

**Teacher Retirement System  
of Texas**

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**ACTUARIAL VALUATION  
August 31, 2003**



**GABRIEL, ROEDER, SMITH & COMPANY**

**Consultants & Actuaries**

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Board of Trustees  
Teacher Retirement System of Texas  
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**Subject: Actuary's Certification of the Actuarial Valuation as of August 31, 2003**

We certify that the information included herein and contained in the 2003 Actuarial Valuation Report is accurate and fairly presents the actuarial position of the Teacher Retirement System of Texas (TRS) as of August 31, 2003.

All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, the results presented comply with the requirements of the Texas statutes and, where applicable, the Internal Revenue Code, ERISA, and the Statements of the Governmental Accounting Standards Board. The undersigned are independent actuaries. Mr. Carter is a member of the American Academy of Actuaries, and is also an Enrolled Actuary. All are experienced in performing valuations for large public retirement systems.

***Actuarial Valuations***

The primary purpose of the valuation report is to determine the adequacy of the current State contribution rate through measuring the resulting funding period, to describe the current financial condition of the System, and to analyze changes in the System's condition. In addition, the report provides information required by the System in connection with Governmental Accounting Standards Board Statement No. 25 (GASB No. 25), and it provides various summaries of the data.

Valuations are prepared annually, as of August 31 of each year, the last day of the System's plan and fiscal year.

***Financing Objective of the Plan***

Contribution rates are established by Law that, over time, are intended to remain level as a percent of payroll. The employee and State contribution rates have been set by Law and are intended to provide for the normal cost plus the level percentage of payroll required to amortize the unfunded actuarial accrued liability over a period not in excess of 31 years.

***Progress Toward Realization of Financing Objective***

The actuarial accrued liability, the unfunded actuarial accrued liability (UAAL), and the calculation of the resulting funding period illustrate the progress toward the realization of financing objectives. Based on this actuarial valuation as of August 31, 2003, the System's underfunded status has increased because of the recognition of the prior two years poor investment markets, and the UAAL is now \$5.230 billion.

This valuation shows a normal cost equal to 12.46% of pay. Since the State contribution rate of 6.00% of pay plus the member contribution rate of 6.40% of pay total 12.40% of pay, and since this total contribution rate is less than the normal cost rate, there are no contributions available to amortize the UAAL. Therefore the funding period corresponding to the 6.00% State contribution rate is "never" or infinite, which is greater than the statutory limit of 31 years.

The actuarial valuation report as of August 31, 2003 reveals that while the System has an unfunded liability, it still has a funded ratio (the ratio of actuarial assets to actuarial accrued liability) of 94.5%. However, the System is still deferring \$11.4 billion in prior asset losses that will be recognized over the next three valuations. Even though the System earned an 11.0% return on a market value of assets basis for the plan year ending August 31, 2003, the System experienced a \$2.0 billion loss on the actuarial value of assets due to the recognition of prior investment losses.

In the absence of significant actuarial gains over the near term, the contribution rate to the System will need to increase to produce a funding period that does not exceed 31 years. The System would need to earn an average rate of return of 12.7% on a market value basis over the next three years to offset the deferred asset losses that are scheduled to be recognized over the next three valuations. Even if these losses were somehow offset, the current unfunded liability of \$5.2 billion would still require an increase in the contribution rate in order to be amortized. Using GASB Statement No. 25 as a guide, the State contribution rate would need to increase from 6.00% of pay to 7.39% of pay. This rate would fund the normal cost and amortize the UAAL as of August 31, 2003 over the 30-year period called for by GASB Statement No. 25.

It seems unlikely that the System will be able to generate the necessary gains (either asset or liability gains) to offset these deferred asset losses. In fact, if the System earns 8% on a market value basis for the 2003/04 plan year, the System can expect to recognize a \$4.4 billion loss on the actuarial value of assets. Therefore, we believe the Board should begin laying the groundwork with the Legislature for an increase in the contribution rate. The Board will have the results of another actuarial valuation prior to the next Legislative Session, which the Board can use to better define the recommended increase in the contribution rate, but we believe that is important that the message be delivered to the appropriate State Budget personnel that a request for additional funding will be forthcoming.

Any increase in the State contribution rate, however, should be put in historical perspective. Except for non-actuarial issues (related to Texas budget reasons), the TRS State contribution rate has either decreased or not increased since 1979. Even at 7.39%, the State contribution rate would be less than it was for the 1989/1990 – 1990/1991 biennium.

Caution is warranted over the next few years. There should be no benefit increases passed by the Legislature over the next several Legislative Sessions without adequate funding, and the funded status should be carefully monitored. As noted above, in the absence of significant actuarial gains over the near term, an increase in the State contribution rate will be necessary to maintain the actuarial soundness of the System.

### ***Plan Provisions***

The plan provisions used in the actuarial valuation are described in Table 20 of the valuation report. This valuation reflects the changes to plan provisions as enacted by the 78<sup>th</sup> Texas Legislature.

### ***Disclosure of Pension Information***

Effective for the fiscal year ending August 31, 1996, the Board of Trustees has adopted compliance with the requirements of Governmental Accounting Standards Board (GASB) Statement No. 25.

### ***Actuarial Methods and Assumptions***

The actuarial methods and assumptions have been selected by the Board of Trustees of the Teacher Retirement System of Texas based upon our analysis and recommendations. These assumptions and methods are detailed in Table 21 of the valuation report. The Board of Trustees has sole authority to determine the actuarial assumptions used for the plan. The actuarial methods and assumptions are based on a study of actual experience for the four year period ending August 31, 1999 and were adopted on March 31, 2000. Further modifications were made based on the recommendation of the actuary. These changes were adopted by the Board on September 27, 2002.

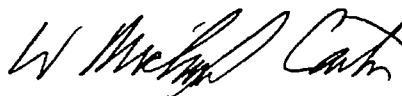
In our opinion, the actuarial assumptions used are appropriate for purposes of the valuation and are internally consistent and reasonably related to the experience of the System and to reasonable expectations.

**Data**

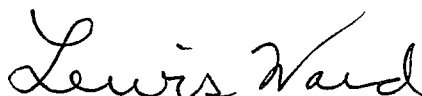
In preparing the August 31, 2003 actuarial valuation, we have relied upon member and asset data provided by the Teacher Retirement System of Texas. We have not subjected this data to any auditing procedures, but have examined the data for reasonableness and for consistency with prior years' data.

The schedules shown in the actuarial section and the trend data schedules in the financial section of the TRS financial report include selected actuarial information prepared by TRS staff. Six year historical information included in these schedules was based upon our work. For further information please see the full actuarial valuation report.

Respectfully submitted,  
Gabriel, Roeder, Smith & Company



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TABLE OF CONTENTS

Transmittal Letter

<u>Section</u>		<u>Page</u>
A	Executive Summary .....	1
B	Introduction .....	3
C	Funded Status of the System .....	4
D	GASB Disclosure .....	7
E	Change in Assets During the Year .....	8
F	Actuarial Gains (Losses) and the Funding Period .....	9
G	Summary and Closing Comments .....	11
H	Actuarial Tables .....	12

**EXECUTIVE SUMMARY**

The actuarial valuation of the Teacher Retirement System of Texas (TRS) as of August 31, 2003, indicates that the System continues to have an unfunded actuarial accrued liability (UAAL). The UAAL increased from \$3.287 billion in 2002 to \$5.230 billion in 2003. The System will never be funded under the current contribution structure without developing future actuarial gains.

The key results of this valuation as of August 31, 2003, may be summarized as follows.

	2003	2002
	(1)	(2)
• Net Plan Assets		
— Market Value	\$ 77.633 billion	\$ 71.696 billion
— Actuarial Value	\$ 89.033 billion	\$ 86.035 billion
• Members		
— Actives for valuation purposes	754,715	745,923
— Actives in DROP (included above)	2,581	3,290
— Actives contributing in last year (included above)	677,504	663,507
— Actives not contributing in last year (included above)	9,173	8,666
— New entrants missing data (included above)	65,457	70,460
— Inactive, nonvested	60,755	62,168
— Inactive, vested	47,821	38,554
— Service retirees	200,472	184,807
— Disabled retirees	8,018	7,858
— Survivor benefit recipients	8,987	8,776
• Covered payroll	\$ 25.756 billion	\$ 24.818 billion
• Normal cost rate	12.46%	12.67%
• UAAL	\$ 5.230 billion	\$ 3.287 billion
• Actuarial assets as % of actuarial accrued liability	94.5%	96.3%
• Funding period	Never	Never
• State contribution rate	6.00%	6.00%
• Employee contribution rate	6.40%	6.40%
• Estimated yield on actuarial assets	5.7%	1.5%
• Employee contributions during year	\$ 1,516.8 million	\$ 1,450.3 million
• State contributions during year	\$ 1,239.5 million	\$ 1,201.9 million
• Employer contributions during year	\$ 182.5 million	\$ 157.8 million
• Benefit, refund, and expense payments	\$ 4.978 billion	\$ 4.590 billion
• GASB ARC as % of pay	7.39%	7.15%

	<u>2003</u>	<u>2002</u>
	(1)	(2)
• Actuarial gains (losses)		
— Assets	\$(1,965.3) million	\$(5,527.8) million
— Assumption changes/Legislative changes	0.0 million	847.5 million
— Liability experience	<u>565.6 million</u>	<u>(725.1) million</u>
— Total	\$(1,399.7) million	\$(5,405.4) million
• Net external cash flow	\$(1,883.7) million	\$(1,669.5) million
• GASB 25 disclosure		
— Funded ratio	94.5%	96.3%
— UAAL as % of pay	20.3%	13.2%
• Changes in funding period		

Item	Change in Funding Period	Funding Period
(1)	(2)	(3)
1. 2002 valuation	--	Never
2. 2003 results using expected contributions	--	Never
3. 2003 results using actual contributions	--	Never
4. Actual liabilities	--	Never
5. Actual assets	--	Never



## INTRODUCTION

The valuation of the Teacher Retirement System of Texas (TRS) as of August 31, 2003, reflects the following contribution rates: (a) a member contribution rate of 6.4%, and (b) a State contribution rate of 6.00%. Given legislative history since 1983 concerning the contribution rate, valuation results are determined assuming the current (6.00%) State contribution rate is the ultimate rate.

In preparing this valuation, Gabriel, Roeder, Smith & Company (GRS) has relied on employee data and asset information provided by the staff of the Teacher Retirement System. While not verifying the data at their source, GRS has performed such tests for consistency and reasonableness as has been deemed necessary to be satisfied with the appropriateness of using the data supplied.

Section A contains an executive summary of the most significant valuation results. The basic results of the valuation are covered in Section C. Section D contains the necessary disclosure items required by the Governmental Accounting Standards Board (GASB). Section E provides analysis and discussion of changes in assets. Section F produces a determination of actuarial gains and losses for the year and an analysis of the change in the funding period since the prior year's valuation. Section G summarizes the findings of the valuation, and Section H provides the tables supporting the report.

This valuation utilizes actuarial assumptions and methods modified as a result of the 2002 Actuarial Audit. These assumptions and methods were adopted by the Board on September 27, 2002.

## FUNDED STATUS OF THE SYSTEM

Table 3 in Section H details the normal cost of the Retirement System by its various components. This normal cost is developed based on the valuation method known as the entry-age-normal actuarial cost method. The total normal cost for the Retirement System is 12.46% of pay, this amount being inclusive of the amount contributed by the employees. The net normal cost for the State is 6.06% of pay based on the member contribution rate of 6.40%.

Since the State contribution rate is 6.00%, the State normal cost rate exceeds the State contribution rate by 0.06%. In order to remain an actuarially sound system under this situation, there must be a funding surplus (i.e., a negative unfunded actuarial accrued liability) of sufficient magnitude to make up for this shortfall. Any funding surplus would be reduced over time as it is used to fund the shortfall between the total normal cost rate and the total contribution rate.

As stated earlier, the funding period for the System is determined under the entry-age-normal actuarial cost method based on a level percentage of pay. The key points of this method are as follows:

1. The "normal cost" for the System is deemed to be equal to the cost of benefits for newly hired participants.
2. The "actuarial accrued liability" for benefits payable in the future to present active members is calculated as the present value of benefits payable in the future to present active members less the present value of future normal costs.
3. Funding of the unfunded actuarial accrued liability (UAAL) is a function of the rate of future growth in total covered payroll.

Table 5 develops the funding period under the above approach not only for the current valuation, but also for the valuation as of August 31, 2002. As shown in Item A3 of Table 5, the normal cost for the System consists of the entire 6.40% of pay contributed by the members plus 6.06% of pay from the State. As developed in Item A4, the 6.00% of pay contributed by the State is 0.06% of pay less than the State normal cost. This shortfall will increase the unfunded actuarial accrued liability (or, equivalently, reduce the funding surplus).

The UAAL as shown in Item B4 of Table 5 is \$5.230 billion for 2003, an increase from \$3.287 billion in 2002. As indicated in the table, the UAAL equals the difference between the total actuarial accrued liability (Item B2d) and current actuarial assets (Item B3). The shortfall of State contributions that will be added to the UAAL is determined as the product of 0.06% of pay (i.e., that shortfall in the State contributions) multiplied by the covered payroll.

In determining the number of years that will be required to amortize the UAAL, an assumption is made concerning future growth of the payroll of the System. GASB Statement No. 25 requires that the payroll growth assumption not consider growth in the active employee census. Under GASB 25 the appropriate payroll growth assumption is 3.00%.

As shown in Item B6 of Table 5 and using the assumed rate of increase in covered payroll of 3.00%, the period to fund the UAAL is now infinite, i.e., the UAAL will never be funded under the current contribution structure without future actuarial gains. An analysis of the change in the funding period since the 2002 valuation is provided in Section F.

Although there was favorable investment experience on a market value basis during the year, there was unfavorable experience on an actuarial value of assets (AVA) basis. This result is due to the asset smoothing methodology that is used for determining the actuarial value of assets. Because of the asset smoothing methodology, as may be seen in Item 2e of Table 4b, the AVA methodology is deferring \$11.4 billion in investment losses to the next four valuations.

The unfavorable actuarial investment experience (5.7% yield based on actuarial assets) has resulted in an increase in the TRS underfunded status.

Table 7 offers a comparative view of the unfunded actuarial accrued liability (UAAL). It compares the UAAL with three items: the covered payroll for the year, the total actuarial value of present assets at the end of the year, and the total actuarial liabilities (or, equivalently, the total present value of future benefits) as of the valuation date.

The actuarial value of assets is developed in Table 4b. It should be remembered that the intent of the actuarial asset valuation method is to smooth out year-to-year fluctuations in market rates of return. It accomplishes this smoothing effect by recognizing the excess or shortfall in total market return over the expected return at the rate of 20% per year over a five year period. The excess or shortfall of investment income attributable to the most recent four years is shown in Table 4a.

While the design of the actuarial asset valuation method is to smooth out year-to-year fluctuations in market rates of return, the method is also designed to not allow the actuarial value of assets to drift too far from the actual market value of assets. To accomplish this goal a corridor is established around the market value of assets (not less than 80% nor more than 120% of the market value of assets). If the actuarial value of assets using the smoothing technique produces a preliminary actuarial value of assets that is outside of the corridor, then the actuarial value of assets is set equal to

the nearest corridor threshold. The 2002 valuation was the first time this corridor had impacted the actuarial value of assets. For the 2003 valuation the actuarial value of assets has returned to a value that is inside the corridor. The preliminary actuarial value of assets is \$89.033 billion as shown in Item 4 of Table 4b. This number is equal to 114.7% of the market value of assets. Since that lies within our 80% to 120% corridor, the preliminary actuarial value of assets becomes the final actuarial value of assets as shown in Item 6 of Table 4b.

Table 2 provides an overall summary of key actuarial data for the 2003 valuation, with comparative data for 2002. This information is summarized from the other tables, which supply more detail. Its value is in providing in one convenient place key comparative valuation results.

The fact that the total contribution rate is 0.06% of pay less than the normal cost rate combined with the System's increasing underfunded status creates a period of extreme caution for TRS. As noted above, the System has an unfunded liability of \$5.230 billion and another \$11.4 billion in unrecognized investment losses deferred into plan years 2004-2007.

If these amounts are not offset by actuarial gains, the System will not achieve an acceptable funding period without an increase in its contribution rate. As of this valuation the State contribution rate would need to increase to 7.39% of pay in order to pay the normal cost and amortize the \$5.2 billion UAAL over 30 years.

The severity of the market turmoil on TRS is significant. To offset the \$11.4 billion in deferred investment losses between 2003 and 2007, the System will need to average a return of 12.7% for the next three plan years and 11.5% for the next four plan years. In addition, there is virtually no way that TRS can absorb any benefit enhancements over at least the next four years without an increase in the State contribution rate to a level in excess of 7.39% of pay.

## GASB DISCLOSURE

The Governmental Accounting Standards Board (GASB) has issued Statement No. 25 which provides the manner in which the actuarial condition of a public sector retirement plan is to be disclosed and which replaces GASB No. 5.

TRS elected to comply with GASB No. 25 beginning with the fiscal and plan year ending August 31, 1996. The required actuarial disclosure tables are represented by Tables 14a – 14c.

GASB No. 25 provides for a calculation of an annual required contribution (ARC). The ARC for TRS is greater of the 6% state contribution rate or the 30-year funding cost. Since the System is now underfunded, the 30-year funding cost exceeds 6.00%. For the 2003 valuation it is 7.39% of pay.

If TRS's auditors consider TRS a "special situation multi-employer plan" under GASB 27, then the State may need to establish a Net Pension Obligation for the State's 2003/2004 fiscal year to reflect the difference between its 6.00% contribution rate and the 7.39% ARC.

## CHANGE IN ASSETS DURING THE YEAR

This section provides an analysis of the change in the Plan Net Assets during the year and an estimate of the yield on mean assets of the total System. Table 8a shows a rearrangement of some of the tables included in the annual financial statements of the System. Table 8b shows the estimated yield on a market value basis and on the actuarial asset valuation method.

To determine estimated yield on "mean assets", the traditional insurance company formula for yield rates is used. The estimated yield is derived by dividing the appropriate income by the corresponding mean assets.

As indicated by Item A4 of Table 8b, the estimated yield on mean market value is 11.0%, up significantly from the -7.8% return in 2002. The actuarial asset yield (Item B4) is 5.7%, compared to 1.5% in 2002, and compared to the 8% assumption rate. This difference in the estimated yield on market value and actuarial value illustrates the smoothing effect of the asset valuation method.

As mentioned in Section C, the investment results on an actuarial value basis are unfavorable for the 2002/2003 plan year. On an actuarial value basis the System fell short of its 8% assumption rate. As a result, the System suffered an actuarial investment loss of \$1.965 billion. It should be noted, however, that the asset valuation method is deferring another \$11.4 billion in unrecognized losses into future years. This deferred loss will be recognized over the next four actuarial valuations. If there are offsetting investment gains during these four years, the funded status of the System may not deteriorate further. If there are no offsetting gains, the funded position will become much worse.

## ACTUARIAL GAINS (LOSSES) AND THE FUNDING PERIOD

Section C has noted that the unfunded actuarial accrued liability (UAAL) has increased from \$3.287 billion in 2002 to \$5.230 billion in 2003. The funding period has remained at “never”. The purpose of this section is to determine the source of the gains and losses and the impact of those gains and losses on the funding period.

Section E has discussed the change in assets for the year. Table 8b develops the estimated yield for the year based on two measures of asset values. Table 9 takes the information contained in Table 8 and develops the expected value of actuarial assets for this valuation, based on the investment return assumption of 8%.

As shown in Item 7 of Table 9, the expected value of actuarial assets as of August 31, 2003 is \$90.998 billion. As developed in Table 4, the actual value of actuarial assets as of the valuation date is \$89.033 billion (as repeated in Item 8 of Table 9). Thus the asset loss for the year is the difference between the actual value and the expected value, or \$(1.965) billion (as shown in Item 9). Item 10 indicates that this loss represents –2.21% of this year's actuarial assets. This asset loss for the year is a direct reflection of the estimated yield for the year based on the value of actuarial assets, namely 5.7% (as shown in Item B4 of Table 8b).

Table 10 develops the total actuarial gain (loss) for the year and separates it between the asset gain (loss) and the liability gain (loss). The items in Table 10 that are used to develop the expected UAAL as of August 31, 2003 are derived from Table 5 and Table 8. The total actuarial loss for the year is seen to be \$(1.400) billion.

Since the asset loss for the year is \$(1.965) billion, this means that there is an overall actuarial gain associated with the liability experience of the System in an amount equal to \$565.6 million. This gain is primarily attributable to lower than expected salary increases.

Overall, the liability experience matches up relatively well with the assumed experience. The actual accrued liability is 99.4% of the expected accrued liability.

Table 11 traces the changes in the funding period from the valuation as of August 31, 2002, to August 31, 2003. Because the UAAL of the System is positive and the normal cost exceeds the contribution rate at all of the measured changes, the informational value of this Table is diminished.

Item 2 of Table 11 shows the funding status if there had been no actuarial gains or losses in the areas of assets, liabilities, or growth in covered payroll. The UAAL would have increased during the year to \$3,752 million.

Item 5 of Table 5 illustrates that the liability experience gain decreased the UAAL to \$3.265 billion but that the asset loss (shown in Item 6) increased the UAAL to \$5.230 billion. Because the UAAL is positive and the contribution rate is less than the normal cost rate at all of the different measurements, the funding period is “never” (or “infinite”).

Given the unprecedented volatility and uncertainty that currently exists in the investment markets, the substantial investment losses that occurred (from a market value basis) during the 2000/2001 and 2001/2002 plan years, and the relatively mild recovery experienced in the 2003 plan year, extreme caution should be exercised relative to possible future benefit enhancements.

Referring to Item 2e of Table 4b, there are \$11.4 billion of investment losses being deferred as of August 31, 2003. The asset valuation method will recognize these losses over the next four years. If there are not sufficient offsetting market gains during this time, the recognition of these deferred losses will significantly increase the System’s unfunded liability and will necessitate an increase in the contribution rate.



## SUMMARY AND CLOSING COMMENTS

To summarize the results of the actuarial valuation of the Teacher Retirement System as of August 31, 2003, it is our opinion that for the System to remain actuarially sound, significant actuarial gains must be generated. In the absence of these gains, contribution rates will need to increase. It is our opinion that the Board should begin preparing the Legislature for a recommended increase in the contribution rate for the next biennium.

The funding period is determined as “never” based on the 3.00% payroll growth assumption and based on the current 6.00% State contribution rate.

Because of this situation, extreme caution is warranted. The System’s normal cost rate exceeds its contribution rate by 0.06% of pay. This would be acceptable if the System were sufficiently overfunded. The biggest obstacle is the turmoil that has existed in the investment markets. The System is underfunded by \$5.2 billion and has \$11.4 billion in deferred investment losses that will be recognized over the next four years under the actuarial asset valuation method.

In order for the System to again become fully funded during this period of time, it must generate sufficient market gains (or liability gains) to offset the recognition of those deferred losses and offset the \$5.2 billion UAAL. Otherwise the System will require an increase in its contribution rate. Given the likelihood that the System will not be able to generate these gains, we believe the Board should be laying the groundwork for an increase in the contribution rate at the next biennium.

Any increase in the State contribution rate, however, should be put in historical perspective. Except for non-actuarial issues (related to Texas budget reasons), the TRS State contribution rate has either decreased or not increased since 1979. Even at 7.39%, the State contribution rate would be less than it was for the 1989/1990 – 1990/1991 biennium.

For the foreseeable future, no benefit enhancements, including ad hoc increases, should be considered without significant contribution rate increases. The starting point for any proposed enhancements would be an increase of 1.39% of pay in the contribution rate.

**ACTUARIAL TABLES**

Table Number	Table of Contents	Page
1	Actuarial Present Value of Future Benefits	13
2	Summary of Cost Items	14
3	Normal Cost by Component	15
4a	Calculation of Excess Investment Income for Actuarial Value of Assets	16
4b	Development of Actuarial Value of Assets	17
5	Years to Fund the Unfunded Actuarial Accrued Liability	18
6	Growth of Covered Payroll and Active Members	19
7	Relative Size of Unfunded Actuarial Accrued Liability	20
8a	Change in Plan Net Assets	22
8b	Estimation of Yields	23
9	Actual Versus Expected Actuarial Assets	24
10	Actuarial Gain or Loss for the Year	25
11	Analysis of Change in Funding Period	26
12	History of Cash Flow	27
13	History of Contribution Rates	28
14a	Schedule of Funding Progress	29
14b	Schedule of Employer Contributions	30
14c	Notes to Required Supplementary Information	31
15	Statistical Information	32
16	Statement of Plan Net Assets	34
17	Distribution of Active Participants by Age and Service	35
18	Distribution of Life Annuities by Age	36
19	Distribution of Disabled Annuities by Age	37
20	Summary of the Benefit Provisions of the Retirement System	38
21	Actuarial Assumptions and Methods	50
22	Definition of Actuarial Terms	57

ACTUARIAL PRESENT VALUE OF FUTURE BENEFITS

	August 31,	
	2003 (1)	2002 (2)
<b>A. Present Value of Benefits Presently Being Paid:</b>		
1. Service retirement benefits	\$ 39,855,845,308	\$ 36,157,908,033
2. Disability retirement benefits	\$ 829,882,596	818,188,000
3. Death benefits	\$ 629,445,482	768,243,000
4. Present survivor benefits	\$ 159,810,826	193,210,000
5. Total present value of benefits presently being paid	\$ 41,474,984,212	\$ 37,937,549,033
<b>B. Present Value of Benefits Payable In the Future To Present Active Members:</b>		
1. Service retirement benefits	\$ 72,627,163,340	\$ 70,896,102,172
2. Disability retirement benefits	\$ 1,334,277,382	1,288,660,934
3. Termination benefits	\$ 4,703,320,045	4,499,838,330
4. Death and survivor benefits	\$ 1,636,283,604	1,714,253,958
5. Total active member liabilities	\$ 80,301,044,371	\$ 78,398,855,394
<b>C. Present Value of Benefits Payable In the Future To Present Inactive Members:</b>		
1. Inactive vested participants		
a. Retirement benefits	\$ 979,820,873	\$ 936,311,478
b. Death benefits	\$ 59,399,100	30,569,400
c. Total inactive vested benefits	\$ 1,039,219,973	\$ 966,880,878
2. Refunds of contributions to inactive nonvested members	\$ 166,059,923	143,745,906
3. Future survivor benefits payable on behalf of present annuitants	\$ 695,568,135	652,645,000
4. Total inactive liabilities	\$ 1,900,848,031	\$ 1,763,271,784
<b>D. Total Actuarial Present Value of Future Benefits:</b>	\$ 123,676,876,614	\$ 118,099,676,211

SUMMARY OF COST ITEMS

	Valuation as of August 31, 2003		Valuation as of August 31, 2002	
	Cost Item (1)	Cost as % of Pay (2)	Cost Item (3)	Cost as % of Pay (4)
1. Participants				
a. Active contributing members				
1. Not in DROP	677,504		663,507	
2. In DROP	2,581		3,290	
b. Active noncontributing members				
1. Assumed to be active	9,173		8,666	
2. Assumed to be inactive vested	32,697		25,241	
3. Assumed to be inactive nonvested	49,858		52,749	
4. Total	91,728		86,656	
c. New entrants missing data	65,457		70,460	
d. Active subtotal	837,270		823,913	
e. Inactive members w/deferred benefits	15,124		13,313	
f. Retired members and beneficiaries	217,477		201,441	
g. Subtotal, members	1,069,871		1,038,667	
h. Inactive nonvested members due refunds	10,897		9,419	
i. Total membership	1,080,768		1,048,086	
2. Covered Payroll	\$ 25,756,162,962		\$ 24,818,416,690	
3. Average for Active Members				
a. Average age	43		43	
b. Average years of service	9		9	
c. Average pay	\$ 34,127		\$ 33,272	
4. Present Value of Future Pay	\$ 236,066,204,433		\$ 227,129,207,649	
5. Normal Cost Rate				
a. Gross normal cost	12.46%		12.67%	
b. Less employee contribution rate	(6.40%)		(6.40%)	
c. State normal cost	6.06%		6.27%	
6. Present Value of Future Benefits				
a. Retired members - in pay or deferred	\$ 41,474,984,212		\$ 37,937,549,033	
b. Retired members - future survivor benefits	695,568,135		652,645,000	
c. Vested inactive members	1,039,219,973		966,880,878	
d. Active members	80,301,044,371		78,398,855,394	
e. Inactive nonvested members	166,059,923		143,745,906	
f. Total	\$ 123,676,876,614	480.2%	\$ 118,099,676,211	475.9%
7. Present Value of Future Normal Costs (employee plus employer)	\$ 29,413,849,072	114.2%	\$ 28,777,270,609	116.0%
8. Actuarial Accrued Liability	\$ 94,263,027,542	366.0%	\$ 89,322,405,602	359.9%
9. Actuarial Value of Assets	\$ 89,033,023,666	345.7%	\$ 86,034,962,833	346.7%
10. Unfunded Actuarial Accrued Liability	\$ 5,230,003,876	20.3%	\$ 3,287,442,769	13.2%
11. Employer Contribution Rate	6.00%		6.00%	
12. Funding Period	Never		Never	
13. Estimated Yield on Actuarial Assets	5.7%		1.5%	
14. GASB 25 Funded Ratio	94.5%		96.3%	
15. GASB Annual Required Contribution Rate (ARC) for State	7.39%		7.15%	

ANALYSIS OF NORMAL COST BY COMPONENT

<u>Benefit Component</u> (1)	<u>8/31/2003</u> <u>Cost as % of Pay</u> (2)	<u>8/31/2002</u> <u>Cost as % of Pay</u> (3)
1. Retirement Benefits	10.11%	10.30%
2. Disability Benefits	0.24%	0.24%
3. Death Benefits (including survivor benefits)	0.36%	0.38%
4. Termination benefits	<u>1.75%</u>	<u>1.75%</u>
5. Gross Normal Cost	12.46%	12.67%
6. Less Employee Contribution Rate	<u>(6.40%)</u>	<u>(6.40%)</u>
7. State Normal Cost	6.06%	6.27%

CALCULATION OF EXCESS INVESTMENT INCOME FOR  
ACTUARIAL VALUE OF ASSETS

Item	Plan Year Ending August 31,				
	2003	2002	2001	2000	
(1)	(2)	(3)	(4)	(5)	(5)
1. Actual net investment income based on market value of assets	\$ 7,782,851,430	\$ (6,098,932,157)	\$ (9,389,167,977)	11,113,635,469	
2. Market value of assets, beginning of year	71,695,802,361	79,428,239,521	89,987,158,209	79,910,553,792	
3. Contributions during year					
a. Employee	1,516,801,535	1,450,311,521	1,364,689,388	1,290,665,528	
b. State and employer	1,422,068,354	1,359,729,851	1,279,396,301	1,209,998,933	
c. Membership fees/legislative appropriation for expenses	0	-	(38,522)	1,279,181	
d. Reinstatements	155,410,852	110,388,581	68,348,425	67,274,785	
e. Total	3,094,280,741	2,920,429,953	2,712,395,592	2,569,218,427	
4. Benefits paid during year	(4,753,849,401)	(4,366,038,505)	(3,667,711,511)	(3,360,116,181)	
5. Refunds paid during year	(186,082,670)	(186,421,065)	(214,434,792)	(214,999,991)	
6. Expenses for year	N/A	N/A	N/A	(31,133,307)	
7. Expected net investment income at 8%					
a. Market value of assets, beginning of year	5,735,664,189	6,354,259,162	7,198,972,657	6,392,844,303	
b. Contributions	123,771,230	116,817,198	108,495,824	102,768,737	
c. Benefits	(190,153,976)	(174,641,540)	(146,708,460)	(134,404,647)	
d. Refunds	(7,443,307)	(7,456,843)	(8,577,392)	(8,600,000)	
e. Expenses	N/A	N/A	N/A	(1,245,332)	
f. Total	5,661,838,136	6,288,977,977	7,152,182,629	6,351,363,061	
8. Excess investment income for year (Item 1 - Item 7f)	\$ 2,121,013,294	\$ (12,387,910,134)	\$ (16,541,350,606)	\$ 4,762,272,408	

DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS

Item (1)	Plan Year Ending August 31, 2003 (2)	Plan Year Ending August 31, 2002 (3)
1. Excess (Shortfall) of invested income for current and previous 3 years		
a. Current year	\$ 2,121,013,294	\$ (12,387,910,134)
b. Current year - 1	(12,387,910,134)	(16,541,350,606)
c. Current year - 2	(16,541,350,606)	4,762,272,408
d. Current year - 3	4,762,272,408	8,700,086,063
e. Total for four years	\$ (22,045,975,038)	\$ (15,466,902,269)
2. Deferral of excess (shortfall) of invested income		
a. Current year (80%)	\$ 1,696,810,635	\$ (9,910,328,107)
b. Current year - 1 (60%)	(7,432,746,080)	(9,924,810,364)
c. Current year - 2 (40%)	(6,616,540,242)	1,904,908,963
d. Current year - 3 (20%)	952,454,482	1,740,017,213
e. Total deferred for year	\$ (11,400,021,205)	\$ (16,190,212,295)
3. Market value of plan net assets, end of year	\$ 77,633,002,461	\$ 71,695,802,361
4. Preliminary actuarial value of plan assets, end of year (Item 3 - Item 2e)	\$ 89,033,023,666	\$ 87,886,014,656
5. Actuarial value of assets corridor		
a. 80% of market value, end of year	\$ 62,106,401,969	\$ 57,356,641,889
b. 120% of market value, end of year	\$ 93,159,602,953	\$ 86,034,962,833
6. Final actuarial value of plan net assets, end of year (Item 4, but not less than Item 5a, and not more than Item 5b)	\$ 89,033,023,666	\$ 86,034,962,833

DEVELOPMENT OF YEARS TO FUND THE UNFUNDED  
ACTUARIAL ACCRUED LIABILITY

	As of August 31, 2003 (1)	As of August 31, 2002 (2)
<b>A. Basic Data</b>		
1. Covered payroll	\$ 25,756,162,962	\$ 24,818,416,690
2. Present value of future pay	\$ 236,066,204,433	\$ 227,129,207,649
3. Normal cost rate of benefits		
a. Total normal cost rate	12.46%	12.67%
b. Less employee contribution rate	(6.40%)	(6.40%)
c. State normal cost rate	6.06%	6.27%
4. State contribution rate for funding unfunded actuarial accrued liability		
a. Total State contribution rate	6.00%	6.00%
b. Less State normal cost rate	(6.06%)	(6.27%)
c. State contribution rate available	(0.06%)	(0.27%)
5. Actuarial accrued liability for present active members		
a. Present value of benefits payable in the future to present members	\$ 80,301,044,371	\$ 78,398,855,394
b. Less present value of future normal costs	(29,413,849,072)	(28,777,270,609)
c. Actuarial accrued liability	\$ 50,887,195,299	\$ 49,621,584,785
<b>B. Development of Funding Period</b>		
1. Normal cost		
a. Employee normal cost (Item A3b x Item A1)*	\$ 1,697,846,263	\$ 1,636,030,028
b. State normal cost (Item A3c x Item A1)*	1,607,648,179	1,602,798,168
c. Total normal cost	\$ 3,305,494,442	\$ 3,238,828,196
2. Total actuarial accrued liability		
a. Present value of benefits presently being paid	\$ 41,474,984,212	\$ 37,937,549,033
b. Actuarial accrued liability for present active members (Item A5c)	50,887,195,299	49,621,584,785
c. Present value of benefits for inactive members	\$ 1,900,848,031	\$ 1,763,271,784
d. Total	\$ 94,263,027,542	\$ 89,322,405,602
3. Current actuarial assets	89,033,023,666	86,034,962,833
4. Unfunded actuarial accrued liability (UAAL) (Item B2d - Item B3)	\$ 5,230,003,876	\$ 3,287,442,769
5. Amount of State contribution available to fund unfunded actuarial accrued liability (Item A4c x Item A1)	\$ (15,453,698)	\$ (67,009,725)
6. Years to fund unfunded actuarial accrued liability	Never	Never
	<u>Rate of Increase in Covered Payroll</u>	
	0.00%	Never
	3.00%	Never
	4.00%	Never
	4.75%	Never
	6.00%	Never
7. Annual Required Contribution Rate (ARC) (Normal cost + 30-year amortization of UAAL, but not less than 6.00% of pay)	7.39%	7.15%

\*Also adjusted for payroll growth rate assumption.



GROWTH OF COVERED PAYROLL AND ACTIVE MEMBERS

Year Ending August 31, (1)	Covered Payroll		Active Members			Average Salary		
	Amount in \$ Millions (2)	Percent Increase (3)	Number (4)	Percent Increase (5)	Compound Increase Between Year Indicated and 08-31-2003 (6)	Average Salary (7)	Percent Increase (8)	Compound Increase Between Year Indicated and 08-31-2003 (9)
1976	\$ 2,875	11.3%	331,049	--	3.1%	\$ 8,685	--	5.2%
1977	3,246	12.9%	348,969	5.4%	3.0%	9,303	7.1%	5.1%
1978	3,636	12.0%	361,487	3.6%	3.0%	10,058	8.1%	5.0%
1979	3,928	8.0%	374,078	3.5%	3.0%	10,500	4.4%	5.0%
1980	4,378	11.5%	385,332	3.0%	3.0%	11,363	8.2%	4.9%
1981	4,970	13.5%	389,735	1.1%	3.0%	12,751	12.2%	4.6%
1982	5,616	13.0%	395,578	1.5%	3.1%	14,196	11.3%	4.3%
1983	6,378	13.6%	404,656	2.3%	3.2%	15,761	11.0%	3.9%
1984	6,652	4.3%	404,976	0.1%	3.3%	16,427	4.2%	3.9%
1985	7,547	13.5%	413,938	2.2%	3.4%	18,234	11.0%	3.5%
1986	8,237	9.1%	432,749	4.5%	3.3%	19,034	4.4%	3.5%
1987	8,646	5.0%	443,593	2.5%	3.4%	19,492	2.4%	3.6%
1988	9,166	6.0%	455,460	2.7%	3.4%	20,124	3.2%	3.6%
1989	9,764	6.5%	470,042	3.2%	3.4%	20,772	3.2%	3.6%
1990	10,446	7.0%	483,262	2.8%	3.5%	21,616	4.1%	3.6%
1991	11,181	7.0%	502,625	4.0%	3.4%	22,245	2.9%	3.6%
1992	11,961	7.0%	521,661	3.8%	3.4%	22,928	3.1%	3.7%
1993	13,391	12.0%	575,088	10.2%	2.8%	23,285	1.6%	3.9%
1994	14,167	5.8%	600,484	4.4%	2.6%	23,593	1.3%	4.2%
1995	14,888	5.1%	625,878	4.2%	2.4%	23,788	0.8%	4.6%
1996	15,983	7.4%	652,197	4.2%	2.1%	24,506	3.0%	4.8%
1997	17,044	6.6%	678,749	4.1%	1.8%	25,112	2.5%	5.2%
1998	18,325	7.5%	705,447	3.9%	1.4%	25,977	3.4%	5.6%
1999	19,529	6.6%	736,058	4.3%	0.6%	26,533	2.1%	6.5%
2000	21,920	12.2%	766,906	4.2%	-0.5%	28,583	7.7%	6.1%
2001	23,365	6.6%	797,339	4.0%	-2.7%	29,303	2.5%	7.9%
2002	24,818	6.2%	745,923	-6.4%	1.2%	33,272	13.5%	2.6%
2003	25,756	3.8%	754,715	1.2%	--	34,127	2.6%	--

Note: Beginning August 31, 1993, the above amounts include counts and estimated pay for new entrants with incomplete data. Beginning August 31, 2002, the definition of active member was changed.

Teacher Retirement System of Texas  
Actuarial Valuation - August 31, 2003

TABLE 7

RELATIVE SIZE OF UNFUNDED ACTUARIAL ACCRUED LIABILITY

Year Ending August 31, (1)	Unfunded Actuarial Accrued Liability in \$ Millions (2)	Relative to Covered Payroll		Relative to Actuarial Value of Assets		Relative to Total Actuarial Liabilities (Present Value of Future Benefits)	
		Covered Payroll In \$ Millions (3)	Percent of Covered Payroll (4)	Assets in \$ Millions (5)	Percent of Assets (6)	Actuarial Liabilities in \$ Millions (7)	Percent of Actuarial Liabilities (8)
1969	\$ 1,312	\$ 1,299	101.0%	\$ 1,364	96.2%	\$ 3,960	33.1%
1970	1,444	1,528	94.5%	1,534	94.1%	4,384	32.9%
1971	1,632	1,758	92.8%	1,726	94.6%	5,100	32.0%
1972	1,720	1,904	90.5%	1,937	88.8%	5,551	31.0%
1973	1,633	2,079	78.5%	2,171	75.2%	5,733	28.5%
1974	1,739	2,246	77.4%	2,394	72.6%	6,207	28.0%
1975	1,998	2,583	77.4%	2,764	72.3%	7,143	28.0%
1976	2,445	2,875	85.0%	3,103	78.8%	8,067	30.3%
1977	2,879	3,246	88.7%	3,531	81.5%	9,626	29.9%
1978	2,422	3,636	66.6%	4,016	60.3%	9,858	24.6%
1979	3,322	3,928	84.6%	4,529	73.3%	12,336	26.9%
1980	2,785	4,378	63.6%	5,342	52.1%	12,181	22.9%
1981	3,300	4,970	66.4%	6,386	51.7%	13,890	23.8%
1982	3,864	5,616	68.8%	7,373	52.4%	16,135	23.9%
1983	4,549	6,378	71.3%	8,586	53.0%	20,277	22.4%
1984	4,849	6,652	72.9%	9,851	49.2%	22,456	21.6%
1985	6,474	7,547	85.8%	12,096	53.5%	29,618	21.9%

**TABLE 7**  
**Continued**

**Teacher Retirement System of Texas**  
**Actuarial Valuation - August 31, 2003**

**RELATIVE SIZE OF UNFUNDED ACTUARIAL ACCRUED LIABILITY**

Year Ending August 31, (1)	Unfunded Actuarial Accrued Liability in \$ Millions (2)	Relative to Covered Payroll		Relative to Actuarial Value of Assets		Relative to Total Actuarial Liabilities (Present Value of Future Benefits)	
		Covered Payroll In \$ Millions (3)	Percent of Covered Payroll (4)	Assets in \$ Millions (5)	Percent of Assets (6)	Actuarial Liabilities in \$ Millions (7)	Percent of Actuarial Liabilities (8)
1986	5,365	8,237	65.1%	14,939	35.9%	32,273	16.6%
1987	4,096	8,646	47.4%	18,055	22.7%	34,801	11.8%
1988	3,890	9,166	42.4%	20,096	19.4%	37,332	10.4%
1989	3,489	9,764	35.7%	23,302	15.0%	41,084	8.5%
1990	3,343	10,446	32.0%	26,111	12.8%	45,685	7.3%
1991	3,429	11,181	30.7%	28,860	11.9%	49,515	6.9%
1992	3,441	11,959	28.8%	31,201	11.0%	53,123	6.5%
1993	3,440	13,391	25.7%	35,179	9.8%	59,210	5.8%
1994	825	14,167	5.8%	38,843	2.1%	58,351	1.4%
1995	1,956	14,888	13.1%	43,442	4.5%	65,259	3.0%
1996	1,813	15,983	11.3%	47,487	3.8%	68,948	2.6%
1997	146	17,044	0.9%	53,760	0.3%	74,677	0.2%
1998	(2,463)	18,325	-13.4%	60,357	-4.1%	79,603	-3.1%
1999	(2,190)	19,529	-11.2%	69,435	-3.2%	91,563	-2.4%
2000	(5,446)	21,920	-24.8%	79,328	-6.9%	100,414	-5.4%
2001	(2,135)	23,365	-9.1%	86,352	-2.5%	113,663	-1.9%
2002	3,287	24,818	13.2%	86,035	3.8%	118,100	2.8%
2003	5,230	25,756	20.3%	89,033	5.9%	123,677	4.2%

CHANGE IN PLAN NET ASSETS

	Year Ending August 31, 2003	
	(1)	
I. <u>Revenue for the Year</u>		
A. Contribution and fees		
1. Member contributions	\$ 1,516,801,535	
2. State contributions - State of Texas	1,239,070,201	
3. State contributions - 415 Excess Plan	461,925	
4. State contributions - Employers	182,536,228	
5. Reinstatement of withdrawals	100,499,600	
6. Reinstatement fees	54,911,252	
7. Appropriation for expenses	-	
8. Total	-	\$ 3,094,280,741
B. Income		
1. Interest	\$ 1,224,502,529	
2. Dividends	900,563,260	
3. Net appreciation in fair value of investments	5,673,389,054	
4. Net income on operations of real estate		
5. Income from Securities Lending	22,427,579	
6. Investment expenses	(14,604,331)	
7. Total		7,806,278,091
C. Other Adjustments	\$ -	
D. Total Revenue		\$ 10,900,558,832
II. <u>Expenditures for the Year</u>		
A. Refund of Contributions		\$ 186,082,670
B. Benefit Payments		
1. Service retirements	\$ 3,892,777,093	
2. DROP payments	89,305,527	
3. Partial Lump Sum Option payments	427,944,774	
4. 415 Excess Plan payments	461,925	
5. Disability retirements	122,409,366	
6. Death and survivor benefits	196,378,638	
7. Net ERS/TRS transfer payments		
a. Transfer to ERS	28,609,871	
b. Transfer from ERS	(4,037,793)	
c. Net transfer	\$ 24,572,078	
8. Total benefits		\$ 4,753,849,401
C. Expenses		
1. Gross expenses		
a. Administrative expenses	\$ 23,428,162	
2. Miscellaneous reimbursements	(1,501)	
3. Total expenses		23,426,661
D. Total Expenditures		\$ 4,963,358,732
III. <u>Net Increase in Plan Net Assets (Item I.D. - Item II.D.)</u>		\$ 5,937,200,100

ESTIMATION OF YIELDS

Item (1)	Year Ending August 31, 2003 (2)	Year Ending August 31, 2002 (3)
A. Market value yield		
1. Beginning of year net market assets	\$ 71,695,802,361	\$ 79,428,239,521
2. Investment income	\$ 7,782,851,430	\$ (6,098,932,157)
3. End of year market assets	\$ 77,633,002,461	\$ 71,695,802,361
4. Estimated market value yield	11.0%	-7.8%
B. Actuarial value yield		
1. Beginning of year actuarial assets	\$ 86,034,962,833	\$ 86,351,960,060
2. Investment income	\$ 4,843,712,163	\$ 1,315,032,390
3. End of year actuarial assets	\$ 89,033,023,666	\$ 86,034,962,833
4. Estimated actuarial value yield	5.7%	1.5%

ACTUAL VERSUS EXPECTED ACTUARIAL ASSETS

Item (1)	Year Ending August 31, 2003 (2)	Year Ending August 31, 2002 (3)
1. Actuarial assets, beginning of year	\$ 86,034,962,833	\$ 86,351,960,060
2. Total contributions during year	3,094,280,741	2,920,429,953
3. Benefits paid during year (including DROP)	(4,753,849,401)	(4,366,038,505)
4. Refunds paid during year	(186,082,670)	(186,421,065)
5. Expenses for the year	N/A	N/A
6. Assumed net investment income at 8%		
a. Beginning of year assets	\$ 6,882,797,027	\$ 6,908,156,805
b. Contributions	\$ 123,771,230	116,817,198
c. Benefits	\$ (190,153,976)	(174,641,540)
d. Refunds	\$ (7,443,307)	(7,456,843)
e. Expenses	N/A	N/A
f. Total	\$ 6,808,970,974	\$ 6,842,875,620
7. Expected actuarial assets, end of year (Sum of Items 1 through 6)	\$ 90,998,282,477	\$ 91,562,806,063
8. Actual actuarial assets, end of year	\$ 89,033,023,666	\$ 86,034,962,833
9. Asset gain (loss) for year (Item 8 - Item 7)	\$ (1,965,258,811)	\$ (5,527,843,230)
10. Asset gain (loss) as % of actual actuarial assets	-2.21%	-6.43%

GAIN OR LOSS FOR THE YEAR

Item (1)	Year Ending August 31, 2003 (2)	Year Ending August 31, 2002 (3)
<b>A. CALCULATION OF TOTAL GAIN OR LOSS</b>		
1. Unfunded actuarial accrued liability (UAAL),		
a. Previous year, before Assumption & Method changes	\$ 3,287,442,769	\$ (2,135,175,443)
b. Previous year, after Assumption & Method changes	3,287,442,769	\$ (2,982,708,210)
2. Normal cost for the year	3,238,828,196	3,049,111,638
3. Contributions for the year	(3,094,280,741)	(2,920,429,953)
4. Interest at 8%		
a. On UAAL	262,995,422	(238,616,657)
b. On normal cost	259,106,256	243,928,931
c. On contributions	<u>(123,771,230)</u>	<u>(116,817,198)</u>
d. Total	398,330,448	(111,504,924)
5. Expected UAAL (Sum of Items A1 through A4)	3,830,320,672	(2,965,531,449)
6. Actual UAAL	5,230,003,876	3,287,442,769
7. Gain (loss) for the year (Item A5 - Item A6)	\$ (1,399,683,204)	\$ (6,252,974,218)
<b>B. SOURCE OF GAINS AND LOSSES</b>		
1. Asset gain (loss) for the year (Table 9)	\$ (1,965,258,811)	\$ (5,527,843,230)
2. Asset gain (loss) as a % of actuarial assets	-2.21%	-6.43%
3. Total actuarial accrued liability gain (loss) for year (Item A7 - Item B1)	565,575,607	(725,130,988)
4. Analysis of actuarial accrued liability loss		
a. Legislative changes	-	-
b. Liability experience	<u>565,575,607</u>	<u>(725,130,988)</u>
c. Total	\$ 565,575,607	\$ (725,130,988)
5. Experience liability gain (loss) as % of total actuarial accrued liability (Item B4b as % of total actuarial accrued liability)	0.60%	(0.81%)

ANALYSIS OF CHANGE IN FUNDING PERIOD

Basis (1)	UAAL (\$ Millions) (2)	Normal Cost Rate (3)	Total Contribution Rate (4)	Funding Period (5)	Change in Funding Period (6)
1. 2002 Valuation	3,287	12.67%	12.40%	Never	--
2. Expected 2003 UAAL using expected contributions	3,752	12.67%	12.40%	Never	--
3. Expected 2003 UAAL using actual contributions	3,830	12.67%	12.40%	Never	--
4. Expected 2003 UAAL after Legislative changes	3,830	12.67%	12.40%	Never	--
5. 2003 UAAL using expected assets and actual liabilities	3,265	12.46%	12.40%	Never	--
6. 2003 UAAL using actual assets and liabilities	5,230	12.46%	12.40%	Never	--



HISTORY OF CASH FLOW

Year Ending August 31, (1)	Expenditures During the Year						Total (7)	External Cash Flow for the Year <sup>2</sup> (8)	Market Value of Assets (9)	External Cash Flow as Percent of Market Value (10)
	Contributions for the Year <sup>1</sup> (2)	Benefit Payments (3)	Refund of Contributions (4)	Transfer to Employees Retirement System (5)	Expenses (6)					
1988	\$ 1,271,996,942	\$ (874,560,122)	\$ (113,178,276)	\$ -	\$ (15,155,899)	\$ (1,002,894,297)	\$ 269,102,645	\$ 19,188,847,074	1.4%	
1989	1,356,713,827	(935,943,118)	(118,507,638)	(899,352)	(14,314,799)	(1,069,664,907)	287,048,920	23,941,442,793	1.2%	
1990	1,502,302,663	(1,084,811,284)	(127,848,570)	-	(17,093,847)	(1,229,753,701)	272,548,962	24,555,334,041	1.1%	
1991	1,600,092,649	(1,185,833,198)	(133,870,775)	-	(21,115,074)	(1,340,819,047)	259,273,602	29,695,711,781	0.9%	
1992	1,663,664,046	(1,361,265,788)	(130,032,827)	-	(22,150,155)	(1,513,448,770)	150,215,276	32,766,914,759	0.5%	
1993	1,792,999,133	(1,446,714,384)	(122,114,590)	-	(25,779,705)	(1,594,608,679)	198,390,454	37,981,853,461	0.5%	
1994	1,887,530,125	(1,604,046,513)	(133,227,183)	-	(25,975,865)	(1,763,249,561)	124,280,564	39,277,226,893	0.3%	
1995	1,980,678,842	(1,731,747,042)	(146,099,978)	-	(25,896,749)	(1,903,743,769)	76,935,073	45,965,182,547	0.2%	
1996	1,927,100,219	(2,105,423,164)	(162,257,383)	-	(25,457,726)	(2,293,138,273)	(366,038,054)	50,101,367,986	(0.7%)	
1997	2,052,261,338	(2,217,173,754)	(166,125,695)	-	(24,468,347)	(2,407,767,796)	(355,506,458)	62,160,927,516	(0.6%)	
1998	2,197,477,431	(2,503,386,682)	(183,430,398)	-	(26,803,767)	(2,713,620,847)	(516,143,416)	66,456,822,943	(0.8%)	
1999	2,334,197,510	(2,639,947,187)	(206,354,473)	-	(29,146,859)	(2,875,448,519)	(541,251,009)	79,910,553,792	(0.7%)	
2000	2,569,218,427	(3,360,116,181)	(214,999,991)	-	(31,133,307)	(3,606,249,479)	(1,037,031,052)	89,987,138,209	(1.2%)	
2001	2,712,395,592	(3,667,711,511)	(214,434,792)	-	(32,641,273)	(3,914,787,576)	(1,202,391,984)	79,428,239,521	(1.5%)	
2002	2,920,429,953	(4,366,038,505)	(186,421,065)	-	(37,518,541)	(4,589,978,111)	(1,669,548,158)	71,695,802,361	(2.3%)	
2003	3,094,280,741	(4,753,849,401)	(186,082,670)	-	(38,030,992)	(4,977,963,063)	(1,883,682,322)	77,633,002,461	(2.4%)	

<sup>1</sup> Column (2) includes employee and employer contributions, as well as any service purchase or account reinstatement receipts during the year

<sup>2</sup> Column (8) = Column (2) - Column (7)

HISTORY OF CONTRIBUTION RATES

<u>Fiscal Year</u>	<u>GASB 25 Annual Required Contribution Rate</u>	<u>State Contribution Rate</u>	<u>Member Contribution Rate</u>	<u>Total Contribution Rate</u>
(1)	(2)	(3)	(4)	(5)
1976/77		6.00%	6.00%	12.00%
1977/78		7.50%	6.65%	14.15%
1978/79		7.50%	6.65%	14.15%
1979/80		8.50%	6.65%	15.15%
1980/81		8.50%	6.65%	15.15%
1981/82		8.50%	6.65%	15.15%
1982/83		8.50%	6.65%	15.15%
1983/84		7.10%	6.00%	13.10%
1984/85		7.10%	6.00%	13.10%
1985/86		8.00%	6.40%	14.40%
1986/87		8.00%	6.40%	14.40%
1987/88		7.20%	6.40%	13.60%
1988/89		7.20%	6.40%	13.60%
1989/90		7.65%	6.40%	14.05%
1990/91		7.65%	6.40%	14.05%
1991/92		7.31%	6.40%	13.71%
1992/93		7.31%	6.40%	13.71%
1993/94		7.31%	6.40%	13.71%
1994/95		7.31%	6.40%	13.71%
1995/96		6.00%	6.40%	12.40%
1996/97	6.00%	6.00%	6.40%	12.40%
1997/98	6.00%	6.00%	6.40%	12.40%
1998/99	6.00%	6.00%	6.40%	12.40%
1999/00	6.00%	6.00%	6.40%	12.40%
2000/01	6.00%	6.00%	6.40%	12.40%
2001/02	6.00%	6.00%	6.40%	12.40%
2002/03	7.15%	6.00%	6.40%	12.40%
2003/04	7.39%	6.00%	6.40%	12.40%

**Teacher Retirement System of Texas**  
**Actuarial Valuation - August 31, 2003**

**TABLE 14a**

**SCHEDULE OF FUNDING PROGRESS**  
(as required by GASB No. 25)

Valuation As of August 31, (1)	Actuarial Value of Assets (2)	Actuarial Accrued Liability (AAL) (3)	Unfunded AAL (UAAAL) (3) - (2) (4)	Funding Ratio Assets as % of AAL (2)/(3) (5)	Annual Covered Payroll (6)	UAAAL As a % of Covered Payroll (4)/(6) (7)
	\$	\$	\$			
2003	89,033	94,263	5,230	94.5%	25,756	20.3%
2002	86,035	89,322	3,287	96.3%	24,818	13.2%
2001	86,352	84,217	(2,135)	102.5%	23,365	(9.1%)
2000	79,328	73,882	(5,446)	107.4%	21,920	(24.8%)
1999	69,435	67,245	(2,190)	103.3%	19,529	(11.2%)
1998	60,357	57,893	(2,463)	104.3%	18,325	(13.4%)
1997	53,760	53,906	146	99.7%	17,044	0.9%
1996	47,487	49,300	1,813	96.3%	15,983	11.3%
1995	43,442	45,398	1,956	95.7%	14,888	13.1%
1994	38,843	39,668	825	97.9%	14,167	5.8%
1993	35,179	38,619	3,440	91.1%	13,391	25.7%
1992	31,201	34,643	3,441	90.1%	11,959	28.8%
1991	28,860	32,289	3,429	89.4%	11,181	30.7%
1990	26,111	29,455	3,343	88.6%	10,446	32.0%
1989	23,301	26,790	3,488	87.0%	9,764	35.7%
1988	20,095	23,985	3,890	83.8%	9,166	42.4%
1987	18,055	22,151	4,096	81.5%	8,646	47.4%

Note: Amount in \$ millions.

**SCHEDULE OF EMPLOYER CONTRIBUTIONS**  
(As required by GASB No. 25)

<u>Fiscal Year Ended</u>	<u>Annual Required Contribution</u>	<u>Percentage Contributed</u>
(1)	(2)	(3)
2003	7.15%	84%
2002	6.00%	100%
2001	6.00%	100%
2000	6.00%	100%
1999	6.00%	100%
1998	6.00%	100%
1997	6.00%	100%
1996	6.00%	100%
1995	7.31%	100%
1994	7.31%	100%
1993	7.31%	100%
1992	7.31%	100%
1991	7.65%	100%

**NOTES TO REQUIRED SUPPLEMENTARY INFORMATION**  
 (as required by GASB No. 25)

The information presented in the required supplementary schedules was determined as part of the actuarial valuations at the dates indicated. Additional information as of the latest actuarial valuation follows:

Valuation date	August 31, 2003
Actuarial cost method	Entry Age Normal
Amortization method	Level percent, open
Remaining amortization period	Never*
Asset valuation method	5-year smoothed market
Actuarial assumptions:	
Investment rate of return **	8.00%
Projected salary increases **	4.00% to 26.15%
Weighted-average at valuation date	6.77%
**Includes inflation at	3.0%
Cost-of-living adjustments	None

\* The current employer contribution of 6.00% is not sufficient to amortize the unfunded liability of the System. Consequently, the amortization period is never. The Annual Required Contribution (ARC) of 7.39% shown on Table 13 has an amortization period of 30 years.

STATISTICAL INFORMATION

	August 31,	
	2003	2002
	(1)	(2)
A. Number		
1. Active Members		
a. Total active members	754,715	745,923
b. Average age	43	43
c. Average service	9	9
2. Inactive Vested Members		
a. Male members	9,494	6,930
b. Female members	38,327	31,624
c. Total inactive vested members	47,821	38,554
3. Inactive Nonvested Members	60,755	62,168
B. Annualized Salaries		
1. Active members		
a. Total active members	\$ 25,756,162,962	\$ 24,818,416,690
b. Average annual salary	34,127	33,272
C. Accumulated Members Contributions		
1. Total Active Members	16,444,962,353	15,403,168,280
2. Inactive Vested Members		
a. Male members	\$ 273,546,141	\$ 199,861,096
b. Female members	898,461,074	718,575,834
c. Total inactive vested members	\$ 1,172,007,215	\$ 918,436,930
3. Inactive Nonvested Members	\$ 166,059,923	\$ 143,745,906
D. Active Members in DROP (included in above totals)		
1. Number	2,581	3,290
2. DROP Balance	\$ 301,698,574	\$ 302,608,868
E. Members With No Contributions in Most Recent Plan Year, but With Contributions During Last Five Plan Years *		
1. Treated as active members		
a. Number	9,173	8,666
b. Annualized salaries	\$ 20,719,428	\$ 18,800,886
2. Treated as inactive vested members		
a. Number	32,697	25,241
b. Accumulated contributions	\$ 797,265,435	\$ 544,619,075
3. Treated as inactive nonvested members		
a. Number	49,858	52,749
b. Accumulated contributions	\$ 149,730,916	\$ 133,069,280

\* The counts and amounts in item E are included in items A, B and C above.

STATISTICAL INFORMATION

	August 31,	
	2003	2002
	(1)	(2)
F. Persons Receiving Benefits		
1. Number		
a. Life annuities*	199,188	183,619
b. Annuities certain	1,284	1,188
c. Disability annuities - less than 10 years of service	314	287
d. Disability annuities - 10 or more years of service	7,704	7,571
e. Incomplete Data Records	0	0
f. Survivor annuities		
1) Currently in pay	8,165	8,002
2) Deferred	822	774
3) Total	8,987	8,776
g. Total persons receiving benefits	217,477	201,441
2. Annual Annuities		
a. Life annuities **	\$ 4,234,112,569	\$ 3,883,184,000
b. Annuities certain **	13,609,317	12,824,000
c. Disability annuities - less than 10 years of service	648,893	597,000
d. Disability annuities - 10 or more years of service	110,577,871	109,059,000
e. Survivor annuities		
1) Currently in pay	22,174,838	23,631,000
2) Deferred	231,311	221,000
3) Total	22,406,150	23,852,000
f. Total persons receiving benefits	\$ 4,381,354,800	\$ 4,029,516,000
g. Average monthly annuities		
1) Life annuities **	\$ 1,771	\$ 1,762
2) Annuities certain **	883	900
3) Disability annuities - 10 or more years of service	1,196	1,200
h. DROP Lump Sum payments during year	\$ 89,305,527	\$ 48,697,687
i. Partial Lump Sum Option payments during year	\$ 427,944,774	\$ 386,442,648

\* Includes 1,215 disabled annuitants who are receiving a retirement benefit

\*\* Annual and average life annuity amounts represent values after Partial Lump Sum Option Elections.

STATEMENT OF PLAN NET ASSETS

	August 31, 2003	August 31, 2002
	(1)	(2)
<b>A. ASSETS</b>		
1. Current Assets		
a. Cash and short term investments		
1) Cash on hand and State Treasury	\$ 1,038,117,534	\$ 843,966,154
2) Short term investments	649,509,232	155,166,395
b. Accounts Receivable		
1) Member contributions	47,656,393	43,755,910
2) School districts	11,757,750	10,003,595
3) State	45,081,175	50,981,538
4) Sale of investments	1,021,223,979	124,252,018
5) Interest and dividends	305,842,250	310,013,325
6) Other	369,531	209,609
c. Prepaid assets	0	0
2. Long Term Investments		
a. Fixed income	\$ 21,282,297,734	\$ 21,936,912,851
b. Real estate mortgages	1,990,765,080	1,585,117,738
c. Equities	52,697,198,670	47,158,684,804
d. Real estate held for sale		5,300,000
e. Total long term investments	\$ 75,970,261,484	\$ 70,686,015,393
3. Other Assets		
a. Land	\$ 1,658,310	\$ 1,658,310
b. Building and equipment after depreciation	30,533,007	31,188,802
c. Deferred assets	0	0
d. Total other assets	\$ 32,191,317	\$ 32,847,112
4. Total Assets	\$ 79,122,010,645	\$ 72,257,211,049
<b>B. LIABILITIES</b>		
1. Current Liabilities		
a. Accounts payable	\$ 3,371,476	\$ 5,674,985
b. Benefits payable	447,463,997	409,870,523
c. Due to State's General Revenue Fund	0	0
d. Investments purchased payable	1,008,854,827	117,526,610
e. Total current liabilities	\$ 1,459,690,300	\$ 533,072,118
2. Deferred Credits	29,317,884	28,336,570
3. Total Liabilities and Deferred credits	1,489,008,184	561,408,688
4. Net Assets Held in Trust	\$ 77,633,002,461	\$ 71,695,802,361
<b>C. ASSET ALLOCATION FOR CASH &amp; LONG TERM INVESTMENTS</b>		
1. Cash	2.2%	1.4%
2. Fixed Income	27.4%	30.6%
3. Real Estate Mortgages	2.6%	2.2%
4. Equities	67.8%	65.8%
5. Real Estate Held for Sale	0.0%	0.0%
6. Total	100.0%	100.0%



Distribution of Active Members by Age and by Years of Service  
As of 08/31/2003

Attained Age	Years of Credited Service													Total
	0	1	2	3	4	5-9	10-14	15-19	20-24	25-29	30-34	35-39		
	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	
Under 25	8,935 \$25,575	4,332 \$24,127	1,587 \$19,654	622 \$19,903	313 \$21,706									15,789 \$24,283
25-29	14,297 \$30,155	14,627 \$32,073	12,662 \$33,674	9,177 \$34,624	11,687 \$34,416	125								62,575 \$32,761
30-34	10,739 \$26,976	10,149 \$28,827	8,802 \$30,478	7,809 \$32,659	32,908 \$37,273	6,928 \$38,393	94							77,429 \$33,595
35-39	18,376 \$26,257	11,187 \$25,851	9,109 \$27,278	7,826 \$29,082	25,586 \$32,892	20,802 \$41,403	5,186 \$41,961	144						98,217 \$32,309
40-44	8,825 \$24,053	8,752 \$25,581	7,877 \$26,465	7,082 \$27,515	25,297 \$30,674	17,696 \$37,717	16,903 \$46,220	5,929						98,533 \$33,952
45-49	6,920 \$24,860	7,175 \$26,683	6,691 \$27,642	6,159 \$28,476	25,009 \$31,231	19,786 \$36,177	14,244 \$43,584	15,607			130			108,340 \$36,783
50-54	5,300 \$26,200	5,259 \$28,086	4,796 \$29,392	4,542 \$29,840	19,873 \$32,215	19,096 \$36,831	15,956 \$42,095	12,163			4,276			106,373 \$39,822
55-59	3,358 \$11,553	3,350 \$27,676	3,082 \$28,571	2,732 \$29,853	11,985 \$31,816	12,330 \$35,842	12,139 \$40,496	9,779			6,822			73,549 \$39,829
60-64	1,591 \$5,000	1,652 \$23,857	1,508 \$25,901	1,413 \$25,880	6,010 \$28,160	5,605 \$32,764	5,455 \$38,140	4,011			2,103			34,194 \$36,189
65-69	843 \$17,058	852 \$17,674	874 \$18,944	708 \$19,093	2,729 \$22,530	2,372 \$26,724	1,815 \$31,168	1,329			736			14,259 \$29,075
Total	4 \$8,299	79,184 \$23,547	67,335 \$26,155	56,988 \$28,448	161,397 \$32,712	104,740 \$37,294	71,792 \$42,493	48,962			14,067			689,258 \$35,336

Note: table includes contributing members (except for the new entrant data errors) and those noncontributing members assumed to be active.

**DISTRIBUTION OF LIFE ANNUITIES BY AGE**

<u>Age</u>	<u>Number</u>	<u>Annual Annuities</u>	<u>Monthly Average Annuity</u>
(1)	(2)	(3)	(4)
Up to 35	305	\$ 3,859,031	\$ 1,054
35-40	159	2,272,237	1,296
40-44	275	3,518,934	1,066
45-49	453	6,371,639	1,172
50-54	6,841	195,242,798	2,378
55-59	24,860	634,758,674	2,128
60-64	35,253	794,394,508	1,878
65-69	38,402	785,564,472	1,705
70-74	34,383	698,646,996	1,693
75-79	25,127	488,981,696	1,622
80-84	16,783	318,068,520	1,579
85-89	9,349	172,959,244	1,542
90-94	4,141	79,176,026	1,593
95 & up	2,857	49,559,416	1,446
<b>TOTAL</b>	<b>199,188</b>	<b>\$ 4,233,574,191</b>	<b>\$ 1,771</b>

**DISTRIBUTION OF DISABLED ANNUITIES BY AGE**

<u>Age</u>	<u>Number</u>	<u>Annual Annuities</u>	<u>Monthly Average Annuity</u>
(1)	(2)	(3)	(4)
Up to 40	42	\$ 342,469	\$ 680
40-44	136	1,495,371	916
45-49	398	5,152,144	1,079
50-54	900	12,965,766	1,201
55-59	1,245	16,797,333	1,124
60-64	1,228	15,989,757	1,085
65-69	1,181	17,517,471	1,236
70-74	1,181	19,475,198	1,374
75-79	720	10,859,066	1,257
80-84	441	5,937,759	1,122
85-89	177	2,042,944	962
90-94	47	477,988	847
95 & up	8	88,805	925
<b>TOTAL</b>	<b>7,704</b>	<b>\$ 109,142,071</b>	<b>\$ 1,181</b>

**SUMMARY OF THE BENEFIT PROVISIONS OF THE  
RETIREMENT SYSTEM AS OF AUGUST 31, 2003**

The Teacher Retirement System of Texas makes retirement, disability, and death and survivor benefits to all employees of the public school system of Texas. The major provisions of the System may be summarized as follows:

A. RETIREMENT BENEFITS

1. Normal Retirement Date:

- (a) end of month following age 65 and 5 years of creditable service,
- (b) end of month following age 60 and 20 years of creditable service, or
- (c) end of month following attainment of “Rule of 80”.

2. Standard Annuity:

The product of 2.3% of the member's best 3-year average compensation multiplied by years of creditable service.

3. Normal Retirement Benefits:

Greater of standard annuity, or \$150 per month.

4. Early Retirement:

- (a) after age 55 with 5 or more years of creditable service, or
- (b) after 30 years of creditable service, regardless of age.

5. Early Retirement Benefits:

- (a) If at least age 55 with 5 to 19 years of creditable service, normal retirement benefit earned to the date of retirement, reduced according to the following table:

Years of Service	AGE AT DATE OF RETIREMENT										
	55	56	57	58	59	60	61	62	63	64	65
5-19	47%	57%	55%	59%	63%	67%	73%	80%	87%	93%	100%

- (b) If at least 55 and 20 or more years of creditable service, or any age and at least 30 years of creditable service, normal retirement benefit earned to the date of retirement, reduced according to the following table:

Years of Service	AGE AT DATE OF RETIREMENT					
	55	56	57	58	59	60
20	90%	92%	94%	96%	98%	100%
21	92%	94%	96%	98%	100%	100%
22	94%	96%	98%	100%	100%	100%
23	96%	98%	100%	100%	100%	100%
24	98%	100%	100%	100%	100%	100%
25	100%	100%	100%	100%	100%	100%
26	100%	100%	100%	100%	100%	100%
27	100%	100%	100%	100%	100%	100%
28	100%	100%	100%	100%	100%	100%
29	100%	100%	100%	100%	100%	100%
30 or more	100%	100%	100%	100%	100%	100%

6. Normal Form of Benefit:

Straight life annuity payable monthly with benefits commencing at end of month following retirement with the last payment payable on behalf of the annuitant in the month of death.

7. Optional Forms:

**Option 1** - joint and 100% survivor, benefit reverts to normal form following the death of the joint annuitant.

**Option 2** - joint and 50% contingent survivor, benefit reverts to normal form following the death of the joint annuitant.

**Option 3** - 5 years certain and life.

**Option 4** - 10 years certain and life.

**Option 5** - Joint and 75% contingent survivor, benefit reverts to normal form following the death of the joint annuitant.

**Partial Lump**

**Sum Option** - Members, eligible for unreduced retirement and not participating in the DROP program, may select a partial lump-sum distribution not to exceed an amount equal to 36 months of a standard service retirement annuity. When this option is selected, the member's annuity will be actuarially reduced to reflect that distribution and will be computed so that no actuarial loss results to TRS.

8. Deferred Retirement Option Plan (DROP):

A. Eligibility:

- 1) Must be an active contributing member.
- 2) Must be eligible for a standard service retirement annuity that is not reduced for retirement at an early age.
- 3) Must have at least 25 years of creditable service.

B. Program Summary:

- 1) Participation begins the 1st of the month following the member's application and TRS approval of the application. Participation may begin in any month.
- 2) Participation may range from a minimum of one year to a maximum of five years, in 12-month increments. The member elects the period of participation at the outset.

- 3) The amount of the member's standard annuity is established as of the date of participation in the DROP. This amount is also used in determining the monthly deposit to the DROP account. A member will not accumulate further retirement annuity benefits during DROP participation, i.e., no further credit will be achieved from years of service or compensation changes.
  - 4) Any special service credit that a member wishes to purchase must be paid in full prior to DROP participation.
  - 5) A separate DROP account will be established for each participating member. Each month, an amount equal to 60 percent of the calculated standard annuity will be deposited into the account. At retirement, the account plus interest at the rate of five percent per annum will be distributed.
  - 6) Member and employer contributions continue during DROP participation. Contributions are not deposited into the member's DROP account and will not be refunded.
  - 7) Three events terminate participation - death, retirement or expiration of the participation period.
  - 8) Upon retirement, participating members will receive their retirement annuity plus the balance in their DROP account including interest. DROP balances may be paid by TRS in a lump sum or on a time payout selected by the member.
9. Partial Lump-Sum Option Program:

Members, eligible for unreduced retirement and not participating in the DROP program, may select a partial lump-sum distribution not to exceed an amount equal to 36 months of a standard service retirement annuity. When this option is selected, the member's annuity will be actuarially reduced to reflect that distribution and will be computed so that no actuarial loss results to TRS.

Percentages shown in the table below will be applied to reduce a member's standard annuity when he or she elects a partial lump-sum distribution.

The percentage shown in the following table will be applied to reduce the standard annuity when the partial lump-sum option is elected.

Age	Percentage of Standard Annuity		
	12 Months	24 Months	36 Months
45	91.66	83.32	74.98
46	91.62	83.23	74.85
47	91.57	83.13	74.70
48	91.51	83.03	74.54
49	91.46	82.92	74.37
50	91.40	82.79	74.19
51	91.33	82.66	73.99
52	91.26	82.52	73.78
53	91.18	82.37	73.55
54	91.10	82.20	73.31
55	91.01	82.03	73.04
56	90.92	81.84	72.75
57	90.81	81.63	72.44
58	90.70	81.41	72.11
59	90.58	81.17	71.75
60	90.46	80.91	71.37
61	90.32	80.64	70.95
62	90.24	80.48	70.71
63	90.01	80.03	70.04
64	89.85	79.69	69.54
65	89.67	79.34	69.01
66	89.48	78.96	68.44
67	89.28	78.56	67.84
68	89.06	78.13	67.19
69	88.84	77.67	66.51
70	88.59	77.18	65.77
71	88.32	76.65	64.97
72	88.03	76.07	64.10
73	87.72	75.43	63.15
74	87.37	74.74	62.12
75	87.00	74.00	61.00
76	86.59	73.19	59.78
77	86.15	72.31	58.46
78	85.68	71.35	57.03
79	85.16	70.31	55.47
80	84.59	69.18	53.78
81	83.98	67.96	51.94
82	83.32	66.64	49.96
83	82.61	65.21	47.82
84	81.83	63.67	45.50
85	81.00	62.00	42.99
86	80.09	60.18	40.27
87	79.09	58.19	37.28
88	78.00	56.00	34.00
89	76.81	53.62	30.43
90	75.52	51.04	26.56
91	74.13	48.26	22.39



10. Minimum Annuity Payments:

Total annuity payments shall in no case be less than the member's accumulated contributions at retirement. Upon the death of a retiree, the excess, if any, of accumulated contributions over total annuity payments received prior to death will be paid to the beneficiary.

B. DISABILITY BENEFITS

1. Less than 10 years of creditable service: \$150.00 per month for the shorter of:
  - (a) disability, or
  - (b) number of months of creditable service as of date of disability retirement.
2. At least 10 years of creditable service: the greater of accrued retirement income or \$6.50 per month per year of creditable service, payable for duration of disability; disability presumed continuous if it continues past age 60. The minimum disability payment made on behalf of a member will be no less than \$150.00 per month.

C. DEATH BENEFITS

1. Eligibility: applicable if death occurs:
  - (a) in service,
  - (b) while absent from service for good cause,
  - (c) while not in service but eligible to retire,
  - (d) while not in service but would be eligible to retire without additional service before April 15 of the sixth school year after last creditable year of service, or
  - (e) while receiving a disability benefit, but only eligible for 2f, below.
2. Benefit: any one of the following, at the option of the beneficiary:
  - (a) a lump sum (not to exceed \$80,000) equal to two times the rate of pay for the last year of service,
  - (b) a lump sum (not to exceed \$80,000) equal to two times annual pay for the year preceding last year of service,

- (c) 60 monthly payments of accrued standard annuity,
- (d) a life annuity payable under Option 1 as if the member had retired on the last day of the month preceding death,
- (e) a refund of accumulated contributions, or
- (f) the survivor benefits, if eligible.

Note: Items (c) and (d) available only if member has at least 5 years of creditable service.

- 3. Benefit if Absent from Service Without Good Cause: return of accumulated contributions.

D. SURVIVOR BENEFITS

- 1. Benefits: (a) or (b) at the election of the beneficiary:

- (a) lump sum payment of \$10,000, or
- (b) lump sum payment of \$2,500 plus one of the following, if the designated beneficiary is eligible:
  - (i) if a spouse or dependent parent, \$250 per month commencing at age 65,
  - (ii) if a spouse with children under age 18, \$350 per month until youngest child reaches 18, then \$250 per month commencing at spouse's age 65, or
  - (iii) if dependent children, \$350 per month as long as at least two dependent children under 18, reducing to \$250 per month when there is only one child under 18.

If benefits are payable under (i) or (ii) above and eligible spouse or dependent dies, payments will revert in accordance with (iii) above.

- 2. Eligibility:

- (a) all employees eligible for a death benefit other than refund of accumulated contributions,
- (b) any retired member, in addition to any benefit provided by his or her option of payment, or

- (c) any disabled participant, in lieu of other death benefits (Item C2).

E. VESTING OF BENEFITS

1. Vesting: a member is fully vested after 5 years of creditable service.
2. Benefits upon Vesting: a fully vested member is entitled to the following:
  - (a) upon becoming inactive, not required to withdraw accumulated contributions within seven years,
  - (b) may apply at age 65 for normal retirement benefit equal to accrued standard annuity, or
  - (c) may apply for any other retirement benefits for which he or she is eligible upon satisfying age requirement (if applicable) if he or she satisfied the corresponding service requirement at time of last termination; benefit is based on his or her full accrued standard annuity.

F. MEMBER CONTRIBUTIONS

6.40% of compensation per year.

G. STATE CONTRIBUTIONS

6.00% of member compensation each year.

H. LEGISLATIVE CHANGES MADE BY THE 1991 STATE LEGISLATURE

1. The minimum retirement benefit increased from \$75 to \$100 per month.
2. The disability death benefit changed to the same as a service retirement death benefit.
3. An ad hoc cost of living increase was approved for members who retired prior to May 1, 1989. The increase does not apply to a survivor benefit or to a disability benefit for a member who had less than 10 years of service at the time of retirement or death. The amount of the increase is five-tenths of one percent of each full six-month period between the latest effective date of retirement (or date of death) and August 1, 1991. The increase begins August 1991.

I. LEGISLATIVE CHANGES MADE BY THE 1993 STATE LEGISLATURE

1. Increase in survivor benefit by \$50 per month.
2. Retroactive minimum benefit of \$6.50 per year of service for members retired as of November 1, 1991.
3. An ad hoc cost of living increase approximating a 25% CPI catch-up. The actual percentage increase varies by year of retirement and has a minimum increase of 5%. The increase begins with the January, 1994 annuity check and covers all benefit recipients who began receiving benefits before August 31, 1991, except that it does not apply to survivor benefits or to a disability benefit for a member who had less than 10 years of service at the time of retirement or death.
4. ERS/TRS transfer provisions.
  - (a) Service credit transfers allowed if the participant is a member of both ERS and TRS and has at least three years of service credit in the System from which the member is retiring.
  - (b) A member may reinstate or purchase service credit in the other System prior to making the transfer if that member has at least three years of service credit in the current System.
  - (c) TRS and ERS will jointly set rules for the assumptions used in computing asset transfer amounts. The transfer of funds between ERS and TRS takes place at the time of actual retirement.

J. LEGISLATIVE CHANGES MADE BY THE 1995 STATE LEGISLATURE

1. Unreduced benefits at retirement were expanded to include participants age 50 or older with 30 or more years of service.
2. Annuitants' benefits increased in an amount equal to the greater of:
  - (a) A recalculation of benefits based on
    - (i) January 1, 1995 law with all intervening ad hoc increases, plus
    - (ii) A CPI catch-up increase.

- (b) A recalculation of benefits for retirees who retired before September 1, 1993, based on a 2% multiplier and a minimum annual salary of a classroom teacher or full-time librarian as described by the Education Code. This annual salary is currently \$17,000 based on current Education Code.
- 3. Treat all Option 1 and Option 2 benefits as including the pop-up feature.
- 4. The annuity payment in the month of death is payable on behalf of the annuitant.
- 5. The disability benefit payable when a member has less than ten years of service increased from \$50 per month to \$150 per month for both current and future disabled members. The minimum disability payment made on behalf of a member with ten or more years of service shall be no less than \$150 per month.
- 6. The benefit increase reserve account in TRS was eliminated, resulting in the liability for all annuity benefits being included within the retired reserve account.
- 7. The maximum two-times-pay death benefit payable on behalf of a member would increase from \$60,000 to \$80,000.

K. LEGISLATIVE CHANGES MADE BY THE 1997 STATE LEGISLATURE

- 1. Driver's education pay is added to plan compensation for the determination of a member's best 3-year average compensation.
- 2. Disabled participants are allowed to select a Joint and Survivor annuity option after commencement of disability benefits, if they become married after date of disability.
- 3. Retirees are allowed to change the designated beneficiary for pension benefits payable after their death under certain conditions.
- 4. Adoption of "Rule of 80" criteria for unreduced standard retirement annuity (i.e., sum of member's age & credited service is greater than or equal to 80).
- 5. Elimination of \$6.50 per month per year of service minimum standard retirement annuity benefit.
- 6. Addition of \$50.00 to the minimum survivor benefit.
- 7. Creation of a Deferred Retirement Option Program (DROP), described in Item A8 above.

8. A CPI catch-up ad hoc cost-of-living increase for retired members.

L. LEGISLATIVE CHANGES MADE BY THE 1999 STATE LEGISLATURE

1. Increased multiplier from 2.0% to 2.2% effective September 1, 1999, and an equivalent 10% increase for all retirees.
2. A CPI catch-up ad hoc cost-of-living increase for retired members.
3. Established a partial lump-sum option at time of retirement.
4. DROP participant enrolled on or before August 31, 1999, have a one-year window from September 1, 1999 to revoke DROP participation.
5. For members entering DROP on or after September 1, 1999, the monthly DROP deposit will be reduced from 79% to 60% of the standard annuity.
6. Provides a lump-sum death benefit of \$160,000 for an active member employed by a school district who dies due to a physical assault during the performance of their regular duties.
6. Allows a return to teaching after being retired at least 12 months without a reduction in the retirement benefit under certain circumstances.

M. LEGISLATIVE CHANGES MADE BY THE 2001 STATE LEGISLATURE

1. Increased multiplier from 2.2% to 2.3% effective September 1, 2001, and an equivalent 4.5% increase for all retirees.
2. A 6% ad hoc increase for retired members.
3. Increase in survivor benefits of \$50 per month.
4. Allows a return to work as a bus driver with no reduction in the monthly benefit if retired with an unreduced benefit.
5. Permits purchase of up to 3 years of “air time” if the member has at least 7 years of actual membership service. Purchase price is the full actuarial cost of the purchased service.

N. LEGISLATIVE CHANGES MADE BY THE 2003 STATE LEGISLATURE

1. For employees hired on or after September 1, 2003, a 90-day waiting period is required for participation in TRS. Members may have the option to purchase this service. This provision is set to expire on September 1, 2005.
2. Limits the collection of overpayments to the three years prior to the overpayment discovery, except in cases of fraud or knowledge by the participant that the payments were incorrect.
3. Repealed the requirement that in order to reinstate service withdrawn after August 31, 2003, for the purposes of ERS/TRS transfer, the member must belong to the system from which the service is purchased.
4. Retirees who are employed by a third-party entity are considered to be employees of the school for return to work purposes unless the retiree does not perform duties or provide services in behalf of the school.
5. Retirees may work as a substitute and on a half-time basis during a single calendar month as long as the total days worked do not exceed the number of days for one-half time employment for that month.

**ACTUARIAL ASSUMPTIONS AND METHODS**  
**(Adopted March 31, 2000 and September 27, 2002)**

ACTUARIAL ASSUMPTIONS

1. Investment Return Rate      8.00% per annum, compounded annually, composed of an assumed 3.00% inflation rate and a 5.00% real rate of return
2. Mortality, Withdrawal, Disability Retirement, and Service Retirement Rates:

Rates and scales developed in the actuarial investigation as of August 31, 1999, with values at specimen ages shown in the tables below:

a.

<u>Age</u>	<u>PROBABILITY OF DECREMENT DUE TO</u>	
	<u>Death</u>	<u>Disability Retirement</u>
<u>MALE MEMBERS</u>		
20	.000430	.000003
30	.000727	.000050
40	.000891	.000448
50	.001899	.001514
60	.005581	.002888
70	.018034	.000000
<u>FEMALE MEMBERS</u>		
20	.000242	.000007
30	.000294	.000081
40	.000512	.000293
50	.001033	.001570
60	.002563	.003045
70	.009694	.000000



b.

Probability of Decrement Due to Withdrawal											
Years of Service											
Male Members											
Age	0	1	2	3	4	5	6	7	8	9	10+
20	0.1831	0.1825	0.1675	0.1532	0.1294	0.1148	0.1103	0.1155	0.1148	0.1039	0.0874
30	0.1510	0.1433	0.1385	0.1334	0.1088	0.0867	0.0789	0.0769	0.0734	0.0651	0.0591
40	0.1432	0.1363	0.1335	0.1182	0.0930	0.0740	0.0648	0.0555	0.0464	0.0419	0.0198
50	0.1230	0.1172	0.1055	0.0803	0.0673	0.0497	0.0445	0.0401	0.0352	0.0323	0.0097
60	0.1346	0.1282	0.1185	0.0942	0.0708	0.0473	0.0397	0.0378	0.0335	0.0277	0.0096
70	0.2043	0.1945	0.1927	0.1550	0.1062	0.0580	0.0351	0.0344	0.0379	0.0325	0.0152

Female Members											
Age	0	1	2	3	4	5	6	7	8	9	10+
20	0.1578	0.1503	0.1404	0.1141	0.0935	0.0694	0.0655	0.0672	0.0658	0.0644	0.0631
30	0.1448	0.1385	0.1293	0.1038	0.0840	0.0661	0.0587	0.0539	0.0498	0.0446	0.0427
40	0.0932	0.0864	0.0832	0.0753	0.0677	0.0534	0.0476	0.0438	0.0379	0.0332	0.0151
50	0.0979	0.0932	0.0813	0.0653	0.0514	0.0378	0.0356	0.0296	0.0261	0.0206	0.0085
60	0.1249	0.1189	0.1114	0.0946	0.0768	0.0489	0.0370	0.0332	0.0308	0.0258	0.0074
70	0.2287	0.2178	0.2119	0.1735	0.1108	0.0550	0.0384	0.0353	0.0388	0.0338	0.0114

c.

Probability of Decrement Due to Retirement								
Years of Service								
Male Members								
Age	0-4	5-9	10-14	15-18	19	20-24	25-29	30+
50	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2292
55	0.0000	0.0052	0.0165	0.0214	0.0708	0.1202	0.1881	0.1903
60	0.0000	0.0073	0.0393	0.0474	0.1048	0.1622	0.1754	0.1535
65	0.0000	0.0609	0.2593	0.2997	0.3213	0.3429	0.3263	0.2475
70	0.0000	0.0518	0.2083	0.1692	0.1861	0.2030	0.2165	0.2048
74	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Female Members								
Age	0-4	5-9	10-14	15-18	19	20-24	25-29	30+
50	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2432
55	0.0000	0.0242	0.0320	0.0324	0.0384	0.1211	0.2010	0.2257
60	0.0000	0.0267	0.0566	0.0686	0.0726	0.1733	0.1816	0.2463
65	0.0000	0.1123	0.2174	0.2225	0.2305	0.2898	0.2956	0.3369
70	0.0000	0.0976	0.1655	0.1702	0.1833	0.2371	0.2633	0.2909
74	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

There is a minimum 0.1000 probability for retirement under Rule of 80.

3. Rates of Salary Increase

Inflation rate of 3.00%, plus productivity component of 1.00%, plus step-rate/promotional component as shown:

Years of Service	Annual Step Rate/ Promotional Rates of Increase		Total Annual Rate of Increase	
	Males	Females	Males	Females
(1)	(2)	(3)	(4)	(5)
1	22.15%	20.00%	26.15%	24.00%
2	3.50%	3.10%	7.50%	7.10%
3	3.00%	2.40%	7.00%	6.40%
4	2.75%	2.20%	6.75%	6.20%
5	2.40%	2.00%	6.40%	6.00%
6	2.20%	1.75%	6.20%	5.75%
7	2.00%	1.65%	6.00%	5.65%
8	1.50%	1.50%	5.50%	5.50%
9	1.40%	1.40%	5.40%	5.40%
10	1.20%	1.20%	5.20%	5.20%
11 - 19	1.00%	1.00%	5.00%	5.00%
20 or more	0.00%	0.00%	4.00%	4.00%

This weighted average projected salary increase rate is 6.85% based on the active member service distribution as of August 31, 2003.

**DISABILITY ANNUITANTS:**

1. Investment Return Rate: 8% per annum, compounded annually.
2. Mortality: The PBGC Male Disabled Mortality Table for plan terminations after December 1, 1980, with a six-year setback and the PBGC Female Disabled Mortality Table for plan terminations after December 1, 1980, with a four-year setback.

**SERVICE RETIREMENT ANNUITANTS, NOMINEES AND SURVIVORS:**

1. Investment Return Rate: 8% per annum, compounded annually (benefit increase reserve account eliminated by the 1995 legislative session).

2. Mortality: 1994 Group Annuity Male Mortality Table with a four-year setback and the 1994 Group Annuity Female Mortality Table with a two-year setback; used for service retirement annuitants, beneficiaries and survivors. These tables are selected to best reflect the experience developed in the actuarial investigation as of August 31, 1999.

#### **ERS/TRS TRANSFER ASSUMPTIONS:**

A liability for the present value of the potential asset transfer has been calculated assuming that the TRS members who will be eligible for the transfer benefit are approximated by 10% of the inactive TRS members who have at least five years of service and have left their contributions on deposit. The liability is based on the actuarial present value of the deferred benefit assuming future salary increases at the current salary scale rates and that they will retire at the earliest age for which an unreduced benefit will be received.

#### **HANDLING OF ACTIVE DATA WITH MISSING INFORMATION:**

As of the close of each fiscal year there is a large number of new TRS entrants for whom no statistical data has been received. The only information TRS has is social security number and initial contributions. Beginning with the valuation as of August 31, 1993, active member results have been imputed for this group according to the following procedures:

1. The count for this group has been added to the active member count.
2. Covered payroll and the present value of future pay have been increased by the product of the number of such members multiplied by average new entrant pay and present value of future pay.
3. The present value of future benefits for active members has been increased by the product of the new entrant normal cost rate multiplied by the imputed present value of future pay for this group, as determined under Item 2 above.

#### **ASSUMPTION FOR DROP PARTICIPATION**

It is assumed that 5% of members will enter DROP upon first eligibility for DROP and they will remain in DROP until the earlier of their otherwise expected retirement date or the expiration of the DROP participation period.

**BENEFIT ELECTION OF VESTED TERMINATING MEMBERS:**

In determining the liabilities developed for future terminating vested members, it is assumed that the member elects either a refund or a deferred vested benefit, whichever is more valuable. The deferred benefit is assumed to commence at age 65.

**ELECTION RATES FOR ACTIVE MEMBER DEATH BENEFITS:**

It is assumed that the beneficiary will elect the death benefit option with the greatest value.

**CLASSIFICATION OF WHO ARE ACTIVE MEMBERS:**

For members who had no contribution postings during the just-completed plan year but did have a posting during one or more of the four preceding plan years:

1. 10% of such members will be assumed to return to contributing status in the new plan year (i.e., they will be assumed to be active for valuation purposes).
2. 90% of such members will be treated as inactives for the new plan year.
3. The 90% group will be valued as inactive vested or inactive nonvested depending on their years of service credit.
4. If they are considered inactive vested, their actuarial liability will be the present value of their accrued benefit assuming benefit commencement at age 65, plus the value of any death benefit.
5. If they are considered inactive nonvested, their actuarial liability will be their accumulated account balance.

**AVERAGE SURVIVOR BENEFIT LIABILITY:**

One of the options on the death of an active member, a disabled member, or a retired member is a survivor benefit. To determine the liability for this benefit the following average values are used.

	<u>Males</u>	<u>Females</u>
1. Active member	\$62,200	\$59,000
2. Disabled member	\$13,000	\$11,000
3. Retired member	\$12,000	\$12,000

**ACTUARIAL VALUE OF ASSETS:**

The actuarial value of assets is equal to the market value of assets less a five-year phase in of the excess (shortfall) between expected investment return and actual income with the resulting value not being less than 80% or more than 120% of the market value of assets.

**PAYROLL GROWTH FOR FUNDING OF UNFUNDED ACTUARIAL ACCRUED LIABILITY:**

1. Total payroll growth rate: 3.00%.
2. Portion attributable to inflation: 3.00%.
3. Portion attributable to active member growth: No growth.

**ACTUARIAL COST METHOD:**

The funding period required to amortize the unfunded actuarial accrued liability (UAAL) is determined using the Entry Age Actuarial Cost Method. This method assigns the plan's total unfunded liabilities (the actuarial present value of future benefits less the actuarial value of assets) to various periods. The unfunded actuarial accrued liability is assigned to years prior to the valuation, and the normal cost is assigned to the year following the valuation. The remaining costs are assigned to future years.

The normal cost is determined as a level percentage of payroll for a group of new entrants, based on actual new entrant experience for the period 1995-1999. This percentage of payroll is then applied to the total compensation for the prior year for all active members, and is then adjusted for the payroll growth assumption.

The actuarial accrued liability is the difference between the total present value of future benefits and the actuarial present value of future normal costs. The unfunded actuarial accrued liability (UAAL) is the excess of the actuarial accrued liability over the actuarial value of assets.

Since the State statutes governing the System establish the current employee and State contribution rates, the actuarial valuation determines the number of years required to amortize (or fund) the UAAL on a level percentage of payroll basis, taking into account the payroll growth assumption and the normal cost expressed as a percent of pay.

Because of this amortization procedure, any change in the unfunded actuarial accrued liability due to (i) actuarial gains and losses, (ii) changes in actuarial assumptions, or (iii) amendments, affects the funding period. The statutory goal is that the State contribution rate be sufficient to keep the funding period below 31 years.

**FUNDING OF UNFUNDED ACTUARIAL ACCRUED LIABILITY:**

Funded by the excess of future State contributions required by Law over the amount of such contributions required to fund the normal cost of benefits. Based on a study of all new entrants hired in the period from 1995 through 1999 and taking into account all changes in benefit provisions, the normal cost for benefits provided by the System is 12.46% of payroll (6.40% by members plus 6.06% by the State), which is 0.06% of payroll more than the total contributions required by Law. It is intended that the shortfall amount of 0.06% of payroll will be paid for by a reduction in any overfunded position of the System, assuming that total payroll increases by 3.00% per year.

As long as the funding surplus (the negative UAAL) is sufficient to offset the 0.06% contribution shortfall, the System remains actuarially funded. In this case, the funding period will be deemed to be 0.0 years if the funding surplus will support the contribution shortfall indefinitely into the future, based on the current actuarial assumptions.

As of the valuation as of August 31, 2003, there is no negative UAAL, i.e., there is a positive unfunded actuarial accrued liability. Since there are no contributions available to amortize this UAAL, it will never be funded. Future funding of the UAAL will be dependent on either the generation of actuarial experience gains sufficient in size to return the System to an overfunded status or on an increase in the State contribution rate.

## DEFINITION OF ACTUARIAL TERMS

H.B. 2206 as passed by the 1979 Legislature requires that any actuarial study of a public retirement system include "a complete definition of each actuarial term used in the study". In our report we have attempted to avoid the use of a multitude of complex actuarial terminology, but we realize that different users of our reports may have differing opinions as to what constitutes an "actuarial term".

Accordingly, in keeping with the intent and the spirit of the law, we offer the following definitions of several terms contained in this report which might be considered actuarial in nature. Any qualified user of our report who believes that additional terms should be included is invited to communicate such terms either directly to us or through the Teacher Retirement System of Texas.

1. *Actuarial Accrued Liability* - for benefits payable in the future to present members, it will equal the present value of benefits payable in the future to them less the present value of future normal costs.
2. *Actuarial Assumptions* - assumptions as to future experience under the System. Current actuarial assumptions are detailed in Table 21 of the current annual valuation report. Assumptions include future fund earning rates, rates of future salary increases, and rates of death (both before and after retirement), disability, retirement, and withdrawal. Effective August 31, 1985, select and ultimate assumptions were adopted for retirement and withdrawal rates and the salary scale.
3. *Actuarial Gain or Actuarial Loss* - a measure of the difference between actual experience and assumed experience of the System. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, actuarial liabilities emerge which may be the same as forecasted, or they may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., the System's assets earn more than projected, salaries do not increase as fast as assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results that produce actuarial liabilities which are larger than projected. Actuarial gains will shorten the time required for funding of the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period.
4. *Actuarial Liabilities* - the actuarially determined present value of future benefits to be provided by the System. There are separate actuarially determined present values for retired members and non-retired members (either active or inactive). When applied to active members, it takes into account benefits which will be earned through future service and future salary increases.
5. *Actuarial Value of Present Assets* - the value of present System assets for valuation purposes. Prior to August 31, 1985, this value was the same as the book value of assets. Beginning

- August 31, 1985, through August 31, 1993, this value was calculated under the “market over book adjusted asset valuation method.” Beginning August 31, 1993, this value is calculated under a five-year phase in of the excess (shortfall) between expected and actual income return on the market value of assets.
6. *Actuarially Determined* - values which have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the law.
  7. *Actuarially Sound* - a condition existing when the unfunded actuarial accrued liability can reasonably be expected to be funded or amortized over a determinable number of years. Such funding or amortization is accomplished as a result of the excess of total contributions over the normal cost of expected benefits. The Teacher Retirement System of Texas is considered actuarially sound as long as the length of time required to fund the unfunded actuarially accrued liability does not exceed 31 years.
  8. *Decrements* - those types of activities by members of the System which cause them no longer to be members, i.e., death, retirement, disability, and withdrawal. It is a general term referring to any or all of these membership terminating events.
  9. *Defined Benefits* - in a retirement plan, benefits which are defined by a specific formula applied to specific member compensation and/or specific years of service. The amount of the benefit is not a function of contributions or actual earnings on those contributions.
  10. *Defined Contributions* - in a retirement plan, periodic contributions to the plan which are defined as a specific percent of compensation.
  11. *Experience Study* - a periodic review and analysis of the actual experience of the System which may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the Actuary.
  12. *Funding Period* - the number of years in the future that will be required to fund (i.e., pay off or eliminate) the unfunded actuarial accrued liability, based on the actuarial assumptions and assuming no future actuarial gains or losses.
  13. *Future Benefits* - benefits specified in the law which will become payable at some time in the future when the member satisfies the requirement to receive such benefits.
  14. *Future Contributions* - contributions to be made by the member or the State in the future, as required by the law.



15. *Normal Cost* - the actuarial cost to fund the benefits provided by the System were the funding to begin at date of hire. It is expressed as a percent of pay and is equal to the present value at hire of all possible benefits of the System divided by the present value of anticipated future compensation to be received by the new member. In the aggregate, it must be less than the total future contribution to the System if the unfunded actuarial accrued liability is to be amortized. Otherwise there must be a funding surplus sufficient in size to offset any contribution rate shortfall.
16. *Present Value* - the actuarially determined lump sum value as of the valuation date of a series of payments to be made in the future, where the lump sum value is equal to the sum of the discounted value of each future payment. The discounted value of each payment is the product of (a) the amount of the payment, (b) the probability that the payment will be made (based on the current actuarial assumptions as to future experience), and (c) the time value of money (based on the current assumed interest rate).
17. *Unfunded Actuarial Accrued Liability* - that portion of the actuarial accrued liability (including the present value of benefits presently being paid to retired members) that exceeds the value of current actuarial assets. A funding surplus exists if the actuarial accrued liability is less than the actuarial assets.