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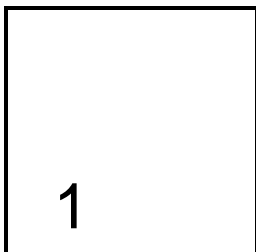
# Audit of Actuarial Work San Diego City Employees' Retirement System

**MERCER**

Human Resource Consulting

## Contents

1. Executive Summary .....	1
2. Actuarial Valuation .....	7
3. Experience Study .....	17
4. Actuarial Methods .....	36
5. Actuarial Reports .....	40
6. Analysis of Unfunded Liability .....	43
7. Analysis of Projection of UAAL .....	48
8. Unified Port District .....	52
9. Manager's Proposal .....	54
10. Actuarial Factors Review .....	56



## Executive Summary

The San Diego City Employees' Retirement System (SDCERS or the System) engaged Mercer Human Resource Consulting (Mercer), to audit the June 30, 2003, actuarial valuation and experience investigation report for the period 1997 through 2001 of Gabriel, Roeder, Smith & Company (GRS) and to evaluate various other actuarial calculations under the System. The purpose of an actuarial audit are to have an independent actuary review the work of the System's retained actuary to ensure that it was performed and reported in conformance with applicable actuarial standards of practice, to confirm that the calculations were accurate, and to identify any changes in assumptions, methods or communications that, in our opinion, would improve the quality of the actuarial valuation and the understanding of its intended audience. We independently reproduced the results of the actuarial valuation.

The purposes of the actuarial valuation are to generate the contribution rates charged to employers each year, to produce an appropriate pattern of contributions to fund the benefits over time, and to determine the plan's funded status. The valuation report presents the actuary's professional conclusions and recommendations. It also records and communicates the methods and procedures to ensure that the parties addressed are aware of the significance of the actuary's opinion or findings.

The valuation process can be divided into three important steps. The first step is to establish the funding methods and assumptions to be used in the valuation. The second step is to perform the calculations. The final step is to interpret the results and communicate the findings to the appropriate stakeholders.

The areas in which we have findings or comments are:

- Actuarial assumptions
- Actuarial valuation methods and results
- Analysis of unfunded liability
- Analysis of the projection of the Unfunded Actuarial Accrued Liability (UAAL)
- Manager's Proposal II

## Conclusions

We conclude that the methods and assumptions used by GRS are reasonable and conform to accepted actuarial practice.

Selecting actuarial methods and assumptions involves a great deal of professional judgment. We have not attempted to substitute our judgment for that of the actuary to SDCERS. However, we have identified some areas of significance in which we recommend alternative methods for SDCERS and its actuary to explore in order to better represent the funded status of the System.

## Actuarial Assumptions

Our evaluation examined the actuarial assumptions recommended by GRS in their most recent reports and not those assumptions specified by the Manager's Proposal.

## Mortality

We found that the mortality assumptions recommended by GRS did not anticipate the continual improvement in mortality rates. We recommend that GRS consider recognizing mortality improvements either through updating mortality assumptions every few years or by using a generational mortality table that automatically updates mortality rates.

## Purchases of Service Credit

Because the factors used for purchases of service credit do not reflect the age of the member, we recommend that consideration be given to adopting an assumption to be included in the actuarial valuation regarding the cost of purchased service. During 2003 alone, the actuary identified a \$12.7 million loss due to service purchases at less than actuarial cost. This amount is expected to be lower in the future due to revised service purchase costs and we agree that it is premature to set an assumption regarding service credit purchases, but we recommend that this assumption be monitored.

## Merit and Seniority Pay

Based on Mercer's method of evaluating salary increases as well as GRS' own results, we recommend higher long-term merit and seniority increase assumptions for both General and Safety members.

## Rate of Inflation

Based on historical inflation and expected economic projections, we believe that a 4.25 percent inflation assumption is too high. We recommend lowering the inflation assumption to 3 percent. However, we are also recommending a change to the wage growth assumption which mitigates the impact of this inflation recommendation.

### Wage Growth

Currently, because of the high inflation assumption of 4.25 percent being used for the economic assumptions, no reflection of productivity increases or wage growth over inflation is considered. We recommend that, in conjunction with our recommendation to lower the inflation assumption to 3 percent, a productivity assumption of 1.25 percent be used in developing the anticipated salary increases. This wage growth assumption, combined with the 3 percent inflation rate causes no net impact on the underlying total wage increase. The increase in total payroll used to determine the amortization of the UAAL is unchanged.

### Administrative Expenses

Administrative expenses are paid from the returns on the System assets. We recommend that an explicit recognition of administrative expenses be included in the assumptions.

### Investment Return

The structure of the System, which involves the payment of certain benefits out of realized gains that exceed the actuarial investment return assumption, makes the development of reasonable investment return assumptions particularly difficult. GRS recommended a reduction in the investment return assumption of 25 basis points to reflect the funding of these benefits. We concur with that recommendation.

## Actuarial Valuation Methods and Results

The valuation methods being used by GRS are within generally accepted actuarial practice. In order to improve the stability of contribution rates, we recommend that SDCERS consider the use of the entry age normal cost method. We also recommend consideration of an alternative method of calculating the actuarial value of assets. However, the current method is considered acceptable by actuarial standards.

Our actuarial valuation results were very close and well within acceptable ranges of the valuation results prepared by GRS.

## Analysis of Unfunded Liability

We evaluated the causes of the current unfunded liability. Several factors contributed to the underfunding. The most significant contributing factor is investment returns over the past three years. However, the underfunding was also increased by changes in benefit levels, a shortfall in required actuarial contributions, and the use of reserves for purposes of providing contingent benefits not subject to the actuarial valuation.

## Analysis of the Projection of the UAAL

The UAAL projection performed by GRS uses some simplifying assumptions. We recommend using more detailed methods to perform these projections to provide more theoretically accurate results. More importantly, it is crucial that actuarial projections be understood based on the underlying purpose of the projection. The determination we made using more detailed projections showed slightly higher funded ratios and lower contribution rates. However, the uncertain nature of actuarial projections makes the differences insignificant. We conclude that it would be reasonable to rely on the UAAL projections performed by GRS for the purposes for which they were developed.

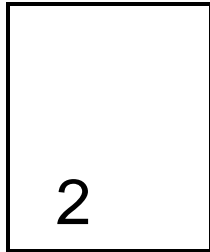
## Manager's Proposal II

Currently, the City contributions and the valuation assumptions used to determine the funded status of the System are based on the Manager's Proposal II. The actuarial assumptions used under the Manager's Proposal are more aggressive than the best estimates recommended by GRS. This means that there is a higher risk that the System may experience negative actuarial experience in the future, which may lead to increases in actuarial liabilities and increased contribution rates. It also creates a current picture of the funded status of the System that may be overly optimistic unless the System experiences substantial investment and other actuarial experience gains in the future. We believe that it is a best practice to use the actuary's best estimate of actuarial assumptions in order to present the most accurate picture of the System's financial status to stakeholders.

The Manager's Proposal also sets the City contribution rates below the actuarial calculated rates. The effect of this increases the unfunded actuarial accrued liability and future contribution requirements unless there are significant gains to offset this loss. The full funding of actuarially determined contributions is considered a best practice because it creates a more stable level funding environment and avoids pushing contributions onto future generations.

## Allocation of Assets to UPD and Airport Authority

The assets of SDCERS are allocated to the UPD and Airport Authority Plans based on the actuarial value of assets. Best practice would be to allocate assets based on market value of assets. We understand that due to the nature of the reserves held by the System, this would be difficult. Also, we recommend that for calculation of funding rates for the separate entities, assets would remain on a smoothed basis.



## Actuarial Valuation

Our review of the actuarial computations included the following:

- Comparison of the data used by the actuary to the data provided by the System
- Review of the calculations presented in the actuarial report for consistency and accuracy
- Reproduction of valuation results from the June 30, 2003, valuation
- Evaluation of the application of the Projected Unit Credit Cost Method

### Comparison of System and GRS Data

The first step in the actuarial valuation is the data processing. The actuary requests census information from the retirement system. This data is then reviewed for completeness, reasonableness and consistency.

Because the underlying data is so important to the accuracy of an actuarial valuation, the American Academy of Actuaries published Actuarial Standard of Practice (ASOP) No. 23 to provide guidelines on the quality of data to be used in actuarial calculations. We used ASOP 23 to guide our review of GRS' methodology. In particular, we addressed the three areas discussed in Section 5 of ASOP 23 which are:

- Selection of data
- Use of Imperfect data
- Reliance on data supplied by others

Our review of the quality of data used by GRS in processing the San Diego City Employees' Retirement System actuarial valuation revealed no major concerns with the process or level of review.

We found the level of disclosure of data information in the actuarial report to be sufficient and complete. Whenever possible, we encourage the inclusion of a data reconciliation in a valuation report. This shows the movement of records between active, inactive, DROP, and retired status and is an aid to ensuring that the available data is complete. The tables providing statistics on new retirees provide some, but not all, of this information.

We encourage the System and GRS to work to resolve data issues with regard to inactive members as data will be more difficult to obtain for these records as time passes.

## Selection of Data

In selecting the data to be used for an actuarial valuation, an actuary has choices with regard to how much data to use, what date to collect the data, and what data elements should be collected.

For this actuarial valuation, GRS has collected data on substantially all members who are currently eligible to receive benefits or who may become eligible in the future. This includes those members who maintain only member contribution balances and have no further benefits anticipated from the System. While sampling methods are available to the actuary, we believe that the use of full individual data is appropriate in this situation, due to the size and complexity of the System.

Because the data was available shortly after the valuation date of June 30, 2003, GRS used data as of the valuation date. The results of the analysis of this data will be used to set contribution rates as of July 1, 2004. This type of delay is reasonable and is anticipated under GASB guidelines due to the difficulty of obtaining complete data closer to the date the contributions begin. We, therefore, believe the June 30, 2003 date is appropriate.

For the purpose of administering the System, SDCERS maintains considerable data on Pension Gold. GRS only collects those elements of data that are necessary for the actuarial valuation. The important elements used in the actuarial valuation are as follows:

Actives

<b>Data Element Collected on Actives</b>	<b>Purpose</b>
Social Security Number	Identification for data questions
Date of Birth	Liability calculations and eligibility for benefits
Date of Hire	Service calculations and eligibility for benefits
Gender	Liability calculations and application of assumptions
Accumulated Contributions	Liability associated with return of contributions
Pensionable Salary	Benefit calculations
Employee Contribution Rates	Projection of employee contributions to offset employer cost calculations
Plan ID	Formula application for benefits and application of assumptions

**Retirees**

<b>Data Element Collected on Retirees</b>	<b>Purpose</b>
Social Security Number	Identification for data questions
Date of Birth	Liability calculations
Gender	Liability calculations and application of assumptions
Service	Census breakdown for actuarial report and data statistic reporting
Date of Retirement	Census breakdown for report of benefits by date of retirement
Benefit Type	Liability calculations
Benefit Option	Liability calculations
Original Annuity	Liability calculations
Original Pension	Liability calculations
COLA Annuity	Liability calculations
COLA Pension	Liability calculations
STAR COLA	Liability calculations used to study loss of purchasing power
Beneficiary Date of Birth	Liability calculations under optional forms of benefit
Beneficiary Gender	Liability calculations under optional forms of benefit

Based on our understanding of the benefits, the data requested by GRS is sufficient to determine the actuarial liabilities.

## Use of Incomplete Data

Sometimes sufficient data is not available to the actuary. On occasion, a group of records will be missing some of the elements described above. In these cases, the actuary is forced to make a decision as to the materiality of the data defect and whether the use of estimates will introduce a material bias into the study. Based on our review of the data and on the actuarial valuation report, GRS did not make any assumptions regarding particular data elements that were missing.

One of the data questions that GRS asked of the System was with regard to a large number of members who did not have sufficient data. This group was indicated to be not active and therefore required no additional information. This type of data deficiency frequently occurs when employees leave employment after a very short time during which their data is not entered into the system. We do not believe that the lack of information for this group would introduce any bias into the calculations because they would not ordinarily enter into the actuarial valuation. We believe the actions of GRS were appropriate with regard to incomplete data.

## Reliance on Data Supplied By Others

In preparing the actuarial valuation, the actuary relies on data supplied by the System. ASOP 23 encourages the actuary, when relying on the data of others, to review the data for reasonableness and consistency. GRS has provided us with copies of the questions they asked of the System to verify the accuracy of the data. The volume of questions that they asked was high and the level of detail was sufficient to make a reasonable assessment of the data.

We noted that many of the questions asked were regarding data for inactive members who had been gone from active service for several years. For example, one list of data questions was regarding members with compensation data for a period following their date of separation. Many of the dates of separation were in the year 2000. Usually such data inconsistencies are resolved during the first valuation following an employee's termination of service. We encourage the System and the actuary to work to change the underlying data files so that such questions are permanently resolved.

## Documentation

In addition to guidelines for data collection and processing, ASOP 23 provides the actuary with guidance regarding the documentation of the data used. Section 6.2 of the ASOP requires the following elements in an actuarial report:

- The source(s) of the data
- The materiality of any biases of which the actuary is aware that are due to imperfect data
- Adjustments or modifications made because of imperfect data, other than routine corrections made by reference to source documents
- The extent of reliance on data supplied by others
- Any resulting limitation on the use of the actuarial work product in the event that the actuary has not sufficiently reviewed the data
- Any unresolved concern the actuary may have about the data that could have a material effect on the actuarial work product

Based on our review of the data items and our review of the June 30, 2004 actuarial report, GRS has complied with ASOP 23 in the analysis of the underlying data for the actuarial valuation and in the documentation of data.

## Review of the Actuarial Report Calculations

For this review, we mathematically checked a number of report exhibits for consistency within the exhibit and for consistency with other exhibits. Amortization amounts were checked, as were calculations of actuarial asset value. Some results presented in the June 30, 2003 valuation also provide comparisons to the results from the prior valuation as of June 30, 2002. We compared the June 30, 2002 results between the reports and found that the numbers matched.

One important part of managing a retirement plan is evaluating the accuracy of actuarial assumptions. Each year, to guide the Board in understanding the valuation results, the actuary prepares an analysis of the sources of deviation from expected results. For example, if more members than expected retire within a given year, this causes an actuarial loss because their benefits are immediately due. Similarly, asset returns that are different than expected create a gain or a loss each year as well.

We have one minor comment on the development of the gain/loss analysis. In the development of the gain/loss analysis, the actuary adds the increase in the DROP benefit reserve to the expected UAAL. However, in the valuation of the benefits, those members who enter DROP are treated as retirees. Thus, any benefits paid to them are treated as retirement benefits. We concur with the treatment of DROP employees as retirees. However, those benefits should be removed from both the liabilities and the valuation assets in the evaluation of the expected UAAL. Since they are removed from both sides of the unfunded equation, they will not impact the gain/loss. We believe that the method currently in use understates the liability loss and leads to an underestimation of the loss due to demographic assumptions. This has no impact on the liabilities.

### Reproduction of GRS Valuation Results – Projected Unit Credit

We have independently calculated the results of the June 30, 2003 valuation using the actuarial methods and assumptions described in the GRS report. The actuarial valuation systems of each of the major actuarial firms contain certain inherent differences in the methodologies they use in performing the liability calculations. A typical standard is based upon a 5 percent corridor, i.e., results are considered to reasonably match when they are within  $\pm 5$  percent in total. It is not unusual for particular ancillary benefits to be somewhat outside the 5 percent range.

As shown below, our results are within 5 percent of the results obtained by GRS. We, therefore, conclude that the valuation results are reasonable and we have no reason to question their accuracy.

Safety	GRS	Mercer	Mercer/GRS Ratio
<b>Normal Cost</b>	<b>52,200,000</b>	<b>51,369,000</b>	<b>98.4%</b>
Member Contributions	21,966,000	21,675,000	98.7%
Employer Normal Cost	30,234,000	29,694,000	98.2%
<b>PUC Accrued Liability</b>			
▪ Actives	760,900,000	756,000,000	99.3%
▪ Terminated Vested	20,400,000	20,200,000	99.0%
▪ Retirees	1,019,900,000	1,025,600,000	100.6%
<b>Total Accrued Liability</b>	<b>1,801,200,000</b>	<b>1,801,800,000</b>	<b>100.0%</b>

General	GRS	Mercer	Ratio
<b>Normal Cost</b>	<b>72,350,000</b>	<b>70,695,000</b>	<b>97.7%</b>
Member Contributions	37,528,000	35,506,000	94.6%
Employer Normal Cost	34,822,000	35,189,000	101.0%
<b>PUC Accrued Liability</b>			

General	GRS	Mercer	Ratio
▪ Actives	948,700,000	961,300,000	101.3%
▪ Terminated Vested	61,100,000	61,400,000	100.5%
▪ Retirees	721,600,000	728,100,000	100.9%
<b>Total Accrued Liability</b>	<b>1,731,400,000</b>	<b>1,750,800,000</b>	<b>101.1%</b>

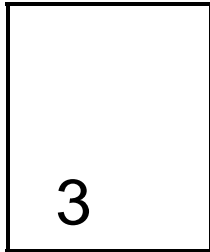
### Reproduction of GRS Valuation Results – Entry Age Normal

In addition, we evaluated the results using the Entry Age Normal Funding Method. The following table shows the results of our calculations in total. Our results are well within industry norms.

Total	GRS	Mercer	Ratio
<b>Normal Cost</b>	<b>121,933,000</b>	<b>121,467,000</b>	<b>99.6%</b>
Member Contributions	59,494,000	57,181,000	96.1%
Employer Normal Cost	62,439,000	64,286,000	103.0%
<b>PUC Accrued Liability</b>			
▪ Actives	1,918,314,000	1,902,517,000	99.2%
▪ Terminated Vested	81,496,000	81,633,000	101.0%
▪ Retirees	1,741,490,000	1,759,056,000	100.2%
<b>Total Accrued Liability</b>	<b>3,741,300,000</b>	<b>3,743,206,000</b>	<b>100.1%</b>

## Application of Projected Unit Credit Funding Method

As part of evaluating the actuarial valuation results, we also examined the application of the cost method. As you can see from our description of the cost method above, there are many elements to each cost method. There are generally standard ways to apply each funding method but, occasionally, an actuary will adjust the funding method somewhat. In the application of the PUC method, GRS uses an adjustment to the traditional PUC method for the development of the employee contribution offset to normal cost. In developing the employee contribution offset, GRS uses the present value of future employee contributions divided by the present value of future salaries to come up with a contribution rate. A more common way to develop the offset is to apply the weighted member contribution rates to develop an average member contribution rate. Using this method creates a lower expected member contribution rate (0.22 percent lower for General and 0.49 percent lower for Safety), which in turn nets a higher employer contribution rate. However, we view the difference as not material.



## Experience Study

The purpose of the actuarial valuation is to generate the contribution rates each year and to produce an appropriate pattern of contributions to fund the benefits over time. It is important to understand that the actuarial valuation does not determine the actual cost of the benefits, only the pattern of contributions. The actual cost of the benefits is determined by the System's benefit structure.

In this section, we examine the assumptions used as the basis of the valuation. In order to evaluate the assumptions, we reproduced the experience investigation for the period 1997 through 2001 used by GRS to recommend assumptions. For this purpose, we are evaluating the assumptions recommended by GRS, not those required by the Manager's Proposal. A discussion of the Manager's Proposal is contained in Section 9 of this report.

The assumptions used in an actuarial valuation are intended to be the best estimate of what the plan will experience over a long period of time. Each year there will be variations in the plan's actual experience. These variations are analyzed by the actuary in the gain/loss analysis. Consistent patterns of either gains or losses in a particular area cause the actuary to question the assumptions used. Plans such as SDCERS that regularly perform experience studies tend to have experience that closely matches the assumptions.

## Methodology

The selection of actuarial assumptions is an art as much as it is a science. Our analysis does not attempt to substitute our judgment for that of your actuary. Rather, we are evaluating the elements taken into consideration by GRS and the reasonableness of the conclusions that were made.

The assumptions reviewed as part of the experience investigation are:

### Demographic

- Mortality for healthy and disabled members and beneficiaries
- Service retirement
- Withdrawal before retirement
- Purchases of service credit
- Rates of disability
- Merit and seniority pay
- Percentage of terminating members who accrue reciprocal service

### Economic

- Rates of investment return
- Rate of inflation

- Rate of wage inflation
- Administrative expenses

In order to determine the reasonableness and appropriateness of GRS' recommendations, we performed a parallel experience study based on the same data that GRS used. Our findings matched those of GRS in most cases. In a few circumstances, our software did not recognize as many decrements as GRS because our software rejects any members whose decrements did not occur during the experience period. For example, if we were provided a date of retirement of June 30, 1997, for a member, our experience study would not recognize that as a retirement decrement because it is outside the relevant time period. However, the differences were not significant and would not have changed the recommendations.

Regarding the development of merit and seniority pay increases, the methodology used by GRS differs substantially from our methodology. Please see the salary scale section for a discussion.

## Demographic Assumptions

### Mortality

The mortality assumption has a significant impact on the liabilities of a pension plan, due to the impact of the assumption on the length of payment for benefits. Recently, studies have shown that mortality continues to improve. Most mortality improvements have resulted not from the extension of the maximum life span—the limiting age continues to be 110 to 120—but rather from the increased average lifetime within that same maximum span. Also, improvements have been more significant for younger ages than for older ages. Mortality improvements have come from health advances (e.g., introduction of antibiotics, better surgical techniques, and reduction in infant mortality) and healthier habits (e.g., more exercise, healthier eating, and less smoking).

- **Healthy Retired Members**

The current assumptions for healthy retired members' mortality are as follows:

Retired Members	
▪ Male	1994 Uninsured Pension Mortality Table male rates, set back two years
▪ Female	1994 Uninsured Pension Mortality Table female rates, set back two years

Using a “set back” adjustment adds years to the life expectancy under the standard table and recognizes mortality rates at younger ages in order to more closely match the long-term expected experience of SDCERS. For example, using the two-year setback specified above treats a 65-year-old member as having the mortality rate of a 63-year-old under the table.

We are somewhat concerned by the GRS recommendation not to change any of the healthy retiree mortality tables. The experience for the 1997 through 2001 observation period shows the ratio of actual-to-expected deaths was lower than 100 percent. A ratio lower than 100 percent does not take into account future improvements in mortality. Actuarial Standard of Practice No. 35 states that the actuary should consider the likelihood and extent of mortality improvement in the future. This would lead the actuary to look for actual-to-expected ratios of more than 100 percent.

Actuaries have taken two different approaches to improving mortality rates. One approach is to recommend decreases in mortality rates with each successive experience investigation. This method allows employers to gradually adjust assumptions to recognize improving mortality. Alternatively, a generational table adjusts automatically for improvements in mortality. The 1994 Group Annuity Mortality Table is available as a generational table. Also, the Society of Actuaries has recently published the RP-2000 Mortality Table, which is the most recently published mortality table. It also includes separate tables for pre- and post-retirement, white-collar vs. blue-collar employees, male vs. female, and for different pension amounts.

The RP-2000 Mortality Table is available as a static table or “generational” table. In the generational table, mortality rates are based on both age and year of birth. So a person who is age 65 in 2004 will have a different life expectancy from someone who is 65 in 2014. If a static table is used, changes in mortality assumption will be required more frequently than with a generational table and have a larger impact when they are made.

We believe that the use of a generational mortality table constitutes a “best practice” although not a common practice among pension plans. This type of table allows the actuary to recognize future mortality improvements without applying those improvements to current retirees. However, most plans continue to use static mortality tables in valuing liabilities. The use of static tables is consistent with generally accepted practices among actuaries as long as the static tables appropriately reflect mortality improvement.

The current healthy retired member mortality assumptions do not take into account future improvements in mortality. Consideration should be given to modifying the current assumption to recognize future improvements in mortality. This can be accomplished by using the current static mortality table with additional adjustments or by moving to a “generational” table.

- **Beneficiaries**

For beneficiaries, the mortality assumption is set the same as for healthy retired members. We agree that it is reasonable to assume the same mortality as retirees. The comments we make above regarding mortality for healthy retired members are appropriate here as well.

- **Disabled Retired Members**

The current assumptions for disabled members' mortality are as follows:

Disabled Retired Members	
▪ Male	1994 Uninsured Pensioner Mortality male table, set forward five years
▪ Female	1994 Uninsured Pensioner Mortality female table, set forward five years

Using a “set forward” adjustment recognizes mortality rates at an older age than the standard table in order to more closely match the long-term expected experience of SDCERS for disabled members.

The total number of disabled deaths within the observation period is too small to develop credible, population-specific rates. During the four-year period under our review, only 93 disabled retirees died. As a result, we believe that the actuary must use industry-wide research to develop rates. In general, rates of disability mortality are heavily dependent on the definition of disability used for eligibility for disability benefits as well as the plan's practice in applying that definition.

Based on the definition of disability in Article 4 of the City Municipal Code, a member is considered disabled when:

- The member is permanently incapacitated from the performance of duty
- The member's incapacity renders his or her retirement necessary

Special rules apply when the member is the victim of a violent attack while performing duties as a City employee.

This definition is more restrictive than some definitions used by other public pension plans but is not as restrictive as the Social Security definition. As a result, we agree that the use of a mortality table that is moderately adjusted to reflect higher mortality for disabled members is appropriate. An additional alternative that is sometimes used is a modified table for the first few years following disability when the mortality rates are the highest.

Because studies show that mortality of disabled members is not improving as rapidly as mortality of healthy members, the use of a static mortality table is appropriate.

- Active Members

In recognition of lower mortality rates at younger ages, the table recommended by GRS for healthy active mortality is the same table as that used for retirees with an additional setback.

Healthy Active Members	
▪ Male	1994 Uninsured Pension Mortality Table male rates, set back five years
▪ Female	1994 Uninsured Pension Mortality Table female rates, set back five years

Using a setback adjustment adds years to the life expectancy and recognizes mortality rates at a younger age than the standard table in order to more closely match the long-term expected experience of SDCERS. Since the setback serves to lower mortality from the retiree assumptions, we consider this to be a reasonable assumption. However, as described above, the use of a generational mortality table such as RP-2000 is more accurate. In addition, as previously noted, the RP-2000 Mortality Tables provide separate tables for active and retired plan participants.

### Service Retirement

- Retirement from Active Membership Status

Because of the different benefit formulas and retirement eligibility for Safety and General members, different service retirement assumptions are used for each group. This practice is appropriate and consistent with industry practice.

- Safety Members

In our opinion, the current retirement assumption is low as compared to the actual experience during the investigation period. However, the Deferred Retirement Option Plan (DROP) was instituted in 1997, the beginning of the investigation period. When a benefit such as DROP is first introduced, retirement rates are generally slightly higher as those members who had not previously been able to participate first take advantage of the new program.

The Safety formula provides for no additional increase in the member's benefit formula after 30 years of service. While the member will continue to see benefit increases through additional salary increases, the cap on benefit accruals can be expected to be a major influence on a member's retirement pattern. In addition, GRS notes a particularly large group of Safety members reaching 30 years of service. As a result, we agree that the inclusion of a higher retirement assumption when a member reaches 30 years of service is appropriate. Also, as of June 30, 2003, only 6 out of 2,684 active Safety members had more than 30 years of service. Those members who desire to continue working after 30 years of service frequently enter the DROP program, an action which is considered a retirement by GRS.

GRS has recommended that the retirement assumption at 30 years be increased by approximately 72 people. This will bring the number expected under the revised assumption closer to the actual experience. Therefore, we believe that the GRS recommendation to increase the retirement assumption is appropriate.

- General Members

The assumption recommended by GRS for the General members has lower expected retirement rates at young ages and does not predict 100 percent retirement until age 70. Based on the experience of the System, this is an appropriate structure for the assumptions. However, during the investigation period, fewer General members retired than was expected.

In the GRS experience investigation report, and in our independent calculations, the retirement rates for those members under age 60 were reasonably consistent with the assumption. For those members ages 60 and older, the assumption appears high. Because a high retirement assumption is conservative, it is appropriate to wait until the DROP plan has been in place for a longer period to make changes to the retirement assumption. However, if the retirement experience remains low at ages 60 and older in future investigations, it would be appropriate to lower the assumption rates.

### Timing of Retirement from Vested Status

For those members who terminate employment before eligibility for service retirement but after vesting, an assumption must be made as to when those members will begin to receive benefits. The current assumption for the actuarial valuation is that those members will start benefits as soon as they are eligible. We believe this to be an appropriate assumption.

### Withdrawal or Termination Before Retirement

When members withdraw from the System before retirement age with more than 10 years of service, they can choose to leave their contributions with the System and receive a pension at retirement age. Alternatively, the members can withdraw their contribution balances from the System and forego the deferred annuity benefit. Prior to 10 years of service, a member does not have an annuity benefit payable from the plan.

GRS reviewed the withdrawal experience over the experience investigation period and found that members were withdrawing less frequently than expected. Since this was a pattern observed over two experience investigations, the GRS recommendation was to make fairly dramatic changes in the number of members expected to withdraw. We concur with GRS' recommendation.

GRS assumes that all members who terminate after they have 10 years of service will leave their contributions in the System to receive a benefit at retirement age. We believe that this is an appropriate assumption. The benefits available to members with more than 10 years of service are significantly better if the members leave their contributions in the System. While some members will find the immediate cash more valuable, most will leave the money in the System to receive a retirement benefit.

In addition, GRS recommended that the male and female withdrawal tables for General members be collapsed into a single unisex table. We also agree with this recommendation.

### Purchases of Service Credit

Because of the changes in the calculation of service credit purchases that were imminent at the time of the experience investigation, GRS did not make any changes to assumptions about the level of service credit purchases. However, based on the current assumptions used to calculate service purchases, there was a considerable opportunity for anti-selection. During the fiscal year ending June 30, 2003, GRS estimated that liabilities increased by \$12.7 million due to service purchases. Effective November 1, 2003, the purchase of service credit rates were increased to address the fact that the prior rates were not actuarially neutral. Experience under the new rate structure should continue to be monitored. We recommend that an assumption for service purchases be included to the extent purchases are not actuarially neutral.

### Rates of Disability

Disability rates are heavily influenced by the definition of disability and the administrative practices of the System; therefore, it is appropriate for GRS to develop assumptions based on this data even though there were only 170 members disabled during the experience investigation period. GRS made two recommendations in the experience investigation. With regard to the total rate of disability (which is not separated in the GRS experience investigation by industrial and non-industrial disability), GRS' recommendation was not to change the assumption. Because the definition of disability is the same for both industrial and non-industrial, this is a reasonable simplification. The rates of disability for the General members were very close to expectation. The rates for Safety members were below the recommendation. Due to the volatility of experience, GRS' recommendation to maintain the current rate of disability assumption is reasonable.

In addition, GRS recommended that the assumption be changed as to how many of these disabilities were industrial or non-industrial. The recommendation was that the assumption of industrial disabilities be lowered to 85 percent for the Safety members. Based on the results of the experience investigation and the eight-year experience indicated in the report, we believe that this change is appropriate.

## Recovery from Disability

We agree that the assumption of no recovery from disability is reasonable and that recoveries should continue to be included as an actuarial gain. We understand that disabilities are assumed to be permanent and that disabled members are not monitored for recovery from disability.

## Salary Scale — Merit

- Merit Scale

The salary increase assumption is composed of an underlying inflation assumption which should be consistent with the inflation assumption on which the other economic assumptions are based. GRS uses 4.25 percent expected inflation. In addition, there is a component of salary increases that predicts merit increases. These increases consist of both additional increases over inflation while employees remain in a particular position as well as promotion to the next level or salary grade. In general, merit increases tend to be higher in the early part of an employee's career when an employee is learning new skills and making rapid advances. In addition, larger percentage increases tend to be given to lower-paid employees earlier in their careers.

To reflect this pattern, GRS uses a service-based salary scale. For the first five years of the member's employment with an SDCERS employer, merit increases are expected to be higher. From the fifth year of service forward, members are expected to receive inflation plus 0.5 percent.

It is particularly difficult to determine how GRS developed the recommendations regarding salary increase assumptions. Their tables provided actual experience for the first ten years. It would be helpful if their report also showed actual experience for years in excess of ten. In addition, their tables provided only the total average annual salary increase and not the merit portion separately. We recommend that an additional column be added to show the merit portion in addition to the overall salary increase. In addition, the table should show actual inflation during the period so that salary increases in excess of inflation can be analyzed. No comparison is made of the proposed scales with the actual experience. Finally, during the years following five years of service, the average salary increase was substantially higher than the expectation for General members. There is no discussion in the text as to why no increase was recommended for the salary assumption.

We note that no mention is made of age-based salary scales. While it is true that salaries often increase early in one's career, as evidenced by the service-based experience, if an employee changes jobs in mid-career, the mid-career salary increase pattern is usually evident. We recommend an investigation of the impact of adding an age-based merit increase assumption.

In the process of evaluating the underlying analysis that GRS performed on salary increases, we uncovered a fundamental difference in the way Mercer evaluates salary increases and the way GRS evaluates salary increases. Based on discussions with GRS staff, their method compares total payroll for a particular cohort year over year. The gross percent increase for all members of that cohort is used as a proxy for the average increase. Mercer develops the increase by calculating the increase for each individual employee in the cohort and comparing the average increases. In addition, in the process of evaluating the data, we eliminated all those members who had anomalous salary increases. For example, we eliminated any members with salary increases of over 25 percent from one year to the next. This way we eliminated those members who increased their pay by increasing their work schedule. We believe that the elimination of anomalies allows us to better evaluate the underlying expected salary increases.

In order to evaluate the recommendation in the experience investigation report, Mercer independently developed an evaluation of the experience, based on our methodology. The results of our analysis are shown in the following table:

### General Experience

Service	Average Increase	Average Inflation*	Average Merit Increase	Current Assumption	GRS Recommended Assumption
0-1	7.5%	3.85%	3.65%	4.5%	4.5%
1-2	10.91%	3.85%	7.06%	3.5%	3.5%
2-3	9.11%	3.85%	5.26%	2.5%	2.5%
3-4	7.52%	3.85%	3.67%	1.5%	1.5%
4-5	5.87%	3.85%	2.02%	0.5%	0.5%
5-6	5.24%	3.85%	1.39%	0.5%	0.5%
6-7	5.12%	3.85%	1.27%	0.5%	0.5%
7-8	4.99%	3.85%	1.14%	0.5%	0.5%

8-9	4.92%	3.85%	1.07%	0.5%	0.5%
9-10	4.87%	3.85%	1.02%	0.5%	0.5%
10+	4.63%	3.85%	0.78%	0.5%	0.5%

\* Inflation over the 4-year period is based on the U.S. City Average Consumer Price Index for All Urban Consumers plus a 1.25 percent productivity increase.

Based on our evaluation, the GRS recommended salary increase for the General members is low. We would recommend that the long-term increase be increased from 0.5 percent to 1.0 percent for years 5 to 10 and to 0.75 percent for those with more than 10 years of service. Additionally, the increases at earlier service points should be evaluated again at the next experience study to determine if these increases are an unusual situation or not.

### Safety Experience

Service	Average Increase	Average Inflation*	Average Merit Increase	Current Assumption	GRS Recommended Assumption
0-1	8.66%	3.85%	4.81%	6.5%	7.5%
1-2	11.78%	3.85%	7.93%	5.5%	6.5%
2-3	8.92%	3.85%	5.07%	4.5%	5.5%
3-4	8.54%	3.85%	4.69%	3.0%	3.0%
4-5	7.15%	3.85%	3.30%	1.5%	1.5%
5-6	4.33%	3.85%	0.48%	0.5%	0.5%
6-7	4.66%	3.85%	0.81%	0.5%	0.5%
7-8	4.67%	3.85%	0.82%	0.5%	0.5%
8-9	4.62%	3.85%	0.77%	0.5%	0.5%
9-10	5.15%	3.85%	1.30%	0.5%	0.5%
10+	5.02%	3.85%	1.17%	0.5%	0.5%

\* Inflation over the 4-year period is based on the U.S. City Average Consumer Price Index for All Urban Consumers plus a 1.25 percent productivity increase.

As with General, the recommended Safety rates appear low relative to experience. Based on this data, we would recommend an assumption of 0.75 percent at service of more than 5 years.

### Percentage of Terminating Members Who Accrue Reciprocal Service

SDCERS has entered into an agreement with the California Public Employees' Retirement System to facilitate reciprocal service for those members who leave SDCERS to work for another public entity with reciprocal service. When a member leaves covered SDCERS employment and goes to another reciprocal system, the benefits they earned under SDCERS are based on their SDCERS service but the pay they earned at the reciprocal employer. Generally, this pay recognition increases the member's benefit. GRS makes the assumption that 20 percent of members who terminate will go on to work for a reciprocal employer.

No discussion of this assumption is included in the experience investigation report except for a brief mention that the recommendation is to keep the current assumption. We do not have sufficient data to evaluate this assumption. We recommend that an evaluation of actual reciprocal service be made at the time of the next experience investigation.

## Economic Assumptions

### Actuarial Interest Rate Assumption

The long-term interest rate assumption is reviewed taking into account:

- The Retirement Board's target asset allocation
- Investment and administrative expenses paid from assets
- The forward-looking real rate of return for each asset class included in the System's portfolio
- The underlying expected inflation

We evaluated the validity of the interest rate assumption in two different ways. The first way was to use the "building block" method in accordance with ASOP No. 27. The second way was to use Mercer's portfolio return calculator.

The building block method combines the expected real rate of return for each asset class with the assumed inflation rate to develop a gross expected rate of return. This is then adjusted for investment expenses.

This table shows the asset allocation targets as of July 1, 2003, and Mercer's expected rates of return for each asset class:

Asset Class	Allocation	Expected Real Rate of Return
Domestic Equities	38%	6.0%
International Equity	15%	6.3%
Domestic Fixed Income	32%	1.8%
International Fixed Income	5%	2.5%
Real Estate	10%	5.0%
<b>Expected Real Return</b>		4.4%

Combined with a general inflation assumption of 3.0 percent, we can expect the total return of 4.4 percent before fees to be 7.4 percent or more 50 percent of the time.

Based on information provided by Mercer Investment Consulting, we expect the investment expenses to average 0.45 percent of assets per year. Adjusting the expected return from above for expenses gives us an expected net return on assets of 6.95 percent. This expected net return is based on market or index returns. We examine the contribution of active management below.

The second way we evaluated the interest rate assumption was to use Mercer's Portfolio Return Calculator (PRC). Because of the increased scrutiny being applied to actuarial assumptions, we believe this method is the most accurate.

Mercer's software uses the most advanced research in developing expected returns. It takes into account the relationships of various asset classes in projecting returns. It also reflects the uncertain nature of investment return assumptions by assigning probabilities to the various returns.

We ran the System's portfolio through the PRC, which adjusts the expected rates of return based on the risk characteristics of each investment class, the correlation between expected returns for different asset classes, and the underlying inflation rate.

Using the PRC and an investment expense assumption of 0.45 percent produces a reasonable range of investment return assumptions from 5.7 percent to 8.4 percent with a median 7.02 percent expected return for the System. The range represents the 25th to the 75th percentile of returns over a 30-year period. These assumptions are based on July 1, 2003, expectations because that is the date of the most recent actuarial valuation. The current actuarial return assumption of 8 percent is between the 65th and 70th percentile.

The PRC also allows us to estimate the positive contributions expected of active management, that is, the additional return over the market benchmark or index return expected of SDCERS' managers. Based upon the active manager structure of SDCERS, we estimate that, in aggregate, SDCERS managers will add 94 basis points (.94 percent) per year.

Using the PRC and incorporating a .94 percent active management premium produces a reasonable range of investment return assumptions from 6.64 percent to 9.3 percent with a median 7.96 percent expected return for the System. The range represents the 25th to the 75th percentile of returns over a 30-year period. These assumptions are based on July 1, 2003, expectations because that is the date of the most recent actuarial valuation. The current actuarial interest rate assumption of 8 percent is between the 50th and 55th percentile.

The inclusion of the full adjustment for active management described above makes the assumption that your managers will continue to add .94 percent to your return over a very long period. We believe that reliance on manager skill for a very long period in developing the actuarial return assumption could lead to an assumption that is somewhat too high.

The way that certain benefits are funded at SDCERS can have an impact on the ability of SDCERS to set an appropriate interest rate assumption. In the experience investigation report, GRS recommends that the assumption be lowered to reflect the fact that during those years in which investment returns exceed the expected actuarial return, the excess is used to increase benefits through 13th check and cost-of-living increases. Also, the Corbett agreement uses "excess" earnings to fund benefits. The use of earnings over the actuarial assumption to pay for benefits is very important to understand in the setting of interest rate assumptions. Indeed, this use makes the task of determining an assumption particularly challenging. If the actuary recommends a lower interest rate assumption, this is considered to be "conservative" as the liabilities are larger and require larger contributions by the employer. On the other hand, if the actuarial assumption is low, there is a greater likelihood of "excess" earnings, which could be used to provide additional benefits.

The current interest rate assumption is 8.0 percent net of all investment-related expenses. We believe that the interest rate assumption is within a reasonable range considering the allocation of the asset portfolio and the investment expenses and the level of active management. The use of investment earnings to fund non-vested benefits indicates a drag on investment earnings that justifies a lower return assumption. We concur with GRS' recommendation to lower the interest rate assumption based on this special consideration. Also, please see the section below regarding administrative expenses. If administrative expenses are assumed to come from the interest rate assumption, our conclusions would be impacted.

Based on available survey information, 8 percent is the most prevalent interest rate assumption being used in the public sector. For the valuation performed in 2002, fully 50 percent of respondents used eight percent and over 80 percent of respondents used 8 percent or higher in the 2002 valuation. Despite the current market environment, most systems did not anticipate making changes for the 2003 valuation.

We note that there is little information regarding the development of the interest rate assumption in GRS' experience investigation report. The actuary indicates that the Board should be very active in setting the actuarial interest rate assumption. However, there is very little background information in the report to help the Board assess the assumption. Because of the very important nature of this assumption, the methodology for developing the assumption should be explicitly disclosed.

## Inflation Assumption

The current inflation assumption, as recommended by GRS, is 4.25 percent. This assumption is combined with the expected real rate of return on assets to determine the investment return and with the merit and productivity elements to determine the salary scale. As a result, the inflation assumption is a very important underlying assumption.

To evaluate the inflation assumption, we reviewed historical inflation increases and expectations for future inflation.

History of CPI Increases  
Expressed as an Annualized Average \*

Number of Years Ending December 31, 2002	CPI
10	2.39%
20	3.10%
30	4.92%
40	4.54%
50	3.89%
60	4.02%

*\*Geometric average. CPI data is based upon US All City Average, CPI-U for years after 1979.*

With the exception of the high inflationary period between 1972 and 1981, inflation has been in the range of 2.5 percent to 3.5 percent.

While historical inflation experience provides us with very valuable information about inflation assumptions, we also look to future expectations to guide our recommendation. Based on the current economic environment and the direction of federal fiscal policy, economists are expecting that the current low inflation environment will continue in the future.

Accordingly, we consider GRS' 4.25 percent inflation rate to be too high. Our analysis includes a 3.0 percent inflation assumption in the development of investment return and the salary increases.

### Wage Growth

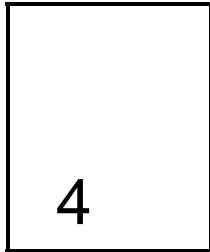
The wage growth assumption is used in two places in the valuation. It is used as the basis for the compensation increase assumptions. It is also used to project the future growth of total compensation for the amortization of the UAAL.

GRS uses the 4.25 percent inflation assumption to develop the salary increase assumption. Because this inflation assumption is high relative to recent inflation, it has been able to keep pace with the overall increase in wages. If a lower inflation assumption were used, the salary increase would need to incorporate some adjustment for "wage inflation" or productivity increases. This reflects that, with improvements in modern technology, fewer workers are able to produce more work. As a result, some salary increase is reflective of this increase in productivity.

Data published by the Bureau of Labor Statistics show that labor costs have increased by an average of 1.73 percent over the past 20 years. This is reflective of the increase in productivity of business workers and is indicative of salary increases above standard inflation. Thus, we believe that the 4.25 percent underlying increase in salaries is appropriate when combined with a merit assumption. However, we would express the 4.25 percent as 3.0 percent inflation and 1.25 percent productivity increases.

### Administrative Expenses

In accordance with Section 24.1502 of the City Municipal Code, administrative expenses (excluding investment management fees) are paid from realized investment returns. Actuarial Standard of Practice No. 35 stipulates that actuarial best practice is to recognize an administrative expense assumption. This assumption may be made by reducing the expected asset return, increasing the normal cost by the expected annual administrative expenses, or by adding a percentage increase on the liability calculation. We believe that some expectation of administrative expenses should be included in the actuarial valuation. In the past two years, administrative expenses have been approximately 0.3 percent of market value of assets.



## Actuarial Methods

### Funding Methods

The funding methods used in an actuarial valuation determine how contributions are spread over time so that, when combined with investment earnings on those contributions, the benefits will be fully funded. Within parameters set by the Governmental Accounting Standards Board (GASB) and professional actuarial standards, there is some flexibility to select methods that best meet the funding needs of SDCERS.

The actuarial funding method is a way to allocate costs over a period of time. Most plan sponsors agree that a good funding method has the following characteristics:

- It fully funds benefits by the time a member retires and benefits are due. The Projected Unit Credit funding method meets this criteria.
- It follows the principal of generational equity whereby costs are borne by the taxpayers benefiting from the members' service. The Projected Unit Credit method tends to have a normal cost which increases as an employee ages. This causes more costs to be borne by those active taxpayers later in the member's career. However, if the population has the same age and service makeup from year to year, this will be minimal.

- It is relatively stable without large fluctuations in costs from year to year. The Projected Unit Credit method is stable.

Actuarial funding methods include the allocation of costs over time (cost method), the determination of assets to be used in calculations (asset valuation method), and the amortization period for the Unfunded Actuarial Accrued Liability (UAAL).

### Cost Method

GRS currently uses the Projected Unit Credit (PUC) cost method to develop the funded ratio and contribution rates. Under PUC, an actuarial accrued liability (liability for service already worked in prior years), and a normal cost (additional liability for service worked during the current year) are developed. The actuarial accrued liability is compared to the actuarial value of assets to develop the unfunded actuarial accrued liability (UAAL) and the funded ratio.

The PUC cost method determines the accrued liability based on service to date and compensation expected at the time the participant is expected to leave active employment. The normal cost is the increase in the accrued liability due to service worked during the year. In determining the appropriate contribution rate, the normal cost and an amortization of the UAAL are calculated. In the case of SDCERS, the contribution rate is determined as a percentage of pay.

The PUC is an accepted cost method under GASB. Based on a survey by the Public Pension Coordinating Council, only 11 percent of public sector funds use the PUC method. The primary reason for this is that the PUC method tends to push more of the costs into the later part of a member's service. For this reason, the PUC method generally has a lower accrued liability than the most prevalent method which is Entry Age Normal. We note that GRS also includes calculations based on the Entry Age Normal method in the actuarial valuation report. The EAN method shown by GRS presents a higher liability than PUC.

We believe the Projected Unit Credit method to be an appropriate method and the PUC is accepted under GASB rules. However, as the population ages, the normal cost will tend to increase as a percentage of member payroll unless younger employees are hired to maintain a lower average age for active members. If the goal of the System is to maintain a stable normal cost as a percent of payroll, EAN is a more suitable cost method.

A further discussion of the application of the funding method by GRS is included in the section on the actuarial valuation.

#### Asset Valuation Method

In order to mitigate the volatility of the capital markets, pension plans frequently employ the use of a smoothed market value to determine assets. This smoothing mitigates the impact of asset fluctuations on pension contributions.

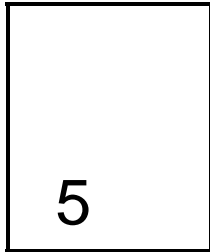
The current actuarial value of assets is determined by comparing the net market value of assets to the net book value of assets over the past five years. The average ratio of market to book value over the five-year period is then applied to the book value of assets for the current valuation. This asset valuation method was once quite common among pension plans. The method is more appropriate for plans that are primarily invested in bonds than for those invested in stocks. One characteristic of the method is that the actuarial value of assets is dependent on the trading practices of investment managers and other external factors. For example, if the System executes a change in asset strategy that requires sale of a large amount of assets and purchase of new securities, this will impact the book to market ratio. Likewise, if the System holds assets for a long period of time, this will have a different impact on the actuarial asset value. It is preferable that such asset strategies not impact the actuarial value of assets simply because of trading or holding assets.

A more common method that is frequently used smoothes investment returns over a five-year period. This method compares the expected return from the actuary with the actual return that the plan experienced, on a market value basis, and recognizes the difference over a five-year period. Under this method, the returns during good years are "saved up" for use during the bad years. But when you have difficult years, the System does not have to recognize the full amount of the loss immediately.

We believe that it would be better practice for the System to change the method for smoothing asset values to a method that does not rely on book value of assets. However, the current method is an acceptable method under Actuarial Standards of Practice and is not an unsound method.

#### Amortization Period for UAAL

Currently the UAAL is being amortized over 18 years. This is a decreasing amortization period. If the System continues with this method, the full amount of the UAAL will be amortized by 2021. This amortization period is well within the parameters outlined by GASB and is reasonable. Also, the amortization is expressed as a percent of payroll. Since the benefits are based on employee payroll, this is also a reasonable methodology. Note that since the amortization is a percent of payroll, the dollar amount contributed towards the UAAL is assumed to increase by 4.25 percent, the expected increase in overall wages. This is consistent with the underlying actuarial assumptions. It is also important to note that if aggregate payroll does not increase as much as expected, contributions will increase as a percentage of payroll. However, due to lower salary increases, the increased contribution as a percent of compensation will be somewhat offset by lower liabilities.



## Actuarial Reports

### Conformance of Actuarial Reports to Standards of Practice

The American Academy of Actuaries provides guidance to actuaries through the Actuarial Standards of Practice (ASOPs). These standards provide guidelines for actuarial communications. For example:

- The client for whom the actuarial communications are made must be identified. The form and content of the communication should be clear and appropriate to the circumstances, taking into account the intended audience.
- The communication should be issued within a reasonable period following the completion of the analysis.
- The report should identify the actuary responsible for the conclusions in the report.
- If the actuary is not financially and organizationally independent concerning any matter related to the subject of the actuarial communication, this non-independence should be disclosed.
- The report should disclose any reliance on other sources.
- The report should disclose any methods or assumptions that were prescribed by the client.

- The report must contain enough information that another actuary qualified in the same practice area could make an objective appraisal of the reasonableness of the actuary's work as presented in the actuary's report.

Based on our review of the Actuarial Valuation as of June 30, 2003 and the 2002 Experience Study, we believe that the reports provided by GRS meet the intent of the Actuarial Standards of Practice.

There are two particular items that we uncovered while working extensively with the reports through our audit that we believe should be addressed.

- In the description of system benefits, no mention is made of retiree medical benefits. While these benefits are not considered in the valuation of liabilities, some description of the benefit and the method of funding that is used would be appropriate. In particular, in looking at the reserves, a reader would not understand the need for the 401(h) reserve without some description of the retiree medical benefits. In addition, the presence of a retiree medical benefit not being considered in the valuation could impact a reader's assessment of the financial stability of the System if the funding mechanism is considered to be unstable.
- There is no description of the non-medical benefits which may be funded from reserves such as the annual supplemental benefit. The increased retirement benefit under the Corbett Settlement is mentioned in the "Comments" section.

## Qualifications and Adequacy of GRS Staff

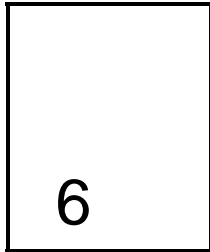
Gabriel, Roeder, Smith & Company is a national actuarial and benefits consulting firm formally established in 1962, with its origins tracing back to 1938. GRS and its approximately 100 employees serves over 500 public and private clients from seven offices in the United States, including Chicago, Dallas, Detroit, Fort Lauderdale, Gainesville, Sacramento and San Diego. GRS maintains a large public sector retirement practice.

GRS uses an internal, proprietary valuation system to prepare actuarial valuation results. Based upon the results of our independent parallel actuarial valuation in Section 2, we believe that the valuation system is adequate to perform the necessary calculations.

The actuary signing the June 30, 2003 actuarial reports and other actuarial communications, Rick Roeder, is a Fellow of the Society of Actuaries, an Enrolled Actuary, and a Member of the American Academy of Actuaries. These credentials represent the highest credentials available to pension actuaries in the United States. Mr. Roeder meets the qualification standards of the American Academy of Actuaries to perform the actuarial work for the System. In addition to his work for SDCERS, Mr. Roeder has experience providing similar services for other retirement systems, such as the Los Angeles City Employees' Retirement System, Marin County Employees' Retirement Association, the Los Angeles Fire and Police Pension Association, and Sonoma County, among others.

Mr. Roeder relies on the assistance of Anne Harper, an Enrolled Actuary and other staff, to perform the actuarial calculations regarding SDCERS. Jay Hirsch provides additional assistance including peer review. Mr. Hirsch is a Fellow of the Society of Actuaries and an Enrolled Actuary. Both Ms. Harper and Mr. Hirsch assist with the clients listed above. Because of their credentials and memberships in actuarial organizations, all three actuaries are bound by the Code of Professional Conduct promulgated by the American Academy of Actuaries. It is our belief that the credentials of these individuals meet the standards of the actuarial profession for providing the services required by SDCERS.

Based on the information provided above regarding the staff assigned to perform the work for SDCERS, the team is qualified and adequate to provide the services required.



## Analysis of Unfunded Liability

All retirement systems have funding ratios that fluctuate over time. There can be many factors contributing to the level of funding for any system. The primary drivers of a system's funded ratio are:

- Benefit levels and changes in benefit levels
- Asset performance
- Actuarial smoothing method to control asset volatility
- Contributions higher or lower than actuarially determined
- Period over which unfunded liabilities are amortized
- Demographic experience
- Additional benefits paid from earnings on assets

As of June 30, 1996, SDCERS had an unfunded accrued liability of \$139 million. If all actuarial assumptions had been met, that unfunded would have grown to \$149 million by June 30, 2003. In actuality, the unfunded at June 30, 2003 was \$1,157 million. We evaluated any events subsequent to June 30, 1996, that contributed to the \$1,008 million unexpected increase in the unfunded accrued liability.

## Benefit Levels

Since 1996 benefit levels have been increase through benefit improvements and through the Corbett lawsuit. These benefit improvements increased the cost of the plan by \$260 million.

## Contribution Shortfalls

Over the years, various Manager's Proposals have governed the contribution levels to the System rather than GRS' calculations. Since 1996, contributions have been less than those determined by GRS. Since a portion of the contribution rate is intended to pay interest and principal on the UAAL, contribution shortfalls cause the UAAL to increase with interest. We estimate that this contribution shortfall has contributed approximately \$184 million to the increase in the UAAL.

## Asset Performance

During the period since 1996, the markets have experienced returns very different from those expected. During the early part of the period, the markets returned some of the highest returns in history. Then during the following three years, some of the lowest returns in history. The sum of this activity is that return on assets only contributed \$75 million to the UAAL. This determination is based on the actuarial value of assets calculation, which is the value used to determine the unfunded liability.

## Use of Reserves for Additional Benefits

During years in which investment earnings received exceed the amount needed to credit reserves with interest as determined by the Board and the amount needed to pay budgeted expenses and costs of operating the System, under Section 24.1502 of the Municipal Code, the Board can allocate a portion of those investment returns to pay for additional benefits including retiree medical benefits, supplemental benefits for retirees, and increased benefits pursuant to the Corbett Settlement. This use of earnings to pay for additional benefits prevents those earnings from being used in future years to offset low investment earnings. Because these benefits are not reflected in the actuarial valuation, the funding of these benefits reduces the overall funded status of the System. The use of excess returns to provide benefits is like providing a benefit improvement.

We estimate that \$300 million has been used from reserves to pay additional benefits since 1996. During 2002 and 2003, there were not sufficient realized gains to grant additional benefits.

## Assumption Changes

Since 1996, several changes in assumptions increased the liabilities. These changes increased the UAAL by \$48 million.

## Other Factors

In addition to those factors outlined above, several small factors combined to increase the UAAL by approximately \$38 million. This includes actual experience with regard to the demographic (mortality, withdrawal, disability, service retirement age) which increased the liabilities by \$55 million. Changes in actuarial assumptions increased liabilities by \$48 million. Changes in data reporting which made the liability calculations more accurate increased liabilities by \$83 million.

## Summary of Impacts

The following table summarizes our estimates of the contribution of various elements to the current UAAL (in millions):

Factor	Increase in UAAL	Percentage of Total UAAL
Benefit Levels	\$ 261	25.9%
Contribution Shortfall	\$ 185	18.3%
Asset Performance	\$ 75	7.5%
Use of Reserves for Additional Benefits	\$ 300	29.8%
Non-asset Experience	\$ 139	12.1%
Total	\$1,008	

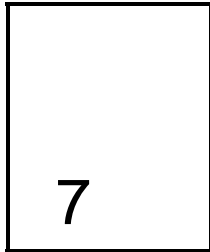
As can be seen from this table, several factors such as changes in benefit levels, the shortfall in the actuarial contribution, investment returns less than expected and the use of reserves for benefits not considered in the actuarial valuation played an important part in the current System funding status.

## Comparison with Other Retirement Systems

In order to evaluate the System's funded level, we researched funded levels for other systems. Because of the difficulty obtaining timely information, most studies evaluate the funded levels for employers' fiscal years 2002. Based on the Public Fund Survey prepared by the National Association of State Retirement Administrators and the National Council on Teacher Retirement, the 2002 distribution of funded ratios was as follows:

Below 60%	5.0%
60% to 79.9%	12.4%
80% to 99.9%	43.0%
100% to 119.9%	35.5%
Above 120%	4.1%

As can be seen from this table, the Fiscal Year 2002 SDCERS funded ratio of 77 percent is within the lowest 17 percent of funded ratios. As with SDCERS, the funded ratios for the Systems in the study are likely to fall in the Fiscal Year 2003 valuation.



## Analysis of Projection of UAAL

Based on a request from the City, GRS provided projections of the Unfunded Actuarial Accrued Liability until 2009 under the Projected Unit Credit and Entry Age Normal methods. We have analyzed the assumptions used in these results and evaluated the projection methodology.

### Background

Since the actuarial valuation is performed based on snapshot information, actuarial projections provide useful information not provided by the actuarial valuation. Projections can aid in Board decision-making, employer budgeting and general education of Board members and employers. However, projections of actuarial information have some inherent limitations that should be communicated to all users of the information. The primary limitation is the inability of such projections to provide exactly the expected scenario. For example, a projection might assume that the System earns exactly the actuarial assumption for investment returns. However, since the actuarial investment return assumption is a long-term assumption, in any given year the actual investment return will be higher or lower than the actuarial return assumption, rendering the projection either too conservative or too aggressive for that particular year.

One primary danger in actuarial projections is the tendency for users of the information to latch onto the numbers at the end of the projection and to use those as actual numbers. Education is a very important element of sharing the information presented in actuarial projections. Also worth noting is that actuarial projections vary depending on the intended use of the results. For example, if an employer wants to understand the "worst case" scenario that it needs to plan for, conservative assumptions would be used. Conversely, if a Board is seeking to understand the implications of certain assumption decisions, the projections would test the sensitivity of results to the particular assumption in question. The end results in these two scenarios might be quite different. Because projections are based on so many assumptions, it is important to recognize the difficulty in indicating that one particular set of projections is more appropriate than another set.

## GRS' Projections

GRS has prepared actuarial projections to the year 2009. These actuarial projections provide information to the System regarding the projected UAAL and contribution rates in the future. In order to prepare these assumptions, GRS used certain simplifying assumptions.

## Liability Assumptions

GRS assumed that the actuarial accrued liability would increase by 9.5 percent per year, the same percentage that the liability had increased in recent years. Then, to reflect the fact that the System is adjusting the way that service purchases are calculated, the liabilities are decreased by the portion of the 9.5 percent that was attributable to service purchases at less than actuarial cost. All other actuarial experience is expected to follow the assumptions in the actuarial valuation, including an increase in the covered payroll of 4.25 percent per year. The numbers used in the projection are based on the actuarial valuation, which uses the Manager's Proposal required assumptions.

## Contribution Assumptions

GRS assumed that contributions would follow the Manager's Proposal II until 2005, at which time the actuarially calculated contributions would be received by the System. The amortization of the UAAL would be on a decreasing period until the period reaches 15 years, at which time the amortization period would remain at 15 years. This is to reflect the fact that most systems are likely to limit the length of the amortization period to prevent high volatility in employer contribution rates. Also, for each of the next five years, an additional \$9 million contribution will be received from the Enterprise funds.

## Investment Assumptions

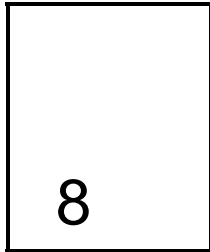
The investments are expected to earn the actuarial assumption of 8 percent for the duration of the projection. However, during the first four years, the investments are expected to be reduced by \$8.8 million per year, which is the City's portion of the deferred losses as of July 1, 2003.

## Our Analysis

In order to evaluate the impact of the simplifying methods employed by GRS, we recalculated the numbers using more detailed methods. In particular, instead of using the 9.5 percent per year increase in the actuarial accrued liability, we used actuarially developed projections assuming no actuarial gain or loss on liabilities. Our projections of liabilities came out somewhat lower than those developed by GRS and showed the System liabilities at 2009 to be approximately \$600 million lower than those developed by GRS. This translates into a funded ratio calculated under Mercer's method that is 7 percent higher than GRS' projection. However, the projections performed by GRS are based on the valuation results that use assumptions stipulated in the Manager's Proposal II. These assumptions are less conservative than those recommended by GRS as a result of the experience investigation. If these assumptions generate actuarial losses in the future, as expected by the results of the experience investigation, the projected liabilities under the Manager's Proposal will be higher than those projected under our method. As discussed in the section on the Manager's Proposal, this is one of the disadvantages of setting assumptions in accordance with any

purpose other than best-estimates of the liabilities. Based on our analysis, if the liabilities, as developed under the Manager's Proposal assumptions, are 3.5 percent lower than actual experience, the projections prepared by GRS are appropriate. However, if the assumptions used for the actuarial valuation are correct, we believe that the projections prepared by GRS are somewhat conservative. Finally, if these projections of liabilities are low, as is expected based on our separate analysis of the actuarial assumptions, the projections appear to be reasonable. Under any of these approaches, GRS' projection results appear to have been reasonable to rely on for the stated purpose of short-term contribution rate planning.

Notwithstanding this conclusion, we recommend that the Board consider requiring more information regarding these projections. In particular, we believe that it would be appropriate for the Board to consider the results based on several economic scenarios in order to have a more complete picture of the potential range of outcomes. For example, using GRS' projections, a change in the actual investment return from 8 percent to 7 percent during the period ending in 2009 would reduce the funded ratio at July 1, 2009 from 65 percent to 62 percent and would increase the UAAL from \$2.1 billion to \$2.2 billion. Similarly, a change in the actual investment return from 8 percent to 9 percent during the period ending in 2009 would increase the funded ratio at July 1, 2009 from 65 percent to 69 percent and would decrease the UAAL from \$2.1 billion to \$1.9 billion.



## **Unified Port District**

We understand that the Actuarial Valuation for the Unified Port District as of June 30, 2003 has not yet been issued.

### **Allocation of Assets to Unified Port District and Regional Airport Authority**

The methodology used by SDCERS to allocate fund assets between the City and the other employers is based upon the premise of a continuing presence of all employers within SDCERS. Reserve accounts are maintained primarily as funding mechanisms in order to equitably determine the separately established employer contributions of each employer on a reasonable actuarial basis. The major drawback of this methodology is that there is never a true allocation of funds on a market value basis. SDCERS does not provide the employers with a financial report that identifies appropriately each plan's share of the current plan assets. The only published asset division between the City and the other employers is shown in the annual actuarial report and this value is not based upon market value, but upon actuarial (i.e., "smoothed") value.

It is not uncommon within both the public sector and the private sector for a single commingled trust to hold the assets for more than one plan. However, generally the assets for each plan are allocated on a market value basis, often with allocations done monthly in order to mitigate effects of timing differences among the plans with respect to when contributions are made and benefits are paid. The current methodology would be more appropriate for a multiple employer plan (i.e., a single plan covering more than one employer) than for separate employer plans (as is the situation with the City and the other employers).

We reviewed the allocation of assets to the separate employers and found that allocating based on market value of assets would make a relatively small difference of approximately 2.5%. However, changing to a market value allocation of assets and including such allocation within the annual SDCERS annual financial report could cause the allocation to become subject to review during the annual independent audit of the system. This further audit would provide a greater level of confidence that the funds accumulated in the UPD and Airport Authority plans are being used exclusively for retirees and beneficiaries of those plans.

9

## Manager's Proposal

According to the 2003 Actuarial Valuation report, the Manager's Proposal II stipulated that the actuary use certain actuarial assumptions to determine the contribution rates and the funded status. The stipulated assumptions are more aggressive than those recommended in the GRS experience investigation and result in lower liabilities.

Actuarial assumptions are intended to develop a best estimate of future liabilities. If those assumptions are inaccurate, the System will experience actuarial gains or losses that will serve to decrease or increase costs in the future. In addition, those assumptions are intended to give the employer, the System, and the public as accurate an estimate of the funded position of the System as possible. GRS has monitored the experience of the System for many years. Based on that monitoring and, based on your actual experience, your actuary recommended a number of assumptions be used for the actuarial valuation. Our evaluation of your actuary's recommendations did not produce any serious differences of opinion with those recommendations.

The assumptions that were stipulated by the Manager's Proposal are:

- Salary increases
- Withdrawal rates
- Industrial disability retirements
- Retirement rates

The use of these more aggressive assumptions causes two issues for the System. First, it increases the risk that contribution rates will rise if the experience of the System is closer to that of the actuary's recommended assumptions than those in the Manager's Proposal. If actual experience is negative and contributions increase, this forces the costs for current City employees into the future, possibly to be borne by future employees rather than by those who are receiving the benefits. Second, the information developed for the Board, the City, and the public to evaluate the health of the pension system is more likely to create a belief that the System is better funded than is expected under less aggressive assumptions.

The current City contribution is not based on the actuarial rate developed by GRS. Until the Fiscal Year ending in 2005, the City contribution is governed by the Manager's Proposal II. Thus, the use of different actuarial assumptions does not impact the City's contribution. The risk of having to make higher contributions in the future under the Manager's Proposal is also increased to the extent the actuarial assumptions are updated in accordance with our recommendations in Section 2.

We believe that the use of the best estimate actuarial assumptions is typically more appropriate because it allows all interested parties to understand the true current funding situation of the System.

## Contribution Levels

The Manager's Proposal II also sets the City contribution rates at levels that are below the actuary's calculated contributions, even under the more aggressive assumptions. The 2003/2004 contribution rate of 13.43 percent is above the normal cost rate of 11.95 percent but significantly below the total calculated contribution rate of 27.94 percent. The effect of setting the City contribution level below the actuarially calculated contribution is to allow the Unfunded Actuarial Accrued Liability to grow. Absent large investment and other experience gains to offset the growth of the UAAL, this will cause contribution rates to increase in the future. This pushes the funding of today's benefits off to future generations of taxpayers. When the Manager's Proposal rates expire in 2009/2010, the contribution rate will have to increase to pay off the UAAL by the end of the amortization period. Best practice is to contribute an amount which is equal to the actuarially calculated rate.

10

## Actuarial Factors Review

We assessed the appropriateness of the actuarial factors used for service purchases, leave conversions and optional benefit forms. If these actuarial factors are reasonable, the decisions of members to purchase service, pay for leaves of absence or elections of alternative ways to have benefits paid do not impact the cost of the system. If, however, the factors are not reasonable, these decisions can impact the funding of the System.

### Service Purchases

Members have the ability, under Division 13 of the Municipal Code, to purchase service for probationary periods in which the member is not already covered, for periods the member worked for the City which are not covered by the System, part-time or hourly service not eligible for participation in the System, or for periods between termination of employment and reinstatement at the City.

In order to purchase service, a member is required to pay a certain percentage of pay for each service year purchased. In a defined benefit plan, the value of such service purchases depends on the age of the member at the date the service is purchased. Generally, the younger the member is when the service is purchased, the lower the cost of the service.

There are several inherent uncertainties in any service purchase arrangement. The actuary must make a number of assumptions in order to develop service purchase rates. For example, the actuary must make assumptions about when the member will retire and how much money the member will be making at retirement. Any variation in the experience of the member will either cause the plan to absorb any cost differential above the rate charged or the member to pay more than the value they receive from the purchase. However, if the actuarial factors are reasonable and a large number of members purchase service, the differences will tend to even out so that in total the cost to the System is minimal. Generally, service purchase rates are determined as a percent of pay that is dependent on the member's age when the purchase is made.

Under SDCERS, the rate charged for service purchases is the same rate as a percent of pay for any member. This means that the cost is the same to a member aged 58 making \$50,000 as it is to a member aged 51 making \$50,000.

The following chart compares the cost to a General member for the purchase of one year of service at age 51 or at age 58. In this example, we assume that all assumptions are met regarding salaries and investment returns.

Age at Purchase	Pay at date of purchase	Cost to Member	Accumulated Cost of Purchase at age 58
45	\$37,800	\$10,206	\$27,756
51	\$50,000	\$13,500	\$23,137
58	\$69,200	\$18,684	\$18,684

As you can see from the table, if the member had purchased the service at age 51 for \$13,500, the System would have \$23,137 to offset that purchase when the member retires at age 58. If the member chooses to wait until age 58 to make the purchase, the System would only have \$18,684 to offset the purchase. Based on the assumptions used in the actuarial valuation, the additional benefit at age 58 is worth \$22,138. If the member purchases service at the assumed age, retires at the assumed age and receives the assumed pay increases, there is no cost to the System. However, if the member purchases service at age 58 and immediately retires, the System does not collect the full cost of the purchase. Likewise, if the member purchases the service before age 51, the System collects more money than is actuarially necessary.

In developing the rates, the actuary used the average service purchase age during the 2001/2002 plan year and the average retirement age over the past few years. If members make service purchases at a variety of ages that roughly average the age used to develop rates and if the average retirement age remains the same, the cost of service purchases will be approximately equal to the value of benefits provided in total. However, as described above, if the members elect to wait to make the contributions until a later age on average than that assumed by the actuary, there will be an actuarial cost to the System. We anticipate that due to the revised service purchase rates that were instituted at October 1, 2003, the cost to the System will be less than has been experienced in recent years.

Notwithstanding the inherent possibility of anti-selection under the current method of charging for service purchases, the approach recommended by the actuary is reasonable.

If the goal of service purchase rates is to have the member pay the full cost of the service and for the System to not incur additional costs due to service purchase, age-based rates should be implemented to reflect the higher cost of service at an older age. In the case of the General members, the cost at age 58 would be 32 percent of pay.

## Leave Conversions

Approved leaves of absence are eligible for service credit that is charged at the same rate that regular service purchases are charged. The same service purchase issues that are addressed above apply to leave conversions. For those members whose leave of absence was less than a year, only one-half of the rate is charged. This is consistent with the Municipal Code which indicates that for leaves of absence less than a year, the member only pays the member portion of the cost.

## Optional Forms of Benefit

If a married member retires, the automatic form of payment is a 50% Joint and Survivor benefit. This provides the full amount of the annuity while the member is alive and provides for 50% of that annuity to be continued to the spouse after the member dies. Members are charged a higher contribution amount to pay for this survivor annuity. If a member retires who is not married, the System either pays the contributions to the member with interest or treats these contributions as additional contributions that are converted to an additional annuity amount.

Members may also elect other optional forms of benefit. These forms are provided through a reduced annuity that is the actuarial equivalent of a life annuity. The options are as follows:

Form of Benefit	Description
Optional Settlement 1	The member receives a reduced benefit but if the member dies before the value of the member contributions have been paid out, the remainder of those contributions are paid to the member's beneficiary or estate (modified cash refund).
Optional Settlement 2	The member receives a reduced benefit and upon the member's death, the beneficiary receives the same amount of benefit as the member (100% joint and survivor).
Optional Settlement 3	The member receives a reduced benefit and upon the member's death, a designated beneficiary other than the spouse receives one-half of the member's benefit (50% joint and survivor).
Optional Settlement 4	The member and beneficiary may choose a continuation percentage to the beneficiary. Certain restrictions apply to the allowed continuation percentages to comply with Federal laws.  Under this option, the member and beneficiary may choose a continuation percentage to the beneficiary. Certain restrictions apply to the allowed continuation percentages to comply with Federal laws.
Social Security Integrated Option	This option allows for a member to receive a larger annuity until eligibility for Social Security benefits. At that time, the annuity amount is decreased. The larger amount is designed to equal the smaller amount plus Social Security benefits such that the total benefit to the member from the System and Social Security is constant throughout the member's retirement.

In order to determine the appropriate reduction in annuity to provide the optional forms, the System uses a mortality assumption of 1971 Group Annuity Mortality for males and an interest assumption of 8 percent. No adjustment is made for the expected cost-of-living increase on the benefit.

The mortality table is different from the mortality table being used for the actuarial valuation. Many plans do not base their optional factors mortality on the same basis as the actuarial valuation assumption. As we discussed above, the valuation mortality assumption should change fairly regularly to reflect the improvement in mortality. If the mortality used for calculation of optional forms of benefit is changed as frequently as the valuation mortality assumption, the result will be additional administrative complexity and difficulty making projections and estimates of benefits available to members and beneficiaries. However, the mortality being used to develop rates is clearly based on outdated tables. In order to determine the impact of the outdated tables, we determined what the rates would be if based on the current valuation assumption recommended by your actuary of UP1994 with a two-year setback for males at various ages.

The following table compares the difference under Optional Settlement 2 to determine the impact on form of annuity conversions. We assumed a member who is three years older than the eligible spouse.

Age at Payment	SDCERS	Valuation assumption	Difference
50	92.04%	94.52%	-2.6%
55	89.78%	93.08%	-3.5%
60	87.26%	91.37%	-4.5%

As you can see, for the optional factors, the current factors are lower than those that would be appropriate if you used the valuation assumptions. There will be an experience gain to the fund each time a retiring member elects Optional Settlement 2.

# MERCER

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