# Evaluating the Unearned Premium Reserve for Automobile Extended Service Contracts

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## ABSTRACT

The balance sheet of a writer of automobile extended service contracts will often list a liability for unearned premiums that is several times larger than the liability for unpaid loss and loss adjustment expense. For the writer of extended service contracts, there is often more risk associated with the adequacy of the unearned premium than with the adequacy of the loss and loss expense reserve.

This paper discusses one method of estimating the adequacy of the unearned premium reserve for extended service contracts for automobiles. Essential to the method described is the manner in which the data is segmented and compiled. Data is segmented by contract duration and miles covered, by the coverage level afforded, and separated by whether the contract was sold on vehicles within the manufacturer's warranty and those on vehicles whose original manufacturer's warranty has expired.

There are three NAIC prescribed tests for the adequacy of the unearned premiums for contracts greater than or equal to thirteen months:

1. The best estimate of the amounts refundable to the contract-holders at the reporting date,
2. The gross premium multiplied by the ratio of the projected future gross losses and expenses for the unexpired term of the contract to the projected total gross losses and expenses under the contracts, and
3. The amount of the projected future gross losses and expenses to be incurred during the unexpired term of the contracts, with specific adjustments for investment income.

This method can provide a basis for estimating the third test in the NAIC required tests for unearned premiums for such contracts.

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## INTRODUCTION

For most lines of insurance, the adequacy of the unearned premium reserve ("UEP reserve") can be estimated by examining the loss ratio of recent accounting periods. However, for extended service contracts ("ESC's"), the prior period's loss ratios are not necessarily representative of the expected loss ratios of the unearned premiums. First, the loss ratio is dependent upon the rate in which premiums are earned. ESC's are not uniformly exposed to loss over the life of the contract, and any difference between the earnings rate and the expected loss emergence will cause distortions in the loss ratio. In addition, many ESC's are priced assuming a certain amount of investment income will accrue over the life of the contract. When investment income is considered in pricing ESC's, given a block of business in force as of a certain date, the loss ratio will rise as the shorter term contracts expire, leaving the longer term contracts to earn in the future. The longer term contracts will typically have a higher loss ratio, due to the effects of investment income. Due to their higher premiums, they may be also be priced at a higher loss ratio due to fixed expense loads. The longer-term contracts also should consider the inflationary impact of increases in parts costs and labor costs. Repairs that occur earlier in the contract period cost less than the same repairs performed later in the contract period due to these inflationary effects. Even for contracts written after the original equipment manufacturer's warranty ("OEM warranty") has expired, the prior year's loss ratios may be a poor indicator of future loss activity.

There have been a few articles written about how to estimate the premiums to charge for automobile ESC's, but little written on estimating the adequacy of the UEP reserve. The purpose of this paper is to describe a method of estimating the adequacy of the UEP reserve. An individual establishing an ESC program might also find this discussion useful in setting up the data requirements for such a program.

**Definitions:**

For the sake of clarity, I will use the term “mileage” and “miles” exclusively, but the terms can be replaced with the appropriate metric measures (kilometers) without altering the meaning of the concepts. However, when dealing with programs in both the United States and Canada, one should not mix the two (i.e. miles with kilometers) in the same data analysis.

**Original Equipment Manufacturer** (“OEM”) is the manufacturer of the item, in this case the vehicle manufacturer. For parts, it refers to those parts sold by the manufacturer, verses after-market parts.

**OEM warranty** will refer to the warranty provided by the OEM. For automobiles, it is typically expressed in terms of both time and mileage from the in-service date.

The **in-service date** is the day the new car was delivered to the customer for use. It is the first day the first retail buyer took possession of the vehicle.

Likewise, the **in-service mileage** is the mileage the day the car was delivered to the customer. While often recorded as zero, cars typically have some miles on the odometer when delivered to the retail customer.

An **Extended Service Contract** (“ESC”) is a contract, separate from the OEM warranty, that provides coverage for the mechanical breakdown of the vehicle. It is not an “Extended Warranty,” as the coverage is (nearly always) different from the OEM warranty. Only the original manufacturer can extend the warranty period. ESC’s typically do not cover glass, paint, and similar ‘cosmetic’ features. The ESC may cover items during the warranty period not covered by the manufacturer’s warranty, such as towing, rental of a replacement vehicle during warranty repairs, and/or roadside assistance.

Coverage under an ESC is usually afforded for a length of time or elapsed miles, whichever occurs first. While there have been some unlimited mileage plans sold in the past, such plans are, for the most part, no longer available. In this paper, the nomenclature will be months/thousands of miles covered. For example, a 36/72 in warranty plan covers a vehicle for 36 months or 72,000 miles, whichever occurs first. If the OEM warranty is 36/36, a 36/72 ESC sold in warranty does not provide any extra time covered, only extra mileage driven beyond the OEM warranty. Out of warranty plans, whose exposure starts immediately, are given in terms of the months and mileage covered, regardless of the age or mileage of the vehicle. Thus a 12/12 out of warranty plan covers the next twelve months or the next 12,000 miles, whichever occurs first. While it is tempting to say a 48/48 ESC plan sold in warranty is equivalent to a 12/12 plan sold out of warranty the day the OEM warranty expires, rules governing out of warranty ESC sales would only permit this to occur if the vehicle were sold at the exact time the OEM expired.

**In warranty** will refer to vehicles whose OEM warranty has not expired, and references to an **ESC sold in warranty** refer to an ESC sold while the vehicle is still covered by the OEM warranty.

**Out of warranty** will refer to vehicles whose OEM warranty has expired, and references to an **ESC sold out of warranty** refer to an ESC sold after the vehicle is no longer covered by the OEM warranty.

To **mile out** is to exhaust the OEM warranty or the ESC due to miles driven.

To **time out** is to exhaust the OEM warranty or the ESC due to the time covered by the OEM warranty or the ESC.

**Inception age and mileage** is the age of the vehicle and odometer reading in miles at the inception date of the ESC.

A **part** refers to the individual part, either as a component of an assembly or an independent part. One example is a brake rotor.

An **Assembly** is a group of parts used together in a unit. One example is the entire brake assembly, which is a collection of brake parts such as the rotor, caliper, etc. This term is important if the deductible applies to an assembly, verses an occurrence or visit.

**Coverage** refers to the parts covered, be it a limited powertrain ESC or the more comprehensive contracts, and to the limitations provided on such ancillary items as length or amount of the rental coverage provided. (Rental coverage provides for a replacement vehicle when the subject vehicle is indisposed due to a covered mechanical failure.)

**Content** refers to what is contained in the vehicle, as it relates to parts and accessories. When stating the **content has increased**, it is meant that the number or cost of accessories has increased, on average, for that particular make of model, from prior years. For example, intermittent windshield wipers used to be an extra cost, optional feature. Now, most vehicles have such a feature. As far as that component is concerned, it has increased the content of the vehicle model that now has that feature as a standard feature.

## Considerations on ESC's, both in- and out of warranty

Extended Service Contract insurance has some unique characteristics. It is those unique characteristics that make the estimation of the adequacy of the UEPR difficult or at least unique from estimating the adequacy of the UEPR from other insurance.

Unlike other lines of insurance, there is no "bureau" data for the coverage. Data is jealously guarded by the companies in the business. Data in the detail needed to perform much of the analysis is not available from public sources. (For that reason, the data used in this document are not actual data from a real ESC program, and might not bear any semblance to real ESC results.)

Earnings usually occur over multiple years, although there are some ESC's sold for twelve months or less. Some ESC's on used vehicles are provided by the auto dealer, and cover periods as short as one or three months post-sale. Some new car ESC's provide coverage as long as seven years from the in-service date.

The exposure is not proportional over the life of the contract, even for ESC's sold on vehicles out of warranty. For a new car, the ESC has little exposure during the period the OEM warranty applies. Coverage attaches when the vehicle miles out or times out of the OEM warranty. Used car ESC's see a higher frequency of small claims initially after the buyer takes delivery, but the cost per claim rises as the vehicle ages and more expensive repairs are needed.

The geographical location in which the contract is sold is not necessarily the area in which the vehicle losses will be repaired. When purchasers of an ESC move, or changes in driving habits occur, no adjustment is made to the price of the contract. Air conditioning costs are lower in the north due to the cooler summers. Labor costs are lower in rural Alabama than in urban New York City.

The frequency of repairs is not necessarily consistent over time. When new car sales are slow and owners keep their cars for a longer period of time, the expected number and rate of miles driven may change. Changes in fuel prices or speed limits also affect driving patterns, which in turn affect the rate of miles driven, and the parts failure rates as respects the age of the ESC.

Seasonal changes also affect parts failures, as does the severity of the seasons in different climates and geographic areas.

Changes in parts prices, delays in obtaining parts and other economic factors affect the availability of parts and the severity of claims for rental of replacement vehicles. If the contracts cover foreign manufactured vehicles, the availability of replacement parts and possibly exchange rate fluctuations should be considered.

Changes in the claims handling can change the results and thus UEP adequacy. This can occur at the ESC company's claims department or at the individual repair facilities.

ESC contracts do not usually consider any driver characteristics; i.e. is there is no classification plan that considers driver characteristics or driving patterns. Some characteristics can be imputed from the time/mileage limit purchased, the level of coverage purchased, and from the vehicle selected. For example, one could make some assumptions about the rate of mileage and driving habits of the purchaser of a new Cadillac DeVille verses the purchaser of a Z28 Camaro. However, such differences are not usually a source of rating differences.

There is not a strict, absolute cutoff between the OEM warranty coverage and the ESC that applies to all parts. For example, an OEM warranty may apply for 36,000 miles and 36 months, but some parts such as catalytic converters might be covered for longer periods. The manufacturer at times also replaces parts that are subject to recalls after the OEM warranty has expired.

For ESC on vehicles still within the manufacturer's warranty period, the exposure is very small or even non-existent during the period that the manufacture's warranty applies. Consequently, there should be little, if any, premiums earned during that period. While the exact time at which the OEM warranty expires and the ESC exposure starts is unknown, one can be certain as to the time by which all ESC's have begun exposure. For example, consider a group of vehicles covered by an OEM warranty of 36 months and 36,000 miles. While we do not know how many, if any, such vehicles have "miled out" of their OEM warranty as of, say 24 months, we do know that all of the vehicles have "timed out" of their

OEM warranty as of 36 months. Thus all of such vehicles have ESC exposure unless the vehicle, in turn, has “miled out” of the ESC.

The OEM warranty can vary from year to year for the same model. Different manufacturers have different warranties, and even within a single manufacturer, different models or brands may have different warranties.

Manufacturers may cover a part failure because of “goodwill” in the instance of a failure immediately after the OEM warranty expires, or in the case of known product defects.

There might not be any case reserves for ESC losses, or loss reserves may be established only for the largest of claims, such as engine or transmission losses. Consequently, a bulk loss and loss expense reserve would need to be established in order to determine the incurred loss and loss expense as of any particular date.

The accident date is usually recorded as the date the vehicle was brought in for servicing, not necessarily the date the failure occurred.

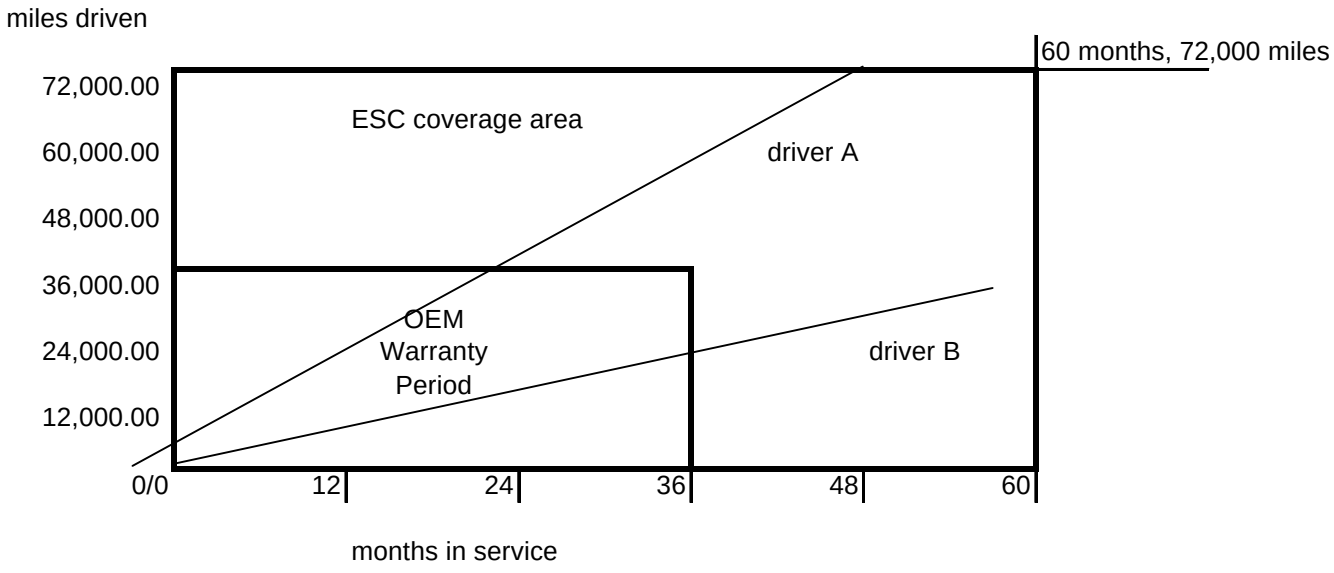
**Considerations on ESC's sold while vehicle is within the OEM warranty period**

The contracts sold on vehicles within the warranty have expiration terms stated in terms of months after the vehicle was placed in service and the vehicle's odometer reading. For example, given an OEM warranty of 36/36, a 72/100 Extended Service Contract would cover 36 months after the OEM warranty of 36 months expired, or to an odometer reading of 100,000 miles (64,000 miles after the OEM warranty "miled out") whichever occurred first.

If we knew when a vehicle miled out of the OEM warranty, we could separate the "in warranty" portion of the exposure from the "truly exposed" portion of the contracts and proceed. Even if we were to obtain the odometer reading at the time of repair of all repaired vehicles, we would only know the mileage on a portion of the vehicles – not all vehicles have a covered repair. Some estimation could be performed using the limited data odometer readings on repaired vehicles would provide, but such an analysis is beyond the scope of this paper.

Since we know the vehicle's in-service date, we do know the date at which the vehicles time out of their OEM warranty. However, we do not know that all such vehicles are exposed to its ESC, as some vehicles might have already miled out of the ESC as well.

We can assume that the time/mileage limits selected by the purchaser will provide some insight into the rate of miles driven. The chart below illustrates the coverage area covered by an OEM warranty of 36/36 and an ESC of 60 months and 72,000 miles. Driver A would drive at a rate such that the ESC would terminate at 48 months, while driver B would be covered for the entire time. However, if a lower mileage plan were available for driver B, presumably at a lower cost, driver B would tend to purchase the lower mileage plan. Likewise, if driver A wanted coverage for the full five years, he would need to purchase a plan with more covered miles. This is to point out that, while miles driven is not captured as a data element, some information about annual miles driven can be assumed from the coverage limits purchased.



## Considerations on ESC's sold on vehicles beyond the OEM warranty period

For out of warranty vehicles, the ESC coverage starts immediately upon the inception of the contract. The important date is the inception date of the contract. The in-service date of the automobile has much less importance, if any. Additionally for used vehicles, the true in-service data is often not available.

Even for ESC's sold out of warranty, the expected loss will vary over time, based primarily upon the time and mileage since the inception of the ESC. If we cannot monitor the mileage driven, we must rely on time since inception.

## The Method

The failure of an automobile part can be thought of as a type of mortality – the likelihood of failure (death of the part) varies with age. With the scores of parts whose failure constitute the losses covered by the typical ESC, determining and then combining the "mortality" of the individual parts would be a very large and complex effort. Consequently, we will observe the ESC costs, regardless of the part that failed, by coverage. Although part failures depend upon both time and miles driven, this method assumes that only the age of the vehicle is known.

This method of estimating UEP adequacy is to estimate the future pure premiums of individual groupings of ESC's, and compare them to the unearned premiums. It is

essentially an incremental pure premium approach, and looks very similar to loss reserving. The first "key" is how the data is grouped.

The first data split is between ESC's sold in-warranty and ESC's sold out of warranty. This is due to the vast difference in expected losses, especially during the period the in warranty ESC's are still within the OEM warranty. If ESC's can be sold late in the OEM warranty period, separating ESC's sold at or near the vehicle in-service date from ESC's sold "late in warranty" might also be appropriate.

Within those two (or three) large groupings, the data is separated by coverage – limited powertrain, comprehensive, and so forth.

The next general split is by contract limits – time and miles covered. Splitting by deductibles offered and other less significant coverage variations increases the homogeneity of each group, but it also reduces the size and credibility of the groups. The usual trade-off between homogeneity and credibility must be considered at this step.

Since ESC's have exposure to loss that is dependent upon the time since the vehicle was placed in service (for ESC's sold in-warranty) or upon the time since the inception of the contract (for ESC's sold out of warranty), the data is aggregated by in-service date or by inception date. This is similar to grouping losses by policy quarter – in this case the grouping is by vehicle in-service quarter for in-warranty ESC's, and by contract inception date for out of warranty ESC's.

This analysis assumes that coding exists that differentiates ESC's sold during the warranty period from those sold after the OEM warranty has expired. It also assumes that the vehicle in-service date is known for ESC's sold on vehicles still within the OEM warranty, as well as the other indicators.

For the sake of simplicity and brevity, the description below applies only to ESC's sold in warranty, and sold at or near the vehicle in service date. The analysis for ESC's sold on vehicles out of warranty is similar to that of ESC's sold in warranty, substituting the inception date for the in service date. For ESC's sold "late in warranty," the data is usually segregated by vehicle in service date rather than contract inception date.

## Paid Losses

The data is grouped as described above, and are accumulated according to the time between the in-service date and the loss date, in order to match the "exposure earnings." For example, a loss occurring 91-120 days past the in-service date will show as a "second quarter" loss.

Exhibit 1 illustrates paid loss data for contracts sold in warranty on or soon after the date the vehicle was placed in service, with contract limits of 48/60.

Contracts, whose inception date is in the fourth quarter of policy year four ("year4"), as of three months, show 27,679 in paid losses. These payments are on contracts whose in-

service date is the fourth quarter of year4. Consider a contract written effective October 1, year4. It will have "earned through" its first quarter as of December 31, year4. But a contract written December 31 will not "earn through" its first quarter until March 30 of year5. If writings are evenly distributed throughout the quarter, we can expect about half of the losses to have emerged as of December 31, year4, excluding reporting and payment delays, on the contracts whose in-service date is in the fourth quarter of year4, and assuming all contracts are written on the in-service date. The losses reported within three months of the in-service date, on contracts whose in-service date is the first quarter of year4, cannot be known until the end of the second quarter, even if there are no delays in reporting and payments. It may help to think of it as "claims made within the first quarter of the contract inception date," substituting "in-service date" for contract inception date.

## Earned Exposures

One ESC, in force throughout an entire quarter, constitutes an earned exposure. Exposures are compiled on the same basis as the paid losses. Like policy year earned premiums, the policy year earned exposures take an extra exposure period to be fully developed. Earned exposures are illustrated in Exhibit 2.

## Average Paid Pure Premiums

The payments by lag period are then divided by the earned exposure counts to get a paid pure premium by lag, as shown in Exhibit 3.

## Estimating Future Average Pure Premiums

Estimated loss payments for future lag periods are then obtained by adjusting prior lag pure premiums for trend and other changes, if necessary. Trends can be obtained from internal data, from auto industry data, or other sources. Since auto industry data will only include inflationary trends, some adjustment for increased vehicle content should be included in the adjustment. The normal averaging or projection methods can be used to estimate the incremental pure premiums for future periods.

Since we are dealing with paid data, the last paid value must include a loading for payments beyond the in force date, to accommodate late payments. (Pipeline IBNR, for example.) While the payments are rather quick and IBNR loads are not large, this unpaid portion must be considered in some manner.

## Estimating Future Earned Exposures

For the latest period, the “yet to be earned” exposures for that period is the difference between the exposures earned during that period and the inforce at the end of that period, assuming no cancellations. Said another way, the yet to be earned exposures for the latest period is roughly half the difference between the beginning and ending inforce counts.

Earned exposures must be estimated for future periods, i.e. “completing the rectangle,” much like loss reserving. The usual projection methods can be used to estimate future earnings by period. Since this exercise is to estimate the adequacy of the unearned

premium reserve, no reduction should be made for the number of exposures expected to cancel in the future. Exposures expected to be earned in the future are shown in Exhibit 4.

## Estimating Future Pure Premiums

The estimated future payment is the future earned exposures multiplied by the estimated future average payment per lag period. This gives the "yet to be paid" loss amounts. Exhibit 5 provides the estimates of future payments.

Adjustments for changes in coverage, vehicle content or other influences in cost by maturity should be made, if such changes have occurred. This is similar to that of adjusting incremental pure premiums in ratemaking.

## Adequacy of the UEP Reserve

The expected future losses are the expected future earned exposure counts multiplied by the expected future payments per exposure. For simplicity in this example, I used the average severity of all periods as the estimated future severity. However, in a real world application, severities should be adjusted for inflation, trends, changes in content and coverage, etc.

Once the expected future payments have been estimated, the additional costs of loss adjustment and other maintenance expenses are loaded to arrive at an estimated final payment. That is then compared to the unearned premium reserve for its adequacy.

Losses can be discounted by anticipated payment date, as the method generates expected future loss payments by period.

## Other considerations affecting ESC's, sold both in-warranty and out of warranty, not reflected in the method

### Changes in content

The expected ESC incremental pure premiums should be adjusted for material changes in the content of the vehicles. As more devices and systems are added to the vehicles, the mix of parts failures, and their attentive costs, changes. Even the parts that constitute the larger severities, engines and transmissions, have become more complex, and more costly to replace and repair. A supercharged engine used to be reserved for the racetrack, now many ordinary passenger vehicles are supercharged. This can be accomplished by adding to the factor used to reflect inflationary changes in parts and labor costs.

### Seasonality

Heavy snows cause more transmissions to fail, extreme heat causes more air conditioners to fail, in other words, different seasons and different extremes within a season may cause different failures. Adjustments for the seasonality of losses are beyond the scope of this paper.

### Changes in claims processing velocity

The method discussed above assumes that the lag between the accident date and the payment date is consistent. This assumption should periodically be tested. Since most ESC claims are paid in days, or at least within a few weeks, the delays are typically short, and changes in the time between the accident date need not be great to cause a

considerable change in this average lag time. Given the high volume of claim activity, increasing or decreasing the lag by even a few days can cause a considerable change in the payments for the period.

## Summary and Conclusion

Using an incremental pure premium method to develop anticipated loss payments is a useful means of estimating the funds needed to support the loss portion of the unearned premium reserve. The key to such a method is in the proper segregation of the data.

48/60 contracts, in-warranty, sold at or near the vehicle in-service date

Exhibit 1

| policy inception | policy year 1 paid losses | | incremental | losses paid as of # months duration of the ESC contract | | | | | | | | | | | | | | *values in italics are not fully matu* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| quarter | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 51 | 54 |
| 1 | 28,328 | 72,449 | 51,304 | 78,433 | 96,808 | 123,080 | 96,390 | 164,405 | 434,614 | 268,602 | 322,326 | 737,813 | 542,407 | 960,997 | 1,261,590 | *640,245* | - | - |
| 2 | 48,237 | 44,933 | 78,489 | 54,355 | 41,589 | 124,083 | 144,403 | 232,295 | 404,295 | 394,913 | 826,043 | 860,148 | 1,333,077 | 1,657,475 | *851,496* | - | - | - |
| 3 | 55,410 | 45,006 | 56,650 | 55,021 | 72,207 | 68,918 | 159,645 | 290,236 | 329,665 | 298,675 | 431,231 | 959,894 | 661,251 | *352,028* | - | - | - | - |
| 4 | 28,572 | 64,991 | 89,181 | 67,961 | 102,261 | 47,260 | 119,450 | 221,291 | 294,674 | 395,907 | 391,843 | 792,037 | *680,204* | - | - | - | - | - |

| policy inception | policy year 2 paid losses | | incremental | losses paid as of # months duration of the ESC contract | | | | | | | | | | | | | | *values in italics are not fully matu* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| quarter | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 51 | 54 |
| 1 | 27,314 | 57,874 | 62,475 | 77,129 | 109,856 | 103,822 | 122,455 | 254,070 | 233,443 | 215,678 | 832,627 | *540,847* | - | - | - | - | - | - |
| 2 | 33,763 | 39,658 | 31,288 | 38,121 | 105,642 | 97,913 | 139,892 | 230,685 | 164,655 | 548,935 | *346,850* | - | - | - | - | - | - | - |
| 3 | 38,455 | 42,931 | 30,359 | 54,225 | 59,224 | 92,653 | 141,244 | 243,280 | 345,316 | *184,218* | - | - | - | - | - | - | - | - |
| 4 | 73,584 | 27,902 | 35,415 | 81,449 | 68,248 | 106,511 | 103,610 | 223,782 | *145,924* | - | - | - | - | - | - | - | - | - |

| policy inception | policy year 3 paid losses | | incremental | losses paid as of # months duration of the ESC contract | | | | | | | | | | | | | | *values in italics are not fully matu* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| quarter | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 51 | 54 |
| 1 | 47,570 | 45,941 | 31,630 | 35,649 | 113,137 | 98,597 | 73,730 | *123,352* | - | - | - | - | - | - | - | - | - | - |
| 2 | 33,291 | 56,682 | 41,236 | 44,295 | 118,007 | 125,966 | *75,881* | - | - | - | - | - | - | - | - | - | - | - |
| 3 | 36,239 | 40,688 | 78,412 | 77,170 | 92,735 | *39,563* | - | - | - | - | - | - | - | - | - | - | - | - |
| 4 | 68,914 | 73,537 | 88,368 | 39,637 | *40,426* | - | - | - | - | - | - | - | - | - | - | - | - | - |

| policy inception | policy year 4 paid losses | | incremental | losses paid as of # months duration of the ESC contract | | | | | | | | | | | | | | *values in italics are not fully matu* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| quarter | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 51 | 54 |
| 1 | 54,116 | 26,219 | 78,777 | *40,490* | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2 | 55,252 | 27,365 | *37,131* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 3 | 57,186 | *20,883* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4 | *27,679* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

## 48/60 contracts, in-warranty, sold at or near the vehicle in-service date

Exhibit 2

| policy inception quarter | year 1 policies 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 51 | 54 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (incremental) earned policy counts | | | | | | | | | | | | | | | *values in italics are not fully mature* | | |
| 1 | 10,000 | 9,990 | 9,977 | 9,973 | 9,968 | 9,960 | 9,954 | 9,951 | 9,949 | 9,945 | 9,942 | 9,941 | 9,941 | 9,941 | 9,941 | *4,971* | - | - |
| 2 | 10,000 | 9,994 | 9,984 | 9,976 | 9,970 | 9,964 | 9,960 | 9,954 | 9,947 | 9,943 | 9,941 | 9,940 | 9,940 | 9,940 | *4,970* | - | - | - |
| 3 | 10,000 | 9,993 | 9,985 | 9,982 | 9,975 | 9,969 | 9,961 | 9,954 | 9,948 | 9,944 | 9,943 | 9,943 | 9,943 | *4,972* | - | - | - | - |
| 4 | 10,000 | 9,996 | 9,988 | 9,980 | 9,975 | 9,970 | 9,963 | 9,959 | 9,957 | 9,955 | 9,954 | 9,953 | *4,977* | - | - | - | - | - |

| policy inception quarter | year 2 policies 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 51 | 54 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (incremental) earned policy counts | | | | | | | | | | | | | | | *values in italics are not fully mature* | | |
| 1 | 10,000 | 9,995 | 9,986 | 9,980 | 9,978 | 9,976 | 9,970 | 9,965 | 9,961 | *9,957* | 9,955 | *4,978* | - | - | - | - | - | - |
| 2 | 10,000 | 9,999 | 9,994 | 9,987 | 9,985 | 9,984 | 9,980 | 9,976 | 9,971 | 9,967 | *4,982* | - | - | - | - | - | - | - |
| 3 | 10,000 | 9,991 | 9,979 | 9,973 | 9,967 | 9,963 | 9,960 | 9,956 | 9,952 | *4,975* | - | - | - | - | - | - | - | - |
| 4 | 10,000 | 9,992 | 9,982 | 9,979 | 9,973 | 9,968 | 9,965 | 9,962 | *4,979* | - | - | - | - | - | - | - | - | - |

| policy inception quarter | year 3 policies 3 | 6 | 9 | 12 | 15 | *18* | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 51 | 54 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (incremental) earned policy counts | | | | | | | | | | | | | | | *values in italics are not fully mature* | | |
| 1 | 10,000 | 9,995 | 9,988 | 9,983 | 9,978 | 9,974 | 9,971 | *4,984* | - | - | - | - | - | - | - | - | - | - |
| 2 | 10,000 | 10,000 | 10,000 | 9,999 | 9,998 | 9,995 | *4,994* | - | - | - | - | - | - | - | - | - | - | - |
| 3 | 10,000 | 9,991 | 9,978 | 9,970 | 9,961 | *4,978* | - | - | - | - | - | - | - | - | - | - | - | - |
| 4 | 10,000 | 9,993 | 9,984 | 9,980 | *4,988* | - | - | - | - | - | - | - | - | - | - | - | - | - |

| policy inception quarter | year 4 policies *3* | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 51 | 54 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (incremental) earned policy counts | | | | | | | | | | | | | | | *values in italics are not fully mature* | | |
| 1 | 10,000 | 10,000 | 9,997 | *4,996* | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2 | 10,000 | 9,998 | *4,996* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 3 | 10,000 | *4,997* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4 | *5,000* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

48/60 contracts, in-warranty, sold at or near the vehicle in-service date

Exhibit 3

policy inception year 1 incremental paid pure premiums — *values in italics are not fully mature*

| quarter | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 51 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.83 | 7.25 | 5.14 | 7.86 | 9.71 | 12.36 | 9.68 | 16.52 | 43.69 | 27.01 | 32.42 | 74.22 | 54.56 | 96.67 | 126.91 | *128.80* | - |
| 2 | 4.82 | 4.50 | 7.86 | 5.45 | 4.17 | 12.45 | 14.50 | 23.34 | 40.64 | 39.72 | 83.10 | 86.53 | 134.11 | 166.75 | *171.33* | - | - |
| 3 | 5.54 | 4.50 | 5.67 | 5.51 | 7.24 | 6.91 | 16.03 | 29.16 | 33.14 | 30.04 | 43.37 | 96.54 | 66.50 | *70.80* | - | - | - |
| 4 | 2.86 | 6.50 | 8.93 | 6.81 | 10.25 | 4.74 | 11.99 | 22.22 | 29.60 | 39.77 | 39.37 | 79.58 | *136.67* | - | - | - | - |
| average | 4.01 | 5.69 | 6.90 | 6.41 | 7.84 | 9.12 | 13.05 | 22.81 | 36.77 | 34.13 | 49.56 | 84.22 | 97.96 | 111.41 | 149.12 | 128.80 | |

policy inception year 2 incremental paid pure premiums — *values in italics are not fully mature*

| quarter | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 51 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.73 | 5.79 | 6.26 | 7.73 | 11.01 | 10.41 | 12.28 | 25.50 | 23.44 | 21.66 | 83.64 | *108.65* | - | - | - | - | - |
| 2 | 3.38 | 3.97 | 3.13 | 3.82 | 10.58 | 9.81 | 14.02 | 23.12 | 16.51 | 55.08 | *69.62* | - | - | - | - | - | - |
| 3 | 3.85 | 4.30 | 3.04 | 5.44 | 5.94 | 9.30 | 14.18 | 24.44 | 34.70 | *37.03* | - | - | - | - | - | - | - |
| 4 | 7.36 | 2.79 | 3.55 | 8.16 | 6.84 | 10.69 | 10.40 | 22.46 | *29.31* | - | - | - | - | - | - | - | - |
| average | 4.33 | 4.21 | 3.99 | 6.29 | 8.59 | 10.05 | 12.72 | 23.88 | 25.99 | 37.92 | 76.63 | 108.65 | - | - | | | |

policy inception year 3 increnental paid pure premiums — *values in italics are not fully mature*

| quarter | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 51 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.76 | 4.60 | 3.17 | 3.57 | 11.34 | 9.89 | 7.39 | *24.75* | - | - | - | - | - | - | - | - | - |
| 2 | 3.33 | 5.67 | 4.12 | 4.43 | 11.80 | 12.60 | *15.19* | - | - | - | - | - | - | - | - | - | - |
| 3 | 3.62 | 4.07 | 7.86 | 7.74 | 9.31 | *7.95* | - | - | - | - | - | - | - | - | - | - | - |
| 4 | 6.89 | 7.36 | 8.85 | 3.97 | *8.10* | - | - | - | - | - | - | - | - | - | - | - | - |
| average | 4.65 | 5.42 | 6.00 | 4.93 | 10.14 | 10.15 | 11.29 | 24.75 | | | | | | | | | |

policy inception year 4 incremental paid pure premiums — *values in italics are not fully mature*

| quarter | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 51 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5.41 | 2.62 | 7.88 | *8.10* | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2 | 5.53 | 2.74 | *7.43* | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 3 | 5.72 | *4.18* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4 | *5.54* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| average | 5.55 | 3.18 | 7.66 | 8.10 | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| average all: | 4.63 | 4.72 | 5.92 | 6.05 | 8.86 | 9.74 | 12.57 | 23.50 | 31.38 | 35.76 | 58.59 | 89.10 | 97.96 | 111.41 | 149.12 | 128.80 | |
| | | | | | | | | | | | | | est pmts post 48 months: | | 59.27 | | |

## 48/60 contracts, in-warranty, sold at or near the vehicle in-service date

Exhibit 4

| policy inception quarter | year 1 policies to be earned in the future 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 51 | 54 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | *anticipated values in italics* | | | |
| 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | *4,970* | *4,971* | *0* |
| 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | *4,970* | *9,940* | *4,970* | *0* |
| 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | *4,971* | *9,943* | *9,943* | *4,972* | *0* |
| 4 | - | - | - | - | - | - | - | - | - | - | - | - | *4,976* | *9,953* | *9,953* | *9,953* | *4,977* | *0* |

| policy inception quarter | year 2 policies to be earned in the future 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 51 | 54 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | *anticipated values in italics* | | | |
| 1 | - | - | - | - | - | - | - | - | - | - | - | *4,977* | *9,955* | *9,955* | *9,955* | *9,955* | *4,978* | *0* |
| 2 | - | - | - | - | - | - | - | - | - | - | *4,984* | *9,963* | *9,963* | *9,963* | *9,963* | *9,963* | *4,982* | *0* |
| 3 | - | - | - | - | - | - | - | - | - | *4,976* | *9,948* | *9,948* | *9,948* | *9,948* | *9,948* | *9,948* | *4,974* | *0* |
| 4 | - | - | - | - | - | - | - | - | *4,981* | *9,955* | *9,955* | *9,955* | *9,955* | *9,955* | *9,955* | *9,955* | *4,978* | *0* |

| policy inception quarter | year 3 policies to be earned in the future 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 51 | 54 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | *anticipated values in italics* | | | |
| 1 | - | - | - | - | - | - | - | *4,986* | *9,964* | *9,964* | *9,964* | *9,964* | *9,964* | *9,964* | *9,964* | *9,964* | *4,982* | *0* |
| 2 | - | - | - | - | - | - | *4,998* | *9,985* | *9,985* | *9,985* | *9,985* | *9,985* | *9,985* | *9,985* | *9,985* | *9,985* | *4,993* | *0* |
| 3 | - | - | - | - | - | *4,979* | *9,954* | *9,954* | *9,954* | *9,954* | *9,954* | *9,954* | *9,954* | *9,954* | *9,954* | *9,954* | *4,977* | *0* |
| 4 | - | - | - | - | *4,991* | *9,971* | *9,971* | *9,971* | *9,971* | *9,971* | *9,971* | *9,971* | *9,971* | *9,971* | *9,971* | *9,971* | *4,986* | *0* |

| policy inception quarter | year 4 policies to be earned in the future 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | 51 | 54 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | *anticipated values in italics* | | | |
| 1 | - | - | - | *4,998* | *9,989* | *9,989* | *9,989* | *9,989* | *9,989* | *9,989* | *9,989* | *9,989* | *9,989* | *9,989* | *9,989* | *9,989* | *4,995* | *0* |
| 2 | - | - | *4,999* | *9,987* | *9,987* | *9,987* | *9,987* | *9,987* | *9,987* | *9,987* | *9,987* | *9,987* | *9,987* | *9,987* | *9,987* | *9,987* | *4,994* | *0* |
| 3 | - | *5,000* | *9,986* | *9,986* | *9,986* | *9,986* | *9,986* | *9,986* | *9,986* | *9,986* | *9,986* | *9,986* | *9,986* | *9,986* | *9,986* | *9,986* | *4,993* | *0* |
| 4 | *5,000* | *10,000* | *10,000* | *10,000* | *10,000* | *10,000* | *10,000* | *10,000* | *10,000* | *10,000* | *10,000* | *10,000* | *10,000* | *10,000* | *10,000* | *10,000* | *5,000* | *0* |

## 48/60 contracts, in-warranty, sold at or near the vehicle in-service date

Exhibit 5

policy inception — year 1 losses to be paid in the future

| qtr | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | post 48 | totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 640,136 | 294,631 | 934,767 |
| 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 741,126 | 1,280,272 | 294,572 | 2,315,970 |
| 3 | - | - | - | - | - | - | - | - | - | - | - | - | - | 553,819 | 1,482,700 | 1,280,658 | 294,661 | 3,611,838 |
| 4 | - | - | - | - | - | - | - | - | - | - | - | - | 487,449 | 1,108,864 | 1,484,191 | 1,281,946 | 294,957 | 4,657,408 |

policy inception — year 2 losses to be paid in the future

| qtr | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | post 48 | totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | - | - | - | - | - | - | - | - | - | - | - | 443,451 | 975,192 | 1,109,087 | 1,484,490 | 1,282,204 | 295,016 | 5,589,439 |
| 2 | - | - | - | - | - | - | - | - | - | - | 292,013 | 887,703 | 975,975 | 1,109,978 | 1,485,683 | 1,283,234 | 295,254 | 6,329,840 |
| 3 | - | - | - | - | - | - | - | - | - | 177,942 | 582,853 | 886,367 | 974,506 | 1,108,307 | 1,483,446 | 1,281,302 | 294,809 | 6,789,532 |
| 4 | - | - | - | - | - | - | - | - | 156,304 | 355,991 | 583,263 | 886,991 | 975,192 | 1,109,087 | 1,484,490 | 1,282,204 | 295,016 | 7,128,537 |

policy inception — year 3 losses to be paid in the future

| qtr | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | post 48 | totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | - | - | - | - | - | - | - | 117,171 | 312,670 | 356,313 | 583,791 | 887,792 | 976,073 | 1,110,089 | 1,485,832 | 1,283,363 | 295,283 | 7,408,378 |
| 2 | - | - | - | - | - | - | 62,825 | 234,648 | 313,329 | 357,064 | 585,021 | 889,664 | 978,131 | 1,112,429 | 1,488,963 | 1,286,068 | 295,905 | 7,604,046 |
| 3 | - | - | - | - | - | 48,495 | 125,122 | 233,919 | 312,357 | 355,955 | 583,205 | 886,901 | 975,094 | 1,108,975 | 1,484,340 | 1,282,075 | 294,987 | 7,691,426 |
| 4 | - | - | - | - | 44,220 | 97,118 | 125,335 | 234,319 | 312,890 | 356,563 | 584,201 | 888,416 | 976,759 | 1,110,869 | 1,486,876 | 1,284,265 | 295,491 | 7,797,321 |

policy inception — year 4 losses to be paid in the future

| qtr | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 | 39 | 42 | 45 | 48 | post 48 | totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | - | - | - | 30,238 | 88,503 | 97,293 | 125,562 | 234,742 | 313,455 | 357,207 | 585,256 | 890,020 | 978,522 | 1,112,874 | 1,489,560 | 1,286,583 | 296,024 | 7,885,837 |
| 2 | - | - | 29,594 | 60,421 | 88,485 | 97,273 | 125,537 | 234,695 | 313,392 | 357,135 | 585,138 | 889,842 | 978,327 | 1,112,652 | 1,489,261 | 1,286,326 | 295,965 | 7,944,042 |
| 3 | - | 23,600 | 59,117 | 60,415 | 88,476 | 97,264 | 125,524 | 234,671 | 313,361 | 357,099 | 585,080 | 889,753 | 978,229 | 1,112,540 | 1,489,112 | 1,286,197 | 295,935 | 7,996,372 |
| 4 | 23,150 | 47,200 | 59,200 | 60,500 | 88,600 | 97,400 | 125,700 | 235,000 | 313,800 | 357,600 | 585,900 | 891,000 | 979,600 | 1,114,100 | 1,491,200 | 1,288,000 | 296,350 | 8,054,300 |