Issues Relating To The Public Employees' Retirement Fund (PERF)

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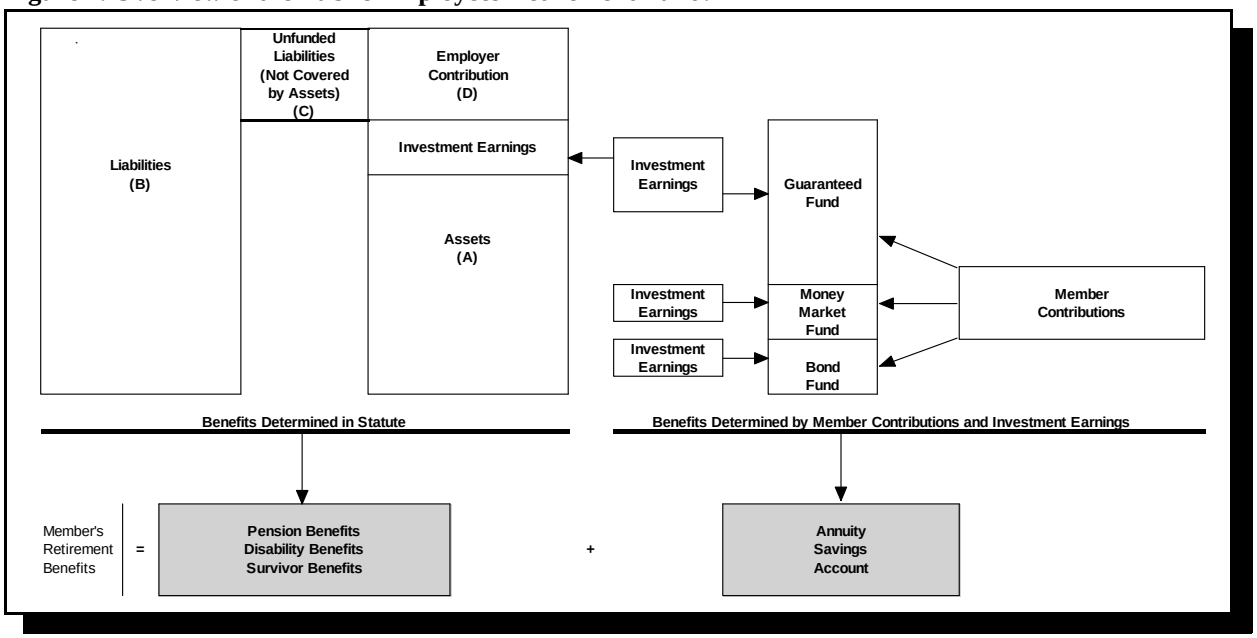
I. Introduction

As part of the review of the Public Employees Retirement Fund (PERF), background information is provided on PERF in particular, and pension funding in general. In addition, a brief overview of the administration of PERF is included.

This report also provides a description of the actuarial valuation process (the process by which fund assets and liabilities are valued resulting in the determination of a contribution rate for the retirement plan), its component parts, and the method of funding. Figure 1 depicts this process as well as the process of benefit determination (pension and annuity). The report also provides some basic pension terms and their definitions, exhibits to show how a pension plan is funded, the part investments play in the funding picture, and exhibits which show the current financial status of PERF. The answers to the questions posed in the Legislative Council Resolution will be found throughout this report.

Figure 1. Overview of the Public Employees Retirement Fund.



PERF was established in 1945 to provide retirement, disability, and survivor benefits to State and local government employees. As of June 30, 1995, there were 139,931 active participants consisting of 54,981 State employees and 84,950 municipal employees. Retired participants and beneficiaries receiving benefits totaled 39,610, with 2,803 disabled participants also receiving benefits. The average annual retirement benefit was $3,843, while the average annual disability benefit totaled $3,092.

All employees of the State who are not statutorily assigned to other pension funds and all employees of participating political subdivisions are required to become members of PERF. A

political subdivision may participate in PERF by passing and filing with the PERF Board of Trustees (the PERF Board) an ordinance or resolution providing for participation and describing the classifications of employees who will become members of PERF.

The State is financially responsible for making contributions for State employee members. Funding is accomplished through expenditures for fringe benefits by each State agency. Each participating political subdivision is responsible for making contributions for the pensions of its employees. The required employer contribution is equal to a certain percentage of payroll that actuaries for PERF determine is necessary to actuarially fund retirement benefits. The State biennially appropriates an amount necessary for the administration of the Fund from Fund earnings.

Retirement Benefits

The PERF benefits received by a retired member are derived from two sources: (1) a pension financed by the employer; and (2) an annuity savings account financed by the member. Members are required to contribute 3% of their compensation to finance the annuity savings account. The State makes this contribution on behalf of State employees while local political subdivisions have this as an option.

Pension Portion

The pension portion of the PERF benefit is a defined benefit type of program with a benefit level predetermined by a formula. The formula as set forth in IC 5-10.2-4-4 is:

Average Annual Compensation x .011 = Pension Base
Pension Base x Years of Creditable Service = Annual Pension at Age 65

The average annual compensation is an average of the salary of the employee's highest twenty calendar quarters' salaries during PERF-covered employment. Employer-paid employee contributions and severance pay up to $2,000 are included as part of the member's salary.

A member of PERF becomes vested for pension benefits after the member accumulates 10 years of creditable service in a position covered by PERF. A member with at least 10 years of creditable service may begin the monthly pension benefit on the first day of the month following the member's 65th birthday. A member may qualify for early retirement with a reduced benefit if he/she is at least age 50 and has 15 or more years of creditable service. A member may also qualify for early retirement with full benefits if he/she is at least age 60 with 15 or more years of creditable service or at age 55 with the employee's age plus years of creditable service equaling 85 or more (commonly referred to as the "Rule of 85").

Annuity Savings Account

The annuity savings account consists of member contributions plus the interest credited to the member's account. This is a defined contribution type of program where the rate of contribution is fixed, and the benefits are level and dependent to some extent upon the contributions. A member may invest the member's annuity savings account contributions in several investment funds. The actual amount of the annuity payable to the member on retirement depends on how much is paid in and how much is earned.

Disability Benefits

A member of PERF is eligible for disability benefits from the Fund if the member: 1) has five or more years of creditable service under PERF and 2) qualifies for Social Security disability benefits. The benefits are computed using only the years of creditable service worked to the date of disability with no reduction for early retirement.

Survivor Benefits

If a member who has fifteen or more years of creditable service dies while in service, his or her spouse or dependent beneficiary may be entitled to survivor benefits. If a retired member dies, the designated beneficiary may receive benefits, depending upon the option selected by that member.

II. Board of Trustees and PERF Administration

Membership of the Board

The Governor appoints the five member Board of Trustees (Board). The current membership is depicted in Exhibit 1.

Exhibit 1. Current Membership of the PERF Board of Trustees.

Position	Board Member	Effective Date	Expiration Date
Chair	Al H. Harding, Jr. *	9/1/90	6/30/94
Vice-Chair	Richard Doermer	7/1/92	7/1/96
	Nancy Kathleen Turner	1/3/96	7/1/99
	Kyle E. Lanham	11/15/93	7/1/97
	Dwayne Isaacs	1/3/96	7/1/98
* Mr. Harding will continue to serve until the Governor reappoints him, or appoints another person.			

The current director of PERF is Mr. H. Garth Dickey, appointed by the Board in November 1995 with the approval of the Governor.

Budget Five Year History

Exhibit 2 depicts a five year history of the PERF budget, showing appropriations for fiscal years 93 through 97, along with the actual expenditures for fiscal years 93, 94, and 95.

Exhibit 2. PERF Appropriations and Expenditures: FY93-FY97.

	FY93	FY94	FY95	FY96	FY97
Appropriations	$3,748,198	$3,748,198	$3,748,198	$3,818,491	$3,818,491
Expenditures	$3,376,250	$3,036,844	$3,560,441	n/a	n/a

Source: State Budget Agency

Administration of the PERF Fund

The Board administers the Fund, and is required to hold an annual meeting in November with regular meetings at least quarterly. The Board establishes overall policy for the Fund and hires the necessary personnel to carry out those responsibilities.

The Board may employ the services of an outside actuary in order to review that assets and liabilities of the Fund are in accordance with IC 5-10.2-2-9. The statute also allows the Board to utilize the services of an outside trust company or state or national bank to serve as master custodian for the investments of the Fund, and may additionally utilize the services of outside asset managers to provide investment management services to the Fund.

At least once every five (5) years, and in every year in which PERF benefits are changed, the Fund's actuary is required to make a separate actuarial investigation. In the actuarial investigation, the Fund's mortality (the rate of death of participants under a retirement plan), service (service from the date of initial employment in a position covered by PERF, regardless of location), and compensation experience (rate of increase in the salaries as defined for Plan benefit purposes) of the members and their beneficiaries are examined. The Fund's actuary also is required to make a valuation of the assets and liabilities of the Fund.

III. Pension Portion of the Retirement Benefit

The following section describes the actuarial valuation process to prefund the pension plan. This is done by amortizing[1] the liabilities that have accrued and paying off the liabilities that will occur during the upcoming year. To determine the unfunded liabilities, the actuary compares liabilities and assets. The portion of the liabilities that is greater than the assets is the unfunded liabilities. Finally a contribution rate is determined to fund the unfunded liabilities.

Specifically, this is a four-step process: (A) the Fund's assets are determined (valuation of assets); (B) the Fund's liabilities are determined (valuation of liabilities); (C) the amount of the Fund's liabilities that are not covered by assets is determined (valuation of unfunded liability); and (D) the amount of employer contribution that is required to make the assets greater than or equal to the liabilities is determined.

A. Valuation of the Fund's Assets (Step One)

The assets of the Fund as of June 30, 1995 are as follows:

Member Deductions	$1,046,515,515
Benefits in Force	1,419,403,136
Employer Accumulation	2,022,935,539
Undistributed Income Reserve	860,682,246
Unreserved Fund Balance	124,279,655
Total Assets Available for Benefits	$5,473,816,091

Member Deductions - contributions made by or on behalf of the employees plus any interest distributions, less amounts refunded or transferred to the Benefits in Force reserve for retirement, disability, or other benefit (this reserve is the employees' annuity savings account).

Benefits in Force - represents the actuarially determined present value of future pension benefits for all members who are presently retired or disabled.

Employer Accumulation - the accumulated employer contributions plus earnings distributions less transfers made to the benefits in force reserve.

Undistributed Income Reserve -a reserve in which all investment income is accumulated.

Unreserved Fund Balance - the unfunded actuarial accrued liability for non-retired participants,

[1] A reduction of debt by means of periodic payments sufficient to meet current interest and to liquidate the debt at maturity.

as determined by the actuarial valuation.

After adding all assets in order to determine the total assets available for pension benefits ($5,473,816, 091), a smoothing process is used in order to reduce fluctuations that occur in the value of assets. These fluctuations occur because investment earnings never follow a stable and level pattern. Earnings might be very good one year and very poor the following year. A procedure was developed by the PERF actuary to reduce these "peaks and valleys" which in turn helps keep the employer contribution rates reasonably level and more predictable.

This procedure requires that a percentage of the expected actuarial value of assets (75%) be added to a percentage of the actual cost value of assets (25%) in order to determine the "smoothed" grand total assets. Twenty-five percent of the actual cost value of the assets is used in order to average out any fluctuations in asset value over a four-year period (if the actuary were to average out the fluctuations over at two-year period, 50% would be used rather than 25%). The expected actuarial value of assets exists as part of the smoothing procedure.

After determining "smoothed grand total assets" ($5,312,016,106), member deductions are subtracted since benefits provided by member contributions are in addition to the benefits provided by employer contributions. The assets are further reduced by the liability for all members and beneficiaries that are currently receiving savings account benefit payments. This is accomplished as follows:

Grand Total Assets ("smoothed")	$5,312,016,106
Less: Member Deductions	$1,046,515,515
Less: Retiree & Benefit Reserve	$1,561,102,678
Equals: Net Assets as of 7/1/95	$2,704,397,913

Exhibit 3 shows the relative consistency of the annual growth of assets for fiscal year 1991 through fiscal year 1995.

Exhibit 3. Investment Experience: FY91-FY95.

Fiscal Year	Growth Rate of Assets
FY91	9.07%
FY92	9.54%
FY93	9.69%
FY94	9.32%
FY95	8.61%

B. Valuation of the Fund's Liabilities (Step Two)

According to the PERF actuary, liabilities are determined using a mathematical model. This mathematical model estimates when each member of PERF will be entitled to a benefit and how much of a benefit such member is entitled. These estimates are based on assumptions and on actual past experience about the frequency of retirement, death, disability, and termination of employment; salary increases; investment earnings; and how long a member lives after benefits have commenced. Based on the mathematical model and assumptions, the actuary calculates the value of the employee benefits payable under PERF (liability).

The liabilities for member deductions (employee contributions to the annuity savings account portion) are not included in this determination of total liabilities since the benefits provided by member contributions are in addition to the benefits provided by employer contributions (member deductions are also excluded from the determination of assets).

As seen below, the liability for retired members and beneficiaries receiving savings account benefit payments is subtracted from total liabilities since this liability is already funded. The assets will also be reduced by the liability for retirees and beneficiaries. This simplifies the funding for the ongoing active participants.

The following indicates how liabilities are calculated:

Grand Total Liabilities	$5,293,592,519
Less: Member Deductions	1,046,515,515
Less: Retiree & Benefit Reserve	1,561,102,678
Equals: Net Liabilities as 7/1/95	$2,685,974,326

C. Determination of Unfunded Liabilities (Step Three)

The unfunded actuarial accrued liability is the portion of the fund's liability not covered by plan assets. In other words, this amount represents the benefits that have accrued to current and past employees that have not been funded by the accumulated contributions and investment earnings. Exhibit 4 shows the unfunded actuarial accrued liability for fiscal year 1991 through fiscal year 1995. The shaded numbers indicate that the Fund had a modest unfunded actuarial accrued liability in fiscal years 91, 92 and 93, while in fiscal years 94 and 95, the actuarial accrued liability was completely funded.

As of July 1, 1995, the unfunded liability of PERF was a negative $18,423,587 (equal to the net liabilities of $2,685,974,326 minus the net assets of $2,704,397,913). Is it bad that the unfunded liability is a negative number? No - this simply means that the plan is well funded such that all current liabilities are nearly amortized or fully paid. It is important to note, though, that things can happen in future years to make the unfunded liabilities become positive (such as plan improvements and changes in the assumptions).

Exhibit 4. Development of the Unfunded Actuarial Accrued Liability: FY91-FY95.

July 1, 1991	State	Municipalities	Total
Actuarial Accrued Liability			
Active Participants	$941,742,042	$992,226,134	$1,933,968,176
Terminated Vested Participants	$18,198,117	$15,028,643	$33,226,760
Total Actuarial Accrued Liability	$959,940,159	$1,007,254,777	$1,967,194,936
Less: Non-Retired Participants Assets	$786,053,525	$867,403,616	$1,653,457,141
Equals: Actual Unfunded Actuarial Accrued Liability (UAL)	$173,886,634	$139,851,161	$313,737,795
Unfunded Actuarial Accrued Liability Prior Year	$268,725,856	$226,895,081	$495,620,937
Less: Amortization of Unfunded Actuarial Liability, Prior Years	$22,942,668	$19,481,613	$42,424,281
Plus: Interest for Full Year at 7.5%	$18,433,739	$15,556,010	$33,989,749
Equals: Expected Unfunded Actuarial Accrued Liability (UAL)	$264,216,727	$222,969,478	$487,186,405
Experience (Gain)/Loss Actual UAL-Expected UAL	($90,330,293)	($83,118,317)	($173,448,610)

July 1, 1992	State	Municipalities	Total
Actuarial Accrued Liability			
Active Participants	$1,017,629,166	$1,089,343,247	$2,106,972,413
Terminated Vested Participants	$20,208,108	$18,426,832	$38,634,940
Total Actuarial Accrued Liability	$1,037,837,274	$1,107,770,079	$2,145,607,353
Less: Non-Retired Participants Assets	$915,484,984	$1,008,126,094	$1,923,611,078
Equals: Actual Unfunded Actuarial Accrued Liability (UAL)	$122,352,290	$99,643,985	$221,996,275
Unfunded Actuarial Accrued Liability Prior Year	$173,886,634	$139,851,161	$313,737,795
Less: Amortization of Unfunded Actuarial Liability, Prior Years	$16,270,804	$13,342,431	$29,613,235
Plus: Interest for Full Year at 7.5%	$11,821,187	$9,488,155	$21,309,342
Equals: Expected Unfunded Actuarial Accrued Liability (UAL)	$169,437,017	$135,996,885	$305,433,902
Experience (Gain)/Loss Actual UAL-Expected UAL	($47,084,727)	($36,532,900)	($83,437,627)

July 1, 1993	State	Municipalities	Total
Actuarial Accrued Liability			
Active Participants	$1,057,241,198	$1,182,066,584	$2,239,307,782
Terminated Vested Participants	$23,677,029	$17,599,686	$41,276,715
Total Actuarial Accrued Liability	$1,080,918,227	$1,199,666,270	$2,280,584,497
Less: Non-Retired Participants Assets	$1,042,043,673	$1,182,213,751	$2,224,257,424
Equals: Actual Unfunded Actuarial Accrued Liability (UAL)	$38,874,554	$17,452,519	$56,327,073
Unfunded Actuarial Accrued Liability Prior Year	$122,352,290	$99,643,985	$221,996,275
Less: Amortization of Unfunded Actuarial Liability, Prior Years	$12,793,090	$10,657,378	$23,450,468
Plus: Interest for Full Year at 7.5%	$8,216,940	$6,673,996	$14,890,936
Equals: Expected Unfunded Actuarial Accrued Liability (UAL)	$117,776,140	$95,660,603	$213,436,743
Experience (Gain)/Loss Actual UAL-Expected UAL	($78,901,586)	($78,208,084)	($157,109,670)

Exhibit 4. Development of the Unfunded Actuarial Accrued Liability: FY91-FY95 (Continued).

July 1, 1994	State	Municipalities	Total
Actuarial Accrued Liability			
Active Participants	$1,079,831,358	$1,277,285,653	$2,357,117,011
Terminated Vested Participants	$26,679,596	$18,583,132	$45,662,728
Total Actuarial Accrued Liability	$1,106,510,954	$1,295,868,785	$2,402,379,739
Less: Non-Retired Participants Assets	$1,176,778,954	$1,349,880,440	$2,526,659,394
Equals: Actual Unfunded Actuarial Accrued Liability (UAL)	($70,268,000)	($54,011,655)	($124,279,655)
Unfunded Actuarial Accrued Liability Prior Year	$38,874,554	$17,452,519	$56,327,073
Less: Amortization of Unfunded Actuarial Liability, Prior Years	$6,965,359	$4,880,870	$11,846,229
Plus: Interest for Full Year at 7.5%	$2,393,189	$942,874	$3,336,063
Equals: Expected Unfunded Actuarial Accrued Liability (UAL)	$34,302,384	$13,514,523	$47,816,907
Experience (Gain)/Loss Actual UAL-Expected UAL	($104,570,384)	($67,526,178)	($172,096,562)

July 1, 1995	State	Municipalities	Total
Actuarial Accrued Liability			
Active Participants	$1,211,036,331	$1,417,265,837	$2,628,302,168
Terminated Vested Participants	$34,294,534	$23,377,624	$57,672,158
Total Actuarial Accrued Liability	$1,245,330,865	$1,440,643,461	$2,685,974,326
Less: Non-Retired Participants Assets	$1,249,865,324	$1,454,532,589	$2,704,397,913
Equals: Actual Unfunded Actuarial Accrued Liability (UAL)	($4,534,459)	($13,889,128)	($18,423,587)
Unfunded Actuarial Accrued Liability Prior Year	($70,268,000)	($54,011,655)	($124,279,655)
Less: Amortization of Unfunded Actuarial Liability, Prior Years	($758,289)	($106,665)	($864,957)
Plus: Interest for Full Year at 7.5%	($5,213,228)	($4,042,874)	($9,256,102)
Plus additional liability due to change in change in definition of Normal Retirement	$34,056,900	$29,199,777	$63,256,677
Plus additional liability due to change in actuarial assumptions	$111,753,924	$134,211,418	$245,965,342
Equals: Expected Unfunded Actuarial Accrued Liability (UAL)	$71,087,885	$105,463,331	$176,551,216
Experience (Gain)/Loss Actual UAL-Expected UAL	($75,622,344)	($119,352,459)	($194,974,803)

Funding Ratio

Another method of representing the soundness of a fund is with a measure known as the funding ratio. The funding ratio of a plan is the ratio of the plan's net assets to liabilities. A plan is said to be well-funded when the net assets are equal to or greater than its liabilities, giving a ratio of at least 1 to 1. Exhibit 5 shows the funding progress and the funding ratio for fiscal year 1991 through fiscal year 1995. As indicated, PERF had a modest unfunded liability in fiscal years 91, 92, and 93, and had a negative unfunded liability in fiscal years 94 and 95, which amounts to a credit.

Exhibit 5. Analysis of Funding Progress: FY91-FY95.

Fiscal Year	Assets Available For Benefits	Accrued Liabilities	Funding Ratio	Unfunded Liability
FY91	$1,653,457,000	$1,967,195,000	.84 : 1	$313,738,000
FY92	$1,923,611,000	$2,145,607,000	.90 : 1	$221,996,000
FY93	$2,224,257,000	$2,280,584,000	.97 : 1	$56,327,000
FY94	$2,526,659,000	$2,402,380,000	1.05 : 1	($124,279,000)
FY95	$2,704,398,000	$2,685,974,000	1.00 : 1	($18,424,000)

D. Determination of the Employer Contribution Rate (Step Four)

The employer contribution rate is the annual contribution rate that the employers must make to fund PERF on a systematic basis. The actuarial valuation process is the mathematical process by which the level percent of payroll contribution rate is determined. In most instances, the actuarially determined contribution includes an amount to cover the benefits that will accrue to members during the next plan year, plus an amount that corrects for the differences between the past assumptions and the plan's actual experience. This is called amortization of the unfunded actuarial accrued liability.

The contribution rate must be sufficient to cover at least: 1) normal cost (the present value of benefits likely to be paid in the future resulting from a member's service being rendered in the current year); plus 2) interest on the unfunded actuarial accrued liability.

PERF's actuaries determine each year the employer contribution rate necessary to meet future liability and contribution projections. In doing so, they make an assumption as to what investment returns are reasonable for the Fund to achieve. For fiscal year 1996, the assumed return is 7.0%. To the extent that actual market earnings are greater than the rate of return

established by the Board for the Guaranteed Fund, the earnings associated with the savings account portion subsidize the pension fund, thus lowering the employer contribution required for the pension fund. For further explanation, see Section V.

Exhibit 6 shows how the PERF employer contribution rate is established.

Exhibit 6. Determination of Employer Contribution Rate (as of July 1, 1995).

Determination of Employer Contribution Rate		
A.	Amortization payments for existing Unfunded Liabilities. This represents those amounts needed to pay off the debt generated from liabilities created by past service. Amortization represent payments for past service, and are needed with normal cost in order to properly prefund a plan.	$(103,058)
B.	Actuarial Experience Gain (this is the savings that PERF had from the last Valuation due to favorable experience such as investment earnings better than expected, salary increases less than expected, etc.)	$(194,974,803)
C.	Factor to amortize the Actuarial Experience Gain over 40 years with an interest assumption of 7%. This is based on a mathematical formula used by the PERF actuary that is similar to the amortization of a home mortgage.	7.0102%
D.	The Amortization Payment for the Actuarial Experience Gain [B x C]	$(13,668,123)
E.	Additional Unfunded Liability due to change in definition of normal retirement. In other words, the liability is higher after the change in definition of normal retirement than before the change. This figure represents the difference.	$ 63,256,677
F.	The Amortization Payment for additional Unfunded Liability due to change in definition of normal retirement [E x C]	$ 4,434,420
G.	Additional Unfunded Liability due to change in assumptions in mathematical model The change results in higher unfunded liabilities. This number represents the difference.	$245,965,342
H.	The Amortization Payment for the additional Unfunded Liability due to changes in the assumptions in the mathematical model [G x C]	$ 17,242,662
I.	Total Amortization Payments [A + D + F + H]	$ 7,905,901
J.	Normal Cost (this is the additional cost to fund the liabilities that will accrue during the upcoming year). Normal cost is equal to the value of participant's total liability at entry age (age at hire) amortized over his/her entire career as a level percentage of payroll. This number increases with the assumed salary scale for every year past entry age.	$159,318,829
K.	The estimated total employer contribution of PERF [I + J]	$167,224,730
L.	The anticipated payroll to be paid to members for the upcoming year	$2,833,328,063
M.	Employer cost expressed as a percentage of payroll: 100*(K)*1.035/L (The 1.035 factor is an adjustment to account for the fact that contributions will generally be made throughout the year, in other words, on average, about half-way through the year). The 100 is needed in order arrive at a percentage. Costs are developed as of the beginning of the year, but since costs come in throughout the year, it is assumed for simplicity purposes that the contributions come in mid-year.	6.1%

Employer Contributions

The current employer contribution rate for the State is 6.3% of anticipated payroll. The average rate for municipalities is 6.0% of anticipated payroll. The overall (average) rate is 6.1%.

As shown in Exhibit 7, employer contribution rates have declined each year from 1991 through 1994. However, in 1995 the rate increased. According to the actuary for PERF, this was due to

Exhibit 7. History of Employer Contribution Rates: 1991-1995.

Valuation Date	State	Municipalities	Total
June 30, 1991	7.0%	6.7%	6.8%
June 30, 1992	6.6%	6.4%	6.5%
July 1, 1993	6.2%	6.0%	6.1%
July 1, 1994	5.6%	5.7%	5.6%
July 1, 1995*	6.3%	6.0%	6.1%

* These contribution rates reflect the retirement date as changed by P.L. 10-1995 to coincide with the definition in the Teachers' Retirement Fund and reflect change in actuarial assumptions.

the passage of legislation that broadens the definition of normal retirement (P.L. 10-1995) to provide full benefits at age 60 with 15 or more years of creditable service, or at age 55 with member's age plus years of creditable service equal to 85 or more (Rule of 85). It was also due to revisions in the actuarial assumptions. The latter was based on an experience study conducted and prepared by the PERF actuary. Exhibit 8 shows a five-year history of the employer contributions.

Exhibit 8. Employer Contributions: FY91-95

Fiscal Year	Employer Contributions
FY91	$174,319,000
FY92	$187,318,000
FY93	$189,237,000
FY94	$184,077,000
FY95	$187,353,000

E. Valuation Method Used

There are several actuarial methods that could be used to calculate the contributions necessary to fund the plan. PERF uses the "entry age normal" method. This valuation method separately amortizes all actuarial gains and losses resulting from experience different from that anticipated in the assumptions. The purpose of this method is to give a smooth progression of the employer costs from year to year, and at the same time, provide for an orderly funding of the liabilities.

Below is a brief explanation and commentary from Gabriel, Roeder, Smith & Co. regarding funding and employer contribution rates:

> A sound funding objective for any retirement plan is to establish and receive contributions, expressed as percents of active member payroll, which will remain approximately level from year to year and will not have to be increased for future generations of taxpayers.
>
> Translated into actuarial terminology, a level percent of payroll contribution objective means that the contribution must be at least:
>
> Normal Cost (the present value of benefits likely to be paid resulting from a member's service in the current year)
>
> plus
>
> Interest on the unfunded actuarial accrued liability (the difference between the accrued liability and current plan assets).
>
> An inevitable by-product of the level contribution objective, if followed, is the accumulation of reserve assets and the income produced when the assets are invested. Investment income becomes in effect the third contributor for benefits to members, and is directly related to the contribution amounts required from members and employers.

Figure 2 shows the principles behind the advance funding mechanism, and is reprinted with permission of the Harvard Business Review (1996).The author describes the theory and application of Advance Funding of Pension Plans in *The ABC's of Pension Funding.* An excerpt follows:

> The Income valve can be viewed as the employer contribution valve, controlled by the employer. Since the flow through this valve will take place much earlier, it provides a "reservoir" for temporarily holding the dollars damned up by the relatively slow opening Benefit Valve. Because these dollars can be invested to create other dollars, another inlet is added to the pension fund, this one labeled Investment Earnings. In the Investment Earnings inlet there is a valve controlled

by a float. When the tank is empty, the Investment Earnings Valve is closed and nothing flows through it. As the dollar level rises in the tank, the valve opens. The size of the opening through the Investment Valve is always proportional to the dollar level in the tank.

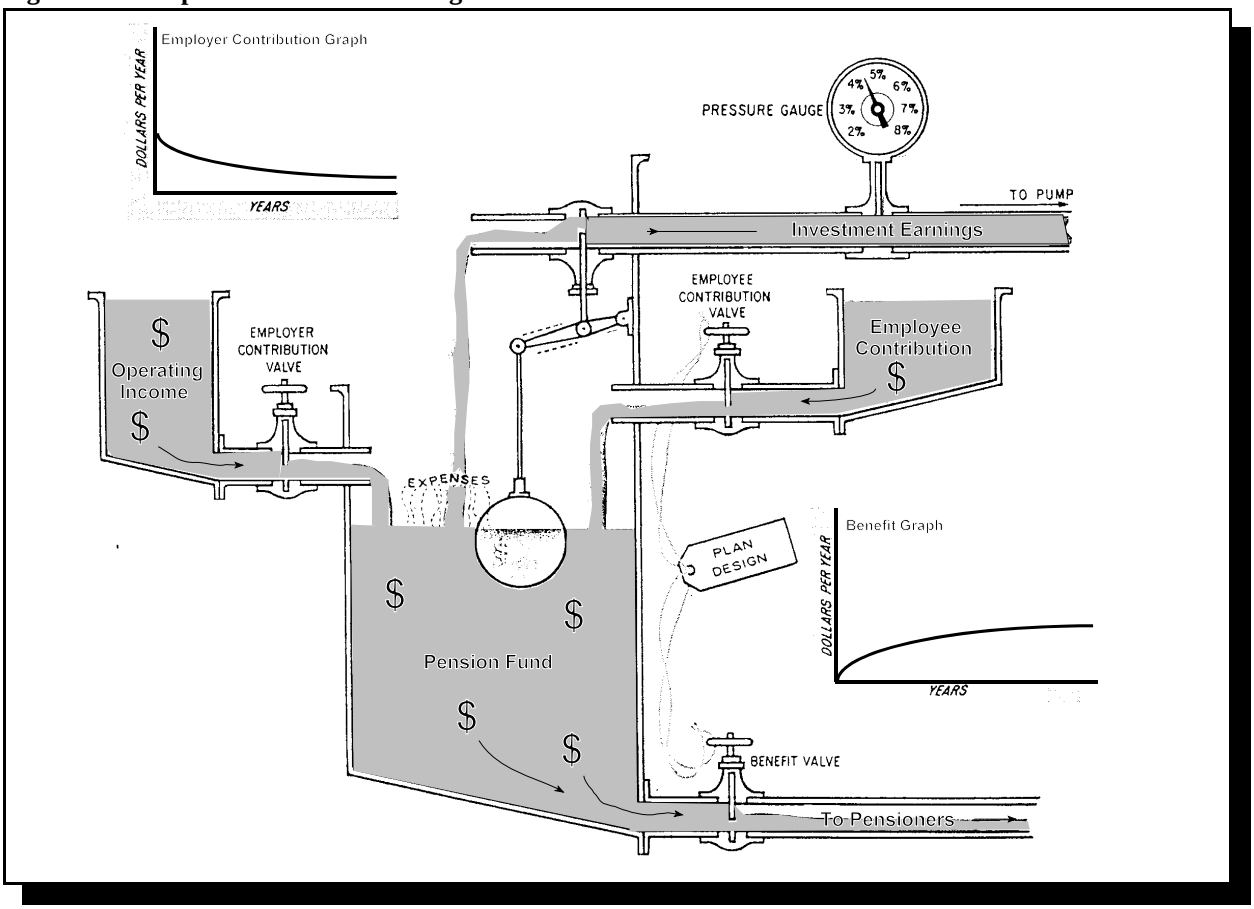
The pressure in the Investment Earnings line is maintained by a pump, but the pressure is not entirely constant. If the gauge were to stay, at say, 7.5% for a year, an amount equal to 7.5% of the dollars in the tank would flow through the valve into the reservoir during the same year. The gauge pressure is intended to represent not only direct earnings in the form of interest or dividends, but also any effect of appreciation or depreciation of assets.

As long as there are any dollars in the tank, and any pressure at all on the gauge, dollars are flowing into the reservoir through the Investment Earnings inlet. The higher the pressure and the fuller the tank, the greater the flow.

To make the picture more general, add another inlet pipe for Employee Contributions. The flow through this inlet, like that through the Benefit outlet is controlled entirely by the terms of the plan itself.

When moneys for employee benefits are accumulated on an advance-funding basis, actuarial valuations are used to compute the contributions required to fund the long-term value of the benefits. Using assumptions about employees and retiree demographics, rate of investment return, and increases in employee compensation over time, the actuary calculates the contributions necessary for the orderly accumulation of assets needed to pay benefits when due.

Figure 2. Principles of Advance Funding.



F. Relationship of Current Investments and Future Contribution Requirements

According to PERF's actuary, a good "rule of thumb" regarding the relationship between investments and future state contributions to the pension fund is as follows:

> Whenever assets earn in excess of what is expected, contribution requirements for the Fund will go down by about ten percent (10%) of the difference between expected earnings and actual earnings. The inverse also is true.

For example, if assets are expected to earn $50 million, but instead earn $60 million, contribution requirements would decline by an estimated $1 million (10% of the difference between $60 million, the actual investment earnings, and $50 million, the expected investment earnings).

The rate of return earned on assets plays a significant role in the funding of retirement systems. According to the United States Bureau of the Census, income from government retirement system investments amounted to almost sixty percent of the total money received by the retirement systems (including employer and employee contributions).

For most government retirement systems, investment decisions are made within the framework of legal restrictions set forth in state or local statutes. Most states rely on some form of the "prudent person" investment standard, which requires that investments be made with the care, skill, and diligence of a prudent individual solely in the interest of plan participants, with efforts made to diversify the portfolio.

The state of Indiana currently employs the prudent person standard. With the passage of SEA 69-1996, however (effective July 1, 1996), Indiana will employ a stricter version of this requirement, referred to as the "prudent investor" standard, which requires investments to be selected with the care, skill, and diligence of a prudent professional with investment expertise.

Investments are structured within PERF guidelines for risk tolerance so as to meet future liability and contribution projections.

IV. Annuity Savings Account Portion of the Retirement Benefit

In addition to the pension portion of the retirement benefit, there is also an annuity savings account portion. It consists of the members' contributions and the interest credits on those contributions. Members are credited individually according to their respective accounts. This is a defined contribution type of program where the rate of contribution is fixed, and the benefits are level and dependent to some extent upon the contributions. A participant who terminates employment prior to eligibility for retirement or disability benefits is entitled to the return of his or her own contributions plus interest.

The Board is required to establish one or more alternative investment programs (within the annuity savings account) that represent a variety of investment objectives. The Guaranteed, Money Market, and Bond Funds have been established in order to fulfill this requirement. A member may invest the member's annuity savings account contributions in the following investment funds.

The Guaranteed Fund: Interest on a member's contribution is credited at a rate annually determined by the PERF Board. Principal and interest are guaranteed with the market risk being assumed by the Fund. Distributions, withdrawals, and transfers are at book value (the amount at which an asset is carried on the books of the owner). According to PERF, as of March 1996, there are 143,612 participants in this fund.

The Bond Fund: A member's contributions are invested in fixed-income instruments that are intended to provide interest and capital gain income. The market risk is assumed by the member. Distributions, withdrawals, and transfers are at market value. According to PERF, there are 1,607 participants in this fund as of March 1996.

The Money Market Fund: A member's contributions are invested in a money market fund that holds a variety of short-term investments having terms of one year or less. These investments include obligations of the United States Government and federal agencies. The market risk is assumed by the member. Distributions, withdrawals, and transfers are at market value. There are 583 participants in this fund as of March 1996.

Currently, members are permitted to select from these investment options during June of each year. A member may invest his/her annuity savings account in only one fund at a time. If a member chooses to transfer his/her annuity savings from PERF's Guaranteed Fund to the Money Market or Bond Fund, the member may never return to the Guaranteed Fund. Investment options would then be limited only to the Money Market and Bond Funds.

V. Public Employees Retirement Fund

Asset Accumulation

Cash accumulation is only part of the pension funding picture. Most pension funds attempt to keep the funds fully invested, and maintain cash only for current operating and short-term investment purposes. Cash is currency on hand and demand deposits with banks or other financial institutions, and cash equivalents are short-term highly liquid investments that are both readily convertible to known amounts of cash and so near their maturity that they present insignificant risk of changes in value because of changes in interest rates. Both cash and cash equivalents are important considerations in asset accumulation. The underlined areas of Exhibit 9 show cash and cash equivalents in the Fund for fiscal year 1991 through fiscal year 1995, while the shaded areas show total assets in the Fund.

Exhibit 9. PERF Comparative Balance Sheet: FY91-FY95.

Assets	FY91	FY92	FY93	FY94	FY95
Cash and Cash Equivalents	68,950,547	674,940,705	225,762,116	275,744,861	237,810,080
Contributions Received	47,227,459	49,028,543	50,085,787	49,299,614	53,967,578
Accrued Interest	56,119,268	48,826,163	60,233,920	62,894,127	67,145,941
Interfund Receivable Adm. Expense	523,619	779,141	814,624	672,128	824,212
Investment Book Value	3,430,654,607	3,322,492,066	4,270,672,402	4,686,852,834	5,111,892,580
Real Estate Investment	4,889,906	4,923,398	4,944,466	4,966,349	4,967,369
Equipment LLess Depreciation	147,104	119,153	99,290	80,979	65,183
Total Assets	3,608,512,510	4,101,109,169	4,612,612,605	5,080,510,892	5,476,672,943
Liabilities and Fund Balance					
Current Liabilities					
Accounts Payable	590,298	1,795,880	1,957,299	2,526,447	2,856,852
Payable to Federal Government	9,493,178	0	0	0	0
Accrued Vacation Leave				138,702	
Total Current Liabilities	10,083,476	1,795,880	1,957,299	2,665,149	2,856,852
Fund Balance					
Reserves:					
Member Reserve	716,704,138	793,526,023	878,179,021	966,871,653	1,046,515,515
Benefits In Force	1,068,704,022	1,153,977,833	1,240,904,466	1,322,612,190	1,419,403,136
Employer Reserves	1,864,900,829	1,870,322,636	1,970,914,974	2,020,032,542	2,022,935,539
Undistributed Income	443,740,982	595,224,592	742,653,120	824,656,431	860,682,246
Total Reserves	4,094,049,971	4,413,051,084	4,832,651,581	5,134,172,816	5,349,536,436
Unreserved Fund Balance	(495,620,937)	(313,737,795)	(221,996,275)	(56,327,073)	124,279,655
Total Fund Balance	3,598,429,034	4,099,313,289	4,610,655,306	5,077,845,743	5,473,816,091
Total Liabilities and Fund Balances	3,608,512,510	4,101,109,169	4,612,612,605	5,080,510,892	5,476,672,943

There is no minimum requirement for accumulated assets. However, the more assets accumulated in the Fund, the lower the required level of employer contributions. In addition, it is beneficial to have sufficient assets to cover the accrued liabilities of the Fund. This would

indicate that all past service liabilities are fully funded and that the only employer contributions required are those for current and future liabilities.

Exhibit 10 shows a 5 year estimated projection of Fund assets by PERF's actuary.

Exhibit 10. Five-Year Projection of PERF Fund Assets: FY95-FY00.

Fiscal Year	Beginning Balance as of July 1	Employer Contributions	Member Contributions	Investment Income	Benefits and Refunds	Administrative Expenses	Estimated Ending Balance as of June 30
FY95	$5,077,911,397	$187,352,847	$89,050,554	$338,478,898	$213,757,285	$5,220,320	$5,473,816,091
FY96	$5,473,816,091	$196,720,489	$93,503,082	$384,908,930	$235,133,014	$5,324,726	$5,908,490,853
FY97	$5,908,490,853	$206,556,514	$98,178,236	$415,017,362	$258,646,315	$5,431,221	$6,364,165,429
FY98	$6,364,165,429	$216,884,340	$103,087,148	$446,538,804	$284,510,946	$5,539,845	$6,840,624,928
FY99	$6,840,624,928	$227,728,556	$108,241,505	$479,451,253	$312,962,041	$5,650,642	$7,337,433,560
FY00	$7,337,433,560	$239,114,984	$113,653,580	$513,716,482	$344,258,245	$5,763,655	$7,853,896,707

Figures for the FY95 are actual. Subsequent years are projected under the following assumptions:

(1) Employer Contributions and Member Contributions increase at the rate of 5% compounded annually (same as assumed increases in salaries from July 1, 1995 Actuarial Valuation).

(2) Investment Income is 7% compounded annually (same as the assumed investment return from July 1,1995 Actuarial Valuation).

(3) Benefits and Refunds increase at the rate of 10% compounded annually (approximate rate of growth over preceding 8 years).

(4) Administrative Expenses increase at the rate of 2% compounded annually (approximate rate of growth over preceding 7 years).

Management and Guidelines for Investments

The Board manages PERF investments and issues guidelines for its annuity savings account investment programs. The Treasurer of State acts as the official custodian of the cash and securities of the Fund, except for securities held by banks or trust companies under custodial agreements with the Board.

PERF funds are invested in United States Government and Agency issues such as Mortgage Backed Security holdings, e.g., Federal National Mortgage Association (FNMA), Government National Mortgage Association (GNMA), Federal Home Loan Mortgage Association (FHLMC), and Veterans Administration (VA). PERF funds are also invested in Treasury Notes and in corporate bonds with a minimum-grade that is one level higher than the Investment Industry's definition of minimum (quality) investment grade.

PERF does not permit investment leverage practices (i.e. borrowing to invest) or future/option derivatives investment, (i.e. gold and oil futures, or pork bellies, etc.), nor does it permit investment in foreign or municipal issues. Additional restrictions include the Indiana State Constitution's prohibition of equity securities investment.

In order for PERF to invest in equities (stocks), the Indiana State Constitution must be amended. This amendment (a joint resolution) must be passed by two separately elected legislatures. In the 1993 session, Senate Joint Resolution 8 passed, and in 1995 the General Assembly passed Senate Joint Resolution 4. These resolutions contain a proposed amendment to the Indiana Constitution which would allow PERF investment in equities (with limitations and regulations). This amendment will be voted on by Indiana citizens in the November 1996 general election.

Categories of Investments

According to the State Board of Accounts, investments are categorized to give an indication of the level of risk assumed by the Fund. Category 1 includes investments that are insured or registered or for which securities are held by the State or its agent in the State's name. Category 2 includes uninsured and unregistered investments for which securities are held by the broker's or dealer's trust departments or agent in the State's name. Category 3 includes uninsured and registered investments for which the securities are held by the broker or dealer, or by a trust department or agent but not in the State's name. According to the State Board of Accounts, PERF funds are invested in Category 2 investments.

For fiscal year 1995, investment income represented approximately 58% of the total money received by PERF. This can be seen in the shaded portions of Exhibit 11.

Exhibit 11. PERF Statement of Revenues, Expenses, and Changes in Fund Balances: FY91-FY95.

	FY91	FY92	FY93	FY94	FY95
Operating Revenues:					
Contributions	260,783,541	267,589,283	270,990,888	267,645,806	276,552,284
Investment Income	293,473,354	315,002,401	330,114,324	330,262,410	360,815,317
Gain (Loss) on Sale of Investments	23,839,037	88,757,723	93,978,727	62,736,829	(22,336,419)
Interfund Contribution Transfers			1,085,727	1,637,888	811,152
Voided Benefit Check					159,388
Interfund Reimbursement of Adm Expenses	523,619	651,966	814,625	672,128	839,322
Total Operating Revenue	579,579,248	672,780,474	696,983,969	662,955,061	616,841,044
Investment Income as % of Operating Revenue	51%	47%	47%	50%	58%
Operating Expenses:					
Annuity Benefits	124,379,454	138,166,765	150,752,228	156,252,334	177,852,344
Disability Benefits	5,635,074	6,102,438	7,042,195	7,631,794	8,364,320
Survivor Benefits	0	0	0	0	0
Funeral Benefits	0	0	0	0	0
Refunds of Contributions and Interest	20,407,882	21,098,996	19,849,093	24,797,314	27,700,009
Refund to Federal Government	11,360,367	1,196,650	1,837,264	0	0
Interfund Contribution Transfer	1,450,403	1,114,887	862,076	1,494,165	960,035
Administrative	4,285,891	4,216,483	5,299,096	5,589,017	6,059,642
Total Operating Expenses	167,519,071	171,896,219	185,641,952	195,764,624	220,936,350
Operating Net Income	412,060,177	500,884,255	511,342,017	467,190,437	395,904,694
Beginning Fund Balance	3,186,368,857	3,598,429,034	4,099,313,289	4,610,655,306	5,077,911,397
Ending Fund Balance	3,598,429,034	4,099,313,289	4,610,655,306	5,077,845,743	5,473,816,091

Money Managers

As part of its investment program, PERF employs seventeen money managers, seven of whom are emerging managers. Emerging money managers are investment managers who hold investment portfolios of less than $500,000,000 as of July 1, 1993, and are minority or women-owned business enterprises.

The Board is required to encourage employment of emerging money managers. By the end of 1996, and thereafter, ten percent of fund assets are required to be invested with emerging money managers who are minority business enterprises, and five percent with those who represent women-owned business enterprises. According to PERF's controller, the period ending June 30, 1995, 8.01% of Fund assets were invested with money managers who represented minority business enterprises, and 3.03% of Fund assets were invested with money mangers who represented women-owned enterprises. As of March, 1996, the same percentages applied.

Registration and Evaluation

All money managers are registered with the United States Securities and Exchange Commission and meet PERF established criteria as to performance, organization, and key personnel. The money managers are evaluated by PERF's investment guidelines at the Board's quarterly meetings. Money managers are selected based on "confidence". "Confidence" implies a trust in a manager's abilities. Prospective managers must provide evidence of competence such that a prudent investor would trust them to manage money competently in a certain investment style.

The fees of the various money mangers depend upon their experience, the amount of money they have to invest, and historical performance. Two-year contract costs for the various money managers range between $75,000 and $1.3 million.

Rates of Growth in Assets and Investment Income

All of PERF's funds are invested in fixed-income securities. During 1995, the aggregated average return of all the individual portfolios for the seventeen active managers was 18.5%. Exhibit 12 represents a five year history of PERF's growth in assets and investment income.

Exhibit 12. PERF Value of Assets.

Year	Growth in Assets	Investment Income
FY91	16.7%	$317,311,000
FY92	7.5%	$403,760,000
FY93	10.4%	$424,093,000
FY94	-2.9%	$392,999,000
FY95	18.5%	$338,479,000

The growth in assets shown here for PERF reflects all investment income earned, exclusive of income earned from the bond and money market funds. This takes into consideration the market value of the portfolio (unrealized gains or losses) in addition to the interest income and realized gains and losses for the calculation period. The investment income shown above in Exhibit 12 consists of the interest income received plus or minus the net accrual for the period and the realized gains and losses.

According to the controller of PERF, the growth of assets is dependent not only on realized income, but also on the value and yield on investments when calculating the rate of return. According to PERF, the total return would only be recognized if there were a total liquidation of the investments at the current difference between value and existing price.

Investment income is only one factor in determining the growth in assets. The negative growth in FY94 of 2.9%, for example, indicates that the potential unrecognized loss of the portfolio would have been greater than the investment income of $392.9 million if the portfolio of approximately $5.3 billion would have been liquidated. In other words, the value of the portfolio declined by 2.9%.

PERF funds are invested in fixed-income securities with a goal of matching or exceeding various market indices (net of management fees) over reasonable time periods such as a market cycle. A market cycle is defined as the length of time between either a "bear-to-bear market" or a "bull to bull market". Some financial advisors have said that an average market cycle is about four years.

Exhibit 13 describes the distribution of PERF investments of all funds, exclusive of the Money Market and the Bond Fund, at the end of 1995.

Exhibit 13. PERF Investments (as of 12/31/95).

Sector	% Invested
Short Term (matures in less than one year)	3.1%
U.S. Treasuries and Agencies	73.2%
Corporate Bonds	23.7%
Total	100.0%

As of June 30, 1995, according to the State Board of Accounts audit of PERF, all investments, including Money Market and Bond Fund, totaled $5,349,702,660, or approximately 98% of total assets.

Exhibit 14 describes the rates of return earned by the Bond and Money Market Funds, and the rate of return credited to the Guaranteed Fund.

Exhibit 14. Fund Comparisons: FY91-FY95.

Year	Bond Fund*	Money Market Fund*	Guaranteed Fund**
FY91	9.114%	6.894%	8.200%
FY92	15.169%	4.394%	7.750%
FY93	14.833%	2.443%	7.750%
FY94	-3.490%	2.792%	8.000%
FY95	13.554%	4.998%	6.750%

* Equals actual rates of return.
** Equals rates of return established by the PERF Board.

On April 25, 1996, the rate of return for the Guaranteed Fund was established (ten months in arrears) by the PERF Board at 8.4% for fiscal year 96.

Each June 30, the investment earnings from the Bond Fund and the Money Market Fund are credited back to the savings accounts of the individual members at the rate of return earned in the market. However, this is not the case for the earnings of the Guaranteed Fund.

In the case of all other investment earnings, including those from the Guaranteed Fund, the earnings are: (a) credited to the accounts of the individual members of the Guaranteed Fund based on their contribution and the rate of return established by the PERF Board (rather than at the actual market rate of return); and (b) the balance remains as investment earnings for the pension fund. To the extent that actual market earnings are greater than the rate of return

established by the Board for the Guaranteed Fund, the earnings associated with the annuity savings account portion subsidize the pension fund, thus lowering the employer contribution required for the pension fund.

For example, if the Fund experiences earnings of 10%, but the PERF Board credits only 7.5% to the Guaranteed Fund, the remaining 2.5% would go into the undistributed income reserve of the pension fund. As an asset of the pension fund, this 2.5% would result in a lowering of the employer contribution required to fund the unfunded liability. For FY91 through FY95, this difference between actual earnings and the rate established by the Board ranged from approximately zero to about 3.25%.

References

Towbridge, Charles, “The ABC’s of Pension Funding”, Harvard Business Review, March-April, 1966, pp. 115-126.