TO: The Honorable Trinidad Navarro
Insurance Commissioner, State of Delaware

FROM: John R. Pedrick, FCAS, MAAA
Vice President, Actuarial Services

DATE: October 11, 2017

RE: Actuarial Memorandum: F-Classification and USL&HW Rating Value Filing

This actuarial memorandum provides a discussion of the analysis performed by the DCRB that results in proposed rating values for employment classifications subject to the United States Longshore and Harbor Workers (USL&HW) Compensation Act (the Act or the USL&HW Act). The overall impact of the proposed change to collectible premium is -0.43%, while the associated impact to the collectible loss cost level is -3.66%. These changes are proposed to be effective on December 1, 2017.

Questions regarding this filing should be directed to John Pedrick, Vice President – Actuarial Services, jpedrick@dcrb.com, 215-320-4429, or to Ken Creighton, Chief Actuary, kcreighton@dcrb.com, 215-320-4924.

DEFINITION OF COVERAGES SUBJECT TO THIS FILING

The employment classifications that are the subject of this filing, known as "F-Classifications" or "F-Classes," provide insurance coverage for compensation liability for maritime or federal employment subject to the USL&HW Act. The F-Classes are used for employees that are "employed in maritime employment, in whole or in part, upon the navigable waters of the United States…"[1] Examples of employment generally subject to this Act are longshoremen, harbor workers, ship repairmen, shipbuilders, ship breakers and other employees engaged in loading, unloading, repairing or building vessels.

On occasion, employer operations not subject to assignment to an F-Class may involve some employees whose duties are subject to the USL&HW Act. State Act classifications (those not designated by an F suffix) do not contemplate liability under the USL&HW Act. Accordingly, a United States Longshore and Harbor Workers Compensation Coverage Percentage is provided in the DCRB Manual to adjust rating values otherwise applicable to State Act classifications for the different (and higher) benefits payable under the USL&HW Act.

Total direct written premium for workers compensation in Delaware, including State Act classes and USL&HW Act classes, was $206,232,000 in Calendar Year 2016. USL&HW earned premium that was reported for Calendar Year 2016 in our 2016 Financial Data Calls was less than $1 million. This shows that the volume of USL&HW business is fairly small in comparison to the total Delaware workers compensation market.

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[1] 33 USC Ch.18.

SUMMARY OF THE PROPOSAL IN THIS FILING

This filing proposes an overall average decrease of 0.43% in collectible F-Class rates, which produces an overall average increase in manual rates for F-Classes of 0.23%. Also, an overall average decrease of 3.66% in collectible F-Class loss costs is proposed, which produces an overall average decrease in manual F-Class loss costs of 3.02%. The USL&HW Compensation Coverage Percentage is proposed to change from 58.00% to 105.34%. This results in a factor of 2.0534 which, when applied to the approved carrier rate(s) in State Act classifications, produces appropriate rates for employees whose duties are subject to USL&HW Act benefits. The Tax Multiplier applicable to F-Class exposures in retrospective rating is proposed to change from 1.2409 to 1.1269.

DISCUSSION OF THIS FILING'S METHODS, ANALYSIS AND FINDINGS

Key Results

F-Class	Current Rates	Proposed Rates	Percentage Change	Current Loss Costs	Proposed Loss Costs	Percentage Change
6824F	7.16	7.17	0.14%	5.54	5.36	-3.25%
6826F	7.25	7.26	0.14%	5.60	5.43	-3.04%
6843F	8.15	8.16	0.12%	6.30	6.10	-3.17%
6872F	10.25	10.27	0.20%	7.92	7.68	-3.03%
7309F	28.51	28.59	0.28%	22.04	21.39	-2.95%
7313F	10.38	10.39	0.10%	8.02	7.77	-3.12%
7317F	22.06	22.09	0.14%	17.05	16.52	-3.11%
7327F	11.77	11.79	0.17%	9.10	8.82	-3.08%
7366F	5.52	5.53	0.18%	4.27	4.14	-3.04%
8709F	2.21	2.21	0.00%	1.71	1.65	-3.51%
8726F	3.00	3.00	0.00%	2.32	2.24	-3.45%
Overall Manual Change			0.23%			-3.02%
Other Changes:						
• Revise Expense Constant from $260 to $295						
• Revise USL&HW Compensation Coverage Percentage (Rule XII) from 58.00% to 105.34%						
• Revise the Tax Multiplier used in retrospective rating from 1.2409 to 1.1269						

Data Used for Loss and Exposures

This filing uses loss and exposure data attributed to F-Class business as submitted on unit reports under the approved Statistical Plan in Delaware. Unit statistical data has been used in lieu of financial data because the DCRB has found this information to be more consistent, accurate and reliable than the separate reporting for F-Class business in Financial Calls.

Unit statistical data is limited to case incurred losses, separately reported for indemnity and medical benefits, for a series of ten successive annual evaluations beginning 18 months after the inception of each policy period (First Report through Tenth Report).

Supporting information for this filing includes standard earned premium and incurred losses from unit statistical data for Policy Years 2005 through 2014.

Unit statistical data used for the analysis of the overall indicated rate level change in this filing is presented in F-Class Exhibit 5.

Analysis of Loss Experience

The DCRB performed incurred loss development analyses, separately for indemnity and medical benefits. All available development points at each maturity (i.e. development factors for policy years containing reported loss amounts) were computed and formed the basis for a selected series of loss development factors. Those selected factors were smoothed by fitting curves to the differences (or "residuals") between the selected loss development factors and unity (1.0000).

A number of different curve-fitting alternatives were considered in the preparation of this filing. The curve selected for indemnity is based on the formula $y = a + (b/(x^{0.5})) + (c*ln(x)/(x^2))$. For these curve fitting processes, development factors beyond 10th report were selected to be unity (1.0000) to control the shape and behavior of the final fitted curves.

Similarly, for medical loss development, a number of different curve-fitting alternatives were considered. The curve selected for medical is based on the formula $y = x / (a*x + b)$.

The fitted values for loss development factor residuals were adjusted by adding back the value of unity (1.0000) that was removed prior to the application of the curve-fitting process. Development factors derived by cumulatively multiplying the age-to-age factors were used to estimate ultimate losses for indemnity and medical benefits by policy year.

Linear and exponential trend models were applied to the developed indemnity and medical loss ratios. The most recent eight policy year loss ratios were selected as the basis for the indicated change in F-Class rates.

The DCRB's loss development and trend analyses are included in F-Class Exhibit 5.

The estimated effect of the anticipated October 1, 2018 benefit change for USL&HW benefits is derived in F-Class Exhibit 14.

Data Used for Expenses

Expense data is not reported to the DCRB separately for F-Class business. Accordingly, much of the expense data used in preparation of this filing is Delaware experience for stock agency companies or total Delaware workers compensation expense data, each related to their respective workers compensation premiums.

The DCRB's expense study performed in support of this filing is included in F-Class Exhibit 3. Provisions were separately measured based on Delaware experience for stock agency companies or total Delaware workers compensation experience for the following expense components: commission and brokerage, other acquisition, general expense and loss adjustment expense.

Using unit statistical data, an indicated provision in proposed rates for premium discounts was obtained based on experience for risks written by carriers using the Schedule Y discount table. This derivation is also presented in F-Class Exhibit 3. A provision for uncollectible premium is included based on data collected by the NCCI for residual market business in the State of Delaware. The analysis appears on Page 3.7 of F-Class Exhibit 3.

Analysis of Expense Experience

Historical ratios of expense to premium were obtained from the most recent available three years of experience. Provisions for the Federal Assessment and Premium Tax were based on current assessment levels. Miscellaneous taxes were estimated based on historical relationships between such taxes and premiums. Loss adjustment expenses were measured in relation to losses on the basis of the most recent available three years' experience.

The proposed expense loadings consistent with this filing are shown in F-Class Exhibit 2.

Derivation of Permissible Loss and Loss Adjustment Expense Ratio

The DCRB retained an economic consultant to accomplish the following portions of the analysis supporting this filing:

- Determine an appropriate rate of return for the enterprise of writing workers compensation insurance in Delaware

- Prepare a model to account for all applicable cash flows attendant with the writing of workers compensation insurance business in Delaware

- Using this model, compute a permissible portion of premium to be attributed to loss, loss adjustment expense and loss-based assessments in combination and a separate provision for profit consistent with the anticipated cash flows and rate of return noted above

Detail of the model applied in preparation of this filing with a summary of key inputs, outputs and assumptions is provided in F-Class Exhibit 4.

Analysis of USL&HW Compensation Coverage Percentage

The USL&HW Compensation Coverage Percentage is based on a comparison of benefit levels between State Act coverage and the USL&HW Act. This comparison is performed by type of claim and type of benefit to measure the respective potential obligations arising from injuries occurring under the jurisdiction of federal, as compared to state, law. Such a comparison then serves as the basis for the factor to adjust premiums in state classifications for the contingency of exposure to federal benefits.

The derivation of the proposed USL&HW Compensation Coverage Percentage is presented in F-Class Exhibit 6.

Proposed Classification Rates and Loss Costs

The DCRB has applied the same classification pricing methods customarily used in rate and loss cost filings for State Act coverage to derive rate relativities for the F-Classes subject to this filing. The rate and loss cost formulae used are set forth in F-Class Exhibit 10. Summaries of unit statistical data for the experience period included in the derivation of F-Class rate relativities in this filing are shown in F-Class Exhibit 7. Details of individual F-Class experience and the application of the prescribed rating formulae are presented in F-Class Exhibit 15. Proposed F-Class rates and loss costs are shown in F-Class Exhibit 12.

Miscellaneous Rating Values

Tax Multiplier – A factor to account for assessments made on losses when policies are written using retrospective rating plans for F-Class business is derived as shown in F-Class Exhibit 8.

Experience Rating Plan Parameters – The approved Experience Rating Plan applies to F-Class business in Delaware. Expected loss rates are required for the F-Classes in order to incorporate experience under those classifications into the determination of employers' experience modifications. The derivation of expected loss rate factors, which are multiplied by the proposed rates to produce the necessary expected loss rates by year in each F-Class, is shown in F-Class Exhibit 11.

DISCUSSION OF EXHIBITS

An index of all exhibits appears at the end of this memorandum. The following material provides discussion of the key elements.

F-Class Exhibit 1 – Indicated Change in Rate Level

F-Class Exhibit 1 shows the derivation of an indicated change of -0.4% in collectible rate level for Delaware F-Class business. On a manual basis, the indicated rate level change is an increase of 0.2%. Also, F-Class Exhibit 1 shows indicated changes of -3.7% in collectible loss cost level and -3.0% in manual loss cost level.

The procedure for developing the indicated changes in F-Class Exhibit 1 is the same as that used in previous Delaware F-Class filings. Derivation of the trended loss ratios on Line (1) is described in F-Class Exhibit 5.

The assignment of 5% credibility to the trended loss ratio in Line (1), results in 95% credibility applicable to the loss ratio underlying current rates in Line (3).

The credibility-weighted trended loss ratio is adjusted to include loss adjustment expenses (Line (5)). The total on Line (6) is then compared to the permissible loss and loss adjustment ratio (Line (7)) and multiplied by the estimated effect of the October 1, 2018 benefit change (Line (9)) to produce the indicated change in overall rate level on Line (10). Consistent with past practice, the DCRB derived indicated changes in voluntary market loss costs (Line (11)) directly from the indicated change in overall rate level discussed above. This derivation is accomplished by removing from the rate level change the combined effects of all provisions for profit and expenses, other than loss adjustment expenses and loss-based assessments. Derivation of Lines (5) and (7) are discussed below.

The indicated changes in collectible premium and loss costs are converted to indicated changes in manual rate level (Line (14)) and manual loss cost level (Line (15)) by adjusting for the change in the off-balance of the Experience Rating Plan (collectible premium ratio). The proposed collectible premium ratio is taken from the Delaware December 1, 2017 Rate and Loss Cost Filing (DCRB Filing No. 1701).

F-Class Exhibit 5 – Analysis of Experience

F-Class Exhibit 5 presents a review of F-Class experience as reported under the Unit Statistical Plan. Experience for the most recent available years through 2014 was newly extracted from the current rate revision database. This recent data has been supplemented by prior experience included in previous F-Class filings. Page 1 of F-Class Exhibit 5 shows reported standard earned premiums (1999 to 2014) and indemnity incurred losses (1999 to 2014). The step-shaped lines separating successive evaluations for a given policy period indicate that the data was extracted from successive reviews. Page 2 shows similar detail for F-Class medical experience.

Page 3 shows the age-to-age incurred loss development factors for indemnity losses from 1st through 10th report. The step-shaped lines separate ratios of losses whose successive evaluations were drawn from six different rate revision extracts (2002-2004, 2004-2006, 2006-2008, 2008-2010, 2010-2013 or 2013-2017). The data from prior filings was not re-extracted and edited and may therefore have a degree of inconsistency with data subsequently extracted due to corrections of units, availability of previously missing units or the lack of units previously included. The cells denoted with asterisks (****) represent points where an inconsistency in data was observed between successive extracts for a given report year and maturity. Average age-to-age factors for the latest three years and all years available are shown. Page 4 shows the age-to-age incurred loss development factors for medical losses in a similar format. The selected age-to-age factors for indemnity and medical are derived on Pages 5 and 6, respectively, and are the result of fitting the all-year average age-to-age factors to a curve. Unity (1.0000) is selected

as the tail factor (10th-to-ultimate). The bottom sections of Pages 3 and 4 show incurred loss development factors to an ultimate basis for indemnity and medical losses, respectively.

Page 5 shows the derivation of selected indemnity age-to-age development factors. Residuals (LDF-1) of average age-to-age loss development factors are fitted to a curve of the form $y = a + (b/(x^{0.5})) + (c*ln(x)/(x^2))$. Page 6 shows the derivation of selected medical age-to-age development factors, which were fitted to a curve of the form $y = x / (a*x + b)$.

Ultimate on-level loss ratios are calculated on Page 7 for indemnity, medical and in total. Page 8 shows a graph of the resulting projected ultimate loss ratios.

An analysis of loss ratio trend is summarized on Page 9. Linear and exponential trend lines were used to project trended loss ratios for indemnity and medical, using combinations of policy years ranging from three to ten points. Eight-year average loss ratios and zero percent annual trend were selected for both indemnity and medical losses. The resulting trended loss ratios of 52.74% for indemnity and 21.98% for medical were carried to Line (1) of F-Class Exhibit 1.

F-Class Exhibit 2 – Expense Loading

Expense provisions are presented in F-Class Exhibit 2 and are broadly categorized as loss and loss adjustment and underwriting expenses.

The columns of F-Class Exhibit 2 show current and proposed expense provisions. Proposed provisions for the Federal Assessment (4.51%) and State Premium Tax (2.00%) are based on current assessment levels. Other State Tax is estimated to be 0.33%. Provisions for general expense, other acquisition, premium discount, commissions and uncollectible premiums are derived in F-Class Exhibit 3 – Expense Study.

The provisions for profit (2.36%) and the combined provision for loss and loss-related expenses (74.80%) were derived from an internal rate of return model, as described in F-Class Exhibit 4. The combined provision for loss and loss-related expenses of 74.80% was split into the loss (58.15%), loss adjustment expense (12.14%) and the federal assessment (4.51%) components by maintaining a ratio of loss adjustment expense to loss of 20.87% and a ratio of federal assessment expense to loss of 7.75%.

F-Class Exhibit 3 – Expense Study

Page 3.1 of F-Class Exhibit 3 derives provisions for commission, other acquisition, and general expense exclusive of expense constant dollars. Commissions are related to premium, including large deductible business on a net (as reported) basis. Other acquisition and general expense are related to premiums, including large deductible business on a gross (before deductible credits) basis. An average factor over three years, 2013 through 2015, is used. Experience for stock agency companies is included.

Loss adjustment expenses for Calendar Years 2013 through 2015 are related to incurred losses, including large deductible business on a gross (before reimbursement) basis. The resulting average factor of 20.87% is shown on Page 3.4. Experience for all companies is included.

An average premium discount figure of 8.38% is derived on pages 3.5 through 3.6 of F-Class Exhibit 3, based on the total Delaware premium for all policies from Schedule Y companies including those with F-Class exposure. The figure includes an adjustment to account for multi-state risks.

Based on data from the Delaware (Assigned Risk) Insurance Plan, an average uncollectible premium rate of 1.1% was selected.

F-Class Exhibit 4 – Internal Rate of Return Model

F-Class Exhibit 4 presents an internal rate of return model which tracks the premium, loss and expense cash flows of Delaware workers compensation F-Class business for the prospective rating period. The model combines expense assumptions from F-Class Exhibit 2, a premium collection pattern, loss and expense payout patterns, and a base standard premium of $1 million to model the net cash flows for F-Class business.

A profit loading is chosen so that the net cash flows, when discounted to present value, provide a return on equity equal to the projected target rate of return or cost of capital. The cost of capital is derived in F-Class Exhibit 4 and is equal to 8.71%.

In the internal rate of return analysis, the profit provision is 2.36%. A loss ratio, including provision for loss, loss adjustment and the federal assessment, and consistent with the other expense values used in the model, is also derived and equal to 74.80%. That loss ratio is subsequently split into the loss (58.15%), loss adjustment expense (12.14%) and federal assessment (4.51%) values, as indicated in F-Class Exhibit 2.

F-Class Exhibits 9, 10, 11, 12 and 15 – Classification Analysis and Exhibits

The standard methodology for the derivation of F-Class rates and loss costs used in this filing is the same as that used to develop F-Class rates and loss costs in each F-Class filing since 2004, and is similar to the process used in the calculation of State Act rates and loss costs. F-Class Exhibit 10, Rate and Loss Cost Formulae, describes the steps used in the classification ratemaking process. F-Class Exhibit 9, Derivation of F-Class Rates, shows current and proposed rates by class and the respective percentage changes. Expected loss rate factors used to calculate expected losses for experience rating are derived in F-Class Exhibit 11, Calculation of Expected Loss Rate Factors. Proposed rating values are shown in F-Class Exhibit 12, Manual Rates, Loss Costs and Expected Loss Rates. F-Class Exhibit 15, Index and Supporting Classification Exhibits & Class Book, are also included. The Class Book shows the reported and projected experience for each class and the derivation of proposed rates. The F-Classification Exhibits show various factors used in the class ratemaking process. The per-claim and per-accident loss limits and the credibility tables are the same as the ones used in the December 1, 2017 Delaware State Act Rate and Loss Cost Filing.

F-Class Exhibit 6 – U. S. Longshore & Harbor Workers Compensation Coverage Percentage

F-Class Exhibit 6 shows the derivation of a USL&HW factor which, when applied to State Act class rating values, provides for the pricing of State Act risks with USL&HW exposure. The USL&HW loading is based on a comparison of average benefit levels by type of injury under the USL&HW Act and the Delaware Workers Compensation' Act. These average benefit levels are then weighted by type of injury to get an overall benefit level for each coverage.

The DCRB proposes that the USL&HW factor be increased from 1.5800 to 2.0534, representing a 105.34% load to State Act rating values.

Other F-Class Exhibits

F-Class Exhibit 7, Table II - Unit Statistical Data, presents a summary of Unit Statistical Plan experience on a reported and projected basis for F-Class business by type of injury.

F-Class Exhibit 8, Tax Multiplier, provides a tax multiplier factor applicable to F-Class exposures for use in retrospective rating. The DCRB proposes that the factor decrease from 1.2409 to 1.1269.

INDEX OF EXHIBITS