Denver Public<br>Schools Retirement System<br>Annual Actuarial Valuation

December 31, 2005

## GRS

Gabriel Roeder Smith \& Company


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The Board of Trustees

Denver Public Schools Retirement System
Denver, Colorado
Dear Board Members:
The results of the Annual Actuarial Valuation of the Denver Public Schools Retirement System are presented in this report. The purpose of the valuation was to measure the system's funding progress and to determine the computed employer contribution rate for the next fiscal year.

The valuation was based upon information, furnished by Retirement System staff, concerning Retirement System benefits, financial transactions, and active members, terminated members, retirees and beneficiaries. Data was checked for internal and year-to-year consistency but was not otherwise audited. All promised benefits were included in the actuarially computed contribution rates.

The date of the valuation was December 31, 2005.
To the best of our knowledge this report is complete and accurate and the valuation was conducted in accordance with standards of practice prescribed by the Actuarial Standards Board. It is our opinion that the actuarial assumptions used for the valuation produce results which are reasonable.

Respectfully submitted,

Norman L. Jones, FSA, MAAA

Judith A. Kermans, EA, MAAA

Kenneth G. Alberts
JM:bd

## SECTION A



## Funding ObjEctive and Executive Summary

The funding objective of the Retirement System is to establish and receive contributions, expressed as percents of active member payroll, that will accumulate assets during each member's working years which, together with regular interest, will be sufficient to pay promised benefits after retirement.

## Executive Summary

- The recommended employer contribution for the fiscal year beginning July 1, 2007, based on normal cost plus 30 -year amortization, would be $14.51 \%$ of payroll. This compares with the phase-in funding policy contribution rate of $12.83 \%$ of payroll (see page A-2).
- The funding policy results in a contribution rate for FY08 that is equal to $1 / 2$ of the actuarially determined rate plus $1 / 2$ of the rate adopted for FY07 ( $1 / 2 \times 14.51 \%+1 / 2 \times 11.14 \%$ $=12.83 \%$ ). In FY09 the funding policy contribution will be equal to $100 \%$ of the actuarially determined rate.
- This valuation includes a $1.75 \%$ adjustment to active liabilities for future normal, early, and deferred benefits to account for the option factor subsidy (the result of not recognizing the cost of post-retirement benefit increases when joint life forms of payment are elected). The adjustment added approximately $\$ 15.3$ million to our measurement of the accrued liability.
- The funded status before the adjustment described above was $88.3 \%$ compared with $88.2 \%$ a year ago. The current actuarial funding ratio is $87.9 \%$ (after the change). The market value of assets was $\$ 26$ million less than the funding value of assets as of December 31, 2005. In the absence of offsetting future gains, the funded ratio is likely to decline somewhat in the coming years.


## Conclusion

The Denver Public Schools Retirement System continues to be in sound financial condition based on actuarial principles of level percent-of-payroll financing. In order to meet Plan obligations and to maintain a strong funding level, receipt of the recommended contribution amounts is essential.

# CONTRIBUTIONS To Provide BENEFITS Expressed as Percents of Active Member Payroll FOR FISCAL YEARS BEGINNING JULY 1, 2006 AND 2007 

| Contributions for | FY Beginning 7/1/07 |  | FY Beginning 7/1/06 |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Recommended | Funding\# Policy | Recommended | Funding\# Policy |
| Normal cost of benefits: |  |  |  |  |
| Age \& service | 12.67 \% |  | 12.20 \% |  |
| Disability | 1.00 \% |  | 1.00 \% |  |
| Death-in-service | 0.26 \% |  | 0.25 \% |  |
| Refunds of member contributions | 1.90 \% |  | 1.90 \% |  |
| Total normal cost | 15.83 \% |  | 15.35 \% |  |
| Member contributions | 8.00 \% |  | 8.00 \% |  |
| Employer Normal Cost | 7.83 \% |  | 7.35 \% |  |
| Unfunded Actuarial Accrued Liabilities | 6.68 \%* |  | 7.12 \%* |  |
| COMPUTED EMPLOYER RATE | 14.51 \% | 12.83 \% | 14.47 \% | 11.14 \% |
| * Amortized as a level percent-of-payroll over a period of 30 years. <br> \# Based on funding policy beginning 7/1/2005 that includes a 4-year phase-in of the employer contribution rate to the level recommended by the actuary. |  |  |  |  |

Actual employer contributions for the last completed fiscal year were reported to be $\$ 28,448,702$.

## DERIVATION OF EXPERIENCE GAIN (LOSS) YeAR Ended DECEMBER 31, 2005

Actual experience will never (except by coincidence) coincide exactly with assumed experience. Gains and losses often offset one another over a period of years, but sizable year-to-year fluctuations are common. Detail on the derivation of the experience gain (loss) is shown below.

12/31/2005
(1) UAAL* at start of year
\$349,466,421
(2) Normal cost from last valuation

49,102,229
(3) Actual contributions 55,718,194
(4) Interest accrual: [(1) $+\{(2)-(3)\} / 2] \times .085$ 29,423,467
(5) Expected UAAL before changes: (1) + (2) - (3) + (4)

372,273,923
(6) Change in assumptions \# 15,275,656
(7) Changes in benefits
(8) Expected UAAL after changes: (5) + (6) + (7)

387,549,579
(9) Actual UAAL at end of year
(10) Gain (loss): (8) - (9)
(11) Gain (loss) as percent of actuarial accrued liabilities at start of year $(\$ 2,960,990,156)$

* Unfunded actuarial accrued liability.
\# Active accrued liabilities for normal, early and deferred benefits were increased by $1.75 \%$ to account for the cost of subsidized option factors.


# DERIVATION OF EXPERIENCE GAIN (LOSS) BY SOURCE YeAR ENDED DECEMBER 31, 2005 

Age \& Service Retirements
Members retired at younger ages or with higher final average
pay or service than assumed, causing a loss.

## Disability Retirements

Disability claims were less than assumed, causing a small gain.

## Death-in-Service Benefits

Survivor claims were more than assumed, causing a loss.

## Withdrawal from Employment

More liabilities were released by withdrawals than assumed, causing a gain.

## Pay Increases

Pay increases were less than assumed, causing a gain.

## Investment Income

Recognized investment income was less than assumed, causing a loss.

## New Entrants

New members with prior service causing a loss.

## Death After Retirement

Retirants lived for a shorter period than assumed, causing a gain.

## Other

Miscellaneous gains and losses resulting from other data adjustments, timing of financial transactions, subsidized service purchases, recognition of additional outside and non-qualified service, etc.

## Gain (or Loss) During Year From Financial Experience

\% of AAL*

$$
(4,882,636)
$$

1,550,423
0.1\%

$$
(6,458,796)
$$

$(2,526,800)$
\$15,380,526
0.5\%

* AAL: Beginning of year actuarial accrued liability.


## Summary Statement of System Resources and Obligations

## Present Resources and Expected Future Resources

A. Present valuation assets

1. Net assets from system financial statements $\$ 2,667,850,663$
2. Funding value adjustment
3. Valuation assets

| $25,835,185$ |
| ---: |
| $2,693,685,848$ |

B. Actuarial present value of expected future employer contributions

1. For normal costs

197,776,466
2. For unfunded actuarial accrued liability

372,169,053
3. Totals

569,945,519
C. Actuarial present value of expected future member contributions

195,982,175
D. Total Present and Expected Future Resource \$3,459,613,542

## Actuarial Present Value of Expected Future Benefit Payments

A. To retirees and beneficiaries

1. Annual allowances

| $\$ 2,132,638,000$ |
| ---: |
| 0 |
| $2,132,638,000$ |

B. To vested terminated members

17,736,108
C. To present active members

1. Allocated to service rendered prior to valuation date - actuarial accrued liability 915,480,793
2. Allocated to service likely to be rendered after valuation date
3. Totals
$393,758,641$
$1,309,239,434$
D. Total Actuarial Present Value of Expected Future Benefit Payments

## COMPUTED EMPLOYER CONTRIBUTIONS

COMPARATIVE STATEMENT

| December 31 | Active Members |  |  |  | Retirees \& Beneficiaries |  |  | Employer Contribution Rate |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Valuation Payroll |  |  |  |  | Annual Benefits |  |  |
|  | No.\# | Total | Average | \% Incr. | No. | Dollars | $\%$ of Payroll |  |
| 1996 | 6,158 | \$223,841,000 | \$36,350 | 4.33 \% | 4,910 | \$ 97,420,560 | 43.5 \% | 15.75 \% |
| 1997 | 6,300 | 235,279,509 | 37,346 | 2.74 \% | 4,957 | 101,190,312 | 43.0 \% | 2.68 \% |
| 1998 | 6,434 | 248,766,208 | 38,664 | 3.53 \% | 5,037 | 108,710,952 | 43.7 \% | 2.90 \% |
| 1999 | 6,677 | 264,079,253 | 39,551 | 2.29 \% | 5,158 | 115,755,528 | 43.8 \% | 2.90 \% |
| 2000 | 7,182 | 292,404,031 | 40,713 | 2.94 \% | 5,222 | 125,550,888 | 42.9 \% | 2.90 \% |
| 2001 | 7,466 | 307,833,700 | 41,231 | 1.27 \% | 5,514 | 141,383,423 | 45.9 \% | 4.98 \%* |
| 2002@ | 7,691 | 331,607,085 | 43,116 | 4.57 \% | 5,610 | 151,283,074 | 45.6 \% | 8.12 \%* |
| 2003 | 7,311 | 318,121,662 | 43,513 | 0.92 \% | 5,699 | 160,764,146 | 50.5 \% | 8.66 \%* |
| 2004@! | 7,192 | 315,156,876 | 43,820 | 0.71 \% | 5,869 | 174,668,685 | 55.4 \% | 11.14 \%* |
| 2005 | 7,179 | 318,405,492 | 44,352 | 1.21 \% | 5,961 | 185,016,528 | 58.1 \% | 12.83 \%* |

* Based on current funding policy, see page A-2.
\# Excludes affiliate members.
@ After experience study.
! After benefit changes.


## Actuarial Accrued Liabilities \& Valuation Assets Comparative Statement

| December 31 | Actuarial <br> Accrued <br> Liability (AAL) <br> (1) | Valuation Assets (2) | Unfunded Actuarial Accrued Liability (UAAL) (1) - (2) (3) | Ratio of Present Assets to AAL (2)/(1) | Annual <br> Covered <br> Payroll <br> (5) | Ratio of UAAL to Valuation Payroll (3)/(5) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1997 | \$1,727,251,343 | \$1,760,123,981 | \$ $(32,872,638)$ | 101.9 \% | \$235,279,509 | - |
| 1998 | 1,894,138,915 | 1,889,151,846 | 4,987,069 | 99.7 \% | 248,766,208 | 2.0 \% |
| 1999 | 1,983,399,740 | 2,044,332,158 | $(60,932,418)$ | 103.1 \% | 264,079,253 | - |
| 2000 | 2,371,925,173 | 2,308,030,298 | 63,894,875 \# | 97.3 \% | 292,404,031 | 21.9 \% |
| 2001 | 2,550,556,774 | 2,462,548,441 | 88,008,333 | 96.5 \% | 307,833,700 | 28.6 \% |
| 2002* | 2,712,292,741 | 2,465,049,249 | 247,243,492 | 90.9 \% | 331,607,085 | 74.6 \% |
| 2003 | 2,793,788,109 | 2,531,745,553 | 262,042,556 | 90.6 \% | 318,121,662 | 82.4 \% |
| 2004*@ | 2,960,990,156 | 2,611,523,735 | 349,466,421 | 88.2 \% | 315,156,876 | 110.9 \% |
| 2005 | 3,065,854,901 | 2,693,685,848 | 372,169,053 | 87.9 \% | 318,405,492 | 116.9 \% |
| \# Actual UAAL on valuation date before any offsets. <br> * After experience study. <br> @ After benefit changes. |  |  |  |  |  |  |

The Ratio of Valuation Assets to AAL is a traditional measure of a system's funding progress. Except in years when the system is amended or actuarial assumptions are revised or there are extraordinary experience gains or losses, this ratio can be expected to move gradually toward $100 \%$.

The Ratio of UAAL to Valuation Payroll is another relative index of condition. Actuarial unfunded liabilities represent debt, while active member payroll represents the system's capacity to collect contributions to pay toward debt. The lower the ratio is, the greater the financial strength and vice-versa.

Active and Retired Members and Beneficiaries

$\square$ Active Members $\square$ Retirees and Beneficiaries

Benefits as a Percent of Payroll


## Expected Development of Present Population Based on Current Plan Assumptions

## Closed Group Population Projection



## Expected Terminations from Active Employment for Current Active Members



## Purchase of Non-Covered Service

Section 30.03(8) of the plan provides that periods of non-covered employment will qualify as accredited and as active service with the district provided that certain conditions are met. The charge for purchasing such service is intended to be set at a rate that is cost neutral. Once set, the rate is to be periodically analyzed by the actuary and reviewed by the Board.

The current rate is $34 \%$ of highest average salary (HAS) per year of service purchased. This rate was developed based on the analysis of service purchase during 2002. Based on supplemental data furnished by DPSRS regarding purchases in 2005, we completed the following analysis:

| Number of purchases* | 43 |
| :---: | :---: |
| Average age of purchasers | 54 |
| Total charge for purchases: | \$ 1,552,745 |
| Current rate as a \% of HAS | 34\% |
| Total years purchased | 92.5 years |
| Estimated Average HAS | \$ 49,372 |
| Average benefit service years: |  |
| Before purchase | 18.1 |
| After purchase | 20.3 |
| Increase in present value of future benefits: |  |
| Actives | \$ 729,124 |
| Retired | \$ 922,735 |
| Affiliated | \$ 11,498 |
| Term vested | - |
| Total | \$ 1,663,357 |
| Average per year purchased | \$ 17,982 |
| Average increase in present value per year purchased as a percent of HAS | 36.4\% |

* Excludes one non-vested highly compensated member who terminated subsequent to purchasing enough service to become vested.

If terminated vested member were included in the analysis, the average cost would have increased to $38.9 \%$ of HAS.

## Section B



# Brief Summary of Benefit Provisions Evaluated DECEMBER 31, 2005 

Regular Retirement (no reduction factor for age):
Eligibility - Age 50 with 30 or more years of earned service or age 55 with 25 or more years of earned and outside service (must include 15 years with the District), or age 65 with 5 years of earned service.

Type of Final Average Salary (FAS) - Highest 36 months of earned service or career average, whichever is greater.

Annual Amount - 2.5\% of FAS times earned service. Minimum benefit is $\$ 15$ times first 10 years of earned service plus $\$ 20$ times earned service over 10 years plus an amount equal to the annuitized member balance, including any amount paid to purchase service.

## Early Retirement:

Eligibility - Age 55 with 15 years of service with the District but less than 25 years of service or any age with at least 25 years of service with the District.
Annual Amount - Same as regular retirement but reduced by the following amount:

Age
Under 50
Under 50

Age 50-55

Over 55
$\frac{\text { Service }}{30 \text { years }}$
$25-30$ years

25-30 years

15 years

Reduction Amount*
$4 \%$ for each year prior to age 50
Greater of:

- $4 \%$ for each year of service below 30 years
- $4 \%$ for each year below age 50

Lesser of:

- $4 \%$ for each year under age 55
- $4 \%$ for each year of service below 30 years
Lesser of:
- $4 \%$ for each year under age 65
- $4 \%$ for each year below 25 years
* Reduction amounts based on 6\% rather than 4\% for those hired (or re-hired, if contributions were refunded) on or after July 1, 2005.

Deferred Retirement (vested benefit):
Eligibility - 5 years of service. Benefit begins at age 50 with 30 years of service, age 55 with 25 years of service ( 15 with District), or age 65 with 5 years of service.

Annual Amount - Computed as regular retirement but based upon service and final average salary at time of termination. In lieu of retirement benefits, members may receive $200 \%$ of accumulated contributions in a lump sum or an annuity equal to the actuarial equivalent of $200 \%$ of contributions plus minimum benefit.

## Disability Retirement:

Eligibility - 5 years of service. Recalculated benefit is payable at age 55 with 25 years of service, at age 50 with 30 years of service, or at age 65.

Annual Amount - Accrued benefit immediately. Upon attaining voluntary retirement age, additional qualified service credit is granted and benefit is recomputed.

## Death Before Retirement:

Eligibility - No age or service requirements for a refund of member contributions.
Annual Amount - If the member is eligible for retirement, the beneficiary may receive a refund of accumulated contributions, survivor benefits, or the regular or early retirement benefit.

Survivor benefits are as follows and require that the member have a minimum of 5 years of earned service with the district immediately prior to death:

## Type of Survivor

Child

Spouse and child

Dependent Parent The greater of $10 \%$ of Final Average Salary; and $\$ 240$ per parent.
Spouse:

- Less than 15 The lesser of 30\% of Final Average Salary; and \$480. years of service
- 15 years of The greater of $30 \%$ of Final Average Salary, plus an additional $1 \%$ for service or more each year of service over 15 years; and $\$ 480$.

Spouse’s benefit is payable at age 50 with at least 15 years of service or at age 60 .

## Member Contributions:

$8.0 \%$ of annual compensation. Interest is credited at a rate of $5 \%$ per year compounded monthly.

## Post-Retirement Increases: (ARAA)

3.25\% per year compounded. Effective on the January $1^{\text {st }}$ immediately following retirement. Associate members are not eligible for the annual retirement increase. For those hired on or after July 1, 2005, the increase is based on the lesser of $3.00 \%$ per year or the increase in the Consumer Price Index (CPI) for all urban consumers, U.S. city average, with the first increase calculated on a pro-rated basis.

## SERVICE

Earned Service is used in the determination of benefits and eligibility. It includes periods of employment (regular or casual) with the District or with a Charter School or qualified leaves of absence.

Outside and Non-qualified service counts as service up to a total of 10 years of service in determining eligibility for full retirement with 25 years of service. If purchased, also counts as earned service.

## OPTIONAL FORMS OF PAYMENT

Option A: Single life annuity (SLA) with residual refund of member contributions.
Option B: Installment refund annuity (SLA with reserve balance paid to beneficiary in monthly installments upon employee's death).

Option C: $\quad 100 \%$ joint and survivor with 10 years certain.
Option D: Cash refund on annuity portion and SLA on pension portion.
Option E: $\quad 50 \%$ joint and survivor with 10 years certain.
Option P2: $\quad 50 \%$ joint and survivor with pop-up and residual refund of member contributions.

Option P3: $\quad 100 \%$ joint and survivor with pop-up and residual refund of member contributions.

## RETIREES AND BENEFICIARIES DECEMBER 31, 2005 <br> TABULATED BY OPTIONAL FORM BEING PAId

|  | Optional Form |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | A | B | C | D | E | P2 | P3 | TOTAL |
| Superannuation and Early Retirement (Includes survivors of deceased employees) |  |  |  |  |  |  |  |  |
| Males |  |  |  |  |  |  |  |  |
| Number | 152 | 137 | 1,516 | 149 | 215 | 3 | 5 | 2,177 |
| Average Monthly Benefit | \$2,787 | \$2,682 | \$3,102 | \$2,835 | \$2,467 | \$2,921 | \$2,299 | \$2,971 |
| Females |  |  |  |  |  |  |  |  |
| Number | 656 | 552 | 926 | 806 | 341 | 11 | 11 | 3,303 |
| Average Monthly Benefit | \$2,607 | \$2,228 | \$2,545 | \$2,613 | \$2,518 | \$2,525 | \$2,911 | \$2,519 |
| Total |  |  |  |  |  |  |  |  |
| Number | 808 | 689 | 2,442 | 955 | 556 | 14 | 16 | 5,480 |
| Average Monthly Benefit | \$2,641 | \$2,318 | \$2,891 | \$2,648 | \$2,498 | \$2,610 | \$2,720 | \$2,699 |
| Regular Disability |  |  |  |  |  |  |  |  |
| Males |  |  |  |  |  |  |  |  |
| Number | 59 | 9 | 28 | 8 | 11 | 0 | 0 | 115 |
| Average Monthly Benefit | \$1,348 | \$1,135 | \$1,416 | \$1,419 | \$1,435 | \$0 | \$0 | \$1,361 |
| Females |  |  |  |  |  |  |  |  |
| Number | 146 | 25 | 41 | 24 | 14 | 1 | 0 | 251 |
| Average Monthly Benefit | \$1,515 | \$1,145 | \$1,441 | \$1,166 | \$1,123 | \$249 | \$0 | \$1,406 |
| Total |  |  |  |  |  |  |  |  |
| Number | 205 | 34 | 69 | 32 | 25 | 1 | 0 | 366 |
| Average Monthly Benefit | \$1,467 | \$1,142 | \$1,431 | \$1,229 | \$1,260 | \$249 | \$0 | \$1,392 |
| Survivors of Active Members and Disability Deaths |  |  |  |  |  |  |  |  |
| Number |  |  |  |  |  |  |  | 115 |
| Average Monthly Benefit |  |  |  |  |  |  |  | \$1,042 |
| Grand Total |  |  |  |  |  |  |  |  |
| Number |  |  |  |  |  |  |  | 5,961 |
| Average Monthly Benefit |  |  |  |  |  |  |  | \$2,587 |

## Retirees and Beneficiaries December 31, 2005 <br> Tabulated by Attained Ages

| $\begin{gathered} \text { Attained } \\ \text { Ages } \\ \hline \end{gathered}$ |  |  | Years Since Retirement |  |  |  |  |  |  |  |  |  |  |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | 0-4 | 5-9 |  | 10-14 |  | 15-19 |  | 20-24 |  | 25-29 |  | 30+ |  |  |  |
| Under 45 | Number |  | 7 |  | 2 |  | 0 |  | 0 |  | 0 |  | 0 |  | 0 |  | 9 |
|  | Total Benefit | \$ | 112,872 | \$ | 22,596 | \$ | 0 | \$ | 0 | \$ | 0 | \$ | 0 | \$ | 0 | \$ | 135,468 |
| 45-49 | Number |  | 9 |  | 7 |  | 5 |  | 0 |  | 0 |  | 0 |  | 0 |  | 21 |
|  | Total Benefit | \$ | 208,185 | \$ | 52,739 | \$ | 41,349 | \$ | 0 | \$ | 0 | \$ | 0 | \$ | 0 | \$ | 302,273 |
| 50-54 | Number |  | 103 |  | 24 |  | 3 |  | 0 |  | 0 |  | 0 |  | 0 |  | 130 |
|  | Total Benefit | \$ | 3,664,573 | \$ | 388,664 | \$ | 52,330 | \$ | 0 | \$ | 0 | \$ | 0 | \$ | 0 | \$ | 4,105,567 |
| 55-59 | Number |  | 636 |  | 80 |  | 25 |  | 6 |  | 1 |  | 0 |  | 0 |  | 748 |
|  | Total Benefit | \$ | 26,988,393 | \$ | 2,287,586 | \$ | 493,509 | \$ | 51,890 | \$ | 5,984 | \$ | 0 | \$ | 0 | \$ | 29,827,362 |
| 60-64 | Number |  | 358 |  | 394 |  | 88 |  | 4 |  | 3 |  | 1 |  | 1 |  | 849 |
|  | Total Benefit | \$ | 13,453,069 | \$ | 14,545,273 | \$ | 2,285,587 | \$ | 35,596 | \$ | 41,919 | \$ | 3,442 | \$ | 4,920 | \$ | 30,369,806 |
| 65-69 | Number |  | 297 |  | 186 |  | 403 |  | 19 |  | 2 |  | 0 |  | 0 |  | 907 |
|  | Total Benefit | \$ | 7,327,559 | \$ | 6,070,428 | \$ | 14,960,374 | \$ | 482,499 | \$ | 14,698 | \$ | 0 | \$ | 0 | \$ | 28,855,558 |
| 70-74 | Number |  | 54 |  | 199 |  | 339 |  | 292 |  | 2 |  | 0 |  | 0 |  | 886 |
|  | Total Benefit | \$ | 1,071,555 | \$ | 4,061,708 | \$ | 12,012,190 | \$ | 10,155,855 | \$ | 38,402 | \$ | 0 | \$ | 0 | \$ | 27,339,710 |
| 75-79 | Number |  | 9 |  | 28 |  | 347 |  | 329 |  | 213 |  | 1 |  | 1 |  | 928 |
|  | Total Benefit | \$ | 165,886 | \$ | 633,259 | \$ | 9,850,276 | \$ | 11,003,431 | \$ | 6,643,205 | \$ | 11,811 | \$ | 18,243 | \$ | 28,326,111 |
| 80-84 | Number |  | 2 |  | 4 |  | 51 |  | 411 |  | 324 |  | 56 |  | 7 |  | 855 |
|  | Total Benefit | \$ | 93,881 | \$ | 92,634 | \$ | 1,333,387 | \$ | 10,618,431 | \$ | 10,297,417 | \$ | 1,266,339 | \$ | 84,487 | \$ | 23,786,576 |
| 85-89 | Number |  | 0 |  | 0 |  | 7 |  | 35 |  | 258 |  | 84 |  | 6 |  | 390 |
|  | Total Benefit | \$ | 0 | \$ | 0 | \$ | 205,225 | \$ | 880,877 | \$ | 4,882,710 | \$ | 1,926,035 | \$ | 57,545 | \$ | 7,952,392 |
| 90 \& Over | Number |  | 0 |  | 1 |  | 0 |  | 2 |  | 35 |  | 124 |  | 76 |  | 238 |
|  | Total Benefit | \$ | 0 | \$ | 6,804 | \$ | 0 | \$ | 63,630 | \$ | 693,224 | \$ | 1,789,173 | \$ | 1,462,874 | \$ | 4,015,705 |
| Totals | Number |  | 1,475 |  | 925 |  | 1,268 |  | 1,098 |  | 838 |  | 266 |  | 91 |  | 5,961 |
|  | Total Benefit | \$ | 53,085,973 | \$ | 28,161,691 | \$ | 41,234,227 | \$ | 33,292,209 | \$ | 22,617,559 | \$ | 4,996,800 | \$ | 1,628,069 | \$ | 185,016,528 |
|  |  | Ave | erage Age = |  | 71.9 |  |  |  | Average Years Since Retirement 12.6 (excluding beneficiaries) |  |  |  |  |  |  |  |  |

## InACTIVE MEMBERS <br> ELIGIBLE FOR DEFERRED BENEFITS DECEMBER 31, 2005 Tabulated by Attained Ages

| Attained <br> Ages | No. | Monthly <br> Allowances |
| :---: | :---: | :---: |
| $25-29$ | 4 | $\$ 5,927$ |
| $30-34$ | 20 | 26,760 |
| $35-39$ | 59 | 76,108 |
|  |  |  |
| $40-44$ | 36 | 49,100 |
| $45-49$ | 50 | 68,169 |
| $50-54$ | 59 | 68,263 |
| $55-59$ | 70 | 63,747 |
|  | 45 | 34,302 |
| $60-64$ | 1 | 511 |
| 67 | 344 | $\$ 392,887$ |
| Totals |  |  |


|  | Years of Service to Valuation Date |  |  |  |  |  |  |  | Totals |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Attained |  |  |  |  |  |  |  | Valuation |  |  |
| Age | $0-4$ | $5-9$ | $10-14$ | $15-19$ | $20-24$ | $25-29$ | 30 Plus | No. | Payroll |  |

Under 20

| 20-24 | 26 | 2 |  |  |  |  |  | 28 | \$ | 728,376 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 25-29 | 139 | 17 | 3 |  |  |  |  | 159 |  | 5,315,803 |
| 30-34 | 153 | 85 | 18 | 3 |  |  |  | 259 |  | 9,998,104 |
| 35-39 | 133 | 81 | 35 | 12 | 1 |  |  | 262 |  | 11,027,773 |
| 40-44 | 97 | 88 | 52 | 43 | 14 | 3 |  | 297 |  | 14,279,342 |
| 45-49 | 94 | 67 | 44 | 78 | 34 | 32 | 6 | 355 |  | 17,043,431 |
| 50-54 | 96 | 62 | 42 | 46 | 39 | 38 | 11 | 334 |  | 16,578,320 |
| 55-59 | 56 | 64 | 48 | 43 | 32 | 18 | 14 | 275 |  | 14,453,238 |
| 60 | 8 | 7 | 7 | 6 | 2 | 2 | 1 | 33 |  | 1,917,506 |
| 61 | 9 | 5 | 3 | 6 | 2 | 3 | 2 | 30 |  | 1,433,671 |
| 62 |  | 4 | 3 | 3 |  |  | 3 | 13 |  | 619,258 |
| 63 | 3 |  | 2 | 4 | 4 |  | 2 | 15 |  | 821,124 |
| 64 | 4 | 6 | 1 |  |  | 1 |  | 12 |  | 553,301 |
| 65 | 5 | 2 | 4 | 1 | 1 | 1 |  | 14 |  | 853,289 |
| 66 | 4 | 2 | 5 |  |  |  | 1 | 12 |  | 542,266 |
| 67 |  | 3 | 1 | 2 | 1 |  |  | 7 |  | 345,090 |
| 68 |  |  |  |  |  |  | 1 | 1 |  | 65,904 |
| 69 | 1 | 1 |  | 1 | 1 |  |  | 4 |  | 94,548 |
| 70 | 1 | 1 | 1 | 1 |  |  |  | 4 |  | 224,086 |
| 71 |  | 1 |  | 1 |  |  |  | 2 |  | 70,232 |
| 72 |  |  |  | 1 |  |  |  | 1 |  | 23,990 |
| 73 | 1 |  |  | 1 |  |  |  | 2 |  | 76,996 |
| 74 |  |  |  |  |  |  |  |  |  |  |
| 75 | 1 |  |  |  |  |  |  | 1 |  | 16,650 |
| 76 |  | 1 |  | 1 |  |  |  | 2 |  | 51,194 |
| 77 |  |  | 1 |  |  |  |  | 1 |  | 37,110 |
| 78 |  |  |  | 1 |  |  |  | 1 |  | 24,667 |
| 79 |  | 1 |  |  |  |  |  | 1 |  | 33,644 |
| Totals | 831 | 500 | 270 | 254 | 131 | 98 | 41 | 2,125 |  | 7,228,913 |

$\qquad$
Age: $\quad 44.8$ years
Service: $\quad 9.47$ years
Annual Pay: \$45,755

## Active Female Members December 31, 2005 by Attained Age and Years of Service

| Attained Age | Years of Service to Valuation Date |  |  |  |  |  |  | Totals |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30 Plus | No. | Valuation Payroll |
| Under 20 | 1 |  |  |  |  |  |  | 1 | \$ 22,441 |
| 20-24 | 80 | 3 |  |  |  |  |  | 83 | 2,477,758 |
| 25-29 | 482 | 54 | 1 |  |  |  |  | 537 | 18,309,031 |
| 30-34 | 406 | 234 | 11 |  |  |  |  | 651 | 24,085,220 |
| 35-39 | 231 | 222 | 75 | 9 |  |  |  | 537 | 21,916,250 |
| 40-44 | 184 | 166 | 104 | 88 | 14 |  |  | 556 | 23,922,325 |
| 45-49 | 147 | 164 | 122 | 130 | 72 | 19 | 1 | 655 | 29,471,065 |
| 50-54 | 143 | 146 | 145 | 144 | 106 | 111 | 16 | 811 | 40,179,089 |
| 55-59 | 132 | 144 | 109 | 132 | 103 | 96 | 45 | 761 | 38,332,277 |
| 60 | 17 | 10 | 21 | 20 | 19 | 6 | 7 | 100 | 4,893,342 |
| 61 | 8 | 11 | 11 | 17 | 14 | 10 | 7 | 78 | 3,806,352 |
| 62 | 11 | 15 | 12 | 12 | 16 | 10 | 4 | 80 | 3,853,938 |
| 63 | 10 | 8 | 12 | 12 | 4 | 8 | 1 | 55 | 2,935,135 |
| 64 | 10 | 8 | 9 | 6 | 9 | 6 | 2 | 50 | 2,491,744 |
| 65 | 6 | 5 | 4 | 5 | 5 | 6 | 4 | 35 | 1,687,643 |
| 66 | 1 | 4 | 1 | 3 |  | 4 | 1 | 14 | 581,933 |
| 67 | 1 | 3 |  | 3 | 3 | 3 | 4 | 17 | 837,836 |
| 68 |  | 2 | 1 |  |  |  | 1 | 4 | 154,476 |
| 69 | 2 | 1 | 2 | 1 |  | 1 |  | 7 | 299,489 |
| 70 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 8 | 310,394 |
| 71 |  |  | 1 |  |  |  |  | 1 | 25,255 |
| 72 |  |  | 1 | 1 |  |  | 1 | 3 | 115,822 |
| 73 |  |  | 1 |  |  | 1 |  | 2 | 84,307 |
| 74 |  |  |  | 1 |  |  |  | 1 | 63,146 |
| 75 |  |  | 1 | 1 |  |  |  | 2 | 52,201 |
| 76 |  |  |  | 1 |  | 1 |  | 2 | 109,644 |
| 77 |  |  |  |  |  |  |  |  |  |
| 78 |  |  |  |  |  |  | 1 | 1 | 58,957 |
| 79 |  |  | 1 |  |  |  | 1 | 2 | 99,509 |
| Totals | 1,873 | 1,201 | 646 | 587 | 366 | 283 | 98 | 5,054 | \$221,176,579 |


| Group Averages |  |
| :--- | :---: |
| Age: | 44.7 years |
| Service: | 9.90 years |
| Annual Pay: | $\$ 43,763$ |

# Total Active Members December 31, 2005 <br> by Attained Age and Years of Service 

| $\begin{gathered} \text { Attained } \\ \text { Age } \\ \hline \end{gathered}$ | Years of Service to Valuation Date |  |  |  |  |  |  | Totals |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30 Plus | No. | Valuation Payroll |
| Under 20 | 1 |  |  |  |  |  |  | 1 | \$ 22,441 |
| 20-24 | 106 | 5 |  |  |  |  |  | 111 | 3,206,134 |
| 25-29 | 621 | 71 | 4 |  |  |  |  | 696 | 23,624,834 |
| 30-34 | 559 | 319 | 29 | 3 |  |  |  | 910 | 34,083,324 |
| 35-39 | 364 | 303 | 110 | 21 | 1 |  |  | 799 | 32,944,023 |
| 40-44 | 281 | 254 | 156 | 131 | 28 | 3 |  | 853 | 38,201,667 |
| 45-49 | 241 | 231 | 166 | 208 | 106 | 51 | 7 | 1010 | 46,514,496 |
| 50-54 | 239 | 208 | 187 | 190 | 145 | 149 | 27 | 1145 | 56,757,409 |
| 55-59 | 188 | 208 | 157 | 175 | 135 | 114 | 59 | 1036 | 52,785,515 |
| 60 | 25 | 17 | 28 | 26 | 21 | 8 | 8 | 133 | 6,810,848 |
| 61 | 17 | 16 | 14 | 23 | 16 | 13 | 9 | 108 | 5,240,023 |
| 62 | 11 | 19 | 15 | 15 | 16 | 10 | 7 | 93 | 4,473,196 |
| 63 | 13 | 8 | 14 | 16 | 8 | 8 | 3 | 70 | 3,756,259 |
| 64 | 14 | 14 | 10 | 6 | 9 | 7 | 2 | 62 | 3,045,045 |
| 65 | 11 | 7 | 8 | 6 | 6 | 7 | 4 | 49 | 2,540,932 |
| 66 | 5 | 6 | 6 | 3 |  | 4 | 2 | 26 | 1,124,199 |
| 67 | 1 | 6 | 1 | 5 | 4 | 3 | 4 | 24 | 1,182,926 |
| 68 |  | 2 | 1 |  |  |  | 2 | 5 | 220,380 |
| 69 | 3 | 2 | 2 | 2 | 1 | 1 |  | 11 | 394,037 |
| 70 | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 12 | 534,480 |
| 71 |  | 1 | 1 | 1 |  |  |  | 3 | 95,487 |
| 72 |  |  | 1 | 2 |  |  | 1 | 4 | 139,812 |
| 73 | 1 |  | 1 | 1 |  | 1 |  | 4 | 161,303 |
| 74 |  |  |  | 1 |  |  |  | 1 | 63,146 |
| 75 | 1 |  | 1 | 1 |  |  |  | 3 | 68,851 |
| 76 |  | 1 |  | 2 |  | 1 |  | 4 | 160,838 |
| 77 |  |  | 1 |  |  |  |  | 1 | 37,110 |
| 78 |  |  |  | 1 |  |  | 1 | 2 | 83,624 |
| 79 |  | 1 | 1 |  |  |  | 1 | 3 | 133,153 |
| Totals | 2,704 | 1,701 | 916 | 841 | 497 | 381 | 139 | 7,179 | \$318,405,492 |

Group Averages
Age:
44.7 years

Service: $\quad 9.77$ years
Annual Pay: \$44,352

## COMPARATIVE SCHEDULES

## Active Members December 31,

|  | $\mathbf{2 0 0 5}$ | $\mathbf{2 0 0 4}$ | $\mathbf{2 0 0 3}$ | $\mathbf{2 0 0 2}$ | $\mathbf{2 0 0 1}$ |
| :--- | ---: | ---: | ---: | ---: | ---: |
| Active and Affiliate Members | 7,212 | 7,223 | 7,339 | 7,722 | 7,497 |
| Payroll (in thousands)* | $\$ 318,405$ | $\$ 315,157$ | $\$ 318,122$ | $\$ 331,607$ | $\$ 307,834$ |
| Average Salary* | $\$ 44,352$ | $\$ 43,820$ | $\$ 43,513$ | $\$ 43,116$ | $\$ 41,231$ |
| Average Age* | 44.7 | 44.6 | 44.6 | 44.0 | 44.0 |
| Average Service* | 9.8 | 9.8 | 10.2 | 10.8 | 10.3 |

[^0]
## All Plan Members December 31, 2005

|  | Males | Females | Total |
| :---: | :---: | :---: | :---: |
| Active Members |  |  |  |
| Number | 2,125 | 5,054 | 7,179 |
| Annual Payroll | \$97,228,913 | \$ 221,176,579 | \$ 318,405,492 |
| Affiliate Members | 5 | 28 | 33 |
| Deferred Retirements |  |  |  |
| Number | 79 | 265 | 344 |
| Estimated Monthly Benefit | \$ 102,971 | \$ 289,916 | \$ 392,887 |
| Retired Members |  |  |  |
| Number | 2,256 | 3,339 | 5,595 |
| Annual Benefit | \$78,563,634 | \$ 100,340,054 ${ }^{\text { }}$ | \$ 178,903,688 |
| Disabled Participants |  |  |  |
| Number | 115 | 251 | 366 |
| Annual Benefits | \$ 1,878,111 | \$ 4,234,729 | \$ 6,112,840 |
| Subtotal Number | 4,580 | 8,937 | 13,517 |

Nonvested and Unelected Vested Terminations

$$
\text { Terminated, Owed Refunds } 602
$$

Total Number
14,119

# Development of Funding Value <br> of Retirement System Assets <br> DECEMBER 31, 2005 

| Development of Funding Value of Assets | 2005 | 2004 |
| :---: | :---: | :---: |
| 1. Funding Value (FV) of Assets - BOY | \$2,611,523,735 | \$2,531,745,552 |
| 2. Employer Contributions | 28,448,702 | 21,142,815 |
| 3. Member Contributions | 27,269,492 | 25,992,388 |
| 4. Benefit Payments and Refunds | 183,640,121 | 169,627,621 |
| 5. Decrease in Pension Assessment Expenses | 0 | 0 |
| 6. Release of Prior Unallocated Excess Earnings | 0 | 0 |
| 7. FBE Transfer for Benefit Improvements | 0 | 0 |
| 8. Interest at 8.5\% | 216,542,836 | 216,168,693 |
| 9. Expected FV of Assets - EOY: (1)+(2)+(3)-(4)-(5)+(6)+(7)+(8) | 2,700,144,644 | 2,625,421,827 |
| 10. Market Value (MV) of Assets | 2,667,850,663 | 2,555,931,368 |
| 11. FBE Balance | 0 | 0 |
| 12. Unallocated Excess Earnings | 0 | 0 |
| 13. Adjusted MV of Assets: (10)-(11)-(12) | 2,667,850,663 | 2,555,931,368 |
| 14. Difference between EFV and AMV: (13)-(9) | $(32,293,981)$ | $(69,490,459)$ |
| 15. 20\% of Difference: 0.20 x (14) | $(6,458,796)$ | $(13,898,092)$ |
| 16. Funding Value of Assets - EOY: (9) + (15) | \$2,693,685,848 | \$2,611,523,735 |

The Funding Value of Assets recognizes 20\% of the difference between Market Value and expected Funding Value each year. Expected Funding Value is equal to last year’s Funding Value increased by contributions and assumed investment income and decreased by benefit payments. During periods when investment performance exceeds the assumed rate, Funding Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Funding Value of Assets will tend to be greater than market value.

# SUMMARY OF <br> Actuarial Assets, Revenues and Expenditures 

## BALANCE SHEET

Valuation Assets
Reserves for

| Cash, receivables, accruals |  |  |  |
| :--- | ---: | :--- | ---: | ---: |
| and other short-term assets | $\$ 1,277,741$ | Member contributions | $\$ 234,847,707$ |
| Stocks | $1,588,267,266$ | Pensions and annuities | $2,040,908,231$ |
| Bonds | $816,573,384$ | Deferred retirement allowances | $12,040,492$ |
| Other | $261,732,272$ | Unrealized asset appreciation | $380,054,233$ |
| Funding value adjustment | $25,835,185$ | Funding value adjustment | $25,835,185$ |
| Total Current Assets | $\$ 2,693,685,848$ | Total Applied Reserves | $\$ 2,693,685,848$ |

## Revenues and Expenditures

|  | 2005 | 2004 |
| :---: | :---: | :---: |
| Balance - January 1 | \$2,611,523,735 | \$2,531,745,552 |
| BOY Adjustments | 0 | 0 |
| Adjusted BOY Balance (A) | 2,611,523,735 | 2,531,745,552 |
| Revenues |  |  |
| Member contributions | 27,269,492 | 25,992,388 |
| Employer contributions | 28,448,702 | 21,142,815 |
| Recognized investment income (I) | 213,513,612 | 205,838,822 |
| Total | 269,231,806 | 252,974,025 |
| Expenditures |  |  |
| Benefit payments | 183,640,121 | 169,627,621 |
| Administrative and investment expenses (E) | 3,429,572 | 3,568,221 |
| Total | 187,069,693 | 173,195,842 |
| Balance - December 31 (B) | \$2,693,685,848 | \$2,611,523,735 |
| Recognized rate of return: ( $\mathrm{I}-\mathrm{E}$ )/[1/2x $\mathrm{l}(\mathrm{A}+\mathrm{B}-\mathrm{I}+\mathrm{E})]$ | 8.2\%* | 8.2\%* |

## RECOMMENDED RESERVE TRANSFERS <br> DECEMBER 31, 2005

1. Reserve for Retired Service and Age - Basic
a. Ledger Reserve as of December 31, 2005
\$1,170,963,953
b. Required reserve according to actuarial valuation
c. Amount to be transferred to this reserve
$1,172,058,510$
$1,094,557$
2. Reserve for Retired Regular Disability - Basic

| a. Ledger Reserve as of December 31, 2005 | $\$ 33,723,817$ |  |
| :--- | ---: | ---: |
| b. Required reserve according to actuarial valuation |  | $33,893,462$ |
| c. Amount to be transferred to this reserve | 169,645 |  |

3. Reserve for Survivor Benefits - Basic

| a. Ledger Reserve as of December 31, 2005 | $\$ \quad 7,697,364$ |
| :--- | ---: | ---: |
| b. Required reserve according to actuarial valuation |  |
| c. Amount to be transferred to this reserve | $7,725,745$ |

4. Reserve for Retired Service and Age - ARAA
a. Ledger Reserve as of December 31, 2005 \$ 885,061,882
b. Required reserve according to actuarial valuation
c. Amount to be transferred to this reserve

887,600,229
5. Reserve for Retired Regular Disability - ARAA

| a. Ledger Reserve as of December 31, 2005 |  | $\$ \quad 24,286,559$ |
| :--- | :--- | :--- | ---: |
| b. Required reserve according to actuarial valuation |  |  |
| c. Amount to be transferred to this reserve |  | $(178,021)$ |

6. Reserve for Survivor Benefits - ARAA
a. Ledger Reserve as of December 31, 2005
\$ 7,031,154
b. Required reserve according to actuarial valuation
$7,251,516$
220,362
7. Total Reserve Liability Transfers
a. Ledger Reserve as of December 31, 2005 \$ 2,128,764,728
b. Required reserve according to actuarial valuation
c. Amount to be transferred to this reserve
$2,132,638,000$
$3,873,272$
In order to maintain an exact balance between reserve accounts and retiree liabilities, as calculated in the December 31, 2005 valuation, the above transfers should be made. Differences between reserve accounts and liabilities occur due to differences between actual and expected mortality among retirees.

## Section C



## Summary of Valuation Methods and Assumptions

## Actuarial Cost Methods

Normal Cost. Normal cost and the allocation of benefit values between service rendered before and after the valuation date was determined using an individual entry-age actuarial cost method having the following characteristics:
(i) the annual normal cost for each individual active member, payable from the date of employment to the date of retirement, is sufficient to accumulate the value of the member's benefit at the time of retirement;
(ii) each annual normal cost is a constant percentage of the member's year-by-year projected covered pay.

The normal cost and the present value of future normal cost is based on the benefit levels available to members hired on or after July 1, 2005. The present value of benefits is based on the benefit levels available to each member. The accrued liability is the difference between the present value of benefits and the present value of normal cost.

Financing of Unfunded Actuarial Accrued Liabilities (UAAL). Unfunded actuarial accrued liabilities (full funding credit of assets exceed liabilities) are amortized by level (principal \& interest combined) percent-of-payroll contributions over a period of 30 future years.

## Actuarial Assumptions Used for the Valuation

The actuary calculates the contribution requirements and benefit values by applying actuarial assumptions to the benefit provisions and census data furnished, using the actuarial cost methods described on the previous page.

The principal areas of financial risk which require assumptions about future experiences are:

- long-term rates of investment return to be generated by system assets.
- patterns of pay increases to members.
- rates of mortality among members, retirees and beneficiaries.
- rates of separation (withdrawal) from active membership.
- rates of disability among active members.
- the age patterns of actual retirement.

In a valuation, the actuary calculates the monetary effect of each assumption for as long as each covered person survives - - a period of time which can be as long as a century.

Actual experience of the Fund will not coincide exactly with assumed experience, regardless of the quality of the assumptions, or the skill of the actuary and the precision of the many calculations made. Each valuation provides a complete recalculation of assumed future experience and takes into account all past differences between assumed and actual experience. The result is a continual series of adjustments (usually small) to the computed contribution rate.

From time to time it is appropriate to modify one or more of the assumptions to reflect experience trends (but not random year-to-year fluctuations).

The rates of salary increase used for individual members are in accordance with the following table. This assumption is used to project a member's current salary to the salaries upon which benefits will be based.

|  | \% Increase in Salary at Sample Ages |  |  |
| :---: | :---: | :---: | :---: |
| Sample <br> Ages | Merit and <br> Seniority | Base <br> (Economic)* | Increase <br> Next Year |
|  |  |  |  |
| 20 | $5.0 \%$ | $4.5 \%$ | $9.5 \%$ |
| 25 | $4.5 \%$ | $4.5 \%$ | $9.0 \%$ |
| 30 | $3.6 \%$ | $4.5 \%$ | $8.1 \%$ |
| 35 | $2.8 \%$ | $4.5 \%$ | $7.3 \%$ |
| 40 | $2.1 \%$ | $4.5 \%$ | $6.6 \%$ |
|  |  |  |  |
| 45 | $1.4 \%$ | $4.5 \%$ | $5.9 \%$ |
| 50 | $0.8 \%$ | $4.5 \%$ | $5.3 \%$ |
| 55 | $0.4 \%$ | $4.5 \%$ | $4.9 \%$ |
| 60 | $0.0 \%$ | $4.5 \%$ | $4.5 \%$ |
| 65 | $0.0 \%$ | $4.5 \%$ | $4.5 \%$ |

*Includes 3.5\% for price inflation and 1\% for productivity increases.

The payroll growth rate for financing unfunded Actuarial Accrued Liabilities was assumed to be 4.5\% per year.

The rate of net investment return was $8.50 \%$ a year, compounded annually. This assumption is used to make money payable at one point in time equal in value to a different amount of money payable at another point in time.

The assumed real return is the rate of return in excess of price inflation. Considering other assumptions used in the valuation, the $8.50 \%$ nominal rate translates to a net real return of $5.00 \%$ a year. Experience over the last 4 years has been more favorable than assumed, as illustrated below:

|  | Year Ended December 31 |  |  |  | 4-Year <br> Average |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | 2005 | 2004 | 2003 | 2002 |  |
| Nominal rate (net) | 8.2 \% | 8.2 \% | 7.4 \% | 4.6 \% | 7.1 \% |
| Increase in CPI | 2.5 \% | 3.3 \% | 2.1 \% | 1.1 \% | 2.2 \% |
| Average salary increase | 1.2 \% | 0.7 \% | 0.9 \% | 4.6 \% | 1.8 \% |
| Real return as measured by |  |  |  |  |  |
| - CPI: (1)-(2) |  |  |  |  | 4.9 \% |
| - Salary increases: (1)-(3) |  |  |  |  | 5.3 \% |

The nominal rate of return was computed using the approximate formula: $i=I$ divided by $1 / 2(A+B-I)$, where $I$ is realized investment income, $A$ is the beginning of year asset value and $B$ is the end of year asset value.

The mortality table was as shown below:

| Sample |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Satained <br> Ages | Value at Retirement of \$1 <br> Monthly Increasing 3.25\% <br> Annually After Retirement |  | Future Life <br> Expectancy <br> (years) |  |
| Men | Women | Men | Women |  |
| 50 | $\$ 178.67$ | $\$ 192.26$ | 31.57 | 36.49 |
| 55 | 166.83 | 181.53 | 27.31 | 31.85 |
| 60 | 152.60 | 168.39 | 23.13 | 27.27 |
| 65 | 135.61 | 153.10 | 19.05 | 22.88 |
| 70 | 117.62 | 135.71 | 15.36 | 18.72 |
| 75 | 99.49 | 116.40 | 12.13 | 14.84 |
| 80 | 82.03 | 96.35 | 9.40 | 11.39 |

This assumption is used to measure the probabilities of each benefit payment being made after retirement. The possibility of members dying before retirement is $50 \%$ of the rates shown above.

Disabled life mortality was based on the healthy life mortality rates, set forward 10 years.
The rates of retirement used to measure the probability of eligible members retiring during the next year were as follows:

| Retirement <br> Ages | Normal Retirement |  | Early Retirement |  |
| :---: | :---: | :---: | :---: | :---: |
|  | Women | Men | Women |  |
| 50 | $25 \%$ | $25 \%$ | $10 \%$ | $5 \%$ |
| 51 | $25 \%$ | $25 \%$ | $10 \%$ | $5 \%$ |
| 52 | $25 \%$ | $25 \%$ | $10 \%$ | $6 \%$ |
| 53 | $30 \%$ | $25 \%$ | $10 \%$ | $7 \%$ |
| 54 | $30 \%$ | $30 \%$ | $10 \%$ | $8 \%$ |
| 55 | $35 \%$ | $35 \%$ | $10 \%$ | $9 \%$ |
| 56 | $30 \%$ | $15 \%$ | $10 \%$ | $10 \%$ |
| 57 | $30 \%$ | $20 \%$ | $10 \%$ | $12 \%$ |
| 58 | $30 \%$ | $20 \%$ | $11 \%$ | $12 \%$ |
| 59 | $30 \%$ | $20 \%$ | $12 \%$ | $13 \%$ |
| 60 | $30 \%$ | $20 \%$ | $13 \%$ | $14 \%$ |
| 61 | $35 \%$ | $20 \%$ | $14 \%$ | $14 \%$ |
| 62 | $40 \%$ | $25 \%$ | $15 \%$ | $15 \%$ |
| 63 | $35 \%$ | $20 \%$ | $15 \%$ | $17 \%$ |
| 64 | $35 \%$ | $25 \%$ | $15 \%$ | $20 \%$ |
| 65 | $40 \%$ | $30 \%$ |  |  |
| 66 | $25 \%$ | $25 \%$ |  |  |
| 67 | $25 \%$ | $25 \%$ |  |  |
| 68 | $25 \%$ | $25 \%$ |  |  |
| 69 | $25 \%$ | $25 \%$ |  |  |
| 70 | $100 \%$ | $100 \%$ |  |  |

Rates of separation from active membership were as shown below (rates do not apply to members eligible to retire and do not include separation on account of death or disability). This assumption measures the probabilities of members remaining in employment.

| Sample <br> Ages | Years of <br> Service | \% of Active Members <br> Separating Within Next Year |  |
| :---: | :---: | :---: | :---: |
|  | 0 | $20.00 \%$ | Men |

Rates of disability among active members.

|  | Sample Becoming Disabled <br> Ages |  |
| :---: | :---: | :---: | | Within Next Year |
| :---: | :---: | :---: |$|$| Men | Women |  |
| :---: | :---: | :---: |
| 20 | $0.00 \%$ | $0.00 \%$ |
| 25 | $0.06 \%$ | $0.06 \%$ |
| 30 | $0.06 \%$ | $0.06 \%$ |
| 35 | $0.07 \%$ | $0.07 \%$ |
| 40 | $0.10 \%$ | $0.10 \%$ |
|  |  |  |
| 45 | $0.17 \%$ | $0.17 \%$ |
| 50 | $0.31 \%$ | $0.31 \%$ |
| 55 | $0.56 \%$ | $0.56 \%$ |
| 60 | $1.19 \%$ | $1.19 \%$ |
| 65 | $0.00 \%$ | $0.00 \%$ |

## Miscellaneous and Technical Assumptions DECEMBER 31, 2005

| Marriage Assumption | 80\% of members are assumed to be married for purposes of <br> death-in-service benefits. Male spouses are assumed to be three <br> years older than female spouses. |
| :--- | :--- |
| Pay Increase Timing | Eight months after valuation date. <br> Decrement Timing <br> Decrements of all types are assumed to occur at the middle of <br> the year. |
| Eligibility Testing | Eligibility for benefits is determined based upon the age nearest <br> birthday and exact fractional service. |
| Decrement Relativity | Decrement rates are used directly from the experience study, <br> without adjustment for multiple decrement table effects. |
| Decrement Operation | All decrements operate during the first 5 years of service. |
| Incidence of Contributions | Contributions are assumed to be received continuously <br> throughout the year based upon the computed percent-of-payroll <br> shown in this report, and the actual payroll payable at the time <br> contributions are made. |
| Normal Form of Benefit | Straight Life. |
| Option Factors | Option factors are based on $8.50 \%$ interest and a $50 \%$ unisex |
| blend of male and female mortality. |  |

## SECTION D



# Basic Financial ObJective and Operation of The Retirement System 

Benefit Promises Made Which Must Be Paid For. A retirement program is an orderly means of handing out, keeping track of, and financing contingent pension promises to a group of employees. As each member of the retirement program acquires a unit of service credit they are, in effect, handed an "IOU" which reads: "Your Retirement System promises to pay you one unit of retirement benefits, payments in cash commencing when you retire."

The principal related financial question is: When shall the money required to cover the "IOU" be contributed? This year, when the benefit of the member's service is received? Or, some future year when the "IOU" becomes a cash demand?

The financial objective of DPSRS relative to funding the benefits is to establish and receive contributions, expressed as percents of active member payroll, which will remain approximately level from year-to-year and will not have to be increased for future generations of taxpayers.

Translated into actuarial terminology, a level percent-of-payroll contribution objective means that the contribution rate must be at least:

Normal Cost (the current value of benefits likely to be paid on account of members' service being rendered in the current year)
. . . plus . . .
Interest on the Unfunded Actuarial Accrued Liability (the difference between the actuarial accrued liability and current system assets).

If contributions to the retirement program are less than the preceding amount, the difference, plus investment earnings not realized thereon, will have to be contributed at some later time, or, benefits will have to be reduced, to satisfy the fundamental fiscal equation under which all retirement programs must operate; that is:

$$
\mathbf{B}=\mathbf{C}+\mathbf{I}-\mathbf{E}
$$

Benefit payments to any group of members and their beneficiaries cannot exceed the sum of:
Contributions received on behalf of the group
. . . plus . . .
Investment earnings on contributions received and not required for immediate payment of benefits
. . . minus . . .
Expenses incurred in operating the program.

There are retirement programs designed to defer the bulk of contributions far into the future. Lured by artificially low present contributions, the inevitable consequence is a relentlessly increasing contribution rate to a level greatly in excess of the level percent-of-payroll rate.

A by-product of the level percent-of-payroll contribution objective is the accumulation of invested assets for varying periods of time. Invested assets are a by-product of level percent-of-payroll contributions, not the objective. Investment income becomes the major contributor to the retirement program, and the amount is directly related to the amount of contributions and investment performance.

Computed Contribution Rate Needed To Finance Benefits. From a given schedule of benefits and from the data furnished him, the actuary calculates the contribution rate by means of an actuarial valuation - the technique of assigning monetary values to the risks assumed in operating a retirement program.


## YEARS OF TIME

CASH BENEFITS LINE. This relentlessly increasing line is the fundamental reality of retirement plan financing. It happens each time a new benefit is added for future retirements (and happens regardless of the design for contributing for benefits).

LEVEL CONTRIBUTION LINE. Determining the level contribution line requires detailed assumptions concerning a variety of experiences in future decades, including:

Economic Risk Areas
Rates of investment return
Rates of pay increase
Changes in active member group size
Non-Economic Risk Areas
Ages at actual retirement
Rates of mortality
Rates of withdrawal of active members (turnover)
Rates of disability

## Selection of Assumptions Used in Actuarial Valuations

## Economic Assumptions

Investment return
Pay increases to individual employees: the portion for economic changes Active member group size and total payroll growth

## Demographic Assumptions

Actual ages at service retirement Pay increases to individual members: the portion for merit \& seniority Disability while actively employed Separations before retirement
 Mortality after retirement
Mortality before retirement

## Relationship Between Plan Governing Body and the Actuary

The actuary should have the primary responsibility for choosing the demographic assumptions used in the actuarial valuation, making use of specialized training and experience.

The actuary and other professionals can provide guidance concerning the choice of suitable economic assumptions, but the basis of the economic assumptions is the assumed rate of inflation, a quantity which defies accurate prediction. Given an assumed rate of future inflation, it is very important it is very important that this rate be applied in a consistent manner in deriving the assumed rate of investment return, the economic portion of the assumption on pay increases to individual employees, and the assumed rate of growth of active member payroll. Consistent application of assumptions is an area in which the actuary has specialized training.

A sound procedure is that the actuary suggests reasonable alternatives for economic assumptions, followed by discussion involving the actuary, the Plan Governing Body, and other professionals, and the Plan Governing Body then makes a final choice from the various alternatives.

## GLOSSARY

| Actuarial Accrued Liability | The difference between (i) the actuarial present value of <br> future plan benefits, and (ii) the actuarial present value of <br> future normal cost. Sometimes referred to as "accrued <br> liability" or "past service liability." |
| :--- | :--- |
| Accrued Service | The service credited under the plan which was rendered <br> before the date of the actuarial valuation. |
| Actuarial Assumptions | Estimates of future plan experience with respect to rates of <br> mortality, disability, turnover, retirement, rate or rates of <br> investment income and salary increases. Decrement <br> assumptions (rates of mortality, disability, turnover and <br> retirement) are generally based on past experience, often <br> modified for projected changes in conditions. Economic <br> assumptions (salary increases and investment income) <br> consist of an underlying rate in an inflation-free <br> environment plus a provision for a long-term average rate <br> of inflation. |
| Actuarial Cost Method | A mathematical budgeting procedure for allocating the <br> dollar amount of the "actuarial present value of future plan <br> benefits" between the actuarial present value of future <br> normal cost and the actuarial accrued liability. Sometimes <br> referred to as the "actuarial funding method." |
| Actuarial Equivalent | A single amount or series of amounts of equal value to <br> another single amount or series of amounts, computed on <br> the basis of the rate(s) of interest and mortality tables used <br> by the plan. |
| Actuarial Present Value | The amount of funds presently required to provide a <br> payment or series of payments in the future. It is <br> determined by discounting the future payments at a a <br> predetermined rate of interest, taking into account the <br> probability of payment. |
| Amortization | Paying off an interest-bearing liability by means of <br> periodic payments of interest and principal, as opposed to <br> paying it off with a lump sum payment. |
| A measure of the difference between actual experience and |  |
| that expected based upon a set of actuarial assumptions |  |
| during the period between two actuarial valuation dates, in |  |
| accordance with the actuarial cost method being used. |  |



April 25, 2006

Mr. John MacPherson
Interim Executive Director
Denver Public Schools
Retirement System
1301 Pennsylvania Street
Suite 700
Denver, Colorado 80203-5014
Dear Mr. MacPherson:
Enclosed are twenty copies of the Annual Actuarial Valuation as of December 31, 2005 of the Denver Public Schools Retirement System. Please let us know if you need additional copies.

Sincerely,

Kenneth G. Alberts
KGA:bd
Enclosures
cc: Judy Shimono
Norman L. Jones
Judith A. Kermans


[^0]:    *Excluding Affiliate Members

