Report of
AN ACTUARIAL VALUATION
December 31, 1978 of the
CITY OF RICHFIELD
FIRE DEPARTMENT RELIEF ASSOCIATION
Richfield, Minnesota

GABRIEL, ROEDER, SMITH & COMPANY

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June 13, 1979

Fire Department Relief Association

Richfield, Minnesota

Submitted in this report are the results of an actuarial valuation of the Pension Plan. The date of the valuation was December 31, 1978.

It is essential that the concepts contained in the financing diagram on page 6 be understood.

The covered person data and financial operations data necessary for an actuarial valuation were furnished by the Plan.

The January 1, 1979 active member pay rates were used in computing all liabilities.

Result pages 11-14 will probably be of particular interest.

The financial assumptions and the funding methods used in the actuarial valuation are summarized on pages 15-17.

The assumptions are the same as used in the December 31, 1976 actuarial valuation. The economic assumptions, investment return and rates of pay increase, are established by State Law.

An experience study is required by State Law. Such a study shows, for a given period of time, how actual experiences have compared with previously established assumptions. Upon completion of the study, recommendations will be made concerning the assumptions.

Generally accepted actuarial principles and practices were used in mathematically combining the data, the assumptions, and the funding methods.

Respectfully submitted,

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Richfield Fire Department Relief Association

Brief Summary (12-31-78) of Benefit Provisions Evaluated and/or Considered

Age & Service Retirement

Eligibility. 20 years of service and 50 years of age if hired before January 1, 1968. 20 years of service and 55 years of age if hired after December 31, 1967.

Amount. 50% of base pay.

Pay Used For Plan Purposes. "Base pay" means the salary of a first grade fire fighter.

Disability Retirement

Eligibility. Disabled to the extent that unable to perform the duties of a fire fighter before being eligible for age & service retirement.

Amount. 50% of base pay.

Member's Death While Active, Or In Deferred Status, Or Retired

Eligibility.

Spouse. Legally married to member at least 3 years before separation from service and residing with member at time of death. Benefits terminate upon remarriage.

Child. Younger than age 18.

Amount.

Spouse. 40% of base pay.

Child. 5% of base pay per child if mother is living. 15% of base pay per child if mother is deceased.

Maximum Family Benefit. 50% of base pay.

Funeral Expenses. $500 lump sum payment upon death of a retired or active member.

Vested Deferred. 20 years of service and separated before reaching eligible retirement age. Payment beginning is deferred to attainment of age 50 or 55 depending on the date hired.

Post Retirement Adjustments ("Escalator"). Each time base pay is changed, benefit payments to all benefit recipients are simultaneously changed by the same percent that base pay is changed.

Member Contributions. 6% of base pay. Total member contributions are refundable, without interest, if no monthly benefit is payable upon separation from service.

An inevitable byproduct of the level-cost design is the accumulation of reserve assets, for decades, and the income produced when the assets are invested. Invested assets are a byproduct and not the objective. Investment income becomes in effect the 3rd contributor for benefits to employees, and is interlocked with the contribution amounts required from employees and employers.

Translated into actuarial terminology, the level-cost objective means that the contribution rates must total at least the following:

Normal Cost (the cost of members' service being rendered this year)

... plus ...

Interest on Unfunded Accrued Liabilities (unfunded accrued liabilities are the difference between (i) liabilities for service already rendered and (ii) the accrued assets of the plan).

Computing Contributions to Support Plan Benefits. From a given schedule of benefits and from the employee data and asset data furnished him, the actuary determines the contribution rates to support the benefits by means of an actuarial valuation and a funding method.

In making an actuarial valuation, assumptions must be made regarding anticipated financial experiences for the next year and for decades in the future. Only the subsequent actual experience of the plan can indicate the degree of accuracy of the assumptions.

Reconciling Differences Between Assumed Experience and Actual Experience. Once actual experience has occurred and been observed, it will not coincide exactly with assumed experience, regardless of the wisdom of the assumptions or the skill of the actuary and the millions of calculations he made. The future can be predicted with considerable but not 100% precision, except for inflation which seems to defy reliable prediction.

A well managed plan copes with these continually changing differences by having periodic actuarial valuations. Each actuarial valuation is a complete recalculation of assumed future experience, taking into account all past differences between assumed and actual experience. The result is continuing adjustments in financial position.

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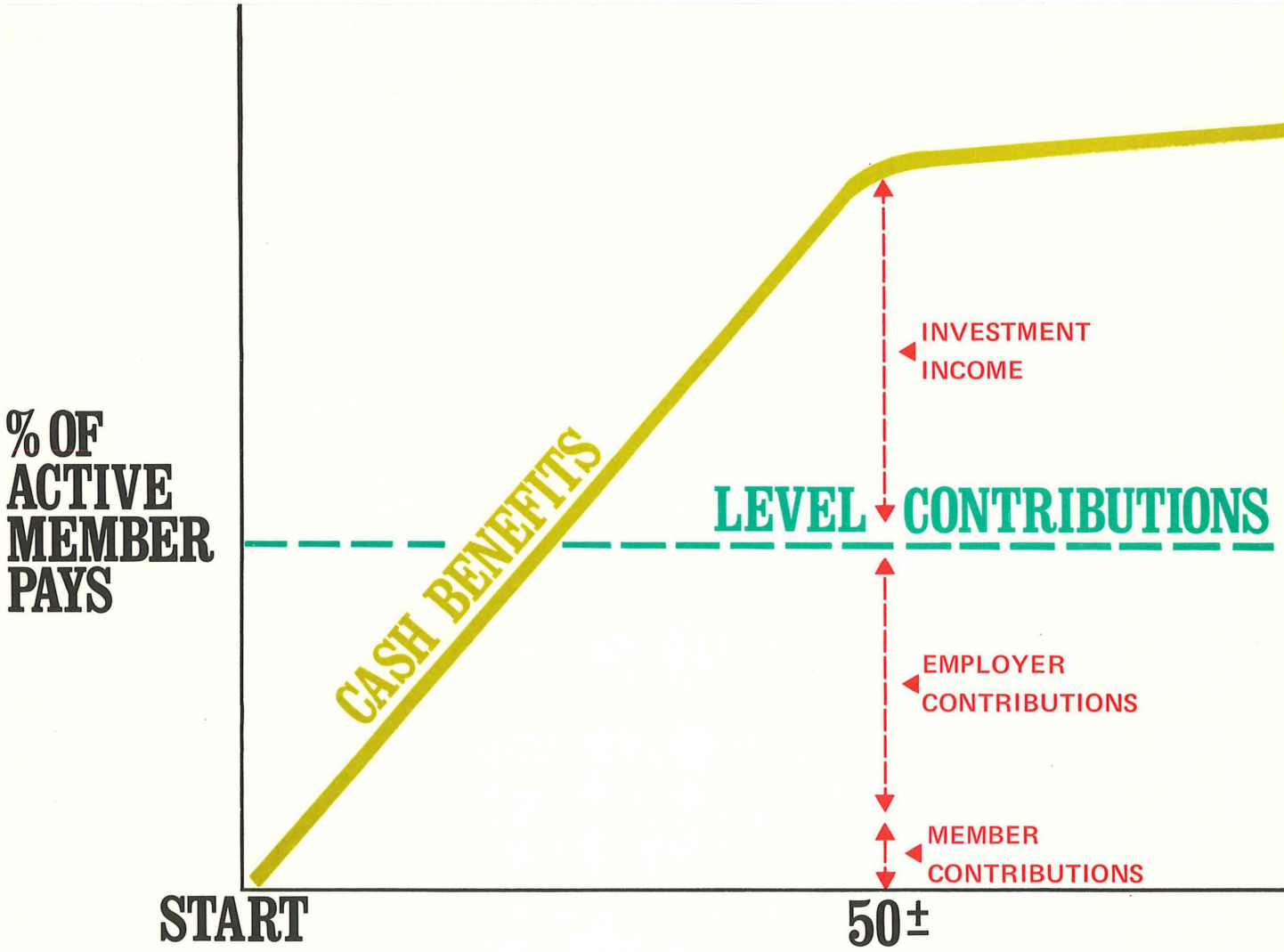

CASH BENEFITS LINE. This relentlessly increasing line is the fundamental reality of retirement plan financing. It happens each time a new benefit is added (and happens regardless of the financing method being followed).

LEVEL CONTRIBUTION LINE. Determining the level contribution line requires detailed assumptions concerning experience in future decades, including:

Rate of withdrawal of active members (turnover);

Rates of mortality;

Rates of disability;

Ages at actual retirement;

Rates of pay increase;

Investment income;

Change in active member group size.

THE ACTUARIAL VALUATION PROCESS

The actuarial valuation is the mathematical process by which the contribution rate is determined, and the flow of activity constituting the valuation may be summarized as follows:

A. Covered people data, furnished by plan administrator including;

Retired lives now receiving benefits

Former employees with vested benefits not yet payable

Active employees

B. + Asset data (cash & investments), furnished by plan administrator

C. + Assumptions of various future financial experiences

D. + The funding method for employer contributions (the long-term, planned pattern for employer contributions)

E. + Mathematically combining the assumptions, the funding method, and the data

F. = Determination of:

Plan Financial Position

and/or New Employer Contribution Rate

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Retirants and Beneficiaries December 31, 1978

By Type of Annuity Being Paid

Type of Annuity Being Paid	No.	Monthly Amounts	Computed Accrued Liabilities
Age & service annuity:			
Retirant receiving	12	$ 5,115.24	$1,059,916
Spouse receiving	1	38.33	2,676
Child receiving			
Total	13	5,153.57	1,062,592
Disability annuity:			
Retirant receiving	9	5,941.46	1,731,014
Spouse receiving			
Child receiving			
Total	9	5,941.46	1,731,014
Death before retirement:			
Spouse receiving	1	212.50	35,520
Child receiving			
Total	1	212.50	35,520
Deferred Annuity:			
	—		
Totals	23	$11,307.53	$2,829,126

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Retirants and Beneficiaries December 31, 1978

By Attained Ages

Attained Ages	Number		
	Age & Service	Disability	Death Before Retirement
45-49		2	
50-54		4	1
55-59	3	2	
60-64	3		
65-69	4		
75-79	2	1	
80-84	1	—	—
Totals	13	9	1

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Active Members December 31, 1978

Tabulated by Attained Age Groups and Years of Accrued Service

Attained Age Groups	Number at Indicated Years of Accrued Service to January 1, 1979							Total No.
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	
20-24	1							1
25-29	1							1
30-34	3							3
35-39		1	2	1				4
40-44			1	2				3
45-49			3		1			4
50-54				3				3
55-59				1				1
Totals	5	1	6	7	1			20

Average age: 41.4 years.

Average accrued service: 11.9 years.

Valuation Payroll: $378,580 ($18,929 each)

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There are no inactive members entitled to a deferred annuity.

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The people data included in the valuation is shown in groups or summaries, for reading convenience.

Financial calculations were made individually for each covered person.

The accrued assets of the Plan were reported to be as follows at December 31, 1978:

Cash	$ 13,901.69
State Investment Accounts	
Other Fixed-Income Investments	1,664,221.09
Other Equity Investments	14,700.00
Total	$1,692,822.78

COMPUTED ACCRUED LIABILITIES & UNFUNDED ACCRUED LIABILITIES ("UAL")

One of the results of the actuarial valuation is computed accrued liabilities.

Amounts at 12-31-1978	Retired Lives & Inactives	Active Members	TOTAL PLAN
Computed accrued liabilities	$2,829,126	$1,197,994	$4,027,120
Reported accrued assets	1,549,124	143,699	1,692,823
Unfunded Accrued Liabilities	$1,280,002	$1,054,295	$2,334,297
5% of UAL (adjusted for equal instalments)			$ 113,902
Assets divided by Liabilities	55%	12%	42%

Assets Divided by Liability %s. If a plan has been following the disciplines of level contribution financing in past years, the Retired % will almost certainly be 100%.

In addition, the Active % will be more than zero. The actual Active % can vary widely, depending upon the funding method and upon the number of years of level contributions (or absence thereof), and still be within a sound range.

MEANING OF "UNFUNDED ACCRUED LIABILITIES"

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

"Accrued liabilities" are the present value $ of plan promises to pay benefits in ıe future based upon service already rendered - - - a liability has been established 'accrued") because the service has been rendered, but the resulting monthly cash benefit ay not be payable until years in the future. Accrued liabilities $ are the result of ɔmplex mathematical calculations, which are made by the plan's actuary (which is the name ıven 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 ɔndition. If the plan's assets equalled the plan's "accrued liabilities", the plan ɔuld be termed "fully funded". This is a rare condition.

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ach time a plan adds a new benefit which applies to service already rendered, an "accrued iability" is created, which is also an "unfunded accrued liability" because the plan can't rint instant cash to cover the accrued liability. Payment for such unfunded accrued iabilities 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 experence is less favorable than assumed financial experience, the difference is added to nfunded accrued liabilities. In plans where plan benefits are directly related to an mployee's pay near time of retirement (a common plan provision) rather than his average ay throughout his working career, unfunded accrued liabilities have been increasing in ecent years because unexpected rates of pay increase have created additional accrued iabilities which could not be matched by reasonable investment results. Some of these nexpected pay increases are the direct result of inflation, which is a very destructive ɔrce on financial stability.

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

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

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

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CONTRIBUTION RATE %S TO PROVIDE BENEFITS

Member portion & Employer portion

Effective January 1, 1980

Contributions for	% of Active Payroll, If $ Paid Equally Throughout Year
Normal cost of annuities:	
Age & service: to member	14.38%
Age & service: to survivors	5.62
Disability	2.27
Death before retirement	4.59
Total Normal Cost	26.86
Unfunded accrued liabilities(UAL) (5% of UAL adjusted for equal instalments):	
Retired lives	16.50
Active members	13.59
Total	30.09
Total Annuities	56.95%
Member contributions	6.00%
less termination benefit	0.67
Usable for annuities	5.33%
COMPUTED EMPLOYER RATE %:	
(a) If Equal $ Instalments Throughout Year	51.62%
(b) IF $ PAID AT CALENDAR YEAR END	52.89%

CONTRIBUTION $ FOR CALENDAR YEAR

For any period of time, the percent-of-payroll contribution rate is converted to dollars. The amount of dollars for any calendar year depends upon the results of the last actuarial valuation, and upon the timing of contributions within the year. The later the contribution date, the more the dollar amount.

The municipality's dollar contributions for a coming calendar year may be determined as follows:

(1) Active member covered payroll projected for coming year (preferably the payroll budgeted for the year) $_____

(2) Employer contribution rate % for year, assuming payment at year end: Rate (b) _____%

(3) Employer dollar contributions for year: (1) times (2) $_____

(4) State contributions received during year $_____

(5) MUNICIPALITY CONTRIBUTIONS AT YEAR END: (3) minus (4) $_____

If Employer contribution dollars are paid in equal instalments throughout the year, Rate (a) may be substituted in step (2) above.

Valuation Financial Assumptions & Funding Methods

The rate of investment return (interest) used in making the valuation was 5.0 percent per annum, compounded annually.

The mortality table used was the United States Life Table, 1959-61, White Males and White Females.

Sample Ages	Single Life Values: Present Value of $1 Monthly — Level For Life		Increasing 3.5% Yearly		Future Life Expectancy (Years)	
	Men	Women	Men	Women	Men	Women
45	$169.61	$186.84	$263.23	$304.86	27.33	32.52
50	154.85	174.20	229.51	270.80	23.22	28.08
55	139.29	159.62	197.24	236.11	19.45	23.81
60	122.79	142.73	166.26	200.76	16.01	19.69
65	106.31	124.22	137.82	166.16	12.97	15.88
70	89.86	104.31	111.71	132.82	10.29	12.38
75	73.39	83.92	87.66	101.94	7.92	9.28
80	57.54	64.24	66.29	74.77	5.89	6.67

Age & service retirement was assumed to occur at age 60, or attained age if older.

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

Sample Ages	% of Active Members Separating Within Next Year
20	3.00%
25	2.50
30	2.00
35	1.50
40	1.00
45	0.50
50+	0.00

Sample Pay Adjustment Factors used to Project Current Pays

Sample Ages	Present Pay Resulting in Pay of $1,000 at Age 60	Percent Increase in Pay During Next Year
20	$ 253	3.5%
25	300	3.5
30	356	3.5
35	423	3.5
40	503	3.5
45	597	3.5
50	709	3.5
55	842	3.5
60	1,000	3.5

Total covered payroll for active members is assumed to increase 3.5% annually.

An entry age-normal cost method of valuation was used in determining the normal cost of age & service benefits (including benefits for death after age & service retirement), and in determining accrued liabilities.

The percent-of-payroll contribution rate for unfunded accrued liabilities ("UAL") was determined by multiplying the UAL by 5%, and then dividing by the active member covered annual payroll.

These steps conform to State law.

The contribution for UAL is equivalent to amortization by level (principal & interest combined) percent-of-payroll contributions over a period of 25 future years.

Disability & Death-before-retirement. Contributions for these casualty benefits were determined using a terminal funding method.

Disability retirements were assumed to occur as indicated below (these assumptions differ from 12-31-76 assumptions):

Sample Ages	% of Active Members Becoming Disabled Within Next Year
20	0.08%
25	0.08
30	0.08
35	0.08
40	0.20
45	0.26
50	0.49
55	0.89