ARIZONA STATE RETIREMENT SYSTEM

ANNUAL ACTUARIAL VALUATION – SYSTEM

AS OF JUNE 30, 2018

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January 28, 2019

Board of Trustees
Arizona State Retirement System
3300 North Central Avenue, 14th Floor
Phoenix, Arizona 85012

Re: Actuarial Valuation of the System as of June 30, 2018

Members of the Board:

We certify that the information contained in this report is accurate and fairly presents the actuarial position of defined contribution program administered by the Arizona State Retirement System (ASRS or the System) as of June 30, 2018. This report was prepared at the request of the Board and is intended for use by ASRS staff and those designated or approved by the Board. This report may be provided to parties other than ASRS only in its entirety and only with the permission of the Board.

Actuarial Valuation

The primary purposes of the actuarial valuation report are to describe the current financial condition of the System, analyze changes in the condition of the System, and provide various summaries of the data.

Plan Provisions

The plan provisions of the System are summarized in Appendix I. There have been no changes in plan provisions since the last valuation.

Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on October 27, 2017 based on the Report on the Actuarial Experience Study covering a five-year period from July 1, 2011 to June 30, 2016, dated October 18, 2017. There have been no changes in actuarial assumptions and methods since the last valuation.

We believe the assumptions are internally consistent and are reasonable, based on the actual experience of ASRS.

The results of the actuarial valuation are dependent upon the actuarial assumptions used. Actual results can and almost certainly will differ, as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution rates and funding periods. A review of the impact of a different set of assumptions on the funded status of the System is outside the scope of this actuarial valuation.

The current actuarial assumptions and methods are outlined in Appendix II of this report.

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Funding Adequacy

The Arizona Attorney General issued an opinion letter on November 24, 2009 stating that System benefits cannot be "diminished or impaired" as defined under Article 29 of the Arizona Constitution. Prior to the Attorney General's opinion letter, the provisions of the System allowed the Board to modify the benefits (up or down) paid by the retirement program in order to maintain a funded status between 95% and 105%.

The only contributions to the System now are the current 7% of pay contributions (by the employer and the member) for the one remaining active member. If all of the actuarial assumptions are met, the System will run out of money before all of the benefits are paid. Specifically, the trust is expected to be exhausted sometime in fiscal year beginning July 1, 2027 based on the current assumptions and no future contributions.

The unfunded actuarial accrued liability (UAAL) of the System decreased from $68.1 million as of June 30, 2017 to $66.2 million as of June 30, 2018. Additionally, the funded ratio of the System—market value of assets divided by the actuarial accrued liability—decreased from 79.6% to 78.9% as of June 30, 2018. The funded status is one of many metrics used to show trends and develop future expectations about the health of a retirement system. The funded status measure itself is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations or assessing the need for or the amount of future contributions.

Assets are being accumulated in the ASRS Plan to guarantee the benefits of members who retired on or after July 1, 1981 from the System. As long as the State continues to guarantee the benefits payable to the System members who retired prior to July 1, 1981, then the objective of paying all promised benefits of the System will be met.

System Assets

The total market value of assets decreased from $265.6 million to $248.3 million as of June 30, 2018. Table 3 reconciles the changes in the fund during the year. For purposes of this actuarial valuation, assets are reported on a market value basis with no smoothing of asset returns. The approximate investment return for the fiscal year ending June 30, 2018 was 10.4%.

Data

The valuation was based upon information as of June 30, 2018, furnished by ASRS staff, concerning system benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by ASRS staff.

The tables in Appendix III show key census statistics for the various groups included in the valuation.

Certification

All of our work conforms with generally accepted actuarial principles and practices, and to the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of, where applicable, the Internal Revenue Code and ERISA.

The signing actuaries are independent of the plan sponsor. Ryan Falls and Joe Newton are Enrolled Actuaries, Fellows of the Society of Actuaries, and Members of the American Academy of Actuaries and Paul Wood is an Associate of the Society of Actuaries and a Member of the American Academy of Actuaries. All three meet the Qualification Standards of the American Academy of Actuaries. Finally, each of the undersigned are experienced in performing valuations for large public retirement systems.

Respectfully submitted,
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Table of Contents

		Page
	Cover Letter	
Section A	Executive Summary	2
Section B	Tables	
Table 1	Development of Funded Status	4
Table 2	Actuarial Present Value of Future Benefits	5
Table 3	Reconciliation of Plan Net Assets	6
Table 4	Total Experience Gain or Loss	7
Appendices		
Appendix I	Summary of Plan Provisions	9
Appendix II	Summary of Actuarial Assumptions and Methods	11
Appendix III	Detailed Summaries of Membership Data	14
Appendix IV	Risk Associated with Measuring the Accrued Liability	18
Appendix V	Glossary	21

SECTION A

EXECUTIVE SUMMARY

Executive Summary

Item	2018	2017
Membership		
• Number of		
- Active members	1	1
- Retirees and beneficiaries	1,079	1,140
- Inactive, non-Retired	21	18
- Total	1,101	1,159
Assets		
• Market value (MVA)	$ 248,346,180	$ 265,558,401
• Return on market value	10.4%	13.8%
Actuarial Information		
• Actuarial accrued liability	$ 314,593,854	$ 333,640,575
• Unfunded actuarial accrued liability (UAAL)	$ 66,247,674	$ 68,082,174
• Funded ratio	78.9%	79.6%
• Estimated exhaustion date assuming no future contributions	FY 2027	FY 2026

SECTION B

TABLES

Table 1

Development of Financial Status

	June 30, 2018	June 30, 2017
1. Total Actuarial Accrued Liability for:		
a. Retirees and beneficiaries	$ 301,570,104	$ 321,528,242
b. Inactive and non-members	9,104,124	8,496,387
c. Active members	3,919,626	3,615,946
d. Total	$ 314,593,854	$ 333,640,575
2. Market Value of Assets	$ 248,346,180	$ 265,558,401
3. Unfunded Actuarial Accrued Liability (UAAL) (Item 1d - Item 2)	$ 66,247,674	$ 68,082,174
4. Funded Status	78.9%	79.6%

Table 2

Actuarial Present Value of Future Benefits

		June 30, 2018	June 30, 2017
1.	Active Members		
	a. Total balances from member contributions	$ 961,055	$ 883,400
	b. Total balances from employer contributions	2,958,571	2,732,546
	c. Total	$ 3,919,626	$ 3,615,946
2.	Inactive Members		
	a. Total balances from member contributions	$ 1,540,324	$ 1,410,034
	b. Total balances from employer contributions	7,493,356	6,938,293
	c. Total	$ 9,033,680	$ 8,348,327
3.	Non-members*	$ 70,444	$ 148,060
4.	Retirees and beneficiaries retired prior to July 1, 1981**		
	a. Monthly annuities	$ 53,554	$ 62,025
	b. 13th checks	2,653	17,812
	c. Total	$ 56,207	$ 79,837
5.	Retirees and beneficiaries retired on or after July 1, 1981***		
	a. Monthly annuities	$ 281,024,974	$ 295,352,562
	b. 13th checks	20,488,923	26,095,843
	c. Total	$ 301,513,897	$ 321,448,405
6.	Total Actuarial Present Value of Future Benefits	$ 314,593,854	$ 333,640,575

* *Non-members are former members who are eligible for refunds. Their printed records were discovered and first included in the June 30, 2006 valuation. They are referred to as the Green Bar members.*

** *Members who retired prior to July 1, 1981 have benefits guaranteed by the State.*

*** *Members who retired on or after July 1, 1981 have benefits guaranteed by the ASRS Plan.*

Table 3

Reconciliation of Plan Net Assets

	Year Ending	
	June 30, 2018	June 30, 2017
	(1)	(2)
1. Market value of assets at beginning of year	$ 265,558,401	$ 272,952,351
2. Revenue for the year		
a. Contributions for the year		
i. Employer	$ 6,983	$ 16,502
ii. Member	6,983	16,502
iii. Total	$ 13,966	$ 33,004
b. Investment income for the year (net of investment expenses)	$ 25,239,733	$ 34,854,597
c. Total revenue	$ 25,253,699	$ 34,887,601
3. Disbursements for the year		
a. Retirement and disability benefits	$ 42,100,109	$ 41,967,073
b. Death benefits	124,448	92,160
c. Refunds	48,644	0
d. Other	0	0
e. Administrative expenses	192,719	222,318
f. Total disbursements	$ 42,465,920	$ 42,281,551
4. Increase in net assets (Item 2c - Item 3f)	$ (17,212,221)	$ (7,393,950)
5. Market value of assets at end of year (Item 1 + Item 4)	$ 248,346,180	$ 265,558,401
6. Estimated dollar weighted market yield	10.4%	13.8%

Table 4

Total Experience Gain or Loss

Item	Year Ending June 30, 2018	Year Ending June 30, 2017
(1)	(2)	(3)
A. Calculation of total actuarial gain or loss		
1. Unfunded actuarial accrued liability (UAAL), previous year	$ 68,082,174	$ 103,868,686
2. Interest at 7.5% on UAAL	$ 5,106,163	$ 8,309,495
3. Assumption change (Gains)/Losses	$ 0	$ (23,847,370)
4. Expected UAAL (Sum of Items 1 through 3)	$ 73,188,337	$ 88,330,811
5. Actual UAAL	$ 66,247,674	$ 68,082,174
6. Total (gain)/loss for the year (Item 5 - Item 4)	$ (6,940,663)	$ (20,248,637)
B. Source of (gains) and losses		
7. Assets	$ (7,047,507)	$ (14,617,338)
8. Annuity Mortality	621,911	(5,671,813)
9. 13th Check Mortality	(739,462)	(357,115)
10. Green Bar Members	(38,252)	(810)
11. Other Demographic (Gains)/Losses	262,647	398,439
12. Total (Sum of Items 7 through 11)	$ (6,940,663)	$ (20,248,637)

APPENDIX I

SUMMARY OF PLAN PROVISIONS

Summary of Plan Provisions

The System is a Defined Contribution Plan, and was the original retirement program when ASRS was created in 1953. System benefits are based on the total amount of member and employer contributions, interest and supplemental credits in a member's retirement account at the time of retirement. Most members of the System elected to join the ASRS Plan when it became available, but those who never elected to receive benefits only under the ASRS Plan still accrue benefits and are entitled to receive retirement annuities according to the terms of the System.

Contributions

While they are active, System members contribute a percentage of their salary and their employers contribute the same percentage to their System retirement accounts. The percentage is currently 7%. System retirement accounts are credited annually with interest at the actuarial valuation rate. Investment return in excess of actuarial interest is called a supplemental credit. System retirement accounts were considered guaranteed, except for supplemental credits, before the Attorney General's opinion letter of November 24, 2009. In light of that opinion, System retiree accounts are now considered entirely guaranteed.

Retirement Benefits

At retirement, System members receive their choice of the benefits that the System will provide and the benefits that the defined benefit Plan will provide. The System benefit is a monthly annuity that is the actuarial equivalent of the entire retirement account balance. The Plan benefit is a percentage of final average salary, multiplied by years of service.

If the Board elects to distribute supplemental credits after a member's retirement, they are distributed to the member through 13th checks. The amount of a 13th check that arises from a supplemental credit is calculated actuarially as an annual annuity with a present value equal to the amount of the supplemental credit. When supplemental credits occur in more than one year of a member's retirement, the amounts are added and one 13th check is paid.

Benefit Adjustments and Guarantees

ASRS former rule said that if the funded status of the System as measured in an actuarial valuation is less than 95%, the Board will reduce non-guaranteed benefits so that the funded status is restored to 95%. If the funded status exceeds 105%, the Board may (but is not required to) increase benefits until the funded status declines to 105%. The Board is authorized to change actuarial assumptions. Changes in the investment earnings assumption or the mortality assumption will change the funded status and can thus lead to benefit increases or decreases. Methods for adjusting benefits are detailed in ASRS rules. Based on the Arizona Attorney General's opinion letter of November 24, 2009, which the Board has adopted, benefits cannot be "diminished or impaired" as defined under Article 29 of the Arizona Constitution. Under this opinion, all benefits are guaranteed. The ASRS Plan guarantees benefits for System members who retired or will retire on or after July 1, 1981. The State guarantees the other System benefits. System liabilities for post-June 30, 1981 retirees are included in the Plan valuation.

Forms of Payment

The annuity options available to System members include straight life annuity, joint and survivor annuity with 100%, 66-2/3%, or 50% of the benefit continuing to the contingent survivor, or life annuity with 5, 10 or 15 years of certain payments.

APPENDIX II

SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS

Summary of Actuarial Assumptions and Methods

The assumptions and methods applied in this actuarial valuation were adopted by the Board of Trustees on October 27, 2017 based on the Report on the Actuarial Experience Study covering a five-year period from July 1, 2011 to June 30, 2016, dated October 18, 2017

I. *Valuation Date*

The valuation date is June 30 of each plan year. This is the date as of which the actuarial present value of future benefits and the actuarial value of assets are determined.

II. *Actuarial Value of Assets*

For purposes of this actuarial valuation, assets are reported on a market value basis with no smoothing of asset returns.

III. *Actuarial Assumptions*

Investment Return: 7.50% per year, net of investment-related expenses (composed of an assumed 2.30% inflation rate and a 5.20% real rate of return)

Mortality Decrements:

Service Retirees, Beneficiaries, and Inactive Members

Rates are based on the 2017 State Retirees of Arizona (SRA) mortality table. Generational mortality improvements in accordance with the Ultimate MP scales and projected from the year 2017.

	2018 Rates of Mortality	
Age	Males	Females
20	0.000390	0.000155
25	0.000465	0.000166
30	0.000435	0.000210
35	0.000502	0.000275
40	0.000603	0.000380
45	0.000935	0.000631
50	0.001620	0.001058
55	0.002678	0.001607
60	0.004444	0.002345
65	0.007877	0.004863
70	0.013963	0.009117
75	0.024749	0.017090
80	0.043868	0.032037

This mortality assumption includes an assumption about mortality improvements before and after the valuation date.

Retirement, Termination, Disability Decrements: None. Liabilities for non-retired members are assumed to be their current account balances.

Beneficiary Characteristics: 100% of members are assumed to be married. The husband is assumed to be three years older than the wife.

Census Data and Assets

- The valuation was based on members of ASRS as of June 30, 2018 and does not take into account future members.
- All census data was supplied by ASRS and was subject to reasonable consistency checks.
- Asset data was supplied by ASRS.

Other Actuarial Valuation Procedures

- No provision was made in this actuarial valuation for the limitations of Internal Revenue Code Sections 415 or 401(a)17.

APPENDIX III

DETAILED SUMMARIES OF MEMBERSHIP DATA

Table A
Summary of Membership Data

Active Members

Item	June 30, 2018	June 30, 2017
Number of Members	1	1
Total of Balances (millions)	$ 3.9	$ 3.6
Average Age	79.7	78.7

Inactive Members

Item	June 30, 2018	June 30, 2017
Number of Members	21	18
Total of Balances (millions)	$ 9.0	$ 8.3
Average Balance	$ 430,175	$ 463,796
Average Age	76.8	75.6

Retired Members

Annuity Item	June 30, 2018	June 30, 2017
Number Receiving	1,079	1,140
Average Age	81.8	81.3
Total Annual Amount (millions)	$ 36.0	$ 36.9
Average Annual Amount	$ 33,357	$ 32,396
Median Annual Amount	$ 19,596	$ 18,809
Maximum Annual Amount	$ 424,454	$ 424,454
13th Check	**June 30, 2018**	**June 30, 2017**
Number Receiving	621	679
Average Age	85.1	84.5
Total Annual Amount (millions)	$ 3.8	$ 4.2
Average Annual Amount	$ 6,046	$ 6,163
Median Annual Amount	$ 3,790	$ 3,848
Maximum Annual Amount	$ 44,800	$ 44,800

Table B
Data Reconciliation

	Active Members	Inactive	Retirees, Beneficiaries and QDRO	Total
Total at June 30, 2017	1	18	1,140	1,159
Terminations	0	0	0	0
Refund	0	0	0	0
Transfer Out	0	0	0	0
Disabled	0	0	0	0
Retirements	0	0	0	0
Returned from LTD	0	0	0	0
New QDRO	0	0	0	0
New Beneficiary	0	0	14	14
Deaths	0	0	(73)	(73)
Benefit Expiration	0	0	0	0
Benefit Terminated	0	0	(3)	(3)
Data Adjustments	0	3	1	4
Rehires	0	0	0	0
New Entrants	0	0	0	0
Net Change	0	3	(61)	(58)
Total at June 30, 2018	1	21	1,079	1,101

Table C

Retired Members and Beneficiaries - Distribution of Count and Average Annual Annuity by Age and Service

Age	Years of Service									Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	
Under 55	2	3	-	-	-	-	1	4	1	11
	$ 4,635	$ 15,970	$ -	$ -	$ -	$ -	$ 45,957	$ 9,846	$ 20,084	$ 14,782
55 - 59	-	-	-	-	-	-	-	-	-	-
	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
60 - 64	-	3	-	1	-	-	2	2	3	11
	$ -	$ 11,545	$ -	$ 59,820	$ -	$ -	$ 31,837	$ 64,795	$ 100,474	$ 53,558
65 - 69	-	6	-	1	1	4	6	14	5	37
	$ -	$ 24,471	$ -	$ 12,474	$ 25,627	$ 37,137	$ 72,296	$ 91,322	$ 136,303	$ 73,710
70 - 74	9	35	9	2	6	13	23	29	1	127
	$ 30,677	$ 23,465	$ 22,574	$ 6,323	$ 50,287	$ 44,075	$ 70,843	$ 84,417	$ 99,302	$ 50,116
75 - 79	14	129	17	17	16	43	38	18	5	297
	$ 25,126	$ 24,421	$ 46,147	$ 34,941	$ 51,014	$ 37,703	$ 62,531	$ 94,845	$ 230,333	$ 42,266
80 - 84	9	138	34	11	19	37	29	7	4	288
	$ 22,848	$ 14,721	$ 17,797	$ 33,038	$ 20,369	$ 39,053	$ 71,077	$ 92,191	$ 137,264	$ 28,796
85 - 89	2	97	39	13	19	20	16	7	1	214
	$ 5,568	$ 9,436	$ 10,616	$ 11,004	$ 15,691	$ 39,639	$ 76,618	$ 92,623	$ 78,330	$ 21,154
90 - 94	1	42	18	7	3	3	2	2	-	78
	$ 10,258	$ 4,056	$ 9,517	$ 5,423	$ 6,828	$ 40,058	$ 34,396	$ 54,274	$ -	$ 9,076
Over 94	-	9	3	3	1	-	-	-	-	16
	$ -	$ 3,134	$ 7,313	$ 3,484	$ 7,065	$ -	$ -	$ -	$ -	$ 4,229
Total	37	462	120	55	65	120	117	83	20	1,079
	$ 23,356	$ 15,901	$ 18,334	$ 22,433	$ 28,558	$ 39,172	$ 67,563	$ 84,398	$ 144,069	$ 33,357

APPENDIX IV

RISKS ASSOCIATED WITH MEASURING THE ACCRUED LIABILITY

RISKS ASSOCIATED WITH MEASURING THE ACCRUED LIABILITY

The determination of the accrued liability requires the use of assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability that results from the differences between actual experience and the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions due to changing conditions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period, or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the plan's future financial condition include:

1. Investment risk – actual investment returns may differ from the expected returns;
2. Asset/Liability mismatch – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
3. Contribution risk – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base;
4. Longevity risk – members may live longer or shorter than expected and receive pensions for a period of time other than assumed;
5. Other demographic risks – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

PLAN MATURITY MEASURES

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following:

	June 30, 2018	June 30, 2017
Ratio of actives to retirees and beneficiaries	0.0	0.0
Ratio of net cash flows to market value of assets	-17%	-16%
Duration of the actuarial accrued liability	5.9	6.1

RATIO OF ACTIVES TO RETIREES AND BENEFICIARIES

A young plan with many active members and few retirees will have a high ratio of active to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

RATIO OF NET CASH FLOW TO MARKET VALUE OF ASSETS

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions.

DURATION OF ACTUARIAL ACCRUED LIABILITY

The duration of the actuarial accrued liability may be used to approximate the sensitivity to a 1% change in the assumed rate of return. For example, duration of 10 indicates that the liability would increase approximately 10% if the assumed rate of return were lowered 1%.

ADDITIONAL RISK ASSESSMENT

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests, and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability.

APPENDIX V

GLOSSARY

Glossary

Actuarial Accrued Liability (AAL): That portion, as determined by a particular Actuarial Cost Method, of the Actuarial Present Value of Future Plan Benefits which is not provided for by future Normal Costs. It is equal to the Actuarial Present Value of Future Plan Benefits minus the actuarial present value of future Normal Costs.

Actuarial Assumptions: Assumptions as to future experience under the Fund. These include assumptions about the occurrence of future events affecting costs or liabilities, such as:

- mortality, withdrawal, disablement, and retirement;
- future increases in salary;
- future rates of investment earnings and future investment and administrative expenses;
- characteristics of members not specified in the data, such as marital status;
- characteristics of future members;
- future elections made by members; and
- other relevant items.

Actuarial Cost Method or ***Funding Method:*** A procedure for allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability. These items are used to determine the ARC.

Actuarial Gain or ***Actuarial Loss:*** A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. 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 Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., the Fund'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.

Actuarially Equivalent: Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions.

Actuarial Present Value (APV): The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. For purposes of this standard, each such amount or series of amounts is:

a. adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.),
b. multiplied by the probability of the occurrence of an event (such as survival, death, disability, termination of employment, etc.) on which the payment is conditioned, and
c. discounted according to an assumed rate (or rates) of return to reflect the time value of money.

Actuarial Present Value of Future Plan Benefits: The Actuarial Present Value of those benefit amounts which are expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age and past and anticipated future compensation and service credits. The Actuarial Present Value of Future Plan Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive, nonretired members either entitled to a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would be provide sufficient assets to pay all projected benefits and expenses when due.

Actuarial Valuation: The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB.

Actuarial Value of Assets or ***Valuation Assets:*** The value of the Fund's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly actuaries use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the ARC.

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.

Amortization Method: A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.

Amortization Payment: That portion of the pension plan contribution or ARC which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.

Actuarially Determined Contribution (ADC) or ***Annual Required Contribution (ARC):*** A calculated contribution for a defined benefit pension plan for the reporting period, most often determined based on the funding policy of the plan. Typically the calculated contribution has a normal cost payment and an amortization payment.

Closed Amortization Period: A specific number of years that is counted down by one each year and therefore declines to zero with the passage of time. For example if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc. See Funding Period and Open Amortization Period.

Decrements: Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or termination.

Defined Benefit Plan: An employer-sponsored retirement benefit that provides workers, upon attainment of designated age and service thresholds, with a monthly benefit based on the employee's salary and length of service. The value of a benefit from a defined benefit plan is generally not affected by the return on the assets that are invested to fund the benefit.

Defined Contribution Plan: A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, and the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.

Employer Normal Cost: The portion of the Normal Cost to be paid by the employers. This is equal to the Normal Cost less expected member contributions.

Experience Study: A periodic review and analysis of the actual experience of the Fund 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.

Funded Ratio: The ratio of the actuarial value of assets (AVA) to the actuarial accrued liability (AAL). Plans sometimes calculate a market funded ratio, using the market value of assets (MVA), rather than the AVA.

Funding Period or ***Amortization Period:*** The term "Funding Period" is used it two ways. In the first sense, it is the period used in calculating the Amortization Payment as a component of the ARC. This funding period is chosen by the Board of Trustees. In the second sense, it is a calculated item: the number of years in the future that will theoretically be required to amortize (i.e., pay off or eliminate) the Unfunded Actuarial Accrued Liability, based on the statutory employer contribution rate, and assuming no future actuarial gains or losses.

GASB: The Governmental Accounting Standards Board is an organization that exists in order to promulgate accounting standards for governmental entities.

Normal Cost: That portion of the Actuarial Present Value of pension plan benefits and expenses which is allocated to a valuation year by the Actuarial Cost Method. Any payment in respect of an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits which are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated. Under the entry age normal cost method, the Normal Cost is intended to be the level cost (when expressed as a percentage of pay) needed to fund the benefits of a member from hire until ultimate termination, death, disability or retirement.

Open Amortization Period: An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. In other words, if the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never completely disappear, but will become smaller each year, either as a dollar amount or in relation to covered payroll.

Unfunded Actuarial Accrued Liability: The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. This value may be negative in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus.

Valuation Date or ***Actuarial Valuation Date:*** The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date.