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Practice Note

Gain/Loss Analysis for Pension Plans

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Developed by the
Pension Committee
of the
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2025 Pension Committee

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Introduction

This practice note was prepared by and reflects the views of the Pension Committee (Committee) of the American Academy of Actuaries (Academy). The purpose of this practice note is to provide information to actuaries on current practices relevant to the performance of an analysis of gains and losses in connection with the actuarial valuation of pension plans (gain/loss analysis). Although this practice note does not address such analysis for other post-employment benefit plans, such as retiree medical plans, the theories and methods described in this practice note may be useful for the analysis of those other plans.

The intended users of this practice note are members of actuarial organizations governed by the Actuarial Standards of Practice (ASOPs) promulgated by the Actuarial Standards Board. The Committee anticipates that this practice note may be helpful to actuaries who have access to valuation systems that produce full gain/loss analyses and who are charged with performing and reviewing the analyses. This paper does not delve too deeply into the theoretical underpinnings of the work, but rather provides practical guidance to help actuaries interpret results and gain insight as to how actual plan experience compares to what is predicted by actuarial assumptions. This practice note is not an interpretation of the ASOPs and is not intended to be a codification of generally accepted actuarial practice. Actuaries are not in any way bound to comply with practice notes or to conform their work to the practices described in this or any other practice note.

Because valuation systems vary, this guide is not a replacement for and will not serve as a technical manual for using any particular system. Although we have endeavored to use terminology that can be applied to any valuation system, some actuaries may find that not all the concepts will translate exactly to the valuation system they use. Nonetheless, the principles in this guide should still serve as a roadmap for understanding gain/loss analysis.

Gain/loss analysis quantifies the financial effect of actual experience that differs from actuarial assumptions. Depending on the results of a gain/loss analysis, the actuary may decide to use an experience study to set new assumptions. Although a gain/loss analysis contains many elements similar to an experience study, this practice note does not address experience studies.

This practice note is intended to be illustrative and spur professional discussion on this topic. Other reasonable methodologies for performing and interpreting gain/loss analyses exist and new ones may evolve in the future.

For a more technical discussion of the mathematical concepts underlying gain/loss analysis, readers are directed to the article "A Practical Approach to Gains Analysis" by Josiah Lynch (*Transactions of Society of Actuaries*, 1975, vol. 27, p. 423) and a follow-up article by Andrew Smith ("A Practical Approach to Gains Analysis Revisited," Society of Actuaries *Pension Section News,* Sept. 1993, Number 18, p. 8).

The Committee welcomes any suggested improvements for future updates of this practice note. Suggestions may be sent to the policy project manager, retirement at publicpolicy@actuary.org.

Purpose of gain/loss analysis

Actuaries use many assumptions when calculating the liability for a pension plan. The liability measurement depends heavily on those assumptions. A gain/loss analysis quantifies the financial effect of the difference between the plan's anticipated experience and actual experience for the previous year.[1] Actuaries use gain/loss analysis to:

- Check overall results for reasonability
- Check that actuarial assumptions remain appropriate
- Check that actuarial valuation programs appear to be working as expected
- Check that census data are loaded as intended and are appropriate for the purpose of the measurement

A plan's total gain/loss is equal to the difference between the plan's funded position (difference between assets and liabilities) at the valuation date and the expected funded position based on a rollforward of the prior year's valuation results, assuming all of the prior year's actuarial assumptions were realized. For this purpose, actuaries generally use the current year funded status reflecting current data but not reflecting any changes in actuarial assumptions, plan provisions, or methods from the previous valuation date. The effects on the plan's liability of changes in assumptions, provisions, and methods are generally analyzed separately at a later point in the valuation process.

The total gain/loss is generally divided between the portion attributable to asset performance and the portion attributable to changes in plan liabilities. This paper focuses on the liability gain/loss. Investment gain/loss for the most part relates to a single actuarial assumption (investment return) and is relatively straightforward for actuaries and non-actuaries to understand. Although investment gain/loss is often quite significant, it arises from events beyond the scope of this paper.

Liability gain/loss analysis provides insight into how well the actuary's assumptions model the plan population's experience. However, compared to investment gain/loss, liability gain/loss usually is neither straightforward nor easy to understand. A plan's liability gain/loss may reflect deviations from expectations based on many elements for which the actuary makes an explicit assumption (e.g., salary scale, death rates, retirement rates) as well as elements for which the actuary doesn't make an assumption (e.g., data corrections and shifts in the yield curve). The elements frequently interact in a complex manner, making the results difficult to interpret.

Often, one of the first steps in reviewing a valuation is to look at the total liability gain/loss to make sure results are broadly reasonable. Beyond flagging any significant anomalies, the total liability gain/loss may not provide very much useful information, as the valuation contains many moving parts. Quantifying the individual sources of gain/loss is often more helpful. This provides a dollar-denominated measure of how

[1] In some situations, the measurement period may be shorter than one year (e.g., partial plan years resulting from change in plan year or merger/spinoff) or longer than one year (e.g., non-ERISA plans that perform biennial or less frequent valuations). The basic concepts discussed in this practice note generally apply to analyzing gains and losses over such shorter or longer periods; however, special considerations may apply when evaluating actuarial gains and losses over periods other than a single year.

well the individual actuarial assumptions model reality and can help inform the development of liability-weighted assumptions.[2]

Quantifying gains and losses related to items for which the actuary might not make an assumption—such as data changes or service purchases—can also be useful. A consistent unidirectional pattern of these other gains and losses may suggest a need for a more in-depth review of the actuarial valuation process.

ASOP No. 4 requirements

ASOP No. 4, Measuring Pension Obligations and Determining Pension Plan Costs or Contributions, was revised December 2021, and is effective for any actuarial report issued on or after Feb. 15, 2023, with a measurement date on or after Feb. 15, 2023. The revised ASOP includes a new Section 3.22, titled "Gain and Loss Analysis."

The revised ASOP No. 4 states that actuaries should perform a gain/loss analysis for all funding valuations, unless "in the actuary's professional judgment, successive gain/loss analyses would not be appropriate for assessing the reasonableness of the assumptions." The ASOP cites, as an example of when gain/loss might not be appropriate for this purpose, a small plan in which a single individual accounts for most of the liability.

Further, the ASOP states that in any year for which a gain/loss analysis is performed, the actuary "should at least separate the total gain or loss into investment gain or loss and other gain or loss." Of course, this has long been common practice for many pension actuaries. However, now that this process is part of the ASOP, pension actuaries may need to give additional thought to the analysis and the interpretation of the results, as well as what level of detail to disclose in the actuarial valuation report.

[2] The dollar-denominated measure usually is much more important than measures based on headcounts of people. For example, a headcount analysis might show that 100 people left covered employment in a year when 80 were expected to do so, which looks like a large deviation that would lead to a gain. But the dollar-denominated measure might show no gain because the people who left covered employment had lower liabilities than those who didn't leave.

Methods for performing a gain/loss analysis

Approaches to performing gain/loss vary from simple to complex. The actuary may consider several factors in determining the approach to take for any given valuation, including but not necessarily limited to the following:

- Size of the plan
- Complexity of the plan provisions
- Complexity of the assumptions
- Complexity of the data
- Quality of the data
- Whether gain/loss has already been performed for the year on a different basis
- Capabilities of the valuation system
- Need for precision
- Cost and effort of performing the analysis

Regardless of the method chosen, when evaluating the results, the actuary should consider the results comprehensively. When looking at a particular gain/loss item, the actuary should consider whether there are offsetting items elsewhere in the results. For instance, what looks like a large gain/loss on the withdrawal decrement when viewed in isolation may be entirely reasonable when viewed in conjunction with the retirement decrement.

Simple (rollforward on total liability)

The simplest form of gain/loss analysis, from a liability perspective, consists of a rollforward of a plan's liabilities in aggregate to the end of the prior year's valuation period. This rolled-forward liability is then compared to the directly calculated liability at the next valuation date before reflecting assumption, plan, and method changes. The excess of the actual liability over the expected liability calculated in the rollforward represents the liability loss and, conversely, any shortfall represents the liability gain for the valuation period. This type of analysis gives the actuary the overall liability impact of the deviation of the actual experience from that predicted by the assumptions and may be useful as a first-step reasonability check. For instance, a total gain/loss of 10% may indicate the need for a closer review of the liability programming or the current year's data before proceeding (unless the actuary has knowledge of or discovers a significant change in plan demographics that would cause such a gain or loss). However, this kind of rollforward does little to tell the actuary where the assumptions or models are giving rise to the gains and losses, and a small-magnitude overall gain/loss is not necessarily an indication that the valuation is reasonable. Results that appear reasonable may still contain offsetting differences that may require further review. For example, if the plan population had a large increase in compensation, the actuary should be expecting a large loss, and having little to no loss might indicate the need for further analysis.

Complex (by source)

A more complex (and often more informative) approach is to perform a gain/loss analysis by source. This type of analysis attributes the total gain/loss to each decrement used by the valuation model and also certain sources that affect multiple decrements, such as salary growth. Generally, the analysis considers the retirement, termination, death, and disability decrements. This allows the actuary to focus on the

amount of the benefit and timing for each contingency under the plan to see if the underlying assumptions and model adequately represent the actual experience of the plan population. The special considerations for each decrement are further explained in the Sources of gain and loss section below.

By participant

Either of the methods described above can be performed for the plan as a whole or by participant. In the case of the analysis by source, the valuation system may perform the calculations by participant and can produce the output on that basis (or in total). Except for small plans, looking at the gains and losses by participant for the purpose of evaluating assumptions may generally be of limited usefulness, but having the results broken out by participant offers maximum flexibility in aggregating the information in useful ways. For example, an hourly population at one manufacturing plant may have similar termination patterns to another plant elsewhere in the country, but different patterns from the salaried group at company headquarters. These populations could be grouped in whichever manner the actuary believes would be most useful in the evaluation of results. Gain/loss analysis by participant can also be useful to identify outliers where deviations from expectations may have an outsized impact or might indicate that further review is needed of data or programming. More specific examples appear in the sections to follow.

Adjustments for benefit payments

Benefit payments are an important component of gain/loss analysis. When looking at the plan from a total gain/loss perspective, the benefit payments should cancel out, as they are incorporated in both the asset and the liability rollforwards.[3] However, when looking at liability gain/loss on its own, the actuary may wish to consider the potential for distortion to arise from the difference between actual and expected benefit payments.

The potential for distortion can vary greatly depending on the provisions of the plan, the assumptions, actual experience, and the composition of the plan population. Lump sum payments, in particular, can give rise to a significant difference between actual and expected payments—for instance, because the number of participants taking a lump sum is very different than anticipated by the valuation assumptions, or because the lump sum conversion basis differs from the valuation assumption.

Discrepancies can arise for other reasons, such as valuation coding that imprecisely captures plan provisions, incomplete benefit information reported to the actuary by the client, or assumptions that differ significantly from actual experience (e.g., an assumption of 100% retirement decrement at age 65 when participants commonly work later). Regardless of whether the actuary uses actual or expected benefit payments in determining the liability gain/loss, the actuary will want to understand and be able to explain the difference between the two.

[3] In valuations where the discount rate does not equal the expected return on assets, the difference in these assumptions can introduce "noise" into the total gain/loss analysis as interest on the benefit payments in the asset and liability rollforwards do not exactly cancel out.

Common approaches with respect to incorporating benefit payments in gain/loss analysis include, but are not limited to the following:

- the use of actual benefit payments for the prior year by individual
- the use of expected benefit payments based on year-end status[4]
- the use of actual benefit payments in aggregate

An example of an analysis using these methods may be found in Appendix B.

As the analysis becomes more granular—attributing gains and losses to subsets of the population (by status or by individual) and to specific sources—allocating actual benefit payments to individuals may become increasingly important. However, the actuary should consider whether the potential additional precision is worth the additional effort, which may be significant.

Use of precise benefit payment data by individual may be more helpful when a plan makes lump sum payments or has other forms of payment where the amount of payout can deviate widely depending on the form of payment elected (certain-only payments, Social Security leveling, return of employee contributions, etc.).

When using estimated benefits in a gain/loss analysis, the actuary will typically verify that the total estimated benefit payments don't deviate significantly from the total actual benefit payments. For example, consider the gain/loss analysis for a plan that pays lump sum benefits upon termination. If the actuary assumes a high lump sum take-up rate at termination, rolling forward the liability with expected benefit payments for continuing actives could result in a large loss because, in reality, no lump sums were paid to this group (because they're still working and no one received a benefit). In this case, the better approach may be to roll the active liability forward assuming actual (i.e., $0) lump sums paid.

When interpreting the results of the gain/loss analysis, the actuary should consider the methods chosen with respect to benefit payments and how the valuation system allocates gains and losses by source. There may be gains attributed to benefit payments that are offset by losses or gains attributed to other causes.

As noted earlier, this could be amplified in plans that pay out large lump sums (i.e., more than *de minimis* lump sums). If the gain/loss analysis used estimated benefit payments, the actuary might pay additional attention to new commencements to make sure that the final calculated benefit is close to what the valuation estimated, or that the difference in actual and expected payments can be explained by factors such as actual interest rates deviating from valuation assumptions. Dramatic movements in interest rates can result in large gains or losses due to benefits such as lump sums differing greatly from estimates. The magnitude of those movements can cover up other sources of gain/loss that might otherwise stand out as significant, so quantifying this impact may be useful.

[4] Under this method, use expected benefit payments for participants in payment at the end of the year (including those who received a lump sum payment during the year) and assume no benefits paid to those who are not.

The narrower the focus of the analysis, whether it be on an individual or a particular source of gain/loss, the more important it may be to understand how the benefit payments may affect the results.

Different bases

Actuaries will rarely run liabilities under only a single set of methods and assumptions. As an example, a single-employer corporate pension plan may need liabilities for many or all of the following in a single plan year:

- Stabilized segment interest rates
- Nonstabilized segment interest rates
- At-risk status
- ASC 960 plan accounting
- PBGC variable rate premium (vested benefits only)
- ASC 715 employer accounting (PBO and ABO)
- ERISA Section 4044

Note that multiemployer and public pension plans also need valuation results on more than one basis, such as for funding, accounting, and the ASOP No. 4 Low-Default-Risk Obligation Measure (LDROM). Although the calculations are similar, they may differ in significant ways (for example, unit credit versus projected unit credit cost method), and the results of the gain/loss analyses may differ accordingly.

Typically, actuaries will run a full gain/loss analysis on a single basis. Doing a complete gain/loss analysis on any basis will often reveal substantive areas for further review (if any) with programming or data for further review. However, actuaries need to take care not to extrapolate too far from the results of one analysis to another. For instance, an early retirement benefit may be subsidized relative to one assumption basis but not another, so retirement experience may lead to a loss on one assumption basis but a gain on another. Similarly, the loss due to higher actual compensation increases than expected may be much larger on a projected unit credit basis than on a traditional unit credit basis.

When an actuary uses entirely separate valuation runs to calculate liabilities on separate bases, a gain/loss analysis on one basis may not be helpful or sufficient in identifying areas for further review on the other basis.[5]

Interpreting the results of liability gain/loss analysis

The first half of a gain/loss analysis is strictly mathematics: an algebraic calculation of the difference between expected and actual experience. As noted in earlier sections of this practice note, the math can be performed on individual participants, on a subgroup, or on the group as a whole. It can be simple or complex. Regardless of the manner in which the analysis is performed, however, interpreting the results is more nuanced, requiring an understanding of what information the output is—and isn't—providing.

[5] While many actuarial software packages allow for multiple sets of liabilities to be developed in a single valuation run, separate runs may be necessary to accommodate differences in the treatment of liabilities on different bases.

Sources of gain/loss

A robust gain/loss analysis will identify how each actuarial assumption contributes to the total gain/loss. The sources of liability gain/loss include decrements (mortality, termination, retirement, disability) as well as other assumptions affecting the value of benefits, such as form of payment, beneficiary age difference, and compensation increases. Some of the most prevalent sources of gain/loss are:

- ***Mortality***. Participants who die earlier or later than expected will give rise to a mortality/survival gain or loss. For retired participants, an individual's death will often generate a gain, while a surviving participant may generate a smaller loss. Mortality for the total retired population may generate a gain depending on the number of participants who died versus the number expected to die, the ages at which they died, and the value of their benefits. For active participants, the analysis may be more complicated, as an individual's death may generate a gain or a loss depending on the value of the death benefit.[6]

- ***Retirement***. Retirement assumptions for active participants are typically age-based (and sometimes age- and service-based) and may extend past the normal retirement age to a later age, such as the plan's required beginning date. Active retirement assumptions may be further distinguished by gender and worker classification (such as union/nonunion or location) or may reflect the availability of subsidized early retirement or retiree medical coverage. Terminated vested participants may be valued with an age-graded scale or assumed to defer retirement until the plan's normal retirement age or a different single age reflecting the average experience under the plan. Because an individual's retirement decision is often influenced by unpredictable external factors, actual retirement experience in any one year may deviate significantly from the assumption. However, retirement benefits can be complex. They often have complicating factors, such as subsidies for early commencement, temporary supplements, and forms of payment that change over time (e.g., joint & survivor (J&S), level income or certain-only options). Those complexities may require special attention to how data are recorded and/or benefits are programmed, reflecting unreduced early retirement or J&S benefits when available, instead of reduced benefits, noting end dates for supplements, using annual benefits versus monthly, etc. An actuary may want to pay special attention to data in the year after a participant retires and carefully check significant gains and losses to confirm they relate to experience and don't indicate a need to further review the data.

- ***Termination***. The termination decrement raises many of the same considerations as the retirement decrement, especially with respect to review of the data when the benefit is first calculated after the participant first terminates employment. Participants terminating employment before eligibility for an early retirement subsidy may produce a large gain, while participants terminating employment with lump sums payable on an Internal Revenue Code (IRC) Section 417(e) basis may produce a loss if the assumed lump sum interest rate in the valuation is higher than the actual Section 417(e) rates used. Each participant terminating employment before

[6] While death benefits to former employees who die prior to benefit commencement may generate a gain, plans that offer generous death benefits to these participants may instead experience an actuarial loss.

vesting may produce a gain, but it should be small. Participants who don't terminate employment will usually produce a small loss (since a portion of each of them was expected to leave), so that the total for the population may be either a gain or a loss. Moreover, benefits may be recalculated upon actual termination; to the extent these recalculations consistently produce gains or losses compared to the results from the valuation for active employees, the actuary will want to review the programming, assumptions, or data to make sure plan provisions are adequately reflected. Alternatively, discrepancies between actual and expected benefits may indicate a need to confirm the data's accuracy with the plan administrator.

- ***Disability.*** Disability benefits may provide substantial subsidies to participants, and, therefore, may generate significant individual losses when participants become disabled. However, for many plans the expected and actual number of disabilities are small, so the total disability gain/loss will likely be small. Conversely, using a disabled mortality table that underestimates rates of death could generate gains for disabled participants.

- ***Hours worked.*** For plans where the accrual of benefit depends on hours worked, a plan will generally experience a gain (loss) when participants work fewer (more) hours than expected and earn a lesser (greater) benefit than expected. However, plans where most participants work sufficient hours to earn a full year of service each year are less likely to experience large gains or losses due to differences between actual and expected service accruals.

- ***Compensation.*** When the accrued benefit depends on compensation, a gain or loss will arise when actual compensation differs from expected. Valuation systems may specifically identify this component of gain/loss by calculating liabilities using expected compensation and then comparing those to liabilities developed using actual compensation. When a plan sponsor provides unexpectedly large or small raises across the board in a given year, compensation gain/loss can be a substantial component of the overall gain/loss. Some valuations might include a separate assumption for base pay and bonus, particularly when the bonus fluctuates significantly year to year. In this case, the compensation gain/loss might be determined separately for the base salary and the bonus, although the actuary may want to weigh whether there is sufficient value to warrant the additional precision of evaluating base pay and bonus separately.

  - To calculate the compensation gain/loss properly, actuaries need to understand what the compensation is that has been supplied in the data. Is it the compensation paid during the year immediately preceding the valuation date, is it the rate of base pay on the valuation date, does it reflect annual bonuses, or does it represent something else?
  - Actuaries may also want to be mindful of special circumstances, such as pay frequencies that may change from year to year. For example, assume there is a compensation-related plan where employees are paid on Fridays. There are generally 52 Fridays in a calendar year, but there will be 53 Fridays in some years, such as in 2032.

- ***Benefits.*** Benefit gain/loss can occur for inactive participants with status changes. For example, a benefit gain/loss would occur if a retiree dies and the amount payable to the beneficiary is different than expected.

- ***Form of payment.*** Gain/loss may arise if a retiring participant elects a form of benefit different than assumed in the valuation. For example, a retiring participant might elect an unsubsidized life annuity, even though the valuation assumes everyone who is married takes the subsidized J&S benefit. Differences in the valuation's actuarial equivalence basis for optional form conversions and the basis in the plan are another source of gain/loss (for example, when the plan's actuarial equivalence basis changes every year based on an external index but the valuation reflects a long-term assumption).

- ***Inflation.*** Inflation may affect the valuation in several ways such as:

  – Statutory limitations: Actual increases in statutory limitations (e.g., the IRC Section 401(a)(17) compensation limit or the Section 415(b) maximum benefit limit) different than expected will give rise to a gain or loss. ERISA minimum funding valuations can't reflect anticipated increases in these limits; in plans affected by these limits, increases in the limits lead to a loss in the funding valuation. These changes may generate either a gain or a loss in an accounting valuation, which generally has an inflation assumption applied to these limits. Depending on how the valuation is coded and the actuary's valuation system, these gains/losses may appear in the compensation gain/loss, the benefit gain/loss, or in a separate category.
  – Social Security amounts: To the extent the accrued benefit depends on Social Security amounts, such as the anticipated Primary Insurance Amount (PIA), covered compensation, or the taxable wage base, actual inflation different from expected will give rise to a gain or loss.

- ***Cost of living***. Automatic cost of living adjustments (COLAs) can give rise to a gain or loss when the actual increase differs from what is assumed.

- ***New hires/rehires.*** Unless a valuation includes an assumption for new hires, any new entrants will create an automatic liability loss to the extent they have accrued a benefit by the valuation date. Rehires may also create a liability loss to the extent their active liability exceeds their inactive liability. This is common when a nonvested termination returns to active service with an accrued benefit.

Decrement analysis illustration

As an illustration, consider a valuation with three active decrements: mortality, termination, and retirement. Assume the valuation output shows the following results for a 58-year-old female active participant who was also active in the prior valuation:

Decrement	(Gain) or Loss
Termination	$0
Retirement	(8,563)
Mortality	4
Total	$(8,537)

In this valuation, the termination decrement stops at early retirement eligibility, which for this participant is age 55. The termination decrement should not produce a gain/loss for this participant because she is past the age at which the termination decrement applies.

The participant was subject to both the retirement and mortality decrements in the previous year yet remained actively employed, so the valuation should produce a gain/loss for both mortality and retirement. In this case, the retirement decrement produced a gain, meaning that the participant would have had a higher liability had she retired instead of staying active. The mortality decrement produces a small loss because she survived when there was a low expectation that she would die (and the death benefit is less valuable than the ongoing benefit with an additional accrual).

Looking at another hypothetical participant, in this case a 62-year-old male participant who retired in the past year, assume the output shows:

Decrement	(Gain) or Loss
Termination	$0
Retirement	81,161
Mortality	261
Total	$81,422

Assume the applicable retirement decrement was 10% and the mortality decrement was 0.5%. The participant's expected liability would have been roughly 10% retiree, 0.5% deceased, and 89.5% active, whereas the actual liability is 100% retiree. For this plan, the immediate benefit is more valuable than the deferred benefit, so retirement before the age at which the retirement decrement ends produces a loss.

If the participant were to die, the participant's liability would be expected to be lower than the liability if he had survived, except, as noted previously, in the case of a plan that pays significantly subsidized death benefits. This happens because the death benefit is usually less valuable than the participant's retirement benefit. The prior valuation expected 0.5% of the participant to die with lowered liability. Because the participant survived, the plan didn't get the anticipated gain, resulting in the mortality loss.

The older active participants get, the closer they get to their expected retirement date and the closer the actual amounts will tie to the expected amounts, at least with respect to the retirement decrement. For instance, if a valuation has a 100% retirement decrement at all ages 65 and up, the year in which the participant finally retires after the 100% decrement age should generate no retirement gain/loss, except perhaps for a small amount due to timing (i.e., the valuation may assume retirement at the beginning of the year, but the participant may retire at any month, potentially earning additional benefits) and potentially due to the optional form selected.

Retirement at any particular age may generate either a gain or loss, depending on the value of any subsidies in the benefit. For instance, if a plan offers subsidies in the early retirement benefit starting at age 62, but only unsubsidized benefits before that, and the retirement decrements start at age 55, a participant retiring at age 57 will generate a gain from the forfeited potential subsidy that would have been available at 62. However, the retirement decrement might still produce a loss for the total population if the majority of participants retire with subsidized benefits. The valuation system may not provide sufficient information to tease out the components of gain or loss in this detail, but the actuary may still want to understand how these factors interact.

Although interpreting the results for individual participants is generally straightforward—each participant will either change status or not—that analysis will rarely reveal any need to further review the coded decrement assumptions. However, looking at the population as a whole offers insight into how well the

plan's experience compares with the assumptions. A large gain or loss may trigger a deeper investigation as to the cause of the divergence between actual and expected experience, especially if the pattern persists over several years.

Putting it all together

Of course, actuaries need to take care when drawing conclusions from the analysis of a single decrement. For instance, analyzing the retirement decrement in isolation can lead to misleading results, as the distinction between termination and retirement may be somewhat artificial. In reality, some participants will defer their benefits even if they are retirement-eligible. For instance, consider a 59-year-old participant who leaves employment but does not begin taking retirement benefits. The participant's liability in the next valuation may be less than expected, as the participant did not accrue anticipated additional benefits and sacrificed any available early retirement subsidies at age 59. Depending on how the valuation is coded, this might appear as a termination or retirement gain. From a bird's eye view, the distinction may not matter so long as the actuary understands what the results mean.

All the decrements intertwine, to a greater or lesser extent, because an individual's change in status due to one decrement will necessarily affect other decrements. For example, if an active participant dies, that participant cannot later retire. Further, the overall analysis will be affected by changes in other actuarial assumptions. For instance, if the plan recognizes bonuses in pensionable earnings, and a company pays big bonuses in one year, then retiring participants may produce a larger than expected loss because their actual retirement benefits are higher than were expected.

Actuaries also need to be careful when drawing conclusions from the analysis of particular individuals. As noted above, an individual early retirement may produce a retirement loss, but the retirement decrement as a whole may produce a gain if fewer participants retire than expected, since participants who were expected to retire early but didn't will produce a gain.

When interpreting the gain/loss analysis, the actuary might take some or all of the following steps:

- Review the results in total. A suspiciously large overall liability gain or loss may suggest the need for further review of the data or coding.
- Perform an initial review of the gain/loss by source produced by the valuation system, paying careful attention to any results that are especially large in magnitude, and making sure the results are consistent with changes in the population. Investigate any results that look anomalous (e.g., if the retirement loss was large but fewer than the normal number of participants retired).
- Review the individual gain/loss for any individuals with unexpectedly large or anomalous results (e.g., if retirements generally produce a loss but several new retirees are showing a gain, or the magnitude of the gain/loss is disproportionate to the participant's liability). The actuary's review may be directed by the results of the gain/loss by source.
- Once confident that any large or anomalous results have been reviewed and addressed, review the gain/loss by source in greater depth, making sure the results tell a comprehensible story and are consistent with the changes in the data.

Analysis by subgroup

Gain/loss is an especially useful tool for reviewing valuation data and coding. For instance, consider a valuation that produces the following results for the retired participants:

Group	Expected liability	Actual liability	(Gain) or loss	(Gain) or loss as percentage of expected liability
Retirees	12,050,000	12,089,000	39,000	0.32%

In this case, the $39,000 loss is small—less than 0.4% of the liability. The actuary might initially conclude that the results of the valuation of the retiree population are reasonable.

However, a closer look at the results might uncover further areas for review.

Subgroup	Expected liability	Actual liability	(Gain) or loss	(Gain) or loss as percentage of expected liability
Continuing retirees	$11,279,000	$11,414,000	$135,000	1.20%
New retirees	398,000	467,000	69,000	17.34%
Deceased retirees	190,000	0	(190,000)	-100.00%
Beneficiaries	183,000	208,000	25,000	13.66%
Total	$12,050,000	$12,089,000	$39,000	0.32%

Continuing retirees generally produce a survivorship loss. Deceased retirees will usually generate a gain. For example, if the average probability of death for the retiree group is 0.9%, we would expect a loss of approximately 0.9% for the group of retirees who survive. For retirees who die, we could estimate the gain by looking at the form of payment and age difference between the participant and the beneficiary. For example, a newly deceased participant receiving a 50% J&S option with a beneficiary three years younger would likely generate a total gain slightly less than 50% of their liability.

In the example above, the continuing retirees, deceased participants, and beneficiaries may all appear reasonable based on the data that the actuary can access. But the new retirees may warrant further review because the actual liability is more than 17% higher than expected. The actuary may want to review the benefit amounts by looking at salary increases in the last year, retirements late in the plan year, unused vacation or sick leave payouts, etc.

Special considerations for different types of plans

The underlying principles of gain/loss analysis apply to all plans. But the actuary may need to take specific considerations into account when performing the analysis, depending on the type of plan. This section explains special considerations with respect to private, public, and multiemployer plans, as well as small plans and cash balance plans.

Private plans

Most single-employer, private pension plans in the U.S. must perform funding valuations under the rules of IRC Section 430, which requires the use of a yield curve (full or a segmented curve with three rates). Benefits paid in an IRC Section 417(e) accelerated form of payment—typically, lump sums and level income options—must be valued using annuity substitution (i.e., valuing the underlying annuity cash flows

rather than the lump sum cash flows), reflecting unisex mortality and the funding interest rates in place of the 417(e) basis.

These mandated assumptions can complicate gain/loss analysis and make interpreting the results more challenging.

First, developing the expected liability requires adjusting the prior year results with interest. When a valuation uses a single discount rate, that calculation is straightforward. But when the interest assumption is a yield curve, applying interest appropriately is complicated. Theoretically, each separate cash flow item should be adjusted with the applicable interest rate for the year in which it is assumed to be paid. This procedure would be computationally complex and cannot easily be applied to roll the assets forward. Accordingly, the analysis is often performed using the effective interest rate—that is, the single discount rate that would produce the same liability (funding target) as the yield curve. This will often provide reasonable results, unless the patterns of cash flows are unusual.

Annuity substitution can introduce significant gain/loss, especially when the valuation is using stabilized segmented interest rates, which have been as much as 375 basis points higher than the IRC Section 417(e) applicable interest rates since the Moving Ahead for Progress in the 21st Century Act introduced interest rates stabilization in 2012. In this situation, the valuation liabilities will be lower than any lump sum paid.

To demonstrate, the table below shows the difference between the valuation present value factors (PVFs) for a deferred-to-65 single life annuity, using the lump sum segment rates for November 2021 (1.02%, 2.72%, and 3.08%) and the stabilized segment rates in effect for 2022 plan years (4.75%, 5.18%, and 5.92%).

Age	IRC Section 417(e) PVF	Valuation stabilized segment rates PVF	Stabilized segment rates PVF as a percentage of 417(e) PVF
35	5.7796	1.9662	34%
45	7.8609	3.5094	45%
55	11.0596	6.7188	61%
65	15.7223	12.2643	78%

Because of these complications, private plan actuaries may perform a gain/loss analysis on a different basis which doesn't have this complication, for example on the ASC 715 basis.

Multiemployer plans

Although the mathematics of a gain/loss analysis for a multiemployer plan are routine, the interpretation of the results should be reviewed in the context of the overall contribution level to the plan. As opposed to other kinds of plans where losses are generally bad and gains are generally good, certain situations that result in actuarial gains may harm the funded position of a multiemployer plan if the contribution base is depleted. Other situations that result in actuarial losses can benefit a plan's funded position if they result in excess contributions.

For instance, during the early days of the COVID-19 pandemic in 2020, some multiemployer plans tying benefit levels to contributions (and by extension, covered work hours) found that fewer work hours were

available due to economic conditions. As a consequence, those plans experienced more turnover and retirements than expected (due to the reduced hours available), as well as more deaths than expected, contributing to actuarial gains. For fiduciaries of these plans, the lack of work hours (and related drop in contributions) and the accelerated turnover of skilled workers presented a new set of challenges with respect to the future outlook of the pension plan. The actuarial gain may not have been welcome news.

Alternatively, actuarial losses may indicate positive news. In a year when actual hours worked exceed those anticipated, accruals will be greater than expected, which will cause the actual liability at the end of the year to be greater than the anticipated liability, all other things being equal. This could result in an actuarial loss. However, the actuary should consider analyzing this loss in the context of the contributions to the plan. If the value of increased contributions exceeded the value of the additional accruals and expenses, then the plan's funded position might have improved despite the actuarial loss.

Overall, the contribution level for a pension plan must exceed the cost of benefit accruals and expenses for a multiemployer pension plan to improve its funded position.

Public plans

Public plans are generally not subject to ERISA and do not have to follow the funding rules under IRC Sections 430 or 431. Public plans are generally funded under guidelines and/or regulations set by the municipality or state.

The following is a list of features unique to public plans that can affect gain/loss analysis:

- Contributions are generally determined a year in advance, resulting in a one-year lag between the valuation date and the beginning of the plan year during which the contribution is made
- Contributions different from the Actuarially Determined Contribution (ADC) will generally create a contribution gain/loss
- Many plans determine the amortization amount on a percentage of pay basis
- Many plans allow for purchase of service
- Many plans provide COLAs, usually with some type of cap
- Many police and fire plans have Deferred Retirement Option Plans (DROPs) features

Most actuarial reports for public plans determine the ADC for the subsequent plan year. For example, a Jan. 1, 2025 (or Dec. 31, 2024), actuarial valuation would determine the ADC for the 2026 plan year. This projection adds complexity to evaluating the gain/loss for the year, because the gain/loss measured on the current unfunded liability might not be the same as is used to establish the gain/loss amortization base for the year.

If the actuary projects liabilities and assets (or the unfunded liability) forward one year and determines the new gain/loss base from the projected unfunded liability, this base may have some additional "noise" due to the use of the projected unfunded liability. For example, if you are doing a 2025 valuation to determine the 2026 contribution, you may calculate the contribution by projecting assets and liabilities forward one year from 2025 to 2026 using standard roll forward techniques. If you project the liabilities using the 2025 calculated normal cost and project the assets based on the contribution determined from the 2024 valuation for 2025, the normal cost used to project the liabilities will be different than the normal cost used for the contribution that is used to project the assets forward. This difference in normal costs will create some "noise" in the gain/loss base. When the actuary projects the contribution forward one

year, they will need to understand how their projection methodology may impact the gain/loss base for the year.

Contributions that are more or less than the recommended ADC usually end up being reflected in the gain/loss base, even though the mismatch is not technically a gain/loss. The actuary should consider how to account for how this difference affects the gain/loss base to properly understand the impact of the gain/loss on the contribution for the year.

Purchase service provisions almost always create some level of gain or loss in the valuation. The purchase service price is generally set using assumptions for the retirement age, mortality and interest. The assumed retirement age will usually be a single age compared to the valuation assumption, which is generally an age-based (or age-and-service-based) table of rates. The interest and mortality for assumptions for calculating the purchase service price generally will be similar to the valuation assumptions except the mortality table will most likely will be unisex. The difference in assumptions will give rise to some amount of gain/loss (more likely losses) in the year an employee purchases service. Some plans provide for a true-up of the purchase price at actual retirement. This process will also create some gain/loss in the valuation to the extent the true-up was not reflected in the valuation assumptions.

DROPs are similar to in-service withdrawal features. However, under a DROP, the participant doesn't receive monthly pension benefits while working. Instead, the employer deposits a lump sum into an interest-bearing account. At retirement, the participant receives the funds in the account and commences retirement benefits. These programs also give rise to gain/loss, but their impact is difficult to measure. The biggest impact will be similar to the impact of the retirement decrement. If the plan contains a DROP, the actuary should consider its possible impact on the gain/loss. Fully analyzing the total impact of DROPs is beyond the scope of this practice note.

Small plans

Actuarial assumptions are generally more predictive across large groups of people, not individuals. For instance, consider a mortality decrement of 2% in the context of a single retiree. A retiree will survive to the next year or not, but in either case the next valuation will not be valuing 98% of the retiree and 2% of the beneficiary. Generally, the plan will experience a small loss each year the retiree lives and a large gain when the retiree dies. In a large plan, gains and losses will be spread across the entire population and should generally average out, if experience resembles the assumption. But a small plan may see exaggerated gains and losses when decrements occur.

This also makes gain/loss analysis less useful for small plans. Because individual decrements can lead to large fluctuations that swamp the rest of the experience, a detailed gain/loss analysis may produce little value to justify the cost.

Small plan actuaries may often simply look at the liability gains and losses in total, and do a deeper analysis only when gains or losses are large and unexplained. Even for small plans, actuaries should consider trends in gains and losses over multiple years to assess whether any adjustments are needed to the assumptions.

Cash balance plans

Cash balance plans have a few specific assumptions generally inapplicable to other plans, and these assumptions will give rise to additional gains/losses.

Many cash balance plans credit interest at a variable rate based on an external index like the 30-year treasury rate or another bond- or CPI-based rate, while some other plans provide interest based on the actual return on plan assets. Valuations for these plans include an assumption for the future interest crediting rate, and differences between the actual rate and the assumed rate will give rise to gain/loss. The effect of this assumption on the gain/loss depends in part on the plan design, for instance, whether the plan provides a lump sum whipsaw.[7]

Cash balance plans cannot provide a benefit less than the sum of a participant's cash balance credits.[8] This will never happen in most plans. But for participants in plans that credit interest using actual return on plan assets, or an index that might go negative, this rule provides an extra layer of insurance that will be reflected in the liabilities and therefore reflected in the gain/loss.

Annuity conversions will also give rise to gain/loss in cash balance plan valuations, depending on the relationship of the plan's actual annuity conversion basis to the valuation basis. The plan may use one basis for converting the cash balance account to an annuity benefit payable under the normal form (i.e., the IRC Section 417(e) basis) but another for converting that normal form of benefit to an optional form of benefit (i.e., plan optional form conversation basis). Cash balance plans that pay whipsaw lump sums and are subject to IRC Section 430 funding rules will also have a gain/loss component attributable to annuity substitution (see the discussion under Private plans, above).

[7] A whipsaw benefit in a cash balance plan is a lump sum equal to the present value of the underlying annuity benefit, rather than the cash balance account.
[8] This rule applies to the total account balance and applies only at the time the benefit commences.

Appendix A—Sample analysis for individual participants

When reviewing gain/loss analysis, the actuary calculates the expected accrued liability at the end of the year by rolling forward the beginning of year liability according to actuarial principles. When calculating the actual accrued liability at the end of the year, an actuary reflects demographic changes during the year, accruals during the year, and benefit payments during the year, usually by using updated data.

Actuaries can review unexpected gains/losses to assess reasonableness of: (1) changes in the census data provided for the project, (2) how the data was interpreted/coded by the actuarial team, and/or (3) the actuarial program coding or assumptions. As discussed in this practice note, gains/losses can arise for many reasons, including when statuses change (for example, when a participant retires from active employment), or if the census data changes.

The following examples illustrate some situations that may arise when reviewing gain/loss, both when the participant doesn't change status and when the participant does. Actuaries should be alert to unexpected status changes when reviewing census changes and the resulting gain/loss.

Example #1

Prior Year Status	Current Year Status	Prior Year Accrued Liability	Expected Accrued Liability	Actual Accrued Liability	Gain/(Loss)
(a)	(b)	(c)	(d)	(e)	(f) = (d)-(e)
Retired	Retired	$518,000	$503,000	$403,000	$100,000

Commentary: This participant's monthly annuity benefit data field unexpectedly dropped from $4,000 in the prior year to $3,000 in the current year. The actuary may want to ask the client to confirm the benefit amount and payment form reported in the current year census data.

Example #2

Prior Year Status	Current Year Status	Prior Year Accrued Liability	Expected Accrued Liability	Actual Accrued Liability	Gain/(Loss)
(a)	(b)	(c)	(d)	(e)	(f) = (d)-(e)
Active	Active	$101,000	$124,000	$115,000	$9,000

Commentary: This active participant was expected to work 2,100 hours for valuation purposes during the prior year. However, the data show that she actually worked 900 hours and did not receive credit for service for the prior year, resulting in an actuarial gain.

Example #3

Prior Year Status	Current Year Status	Prior Year Accrued Liability	Expected Accrued Liability	Actual Accrued Liability	Gain/(Loss)
(a)	(b)	(c)	(d)	(e)	(f) = (d)-(e)
Active	Retired	$175,000	$172,000	$189,000	($17,000)

Commentary: This active participant retired at age 65 and elected a 100% J&S with a spouse 10 years younger. The actual experience differed from the assumptions (namely, 30% of actives age 65 are assumed to retire; 40% of participants are assumed to be married at retirement, and married participants are assumed to elect a 75% J&S pension with a spouse two years younger). This example demonstrates that individual participants can give rise to gain/loss as a normal part of the valuation process.

Example #4

Prior Year Status	Current Year Status	Prior Year Accrued Liability	Expected Accrued Liability	Actual Accrued Liability	Gain/(Loss)
(a)	(b)	(c)	(d)	(e)	(f) = (d)-(e)
Retired	N/A	$310,000	$308,000	$0	$308,000
N/A	Survivor	$0	$0	$221,000	($221,000)
Net		$310,000	$308,000	$221,000	$87,000

Commentary: This retired participant died during the plan year. His surviving spouse received 75% of his pension benefit. The retired participant will show a gain due to his death, but his new surviving spouse will show a loss since she was not in the prior valuation. For a complete gain/loss analysis, the actuary may want to look at the records on a combined basis, since the contingent payments to a surviving spouse were part of the liability for the participant. In this case, there was still a net gain of $87,000 due to the timing of the participant's death relative to expectations.

Example #5

Prior Year Status	Current Year Status	Prior Year Accrued Liability	Expected Accrued Liability	Actual Accrued Liability	Gain/(Loss)
(a)	(b)	(c)	(d)	(e)	(f) = (d)-(e)
Terminated vested	Disability	$170,000	$183,000	$306,000	($123,000)

Commentary: This plan provides disability benefits to participants who become disabled while active, but the data show that this participant became disabled from terminated vested status.

Therefore, the actuary may want to ask the client if this is a truly disabled retirement under the provisions of the plan and confirm the participant's benefit eligibility and amounts. For many plans that rely on Social Security disability as a requirement to receive disability retirement benefits, such a change in status after a few years might be normal. The actuary may consider asking the client for a listing of any pending disability cases, so they can be appropriately valued.

Appendix B—Benefit payments in gain/loss analysis

This appendix demonstrates three different methods of allocating benefit payments in gain/loss analyses; other reasonable methods exist. All three of these methods have the same beginning and ending liability values, with the only difference being how the gain/loss is allocated among different sources. The allocation to sources can extend to what is classified as a liability loss versus what is classified as an asset loss.

The net total of all the gains and losses is the same regardless of method, but as the examples show, the method of allocation may produce very different results for individual participants. Because of this, the actuary may want to understand how the benefit payments affect the gain/loss outcome under the chosen method.

Each example shows the values for participants in a two-participant plan. Both participants are identical to one another at the valuation date (same age, gender, accrued benefit, etc.), and they both retire from active status during the year. The only difference arises when they elect their form of payment: one elects a lump sum and the other elects a single life annuity.

The valuation assumption is that 85% of actives will choose a lump sum upon retirement and 15% will choose a single life annuity. In each example, there is a loss associated with the retirement decrement that is driven by the timing of the retirement. The plan in this example also has a generous early retirement subsidy and the participants are commencing earlier than the weighted average of the assumed retirement age.

Method #1: Actual Benefit Payments

The actual benefit payment approach is generally the most accurate in attributing the appropriate gain/loss by participant and source, although the additional effort for that accuracy may not be warranted. In this example, actual benefit payments are loaded into the valuation data. The method recognizes that the participant receiving the lump sum has been fully cashed out, so the full expected lump sum (rather than 85% of the lump sum plus 15% of the expected monthly annuity) is compared to the benefit actually paid.

	Participant #1	Participant #2	Total
Optional Form Elected	Lump Sum	Annuity	
Expected Liability	$609,748	$609,748	$1,219,496
Expected Benefit Payments	633,664	633,664	1,267,328
Additional Liability Cashed Out	85,031	N/A	85,031
Total Expected BP	718,695	633,664	1,352,359
Actual Liability (before LS)	718,695	524,718	1,243,413
Actual Liability (after LS)	0	524,718	524,718
Actual Benefit Payments	725,000	45,000	770,000
Gain/(Loss) by Source			
a. Retirement Decrement	$ (108,947)	$ (108,947)	$ (217,894)
b. Benefit Payments	(6,305)	588,664	582,359
c. Unreconciled Amounts	0	(439,687)	(439,687)
d. Total	$ (115,252)	$ 40,030	$ (75,222)

Comments on Gain/(Loss) under Method #1:

- **Retirement decrement**: This is driven by the plan's early retirement subsidy. The participants retire earlier than the weighted average assumed retirement age, so their benefits reflect more of the plan's subsidy, resulting in a loss.
- **Benefit payments**: In the case of Participant #1, there is a small loss that arises due to the difference in the actual lump sum amount relative to the expected amount (for example, due to assumed timing versus actual timing or valuation versus actual lump sum interest and mortality basis). In the case of Participant #2, there is a large gain in the benefit payment source because one year of annuity payments is much smaller than the weighted average of 85% of a lump sum payment and 15% of one year of annuity payments. Because the valuation system recognizes the payment as a lump sum, it compares the actual benefit payment to the expected lump sum amount rather than the weighted average of 85% lump sum and 15% annuity.
- **Unreconciled amounts**: This is a balancing item. In the case of Participant #2, it will largely consist of the value of the future annuity payments. There is a large gain in the benefit payment source because one year of annuity payments is much smaller than the weighted average of 85% of a lump sum payment and 15% of one year of annuity payments.

Method #2: Total Benefit Payments

In this case, the actual individual benefit payments are not loaded in the data. Instead, the system calculates gain/loss based on the total benefit payments made during the year. Because the benefit payment gain/loss is unallocated, the gain/loss by source or individual can look larger than its "true" value. For example, this method produces a large deviation in the individual gain/loss for Participant #2 relative to the calculation above. Their actual liability is higher than expected, resulting in a larger loss, because they received a lower payout from the plan than expected, not because they are getting substantially more value from the plan than predicted at the beginning of the year.

	Participant #1	Participant #2	Total
Optional Form Elected	Lump Sum	Annuity	
Expected Liability	$609,748	$609,748	$1,219,496
Expected BP	633,664	633,664	1,267,328
Additional Liability Cashed Out	85,031	N/A	85,031
Total Expected BP	$718,695	$633,664	$1,352,359
Actual Liability	0	524,718	524,718
Gain/(Loss) by Source			
a. Retirement Decrement	$ (108,947)	$ (108,947)	$ (217,894)
b. Unreconciled Amounts	0	(439,687)	(439,687)
c. Subtotal	$ (108,947)	$ (548,634)	$ (657,581)
d. Benefit Payments			582,359
e. Total			$ (75,222)

Comments on Gain/(Loss) under Method #2:

- **Retirement Decrement**: As with Method #1, this is driven by the early retirement subsidy of the plan. The participants retire earlier than the weighted average assumed retirement age, so their benefits reflect more of the plan's subsidy, resulting in a loss.
- **Benefit payments**: The benefit payment gain/loss is only calculated in aggregate. This value represents the difference between the actual benefit payments made for the year and the expected benefit payments given the end of year status of the participants.
- **Unreconciled amounts**: As with Method #1, this is a balancing item. In the case of Participant #2, it will largely consist of the value of the future annuity payments. However, unlike in Method

#1, there is not an offsetting gain in the benefit payment source because the method does not attribute benefit payment gain/loss by individual.

Method #3: Benefit Payments Based on Year End Status

In this example, the "actual" benefit payments used in the gain/loss analysis to calculate gain/loss are set equal to their expected values, resulting in no gain/loss for that source. Therefore, the "actual" benefit payment amount equals 85% of the expected lump sum payout plus 15% of the expected annuity payout for each participant. The aggregate value for both participants is significantly larger than the actual payout from the lump sum plus the first year of the annuity as actually elected. This example differs from the examples above in that the total benefit payment gain/loss is not calculated as part of the liability gain/loss. Therefore, the loss that results from the election of an annuity form of payment with its higher end of year liability is not offset by the lower amounts of benefits leaving the trust. If this method were used, there would be an offsetting impact on the asset gain since the assumed benefit payments would be used in the calculation of actual return.

	Participant #1	Participant #2	Total
Optional Form Elected	Lump Sum	Annuity	
Expected Liability	$609,748	$609,748	$1,219,496
Expected BP	633,664	633,664	1,267,328
Additional Liability Cashed Out	85,031	N/A	85,031
Total Expected BP	718,695	633,664	1,352,359
Actual Liability	0	524,718	524,718
Gain/(Loss) by Source			
a. Retirement Decrement	(108,947)	(108,947)	(217,894)
b. Benefit Payments	0	0	0
c. Unreconciled Amounts	0	(439,687)	(439,687)
d. Total	(108,947)	(548,634)	(657,581)

Comments on Gain/(Loss) under Method #3:

- **Retirement Decrement**: As with Method #1, this is driven by the early retirement subsidy of the plan. The participants retire earlier than the weighted average assumed retirement age, so their benefits reflect more of the plan's subsidy, resulting in a loss.
- **Benefit payments**: As noted above, the benefit payment gain/loss is not calculated in the liability gain/loss for this method.

- **Unreconciled amounts**: As with Methods #1 and #2, this is a balancing item. In the case of Participant #2, it will largely consist of the value of the future annuity payments. However, identical to Method #2, there is not an offsetting gain in the benefit payment source because the method does not attribute benefit payment gain/loss by individual. In this method, the benefit payment gain/loss is not calculated in aggregate either.