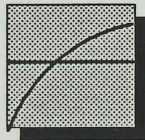




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Crystal Firefighters' Relief Association



Annual Actuarial Valuation December 31, 1990

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Appendix I Financial Principles and Operational Techniques

Appendix II Meaning of Unfunded Accrued Liabilities

June 28, 1991

Board of Trustees
Crystal Firefighters' Relief Association
Crystal, Minnesota

Submitted in this report are the results of the December 31, 1990 actuarial valuation of the assets, actuarial values and contribution requirements associated with the benefits provided by the Crystal Firefighters' Relief Association.

The valuation results contained in Section A provide the actuarial information needed to determine the employer's "minimum obligation" effective January 1, 1992. Section A also contains comments regarding the valuation results.

The valuation was based upon information furnished by the Association concerning benefits, financial transactions, active members, terminated members, retirants and beneficiaries. Data was checked for year to year consistency but was not otherwise audited by us. This information is summarized in Section B.

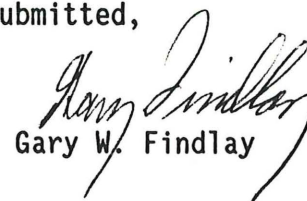
A description of the actuarial funding method and the risk experience assumptions used is contained in Section C. The economic risk experience assumptions, as well as the actuarial funding method to be used, are established by state law.

Information needed to comply with Statement No. 5 of the Governmental Accounting Standards Board is contained in Section D.

The actuarial valuation was prepared using generally accepted actuarial principles and practices based upon the methods, assumptions, summary of plan provisions and the member and financial data described in this report.

Respectfully submitted,


J. Daniel Petersen


Gary W. Findlay

Section A
Valuation Results

COMMENTS

Economic Assumptions and Financing Method

The economic assumptions of 5% annual investment return is established by state law. State law also specifies that the annual minimum obligation of the municipality shall be determined by adding (i) the employer normal cost expressed as a dollar amount, (ii) anticipated administrative expenses, and (iii) the amortization contribution requirement to fund the current unfunded actuarial accrued liability by the established date for full funding.

It is worth noting that when the same assumptions and methods are applied to plans which differ in nature, the valuation results may not be comparable. Caution should be exercised when attempting to assess the financial condition of one Association relative to another on the basis of valuation results produced using the assumptions and methods mandated by state law.

Crystal Firefighters' Relief Association

CONTRIBUTION RATE TO PROVIDE BENEFITS

Member portion & Employer portion
Effective January 1, 1992

<u>Contributions for</u>	<u>If Paid Equally Throughout Year</u> <u>UAAL Dollars</u>
Normal cost of annuities:	
Age & service: to members	\$38,836
Age & service: to survivors	9,537
Disability	919
Death before retirement	5,998
Refunds of member contributions	<u>0</u>
Total Normal Cost	\$55,290
Amortization of unfunded actuarial accrued liabilities (UAAL)	
Based on plan before 1990 plan changes	\$ 0
Resulting from 1990 plan changes (over 20 years from effective date of changes)	<u>26,257</u>
Total	\$26,257
Total Cost of Benefit	\$81,547
Member contributions	0
COMPUTED EMPLOYER RATE:*	
(a) If Paid Equally Throughout Year	\$81,547
(b) IF PAID AT CALENDAR YEAR END	\$83,561

* Anticipated administrative expenses are to be added to this amount
to determine required minimum contribution.

Crystal Firefighters' Relief Association
Present Actuarial Condition

The Association's assets were in excess of \$2.0 million on December 31, 1990 -- a considerable sum of money if unencumbered and allocated among a small group of persons. This is not the case with the Association's assets.

The following schedule puts the \$2.0 million into perspective by showing the relationship between assets, actuarial accrued liabilities, and the number of persons with actual and potential claims on the Association's assets.

	<u>Assets at Market Value</u>	<u>Actuarial Accrued Liabilities</u>	<u>Unfunded Actuarial Accrued Liabilities</u>	<u>Percent Funded</u>
Retirants and Beneficiaries				
Retired Members (28)		\$1,412,702		
Surviving Spouses (2)		34,068		
Surviving Children (0)		<u>0</u>		
Total (30)	\$1,446,770	\$1,446,770	\$ 0	100.0%
Deferred Members (2)	25,824	25,824	0	100.0
Active Members (36)	<u>604,085</u>	<u>930,475</u>	<u>326,390</u>	64.9
Total	\$2,076,679	\$2,403,069	\$ 326,390	86.4%

Actuarial accrued liabilities represent the value, computed as of December 31, 1990 of:

- (i) retirement allowances likely to be paid the 30 retirants and beneficiaries; and
- (ii) the contributions assumed to have been made for the 36 active members from entry into the plan until December 31, 1990.

The value of retirement allowances likely to be paid the 30 retirants and beneficiaries, discounted for investment earnings and mortality, was computed to be \$1,446,770 as of December 31, 1990. To put this amount in perspective, the \$1,446,770, together with investment earnings, will just be sufficient to pay the 30 retirants and beneficiaries their allowances for their remaining lifetimes. This assumes the 30 retirants and beneficiaries live and die according to the assumed mortality and the \$1,446,770 is invested to yield an average annual return of 5.0% over the remaining lifetimes of the retirants and beneficiaries.

With respect to the active members, the actuarial accrued liability of \$930,475 represents the amount that would have been accumulated by December 31, 1990. This assumes the normal cost had been contributed from the date of hire until December 31, 1990 for the 36 actives, and that these amounts had earned 5.0% interest. It also assumes that the members in the past have lived, died, withdrawn, and retired according to the actuarial assumptions shown in this report.

Historical Funding Ratio Schedule
(\$ in thousands)

<u>Valuation Date December 31</u>	<u>Actuarial Accrued Liabilities</u>	<u>Accrued Actuarial Assets</u>	<u>Percent Funded</u>
1988	\$2,110	\$1,875	88.8%
1990	2,403	2,077	86.4

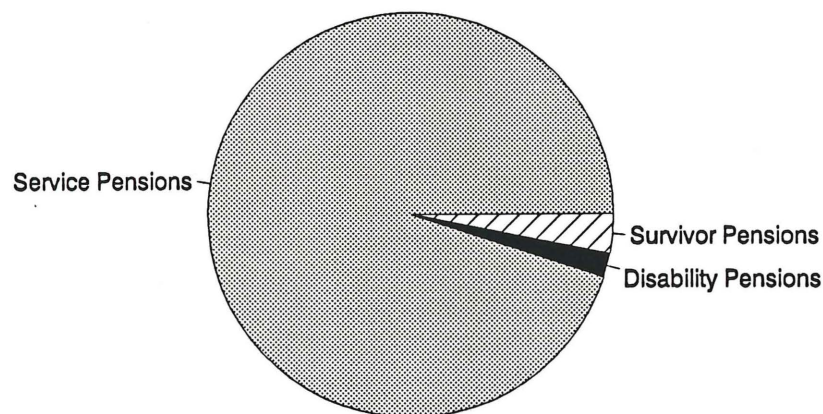
Crystal Firefighters' Relief Association
 Computed Contributions - Comparative Schedule

<u>Year Ended December 31</u>		<u>Total Normal Cost</u>	<u>Contribution For Unfunded Actuarial Accrued Liabilities</u>
<u>Valuation</u>	<u>Fiscal</u>		
1988	1990	\$47,953	\$17,922
1990	1992	55,290	26,257

Section B
Valuation Data
and
Summary of Benefit Provisions

Crystal Firefighters' Relief Association
Retirants and Beneficiaries December 31, 1990
By Type of Annuity Being Paid

<u>Type of Annuity Being Paid</u>	<u>No.</u>	<u>Monthly Amounts</u>	<u>Computed Actuarial Accrued Liabilities</u>
Retirants receiving:			
Age & Service	27	\$10,200.00	\$1,378,310
Disability	<u>1</u>	<u>204.00</u>	<u>34,392</u>
Totals	28	10,404.00	1,412,702
Beneficiaries receiving:			
Spouse	2	340.00	34,068
Child	<u>0</u>	<u>0.00</u>	<u>0</u>
Totals	2	340.00	34,068
	<hr/>	<hr/>	<hr/>
Totals	30	\$10,744.00	\$1,446,770



Monthly Amount Paid by Benefit

Crystal Firefighters' Relief Association
Inactive Members Eligible for Deferred Benefits
December 31, 1990

<u>No.</u>	<u>Monthly Amount</u>	<u>Computed Accrued Liabilities</u>
2	\$195.60	\$25,824

Crystal Firefighters' Relief Association
Retirants and Beneficiaries December 31, 1990
By Attained Ages

<u>Attained Ages</u>	<u>Number</u>		<u>Death Before Retirement</u>
	<u>Age & Service</u>	<u>Disability</u>	
50-54	2	1	
55-59	3		
60-64	7		
65-69	9		
70-74	5		
75-79	<u>3</u>	<u>—</u>	
Totals	29	1	

Crystal Firefighters' Relief Association
Retirants and Beneficiaries Added to and Removed from Rolls
Comparative Statement

<u>Valuation Date December 31</u>	<u>No. Added to Rolls</u>	<u>No. Removed from Rolls</u>	<u>Rolls End of Year No.</u>	<u>Annual Allowances</u>	<u>Discounted Value of Total Allowances</u>
1988			30	\$111,960	\$1,309,148
1990	1	1	30	128,928	1,446,770

Crystal Firefighters' Relief Association

Active Members December 31, 1990

By Attained Age and Years of Service

Attained Age	Years of Service to Valuation Date							Totals
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	
20-24	6							6
25-29	3							3
30-34	1	2	3					6
35-39		5	1					6
40-44		2	1	2				5
45-49				3	3			6
50-54	—	—	—	4	—			4
Totals	10	9	5	9	3			36

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age: 37.1 years.

Service: 11.0 years.

Crystal Firefighters' Relief Association
Comparative Schedule
Of Active Members

<u>Valuation Date December 31</u>	<u>Valuation Active Members</u>	<u>Payroll</u>	<u>Average</u>	
			<u>Age</u>	<u>Service</u>
1988	37	\$ N/A	37.6 yrs.	10.8 yrs.
1990	36	N/A	37.1	11.0

Crystal Firefighters' Relief Association

Brief Summary (12/31/90) of Benefit Provisions Evaluated and/or Considered

Age & Service Retirement

Eligibility. 20 years of service and 50 years of age.

Amount. \$17 per month for each year of active service with a maximum of \$6,120 per year.

May elect lump sum of \$2,500 for each year of active service in lieu of monthly benefit, with a maximum of \$50,000.

Disability Retirement

Eligibility. Same as full-time.

Amount. (1) Total Disability. \$17 per month for each year of active service. At age 50, same as age and service benefit. May elect lump sum of \$2,500 for each year of active service in lieu of monthly benefit.

(2) Partial Disability. \$10 per day with a maximum payment of \$1,000.

Disability benefits are offset by the amount of worker's compensation being received.

Death Benefits

Eligibility.

Spouse. Legally married to member at least 1 year before separation from service and residing with member at time of death. Benefits terminate upon remarriage.

Child. Younger than age 18.

Amount.

Spouse. 50% of monthly benefit based on years of service.

Child. 50% of monthly benefit based on years of service.

Lump Sum Payment. Paid to the surviving spouse, named beneficiary or estate in addition to the benefits listed above.

(1) Active Members. \$2,500 for each year of service with a minimum of \$7,500.

(2) Retired Members. \$2,000.

Vested Deferred.

10 But Less Than 20 Years Service.

Payment may be made as follows:

<u>Years of Service</u> <u>At Least</u>	<u>But Less Than</u>	<u>Single Lump</u> <u>Sum Payment</u>	OR	<u>Amount Per Month For</u> <u>Remainder of Life</u>
10	11	\$15,000		\$102.00
11	12	17,600		119.68
12	13	20,400		138.72
13	14	23,400		159.12
14	15	26,600		180.88
15	16	30,000		204.00
16	17	33,600		228.48
17	18	37,400		254.32
18	19	41,400		281.52
19	20	45,600		310.08

More Than 20 Years Service And Separated Before Age 50.

Benefit amount is same as age & service benefit and payment beginning is deferred to attainment of age 50.

Member Contributions. None.

Section C

Valuation Methods and Assumptions

Crystal Firefighters' Relief Association

Valuation Methods and Assumptions

The Entry Age Normal Cost method was used to determine the normal cost of all benefits. The rate of investment return (interest) as required by state law used in making the valuation was 5.0 percent per annum, compounded annually. Age & service retirement was assumed to occur at age 53, or attained age if older.

Mortality Table*

<u>Sample Ages</u>	<u>Single Life Values: Present Value of \$1 Monthly</u>		<u>Future Life Expectancy (Years)</u>	
	<u>Level For Life</u>			
	<u>Men</u>	<u>Women</u>	<u>Men</u>	<u>Women</u>
45	\$177.21	\$189.58	29.50	34.00
50	163.12	177.21	25.20	29.50
55	147.50	163.12	21.16	25.20
60	130.52	147.50	17.42	21.16
65	112.87	130.52	14.05	17.42
70	95.20	112.87	11.09	14.05
75	77.77	95.20	8.52	11.09
80	61.71	77.77	6.39	8.52

* UP-1984 Table set forward 2 years for males and set back 3 years for females.

Sample Rates of Separation from Active Employment Before Retirement, Death or Disability

<u>Sample Ages</u>	<u>% of Active Members Separating within Next Year</u>
20	1.50%
25	1.25
30	1.00
35	0.75
40	0.50
45	0.25
50+	0.00

Anticipated Disability Retirements

<u>Sample Ages</u>	<u>% of Active Members Becoming Disabled within Next Year</u>
20	0.08%
25	0.08
30	0.08
35	0.08
40	0.20
45	0.26
50	0.49
55	0.89

Section D

The Pension Benefit Obligation and Certain Other Disclosures Required by Statement No. 5 of the Governmental Accounting Standards Board

PENSION BENEFIT OBLIGATION

The amount shown below as the "pension benefit obligation" is a standardized disclosure measure of the present value of pension benefits, adjusted for the effects of projected salary increases, estimated to be payable in the future as a result of employee service to date. The measure is the actuarial present value of credited projected benefits and is intended to (i) help users assess the plan's funding status on a going-concern basis, (ii) assess progress being made in accumulating sufficient assets to pay benefits when due, and (iii) allow for comparisons among public employee retirement plans. The measure is independent of the actuarial funding method used to determine contributions to the plan.

The pension benefit obligation was determined as part of an actuarial valuation of the plan as of December 31, 1990. Significant actuarial assumptions used in determining the pension benefit obligation include (a) a rate of return on the investment of present and future assets of 5.0% per year compounded annually, and (b) the assumption that benefits will not increase after retirement.

At December 31, 1990, the unfunded pension benefit obligation was \$388,477, determined as follows:

Pension Benefit Obligation:

Retirants and beneficiaries currently receiving benefits and terminated employees not yet receiving benefits	\$1,472,594
Current employees --	
Accumulated employee contributions including allocated investment income	0
Employer financed	<u>782,473</u>
Total Pension Benefit Obligation	\$2,255,067
Net assets available for benefits, at cost (market value was \$2,076,679)	<u>1,866,590</u>
Unfunded Pension Benefit Obligation	\$ 388,477

CONTRIBUTIONS REQUIRED AND CONTRIBUTIONS MADE

The Association's funding policy provides for periodic employer contributions at actuarially determined rates that, expressed as percentages of annual covered payroll, are designed to accumulate sufficient assets to pay benefits when due. The normal cost and actuarial accrued liability are determined using an entry age actuarial funding method. Unfunded actuarial accrued liabilities are being amortized as a level dollar amount over a period of 20 years from the date of plan improvements.

During the year ended December 31, 1990, contributions totaling \$89,336 were made in accordance with contribution requirements determined by an actuarial valuation of the plan as of December 31, 1988.

Significant actuarial assumptions used to compute contribution requirements were the same as those used to compute the standardized measure of the pension benefit obligation.

Computed Contribution Comparative Schedule

<u>Fiscal Year December 31</u>	<u>Valuation Date December 31</u>	<u>Contribution Rates</u>		<u>Valuation Payroll</u>	<u>Dollar Contribution For Fiscal Year</u>	
		<u>Normal Cost</u>	<u>UAAL Dollars</u>		<u>Computed</u>	<u>Actual</u>
1990	1988	\$47,953	\$17,922	\$ N/A	\$65,875	\$89,336
1992	1990	55,290	26,257	N/A	81,547	

REQUIRED SUPPLEMENTARY INFORMATION
ANALYSIS OF FUNDING PROGRESS

Valuation Date December 31	(1) Net Assets Available for Benefits	(2) Pension Benefit Obligation (PBO)	(3) Percent Funded (1)/(2)	(4) Unfunded PBO (2)-(1)	(5) Annual Covered Payroll	(6) Unfunded PBO as a Percentage of Covered Payroll (4)/(5)
1988	\$1,907,102	\$1,985,637	96.0%	\$ 78,535	\$ N/A	N/A %
1990	1,866,590	2,255,067	82.8	388,477	N/A	N/A

Analysis of the dollar amounts of net assets available for benefits, pension benefit obligation, and unfunded pension benefit obligation in isolation can be misleading. Expressing the net assets available for benefits as a percentage of the pension benefit obligation provides one indication of the plan's funded status on a going-concern basis. Analysis of this percentage over time indicates whether the system is becoming financially stronger or weaker. Generally, the greater this percentage, the stronger the plan.

Appendices

APPENDIX I

MEANING OF UNFUNDED ACCRUED LIABILITIES

Almost every pension plan (public or private) has "unfunded accrued liabilities", so whatever they are, they aren't rare. Since the term is not part of everyday conversation, it needs some definition.

"Accrued liabilities" are the present value \$ of plan promises to pay benefits in the future based upon service already rendered - - - a liability has been established ("accrued") because the service has been rendered, but the resulting monthly cash benefit may not be payable until years in the future. Accrued liabilities \$ are the result of complex mathematical calculations, which are made by the plan's actuary (which is the name given to the specialist who makes such calculations).

If "accrued liabilities" at any time exceed the plan's accrued assets (cash & investments), the difference is "unfunded accrued liabilities". This is the common condition. If the plan's assets equalled the plan's "accrued liabilities", the plan would be termed "fully funded". This is a rare condition.

Each time a plan adds a new benefit which applies to service already rendered, an "accrued liability" is created, which is also an "unfunded accrued liability" because the plan can't print instant cash to cover the accrued liability. Payment for such unfunded accrued liabilities is spread over a period of years, commonly in the 20-40 year range.

Unfunded accrued liabilities can occur in another way: If actual financial experience is less favorable than assumed financial experience, the difference is added to unfunded accrued liabilities. In plans where plan benefits are directly related to an employee's pay near time of retirement (a common plan provision) rather than his average pay throughout his working career, unfunded accrued liabilities have been increasing in recent years because unexpected rates of pay increase have created additional accrued liabilities which could not be matched by reasonable investment results. Some of these unexpected pay increases are the direct result of inflation, which is a very destructive force on financial stability.

The existence of unfunded accrued liabilities is not bad, then (any more than a mortgage on your house is "bad"), but the changes from year to year in amount of unfunded accrued liabilities are important - - - "bad" or "good" or somewhere in between.

Nor are unfunded accrued liabilities a bill payable immediately (your food costs are payable immediately), but it is important that policy-makers prevent the amount from becoming unreasonably high and it is vital that your plan have a sound method for making payments toward them so that they are controlled.

The existence of large amounts of unfunded accrued liabilities indicates that total contributions in past years were less than level - - - an almost certain history if retired life liabilities are not fully funded now.