>Information Element</th>
<th>Level of Importance to Regulator’s Review</th>
<th>Comments</th>
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<tbody>
<tr>
<td>C.8.a</td>
<td>Obtain sufficient information to understand how the model outputs are used within the rating system and to verify that the rating plan’s manual, in fact, reflects the model output and any adjustments made to the model output.</td>
<td>1</td>
<td>The regulator can review the rating plan’s manual to see that modeled output is properly reflected in the manual’s rules, rates, factors, etc.</td>
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<td>9. Efficient and Effective Review of Rate Filing</td>
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<tr>
<td>C.9.a</td>
<td>Establish procedures to efficiently review rate filings and models contained therein.</td>
<td>1</td>
<td>“Speed to market” is an important competitive concept for insurers. Although the regulator needs to understand the rate filing before accepting the rate filing, the regulator should not request information that does not increase his/her understanding of the rate filing. The regulator should review the state’s rate filing review process and procedures to ensure that they are fair and efficient.</td>
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<tr>
<td>C.9.b</td>
<td>Be knowledgeable of state laws and regulations in order to determine if the proposed rating plan (and models) are compliant with state laws and/or regulations.</td>
<td>1</td>
<td>This is a primary duty of state insurance regulators. The regulator should be knowledgeable of state laws and regulations and apply them to a rate filing fairly and efficiently. The regulator should pay special attention to prohibitions of unfair discrimination.</td>
</tr>
<tr>
<td>C.9.c</td>
<td>Be knowledgeable of state laws and regulations in order to determine if any information contained in the rate filing (and models) should be treated as confidential.</td>
<td>1</td>
<td>The regulator should be knowledgeable of state laws and regulations regarding confidentiality of rate filing information and apply them to a rate filing fairly and efficiently. Confidentiality of proprietary information is key to innovation and competitive markets.</td>
</tr>
<tr>
<td>C.10.d</td>
<td>Obtain complete documentation that would allow future audits of model predictions.</td>
<td>1</td>
<td>The company should provide comprehensive documentation of the rating algorithm such that a rate can be reproduced for any theoretical risk. Comprehensive documentation could be provided as one of the following: a complete set of tree diagrams, a set of if-else logic statements that represents the trees, or a table showing every possible combination of risk characteristics and the final prediction.</td>
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</table>
RANDOM FOREST GLOSSARY OF TERMS

Accumulated Local Effects Plots: A type of interpretability plot. Accumulated Local Effects plots calculate smaller, incremental changes in the feature effects. ALE shows the expected and centered effects of a variable.

Bagged Trees: An ensemble of trees where each tree is based on a “bootstrap aggregated” sample.

Branch: A connection on a decision tree between a parent node and a child node. A relationship based on a predictor variable is checked at each node, determining which branch applies.

Candidate Variables: The variables specified by the modeler to be used within the full model. The random variable selection by a random forest means that component trees might only use a subset of these variables in each tree.

Child Node: The node below a parent node. The child node is the result of a split that occurs based on a predictor variable. The node above the child node, which is where the split occurred resulting in the creation of the child nodes, is called the parent note. There is 1 parent node for every child node. The root node is the only node which is not a child node.

Component Tree: An individual tree within an approach based on an ensemble of trees such as random forest or gradient boosting machine.

Deviance: A measure of model fit. Deviance is based on the difference between the log-likelihood of the saturated model and the log-likelihood of the proposed model being evaluated. Smaller values of deviance demonstrate that a model’s predictions fit closer to actual. Deviance on training data will always decrease as model complexity increases.

Hyperparameter: A model hyperparameter is a model setting specified by the modeler that is external to the model and whose value cannot be estimated from data.

Node: A point on a decision tree. Nodes are either root nodes (the top node), leaf nodes (a terminal node at which point no further splitting occurs), or an internal node which appears in the middle of the tree while splitting is still taking place.

Out-of-Bag Error: Error calculated for observations based on the trees that did not include them in the set of training observations. Out-of-Bag Error is calculable when bootstrapping is used to generate different datasets for each component tree in an ensemble tree method.

Parent Node: The node above a child node. The parent node is where a split occurs based on a predictor variable. The nodes below the parent node, which are a direct result of the parent node’s split, are called child nodes. There are typically 2 child nodes for every parent node. Terminal nodes cannot be parent nodes.

Partial Dependence Plots: A type of interpretability plot. The partial dependence plot computes the marginal effect of a given variable on the prediction.

Pruning: The process of scaling back a tree to reduce its complexity. This results in trees with fewer branches and terminal nodes appearing higher on the tree. Pruning is more common on models built on a single decision tree rather than on ensemble models such as random forests or Gradient Boosting Machines.

Random Forest: An ensemble of trees where each tree is based on a bootstrap aggregated sample and each split is based on a random sample of the candidate variables.

Root node: The first (top) node in a decision tree. This node contains the entire set of data used by the tree as no splits have occurred yet.
Shapley Additive Explanation Plots: A type of interpretability plot. Shapley plots investigate the effect of including a variable in the model by the order in which it is added. The Shapley value represents the amount the variable of interest contributes to the prediction.

Splitting: The process of dividing a node into two or more sub-nodes, starting from the root node. Splitting occurs at every node up until the terminal (leaf) nodes when the stopping criterion is met.

Stopping Criterion: A criterion applied to the splitting process that informs the node when it is ineligible to split any further. Volume of data is often used as a stopping criterion, such that each leaf node is based on at least a pre-determined amount of data.

Terminal Node: An end node containing no child nodes, because the node has met the stopping criterion. The terminal node is associated with a prediction for one of the component trees. The terminal node is also known as a “leaf” node, the resulting endpoint of a decision tree.

Tree-Based Model: A model that can be represented as a decision tree or a collection of decision trees.

Tree Depth: The maximum number of splits between the root node and a leaf node for a tree.

Variable Importance: A measure of how the variables (a.k.a. features) contribute to the overall model. There are multiple ways to measure variable importance.