CALCULATION OF EXPERIENCE RATING VALUES AND PLAN PARAMETERS

William R. Gillam

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By: William R. Gillam, FCAS

Introduction

Experience Rating is an essential part of the pricing of Workers' Compensation insurance. This monograph describes some of the actuarial tasks necessary to keep the plan functioning properly. The description is technical in nature, aimed primarily at the actuarial student.

The other essential part of pricing Workers' Compensation is ratemaking. There is ample material available documenting this part of the process which should be reviewed before entering the special realm described here. See Kallop[1] or Harwayne[2] for more detail.

We begin with a description of the data elements which underly the pricing process.

A. ELEMENTS OF RATEMAKING DATA

This section provides a brief background on the NCCI ratemaking procedures, especially those relevant to calculations of experience rating values.

The most basic element of the process is the Workers Compensation Statistical Plan (commonly called the USP, where the U stands for unit) of the National Council on Compensation Insurance (NCCI). The term unit refers to the fact that there is a separate report for experience on every policy and every state, evaluated annually to fifth report. It is on this basis that the members of the NCCI report the data for experience rating and class ratemaking - payroll and losses are posted by risk in the first and by classification in the second.

Losses less than $2,000 may be (and usually are) summarized, but claims of a greater amount must be listed individually and categorized. Table 1 displays the codes for

types of loss reported under the USP. Medical and indemnity pieces of a loss are reported on different fields of the record for each injury type. (Some states have modified this list)

TABLE 1

INJURY TYPE CODE	INJURY TYPE DESCRIPTION
1	(F)Fatal - Medical Fatal - Indemnity
2	(PT)Permanent Total - Medical Permanent Total - Indemnity
9	(PP)Permanent Partial - Medical Permanent Partial - Indemnity
5	(TT)Temporary Total - Medical Temporary Total - Indemnity
6	(M)Medical Only
7	Contract Medical

There are two compressions of this data made by the NCCI for ratemaking purposes. In the first, Contract Medical amounts are added to Medical Only losses for use in most calculations.

The second adjustment is a bit more complex. The Permanent Partial (PP) category, injury type 9, includes claims covering a wide range of values. For instance, some claims coded as PP turn into life annuities not unlike PT cases; other PP claims may be of short duration. Consequently, PP claims are separated into two categories - Major, which becomes injury type 3, and Minor, which becomes injury type 4.

The split is made by reference to a dollar amount called the critical value, which varies by state. PP losses whose indemnity amount exceeds this value are considered major. The critical value is calculated as a normal part of the annual ratemaking process.

After these adjustments are made, the loss data is summarized for ratemaking purposes

into three categories: 1) The indemnity portions of Fatal, Permanent Total, and Major Permanent Partial are summed to one Serious Indemnity loss total 2) The indemnity portions of Minor Permanent Partial and Temporary Total claims are summed to a Non-Serious indemnity loss total. The medical portions of all losses are summed to one Medical loss total. Table 2 displays the groupings:

TABLE 2

Fatal Indemnity (1) Permanent Total Indemnity (2) Major Permanent Partial (3) Indemnity	**Serious**
Minor Permanent Partial (4) Indemnity Temporary Total Indemnity (5)	**Non-Serious**
All Associated Medical (1,2,3,4,5) Medical Only (6) Contract Medical (7)	**Medical**

This categorization is central to the calculation of both rates and rating values. The technicians perform the many manipulations to the losses associated with ratemaking -loss development, trend, law changes, multidimensional credibility - and compare them with payroll by class to calculate loss costs by type for Serious, Non-Serious and Medical. These ratios are the projected partial pure premiums by category which underly rates as filed for the prospective period. Each class rate, then, has a serious, non-serious and medical component.

It should be noted that the other essential element of ratemaking is Financial Data, as collected in annual calls. These provide aggregate premium and losses (split indemnity and medical) by policy year and accident year, evaluated as of year end to eleven evaluations. (This is an intermediate stage of expansion from eight reports to fifteen)

B. ELEMENTS OF EXPERIENCE RATING

Several sets of values used in the NCCI Experience Rating Plan are revised as part of the regular state rate filing process. Plan Parameters, which vary by state and size of the insured, are the State Reference Point (SRP), Weighting (W) and Ballast (B) values used in the rating formula. Rating Values, applicable to individual insureds, vary by classification. These are the Expected Loss Rates (ELR's), and the Discount Ratios (D-Ratios). Table 3 shows how these fit into the modification formula.

TABLE 3

$$M = \frac{A_p + W\,A_x + (1-W)\,E_x + B}{E + B}$$

Where:

M = The risk modification (mod)
A = Actual Losses of the insured being rated
E = Expected Losses of the insured being rated
p = Primary, x = Excess
W = Weighting Value
B = Ballast Value

E is calculated as the sum of expected losses by class

$$E = \sum_{\substack{\text{all} \\ \text{classes } \iota}} E_\iota$$

$$E = \sum_{\substack{\text{all} \\ \text{classes } \iota}} (\text{Payroll}_\iota \div 100) \times (\text{ELR}_\iota)$$

where ELR_ι is the Expected Loss Rate for class ι

Then

$$E_p = \sum_{\substack{\text{all} \\ \text{classes } \iota}} D_\iota \times E_\iota$$

$$E_x = E - E_p$$

where D_ι is the Discount Ratio (D-ratio) for class ι.

The actual ratable losses, A, is the sum of the individual losses, indexed by n, each limited by the State Accident Limit.

$$A = \sum_n A_n$$

Each loss (occurrence) has a primary component.

$$A_{np} = \begin{cases} A_n \text{ if } A_n \leq L \\ L \text{ if } A_n > L \end{cases}$$

where L is the primary loss limit. Today, L = $5,000

and

$$A_p = \sum_n A_{np}$$

$$A_x = A - A_p$$

The mod is mandatory for eligible employers - those generating sufficient average premiums in the last two or three years. We call these ratable risks.

C. INTERRELATIONSHIPS IN CALCULATIONS OF RATES AND RATING VALUES

It is current practice to calculate the experience rating values at the same time and using the same data as that used in the filed rates. It is important to point out that ELR's are usually quite different from the pure loss costs underlying prospective rates; the adjustments made to account for the difference in time frame are non-trivial in size and concept.

The rates filed provide a best estimated amount to cover losses and expenses by class for the future period when the rates will actually be used. Experience rating values pertain to losses which occur a year or more before the time when rates and ratings will be effective. Of interest here are the relative time frames of 1) the underlying experience used in the rate filing, 2) the prospective effective period of the rates and 3) the associated experience period to be used in the ratings applicable to the prospective period. These should be distinguished in the mind of

the reader of this monograph.

An important aspect of ratemaking is the practice of limiting individual losses. This is done to minimize volatility in rates and rating values. In ratemaking, the overall change in premium is estimated in one step (Overall Rate Level) and then this change in premium is distributed among the various classes as a second step (Class Ratemaking). Capped losses are used in this second step to avoid any distortions in class relativities due to the effect of unusually large losses. It should be noted that NCCI still uses a multiple of the old SRP (the Self Rating Point, a function of the state average serious loss) for limitations to single losses in class ratemaking. Another procedure to lend stability to the ratemaking process, as well as the calculation of experience rating values, is in the imposition of swing or change limits: the rate (or rating value) for each class can only change by a specified amount from one rate filing to the next. The average effect of the loss limits and change limits is spread to all classes in such a way that the selected rate level change is achieved.

In experience rating, losses that are similarly limited -or ratable losses- enter the calculation of the experience modification. The limit applied to a single claim occurrence is ten percent of the SRP. This value is called the State Accident Limit. There is a secondary cap on multiple claim occurrences, which is twice the State Accident Limit, or 20 percent of the SRP. There are special caps for losses incurred under the U.S. Longshoremen's and Harbor Workers' Act and losses which are strictly Employer's Liability. In addition, the total disease losses for a policy are also capped at three times the State Accident Limit, plus 120 percent of the risk's total expected losses for the experience period. (There are specific rules in the Experience Rating Plan Manual defining these experience periods.)

D. CALCULATION OF PLAN PARAMETERS

1. STATE REFERENCE POINT

The SRP is an index of state benefits linearly related to the value G, which is a scale factor for credibilities varying by state, updated annually as part of the annual rate revision. The SRP is also used to calculate the State Accident Limit as mentioned above.

The calculations of G and the SRP are quite simple.

The State Reference Point is based on the state average cost per case (SACC) for all types of claims. Averages are taken from the latest three years of USP data, undeveloped. This is the same maturity level as that of the experience period used in ratings. It is necessary to trend it, however, in that ratings will be using slightly more recent data. In State N, which is used as an example, the length of the trending period is two years whereas most frequently it would only be about one year. This is because statutes in State N require that new rates be filed well in advance of the proposed effective date. The trend used is the countrywide average severity trend used in the latest Retrospective Rating Expected Loss Size Ranges update filing.

SRP = 250 x SACC, rounded to the nearest 5,000.

G = SRP ÷ 250,000

G is rounded to the nearest 0.05.

Because of the potential for volatility in the data, and the normal effect of inflation, it is further stipulated that G and the SRP not be allowed to decrease from one year to the next, unless there is a significant benefit reduction. There also is a "reasonability" limit on the upward change, so that any changes more than +20% will be investigated.

Exhibit 1 shows the calculation of the SRP for State N.

2. CALCULATION OF THE W AND B-VALUES BY THE NCCI

The B and W values are functions of G by state and Expected Losses, E, of a particular insured. First,

$$B = E\,[0.10+2500G/(E+700G)], \text{ subject to a minimum } 7,500$$

Also, we define the intermediate value

$$C = E\,[0.75+200000G/(E+5100G)], \text{ subject to a minimum of } 150,000$$

Then

$$W = \frac{E + B}{E + C}.$$

W is rounded to the nearest .01. It must also be required that it never increases for decreasing E. (This ends up to be a non-trivial programming challenge, although the impact is at most a point or two on W for small risk sizes and certain G values.)

The above formulas are valid for all rated risks, with appropriate rounding for tabular presentation. B is rounded to the nearest 500G in the tables, which apply to values of $E < 477,500 \times G$. For greater values of E, rounding of B is to the nearest dollar.

In particular, it will be noted that in all cases, $0 < W < 1$ and $B > 0$. Because of this, no insured's rate can be completely determined by its own experience.

The derivation of these formulas is documented by Gillam[3].

E. CALCULATION OF RATING VALUES - OVERVIEW

1. THE EXPECTED LOSS RATE

Expected Loss Rates by class, or ELR's, are the basis of the calculation of the risk total expected loss, E, in the Experience Rating Plan. Simply put, the ELR is the loss cost underlying manual rate, actuarially adjusted to the same level as the actual experience to be used in the calculation of the modification. As is the case

with manual rates, ELR's are calculated by the appropriate bureau for each class at the time a rate filing is made. (Law only filings, made for benefit adjustments, are prospective in nature. Therefore, ELR's which apply to past experience are not affected.) The exposure basis for the ELR's is $100 of payroll, just as for rates.

The two major adjustments that must be made to rates to obtain ELR's stem from time frame differences and the loadings for expense, profit, tax and loss assessment.

It is obvious that rates must be stripped of taxes, expenses and profit; this can be accomplished by a single factor. It isn't quite as obvious, but equally true that rates should be adjusted for changes in the workers' compensation environment which have occurred in the most recent two years or so.

To better understand the concepts, we will hypothesize rating an individual policy effective 7/1/90, using rates and rating values effective 1/1/90. At the time the insured's prospective premium is being quoted, its experience for the policy effective 7/1/89 is not yet available. In fact, that policy is still running off. Thus the policy originally effective 7/1/88 is the most recent complete one available. In order to give more credibility to the individual insured's experience, three years of data are used in the rating calculation, in this case the experience under the policies effective 7/1/86, 7/1/87, and 7/1/88. The manual rates used for the insured's 7/1/90 policy are made to reflect ultimate costs in the 1990 policy year. So, these rates must be brought back to reflect benefit levels appropriate for the three expired policy years 1986, 1987 and 1988. Trend from the rate filing can be used to derive factors from the midpoints of the three experience years to the midpoint of the prospective period. For benefit changes, standard parallelogram diagrams are used to derive weighted average factors. These will be unloaded from the rates.

Reentering our example, suppose that from 1/1/86 through 12/31/89 the manual rate

for our hypothetical insured's class was $4.00, but at 1/1/90 it went up to $5.00 due to a law benefit change. Suppose further that 70% of the premium is allocated for the payment of claims, the remainder being for expenses (27.5%) and profit (2.5%). Thus $2.80 in claims are expected for every $100 of payroll for the policy periods used in the calculation of the experience modification; i.e., 7/1/86 through 6/30/89.

In this simplified scenario, assume there is no other change in state compensation experience or expense provisions. Then $2.80 would be the ELR for rating the 7/1/90 policy.

Now someone might try to compare the $2.80 ELR with the $5.00 rate and say that only 56% of the premium goes for claims payment. This would be erroneous as the above discussion shows. Actually $3.50, or 70% of the $5.00 rate is necessary to pay for claims occurring under the 7/1/90 policy, because the claims under this policy will be paid at the new higher benefit level. But since the insured's actual claims experience used in the calculation of its experience modification is at the old benefit level, the class expected loss rate used in the calculation must also be at the old level, namely $2.80, so that a like comparison can be made. Comparing $2.80 to $5.00, to sum up, does not indicate the percentage of claim payments in the manual rate.

While the foregoing illustration is a law benefit change, the concept applies to anything that would make the past class average experience, reflected in the ELR, different from the future projected average experience encoded in the manual rate. Technical elements such as trend, maturity of claim reserve estimates, accident limitations, and experience rating off-balance can all enter in and make the manual rate considerably higher than the ELR. Due to the combined effect of all these elements the ELR can sometimes be considerably lower than the manual rate. An ELR of 35% of the manual rate, for instance, would not be all that unusual or improper.

The major steps of the actual calculation are as follows:

STEP 1. Calculation of the ELR Level Factor

Calculate a factor to reduce manual rates to pure premiums at an average of second report on the same benefit level as the experience period to be used applicable in ratings. This is called the ELR Level Factor.

STEP 2. Calculation of the Hazard Group ELR Factors

Calculate the average cost per case for the three serious injury types: Fatal, Permanent Total, and Major Permanent Partial (indemnity and medical combined). These also vary by Hazard Group, which are groupings of classes determined by relative severity. These average costs will be used to remove the expected loss above the State Accident Limit from the ELR, so that the expected losses will correspond to the limited or "ratable" losses used as the actual experience in the rating.

Using the ratios of the State Accident Limit to the average cost per case by serious injury type and Hazard Group, find the respective Excess Ratios from the former ELPF calculation. (See Harwayne[4] for details of this calculation) There will be three such Excess Ratios for each Hazard Group. Using injury weights for the three serious types, which also vary by Hazard Group, find a single Weighted Excess Ratio for each Hazard Group. Multiply the ELR Level Factor from step (1) by the respective four adjustment factors, the complements of the Weighted Excess Ratios.

The resulting four Hazard Group ELR factors are applied to rates respective of Hazard Group to produce the ELR's by class.

STEP 3. Checking ELR's for reasonableness

Checksheets look for unreasonable changes.

2. CALCULATION OF D-RATIOS - OVERVIEW

D-Ratios are currently calculated using the most recent single policy year of Statistical Plan data available. A policy year, of course, is labeled by the year in which the policies are written but extends over two calendar years, and the reporting, verification and processing of unit data takes some months to complete. Consequently, a rate filing effective 1/1/90 would generally contain D-ratios based on statistical plan data from the 1987 policy year; occasionally, it would be 1986.

D-Ratio Factors (sometimes called Partial D-Ratios) are calculated for serious, non-serious, and medical losses in Step 4. These are then weighted by the corresponding pure premium components of the class rates to produce D-ratios by class. Step 5 is the checksheet for unusual changes in average D-ratio.

Section F documents the spreadsheets used for each step.

F. CALCULATION OF RATING VALUES - DETAIL

STEP 1: CALCULATION OF THE ELR LEVEL FACTOR

Exhibit 2 shows the worksheets for calculation of the ELR Level Factor. The explanation of the columns follows:

Column (1) - The three policy years of the experience rating period, which end one year before the prospective period of new rates. This time period is usually subsequent to the policy periods of statistical data actually available at the time rates are made.

Column (2) - A factor to correct for the natural off-balance produced by experience rating. This factor compensates nominally for the fact that, on the average, insureds large enough to be eligible for experience rating have losses approximately one percent better than the total business average. It is the result of a broad based analysis of data, but may well be subject to a more state specific procedure in the future.

Column (3) - The factors necessary to take the third, second and first reports

which will be available for ratings to the benefit level of the proposed manual rates.

Column(4) - The loss development factors to take third, second and first reports to their ultimate level. These are calculated using statistical plan data to fifth report and financial data development from fifth report to ultimate. To use financial data, it is assumed that all development beyond fifth report inures to serious claims only.

Column (5) - The composite factor for miscellaneous changes in the rates, particularly the ratio of the proposed financial data loss ratio to that of the Statistical Plan. This ratio includes the impact of trend between the dates of the statistical plan data and the effective period of the proposed rates.

Column (6) - The reciprocal of the permissible loss ratio.

Column (7) - The product of columns (2)-(6).

Note that column (7) of the Exhibit has three factors necessary to take the third, second and first report loss costs which will be used for ratings to the same level as the proposed manual rates. Since we wish to perform the reverse operation, we take the reciprocals of the three numbers and record them in column (8). The arithmetic average of the three reciprocals is recorded in the bottom of column (8). This average is the ELR Level Factor which is carried into the further steps of the calculation.

Columns (3), (4), (5) and (6) are based on analysis of the actual data periods used in ratemaking. Page 2 of the Exhibit is the worksheet for these factors and shows how law amendment and loss development factors by injury type are weighted by policy period losses. The data used for weighting is generally not of the same policy period as the one which actually will be used for ratings. It is, however, put at the same stage of development. The development factors used in this exhibit are ones

that were derived as part of the regular ratemaking procedure.

It should be noted that the filing schedule of State N has led to a minor inconsistency. The use of latest second, first and first report data years as weights usually results in a match of the data year with the policy year of the experience rating period for two cases. In State N, however, this means that 1985, 1986 and 1986 are used to weight experience period years 1986, 1987 and 1988. Usually the weights would be 1986, 1987 and 1987.

STEP 2: CALCULATION OF HAZARD GROUP ADJUSTMENT FACTORS

Exhibit 2, Page 1 is the worksheet for the calculations underlying Step 2. The most recent first and second and third reports from ratemaking data are used. The average cost per case is calculated for Fatal, Permanent Total, and Major Permanent Partial claims. These three serious injury types are the likely source for claims exceeding the State Accident Limit. Medical and Indemnity losses of both policy periods are added for each of the three injury types. The number of cases for two policy periods is also added by type. The average cost per case is thus calculated for three years of claims (medical and indemnity) at their respective maturities. An adjustment for trend similar to that used for the SRP must also be made.

Exhibit 3 shows the final calculations of the Hazard Group ELR Factors. These final calculations adjust for the limitation of losses in the experience ratings. We explain each line in the calculation below.

Line (1) - The State Accident Limit which is 10% of the State Reference Point (SRP) as calculated in the proposed rate filing.

Lines (2), (5), and (8) - The average cost per case for Fatal, Permanent Total, and Major Permanent Partial claims by Hazard Group. These are calculated as part of the rate review.

Lines (3), (6), and (9) - The ratio of the State Accident Limit from line (1)

by type to the average cost per case by type from (2), (5) and (8).

Lines (4), (7), and (10) - The Excess Ratio is a fraction of the pure premium for the portion(s) of individual loss(es) above the entry ratio on lines (3), (6), and (9). The excess ratio tables are those used in the former ELPF calculation and described in Harwayne[4].

Line (11) - The weights for Fatal, Permanent Total, and Major Permanent Partial claims by Hazard Group.

Line (12) - Uses line (11) to calculate a weighted average of lines (4), (7), and (10). This represents the fraction of the total pure premium expected to be above the State Accident Limit.

Line (13) - These are the Hazard Group adjustment factors.

Line (14) - This is the ELR Level Factor from Step 1.

Line (15) - This product (13)x(14) gives the Hazard Group ELR Factors. One of the factors is applied to the rate of each class, depending on the Hazard Group assignment of the class, to produce the final Class ELR.

STEP 3: EXPECTED LOSS RATE CHECK SHEET

In addition to the standard calculation of the ELR as described above, the NCCI also has check sheets to identify cases where the ELR Factor (averaged over the Hazard Groups) changes drastically from the previous year. A more detailed investigation is conducted if the change is more than 10%. These check sheets are included in Exhibit 4.

Page 1 looks at ELR's as a function of macroscopic changes in rates, where page 2 considers the microscopic changes by component to provide insight into the cause of ELR change.

The checksheet in this exhibit shows a significant decrease in ELR factors over the previous year, which would normally result in an investigation of changes in State N. In this case, the technicians determined the shift was due to a change to the

Revised Experience Rating Formula so the change in ELR factors was justified. This can plainly be seen on Page 2, where the change in the excess ratio factor is .814, explaining most of the decrease.

STEP 4: CALCULATION OF D-RATIO FACTORS

This procedure can be found in Exhibit 5.

(1) Total indemnity losses (unlimited in a per claim basis)

(2) Total Medical Loss (unlimited in a per claim basis)

Even though ratable losses are limited as described above, use of unlimited losses in the calculation of D-ratio factors provides a measure of conservatism. This is an offset to the fact that the data used is at first report, when severities are likely to be less skewed and D-ratios too high.

(3) Total serious and Non serious losses in this line include associated medical.

(4),..,(8) The denominators of the D-ratio factors for Serious and Non-serious will be indemnity losses only. Medical will be all Medical, as can be seen in (8). This is appropriate because the pure premium weights are indemnity, indemnity and medical. Lines (5) - (7) adjust the primary losses in (4), which are on a combined basis, to a more nearly proper basis.

(9) The First Report Partial D-ratios, then, are the ratios: primary to total indemnity, primary to total indemnity and primary to total medical.

(10),..,(12) An adjustment is necessary because the pure premiums used to weight the partial D-ratios contemplate a future distribution of losses into Serious, Non-serious and Medical. Rather than compute component pure premiums by class for the earlier time period, a formidable task, it works well to put the distribution change adjustment in the partial D-ratios.

(13) The final D-ratio factors, then, are the partial D-ratios from (9),

adjusted by the distribution change (10) ÷ (12).

The D-Ratio for Class XXXX in State N is:

$$\frac{\text{Serious Pure Premium (Class XXXX)}}{\text{Total Pure Premium (Class XXXX)}} \times \text{Serious D-Ratio Factor}$$

$$+ \quad \frac{\text{N-S. Pure Prem. (Class XXXX)}}{\text{Total Pure Prem. (Class XXXX)}} \times \text{Non-Serious D-Ratio Factor}$$

$$+ \quad \frac{\text{Medical Pure Premium (Class XXXX)}}{\text{Total Pure Premium (Class XXXX)}} \times \text{Medical D-Ratio Factor}$$

STEP 5: D-RATIO CHECK SHEET

Exhibit 6 shows a the checksheet. The average D-Ratio for all classes should not decrease from the past one by more than ten points, or increase at all. The normal change expected from inflation is of course a decrease. Either would lead to an investigation. In addition, the maximum D-Ratio is 0.90 and the minimum is now 0.25 for the Revised Experience Rating Plan.

Once calculated, these D-Ratios are included with the rate filing and go into effect if and when the new rates are approved.

REFERENCES

[1]Roy Kallop, "A Current Look At Workers' Compensation Ratemaking," PCAS LXIII, 1975, p.62.

[2]Frank Harwayne , "Use of National Experience Indications in Workers' Compensation Insurance Classification Ratemaking," PCAS LXIV, 1977, p.74.

[3]William R. Gillam, "Parametrizing the Workers Compensation Experience Rating Plan," May 1990 CAS Discussion Paper Program, p. 857.

[4]Frank Harwayne, "Accident Limitations for Retrospective Rating," PCAS LXIII, 1976, p.1.

EXHIBIT 1

STATE REFERENCE POINT - STATE N

REPORT	POLICY PERIOD	<1> TOTAL CASES	<2> TOTAL INCURRED LOSSES	<3> <2>/<1> AVG.COST PER CASE
1ST	1/86-12/86	165,250	195,722,802	1,184
2ND	1/85-12/85	189,629	206,805,713	1,091
3RD	1/84-12/84	188,074	196,806,051	1,046
TOTAL		542,953	599,334,566	1,104

<4>	INDICATED STATE REFERENCE POINT (TOTAL<3>*250)	276,000
<5>	AVERAGE ANNUAL TREND (exp^((.09833)*(1.000)))	1.103
<6>	LENGTH OF TRENDING PERIOD IN YEARS	2.000
<7>	TREND FACTOR (exp^((.09833)*<6>))	1.217
<8>	TRENDED STATE REFERENCE POINT <4>*<7>	335,892
<9>	PROPOSED STATE REFERENCE POINT (ROUNDED TO NEAREST 5,000)	335,000
<10>	G = <9> ÷ 250,000 (ROUNDED TO NEAREST .05)1	1.35

STATE N

STEP 1

FACTORS DERIVED FROM LATEST RATE REVISION

(1) Policy Year	(2) Off-Balance Adjustment	(3) Benefit Changes	(4) Loss Development	(5) ELR Composite Factor	(6) Profit & Expense Factor	(7) Product	(8) Reciprocal
01/86-12/86	1.01	1.067	1.072	1.145	1.574	2.082	0.480
01/87-12/87	1.01	1.047	1.122	1.145	1.574	2.138	0.468
01/88-12/88	1.01	1.012	1.216	1.145	1.574	2.240	0.446
					ELR Level Factor		0.465

ELR CALCULATION
STATE N, EFFECTIVE 01/01/90

1. (a) Financial Data Loss Ratio — 0.8250

   (b) Unit Stat. Plan Loss Ratio — 0.7170

   (c) (a)/(b) — 1.151

2. Other Adjustments+ .995 x .9997 — 0.995

3. ELR Composite Factor (1c)x(2) — 1.145

4. (a) Target Cost Ratio — .7115

   (b) Loss Adjustment Expense — 1.12

   (c) Permissable Loss Ratio

   (4a)÷1.120 4a÷4b — 0.6353

   (d) Reciprocal — 1.574

+ Includes change in trend, minimum premium multiplier change, C&R decision, etc.
* To Latest Law Level effective 1/1/90

For: POL YR. 01/86-12/86

1/85-12/85 Loss Weights		A.F.*			2nd/3rd Dev.Fact.		3rd to Ult. Dev. Fact.	
Death	6,281,433	x 1.056						
P.T.	3,794,997	x 1.041						
Major	54,973,297	x 1.045	68,030,880	x	1.131	76,942,925	1.130	86,945,505
Minor	23,816,205	x 1.048						
T.T	23,155,932	x 1.057	49,435,203	x	1.005	49,682,379	0.999	49,632,697
Ser. Med.	34,533,326	x 1.088	37,572,259	x	1.036	38,924,860	1.180	45,931,335
N.Ser.Med	60,250,523	x 1.088	65,552,569	x	1.036	67,912,461	0.998	67,776,636
Total	206,805,713		220,590,911			233,462,625		250,286,173
Benefit Change	=	1.067			Loss Development =		1.072	

For: POL YR. 01/87 -12/87

1/86-12/86 Loss Weights		A.F.*			1st/2nd Dev. Facts.		2nd to Ult. Dev. Fact.	
Death	7,187,873	x 1.028						
P.T.	2,920,892	x 1.026						
Major	38,424,936	x 1.026	49,809,952	x	1.247	62,113,010	1.278	79,380,427
Minor	26,561,811	x 1.027						
T.T.	25,482,907	x 1.030	53,526,374	x	0.966	51,706,477	1.004	51,913,303
Ser.Med	27,226,941	x 1.067	29,051,146	x	1.065	30,939,470	1.222	37,808,032
N.Ser.Med.	67,917,442	x 1.067	72,467,911	x	1.065	77,178,325	1.034	79,802,388
Total	195,722,802		204,855,383			221,937,282		248,904,150
Benefit Change	=	1.047			Loss Development =		1.122	

For: POL YR. 1/88-12/88

1/86-12/86 Loss Weights		A.F.*			1st to Ult Dev. Fact.
Death	7,187,873	x 1.012			
P.T.	2,920,892	x 1.012			
Major	38,424,936	x 1.012	49,116,105	x	1.594
Minor	26,561,811	x 1.012			
T.T.	25,482,907	x 1.012	52,669,255	x	0.970
Ser.Med.	27,226,941	x 1.013	27,580,891	x	1.301
N.Ser.Med.	67,917,442	x 1.013	68,800,369	x	1.101
Total	197,722,802		198,166,620		
Benefit Change	=	1.012	Loss Development		1.216

Exhibit 3

HAZARD GROUP

		I	II	III	IV
1.	10% of Proposed State Reference Point	33,500	33,500	33,500	33,500
2.	Average Fatal Cost	83,036	98,104	117,074	132,575
3.	Ratio to Average for Fatal (1)/(2)	0.40	0.34	0.29	0.25
4.	Excess Ratio for Fatal	0.693	0.752	0.801	0.840
5.	Average P.T Cost	249,377	292,786	302,965	381,999
6.	Ratio to Average for P.T. (1)/(5)	0.13	0.11	0.11	0.09
7.	Excess Ratio for P.T.	0.941	0.954	0.954	0.966
8.	Average Major P.P. Cost	50,210	51,983	58,190	63,233
9.	Ratio to Average for Major P.P. (1)/(8)	0.67	0.64	0.58	0.53
10.	Excess Ratio for Major P.P.	0.399	0.417	0.457	0.494
11.	(A) Fatal Weight Factor	0.014	0.022	0.048	0.096
	(B) P.T. Weight Factor	0.022	0.030	0.040	0.058
	(C) Major P.P. Weight Factor	0.328	0.344	0.432	0.433
12.	Weighted Average Excess Ratio	0.161	0.189	0.274	0.351
13.	Adjustment Factor - 1.0 - (12)	0.839	0.811	0.726	0.649
14.	ELR Level Factor	0.465	0.465	0.465	0.465
15.	Hazard Group ELR Factors	0.390	0.377	0.338	0.302

EXPECTED LOSS RATE CHECKSHEET
STATE N

Effect. Date: 1/1/90

f amount on line (8) is greater than 1.100 or less than .900, the underlying cause of the arge change should be determined and brought to the attention of Rates Department Supervisor. ine (8) on Page 1 should reconcile to Line (13) on Page (2). The changes on Line (9) and (10) n Page 1 should be in the same direction.

1.	Effective Date of Last Change In ELRs		01/01/88
2.	Rate Change Approved Effective on (1)		1.159
3.	Rate Change Proposed Effective On (1)		1.168
4.	Average ELR Factor Underlying Rate Proposal on Line (3) (Proposed ELR HG2 + Proposed ELR HG3)/2		0.447
5.	Interim Rate Changes Approved		
	Eff.	a.	1
	Eff.	b.	1
	Eff.	c.	1
	Eff.	d.	1
6.	Current Average ELR Factor ((4)x((3)/(2)))/((5a)x(5b)x(5c)x(5d))		0.451
7.	Proposed Average ELR Factor (Proposed ELR HG2 + Proposed ELR HG3)/2		0.358
8.	Change in ELR Factors (7)/(6)		0.794
9.	Proposed Rate Change		1.164
10.	Indicated Change in Expected Losses (8)x(9)		0.924

EXPECTED LOSS RATE CHECKSHEET

STATE N

Effect. Date: 1/1/9

		(1) Last Approved Filing	(2) Proposed Filing	(3) Change (2)/(1)
1.	Benefit Changes			
	a. 3rd Report	1.084	1.067	xx
	b. 2nd Report	1.064	1.047	xx
	c. 1st Report	1.031	1.012	xx
	d. Avg.	1.060	1.042	xx
2.	Loss Development			
	a. 3rd Report	1.052	1.072	xx
	b. 2nd Report	1.080	1.122	xx
	c. 1st Report	1.175	1.216	xx
	d. Avg.	1.102	1.137	xx
3.	Off Balance	1.01	1.01	xx
4.	Composite Factor			
	All Reports	1.144	1.145	xx
5.	Financial Data Loss Ratio	0.8115	0.825	xx
6.	USP Loss Ratio	0.720	0.717	xx
7.	Loss Ratio Factor (7)/(8)	1.127	1.151	xx
8.	Profit and Exp. Factor			
	All Reports	1.570	1.574	xx
9.	Reciprocal of the Combined Effect of these Factors **			
	a. 3rd Report	0.483	0.480	xx
	b. 2nd Report	0.480	0.468	xx
	c. 1st Report	0.455	0.446	xx
	d. Avg.	0.473	0.465	xx
10.	Comparable ELR Level Factors			
	Avg (a)	0.473	0.465	0.983
11.	Excess Ratio Factor	0.945	0.769#	0.814
12.	Overall Change in ELR Factors (10) x (11)	xx	xx	0.800

*If lines (2) and (3) on page one are different then divide line (3) by line (2)
**1/[((1)x(2)x(3)x(4)x(8)]
#From Exhibit 3, Line 13 = (HGII + HGIII)/2

CALCULATION OF DISCOUNT RATIO FACTORS

		(A) Serious	(B) Non-Serious	(C) Medical	(D) Total
1.	Total Indemnity Losses	49,351,958	52,329,922	XXX	XXX
2.	Total Medical Losses	27,437,361	45,660,200	22,648,393	95,745,954
3.	Total Losses (1)+(2)	76,789,319	97,990,122	22,648,393	197,427,834
4.	Total Primary Losses	7,124,224	55,450,538	22,028,546	XXX
5.	Estimated Indemnity Primary (4)x((1)/(3))	4,580,876	29,610,587	XXX	XXX
6.	Estimated Medical Primary (4)-(5)	2,543,348	25,839,951	22,028,546	50,411,845
7.	Primary for D-Ratios A&B=(5), C=(6D)	4,580,876	29,610,587	50,411,845	XXX
8.	Total Losses for D-Ratios A&B=(1), C=(2D)	49,351,958	52,329,922	95,745,954	197,427,834
9.	First Report Partial D-Ratios (7)/(8)	0.093	0.566	0.527	XXX
10.	First Report Loss Distribution (8)/Sum of (8)	0.250	0.265	0.485	1.000
11.	WCSP Experience Adjusted, On Level	290,981,723	178,348,670	390,464,152	859,794,545
12.	Adjusted Experience Distribution (11)/sum (11)	0.338	0.208	0.454	1.000
13.	Final D-Ratio Factors (9)x(10)/(12)	0.069	0.721	0.563	XXX

Discount Ratio (D-Ratio) Checksheet
State N

EXHIBIT 6

If the value of line (9) is > = 1.000 or < = .900, the underlying cause should be determined and brought to the attention of the supervisor.

		A. Current Values Effective 1/01/88				B. Proposed Values Effective 01/01/90			
		Serious	Non Serious	Medical	Total	Serious	Non Serious	Medical	Total
1.	D-Ratio Factors	0.271	1.175	0.253	xx	0.069	0.721	0.563	xx
2.	Total Adjusted Losses for all industry groups	204,002,232	133,319,839	345,267,373	xx	282,506,527	173,154,049	401,299,231	xx
3.	Payroll/100	xx	xx	xx	682,220,187	xx	xx	xx	811,960,370
4.	Average Pure Premium (2)/(3)*	0.299027	0.195421	0.506094	xx	0.347931	0.213254	0.494235	xx
5.	Effect by Parts Used in Filing								
	a. Law	1.025	1.030	1.000	xx	1.014	1.014	1.000	xx
	b. Trend	1.071	1.071	0.960	xx	1.016	1.016	0.973	xx
	c. Assessment	1.000	1.000	1.000	xx	1.000	1.000	1.000	xx
	d. Total	1.098	1.103	0.960	xx	1.03	1.03	0.973	xx
6.	Adjusted Pure Premium (4)x(5d)	0.328332	0.215549	0.48585	1.029731	0.358369	0.219652	0.480891	1.058912
7.	Average D-Ratio Sum((1)x(6))/total of(6)	0.086409	0.245958	0.119371	0.451738	0.023352	0.149558	0.255679	0.428589
8.	D-Ratios for:								
	a.Code 2041 (Haz.Grp.1)	xx	xx	xx	0.42	xx	xx	xx	.53
	b.Code 7380 (Haz.Grp.3)	xx	xx	xx	0.43	xx	xx	xx	.38
	c.Code 7405 (Haz.Grp.4)	xx	xx	xx	0.54	xx	xx	xx	.43
	d.Code 8742 (Haz.Grp.3)	xx	xx	xx	0.43	xx	xx	xx	.40
	e.Code 8810 (Haz.Grp.2)	xx	xx	xx	0.42	xx	xx	xx	.44
9.	Expected Average Change in D-Ratios: 7B/7A=	0.948756							

*These pure premiums reflect the average only if each class code in a state is 100% credible-but can be used for comparative purposes.