

Houston Firefighters' Relief and Retirement Fund

Actuarial Report as of July 1, 2001

March 2002

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Summary of Key Results (\$000)

	July 1, 2001	July 1, 2000
City Contribution Rate*		
■ Normal Cost (City Portion)	22.3%	14.0%
■ Amortization of Unfunded Actuarial Accrued Liability (Surplus)	(7.4)	(4.1)
■ Additional Statutory Requirement	<u>0.5</u>	<u>5.5</u>
■ City Contribution Rate	15.4	15.4

Summary of Assets

■ Market Value	\$ 1,721,504	\$ 1,761,942
■ Actuarial Value	1,863,098	1,726,302

Summary of Liabilities

■ Actuarial Accrued Liability	1,650,810	1,589,350
■ Actuarial Value of Assets	<u>(1,863,098)</u>	<u>(1,726,302)</u>
■ Unfunded Actuarial Accrued Liability (Surplus)	(212,288)	(136,952)

Summary of Data

■ Number of Participants Included in the Valuation		
— Active participants	2,030	2,107
— DROP participants	1,288	1,164
— Retirees and beneficiaries	1,672	1,592
— Vested terminated participants	<u>15</u>	<u>18</u>
— Total	5,005	4,881
■ Annual Payroll		
— Active participants	\$ 93,808	\$ 100,217
— DROP participants	<u>70,507</u>	<u>63,413</u>
— Total	164,315	163,630

* Average for the year

Summary of Market Value of Assets as of July 1, 2001 (\$000)

Investment Category	July 1, 2001		July 1, 2000	
	Amount	Percent	Amount	Percent
■ Cash and Cash Equivalents	\$ 59,753	3.5%	\$ 38,763	2.2%
■ Fixed Income Investments				
— Government bonds	10,392	0.6	13,736	0.8
— Corporate bonds	455,764	26.5	370,898	21.1
— Other	<u>67,074</u>	<u>3.9</u>	<u>103,995</u>	<u>5.9</u>
— Total	533,230	31.0	488,629	27.8
■ Equity Investments				
— Common stock	422,638	24.6	499,501	28.4
— Preferred stock	15,737	0.9	24,938	1.4
— Commingled international equity fund	<u>296,264</u>	<u>17.2</u>	<u>309,109</u>	<u>17.5</u>
— Total	734,639	42.7	833,548	47.3
■ Other Investments*	386,849	22.4	411,041	23.3
■ Other Assets (Liabilities)				
— Miscellaneous receivables	24,123	1.4	52,457	3.0
— Miscellaneous payables	(12,090)	(0.7)	(57,496)	(3.3)
— Self-insurance reserve fund	<u>(5,000)</u>	<u>(0.3)</u>	<u>(5,000)</u>	<u>(0.3)</u>
— Net	7,033	0.4	(10,039)	(0.6)
■ Total	1,721,504	100.0	\$1,761,942	100.0

* Includes land, building and other assets

Change in Market Value Assets Since the Prior Year (\$000)

■ Market Value as of July 1, 2000	\$ 1,761,942
■ Contributions and Disbursements	
— City contributions	24,033
— Employee contributions	12,019
— Benefit payments	(47,875)
— Contributions refunds	(299)
— Contributions to self-insured reserve fund	<u>0</u>
— Net	(12,122)
■ Net Investment Return	
— Interest	40,333
— Dividends	13,322
— Earnings from loans	6,055
— Net appreciation in fair value	(79,978)
— Other earnings	7,759
— Administrative expenses	<u>(15,807)</u>
— Net	(28,316)
■ Market Value of Assets as of July 1, 2001	1,721,504
■ Approximate Rate of Return for the Year (after Expenses)	(1.6)%

Development of Actuarial Value of Assets (\$000)

Actuarial Investment Gain (Loss) for the Year

■ Market Value of Assets as of July 1, 2000	\$ 1,761,942
■ City Contributions	24,033
■ Employee Contributions	12,019
■ Benefit Payments and Contribution Refunds	(48,174)
■ Contributions to Self-Insurance Reserve Fund	0
■ Expected Interest at 8.5%	<u>149,260</u>
■ Expected Market Value of Assets as of June 30, 2001	1,899,080
■ Actual Market Value of Assets as of June 30, 2001	<u>1,721,504</u>
■ Actuarial Investment Gain (Loss)	(177,576)

Schedule of Actuarial Investment Gains (Losses)

Plan Year Ending	Initial Actuarial Gain (Loss)	Five-Year Amortization	Unrecognized Gain (Loss) as of July 1, 2001*
June 30, 2001	\$ (177,576)	\$ (35,515)	\$ (142,061)
June 30, 2000	19,600	3,920	11,761
June 30, 1999	(55,943)	(11,189)	(22,378)
June 30, 1998	55,422	11,084	11,084
June 30, 1997	156,791	31,358	<u>0</u>
			(141,594)

* Deferred for recognition in future years.

Actuarial Value of Assets

■ Market Value as of July 1, 2001	\$ 1,721,504
■ (Gain) Loss to be Recognized in Future Years	<u>141,594</u>
■ Actuarial Value as of July 1, 2001	1,863,098

Unfunded Actuarial Accrued Liability (Surplus) (\$000)

	July 1, 2001	July 1, 2000
■ Actuarial Present Value of Future Benefits		
— Active participants	\$ 624,795	\$ 640,660
— DROP participants	832,981	739,181
— Vested terminated participants	1,444	1,517
— Retirees and beneficiaries	<u>553,888</u>	<u>436,786</u>
— Total	2,013,108	1,818,144
■ Actuarial Present Value of Future Employee Contributions	(100,268)	(62,843)
■ Actuarial Present Value of Future Normal Costs (City Portion)	<u>(262,030)</u>	<u>(165,951)</u>
■ Actuarial Accrued Liability	1,650,810	1,589,350
■ Actuarial Value of Assets	<u>(1,863,098)</u>	<u>(1,726,302)</u>
■ Unfunded Actuarial Accrued Liability (Surplus)	(212,288)	(136,952)

Change in Unfunded Actuarial Accrued Liability (Surplus) Since the Prior Year (\$000)

■ Unfunded Actuarial Accrued Liability (Surplus) as of July 1, 2000	\$ (136,952)
■ Change due to Normal Operation	
— Normal cost (City portion)	21,926
— City contributions	(24,033)
— Interest	(14,758)
— Recognition of prior asset losses (gains)	<u>(35,173)</u>
— Net change	(52,038)
■ Change due to Actuarial Experience	
— Actuarial (gain) loss from liability sources	9,353
— Actuarial (gain) loss from asset sources	<u>35,515</u>
— Net change	44,868
■ Unfunded Actuarial Accrued Liability (Surplus) as of July 1, 2001 Before Changes	(144,122)
■ Change in Plan Provisions as of July 1, 2001	109,189
■ Change in Actuarial Assumptions	<u>(177,355)</u>
■ Unfunded Actuarial Accrued Liability (Surplus) as of July 1, 2001	(212,288)

Historical Unfunded Actuarial Accrued Liability (Surplus) (\$000)

Valuation Date	Actuarial Accrued Liability (AAL)	Actuarial Value of Assets (AVA)	AVA as a Percentage of AAL	Unfunded AAL (Surplus)	Covered Payroll	UAAL (Surplus) as a Percentage of Covered Payroll
July 1, 1982	\$ 208,877	\$ 148,191	71%	\$ 60,686	\$ 73,844	82%
July 1, 1984	294,584	228,032	77	66,552	86,068	77
July 1, 1986	396,609	401,271	101	(4,662)	99,619	(5)
July 1, 1987	415,871	453,322	109	(37,451)	99,837	(38)
July 1, 1988	440,012	478,460	109	(38,448)	96,051	(40)
July 1, 1989	473,431	543,898	115	(70,467)	98,091	(72)
July 1, 1990	512,471	598,814	117	(86,343)	97,633	(88)
July 1, 1991	621,014	642,499	103	(21,485)	104,350	(21)
July 1, 1992	670,123	694,080	104	(23,957)	102,360	(23)
July 1, 1993	758,642	762,794	101	(4,152)	119,503	(3)
July 1, 1994	793,011	831,741	105	(38,730)	120,082	(32)
July 1, 1995	852,327	912,417	107	(60,090)	126,977	(47)
July 1, 1996	989,343*	1,024,569	104	(35,226)	131,641	(27)
July 1, 1997	1,128,230	1,183,817	105	(55,587)	141,989	(39)
July 1, 1998	1,271,416	1,347,414	106	(75,998)	149,045	(51)
July 1, 1999	1,470,597	1,538,487	105	(67,890)	158,965	(43)
July 1, 2000	1,589,350	1,726,302	109	(136,952)	163,630	(84)
July 1, 2001	1,650,810	1,863,098	113	(212,288)	164,315	(129)

* Includes the effect of the change in plan provisions effective November 1, 1996

Historical Solvency Test (\$000)

Actuarial Accrued Liability for:

Valuation Date	Employee Contributions (1)	Retirees, Beneficiaries, and Vested Participants (2)	Active Participants (City- Financed Portion) (3)	Actuarial Value of Assets	Portion of Actuarial Accrued Liability Covered by Assets		
					(1)	(2)	(3)
July 1, 1984	\$ 49,367	\$ 106,204	\$ 93,480	\$ 228,032	100%	100%	78%
July 1, 1986	62,253	133,219	201,137	401,271	100	100	100
July 1, 1987	68,057	140,330	207,484	453,322	100	100	100
July 1, 1988	71,001	162,085	206,926	478,460	100	100	100
July 1, 1989	74,324	176,865	222,242	543,898	100	100	100
July 1, 1990	77,472	203,190	231,809	598,814	100	100	100
July 1, 1991	82,301	245,391	293,322	642,499	100	100	100
July 1, 1992	87,254	270,511	312,358	694,080	100	100	100
July 1, 1993	92,709	292,558	373,375	762,794	100	100	100
July 1, 1994	97,583	318,222	377,206	831,741	100	100	100
July 1, 1995	103,552	342,388	406,387	912,417	100	100	100
July 1, 1996	131,421	360,055	497,867	1,024,569	100	100	100
July 1, 1997	156,501	383,605	588,124	1,183,817	100	100	100
July 1, 1998	261,186	389,700	614,957	1,347,414	100	100	100
July 1, 1999	324,154	424,990	721,453	1,538,487	100	100	100
July 1, 2000	376,688	438,303	774,359	1,726,302	100	100	100
July 1, 2001	374,918	555,332	720,560	1,863,098	100	100	100

Analysis of Financial Experience (\$000)

Year Ended	Gain (Loss) During the Year From Financial Experience			Non-Recurring Items*	Composite Gain (Loss) During the Year
	Liability Sources	Asset Sources	Total		
June 30, 1997	\$ (6,027)	\$ 30,894	\$ 24,867	\$ 0	\$ 24,867
June 30, 1998	(9,126)	7,467	(1,659)	(11,082)	(12,741)
June 30, 1999	(30,772)	(11,189)	(41,961)	(57,642)	(99,603)
June 30, 2000	21,667	3,920	25,587	(15,950)	9,637
June 30, 2001	(9,353)	(35,515)	(44,868)	68,166	23,298

* Non-recurring items reflect changes in actuarial assumptions, methods and plan provisions.

City Contribution Rate

	Fiscal Year 2002			Fiscal Year 2001
	July 1, 2001 through August 31, 2001	September 1, 2001 through June 30, 2002	Average for July 1, 2001 through June 30, 2002	Average for July 1, 2000 through June 30, 2001
■ City Normal Cost Rate	21.9%	22.4%	22.3%	14.0%
■ Rate to Amortize Unfunded Actuarial Accrued Liability (Surplus) Over 40 Years from January 1, 1983	<u>(8.6)</u>	<u>(7.2)</u>	<u>(7.4)</u>	<u>(4.1)</u>
■ Preliminary City Contribution Rate	13.3	15.2	14.9	9.9
■ Additional Statutory Requirement	<u>2.1</u>	<u>0.2</u>	<u>0.5</u>	<u>5.5</u>
■ City Contribution Rate (Payable Monthly)	15.4	15.4	15.4	15.4

Change in City Contribution Rate Since the Prior Year

■ City Contribution Rate as of July 1, 2000 (before Statutory Minimum)	9.9%
■ Change in the City Contribution Rate	
— Normal operation of the plan*	(0.8)
— Actuarial (gain) loss from liability sources	(1.5)
— Actuarial (gain) loss from asset sources	1.5
— Change in plan provisions as of July 1, 2001	2.7
— Change in actuarial assumptions	<u>1.5</u>
■ Preliminary City Contribution Rate as of July 1, 2001	13.3
■ Change in Plan Provisions effective September 1, 2001	<u>1.9</u>
■ City Contribution Rate as of July 1, 2001 reflecting September 1, 2001 Plan Provisions	15.2

* Includes partial recognition of prior asset losses (gains).

Historical City Contributions as a Percentage of Covered Payroll

Actuarially Calculated City Contribution Rate ⁽¹⁾		Actual City Contribution Rate	
Valuation Date	Rate	Period	Rate
July 1, 1986	14.7%	July 1, 1987 through June 30, 1988	15.0%
July 1, 1987	13.0	July 1, 1988 through June 30, 1989	15.0
July 1, 1988	13.3	July 1, 1989 through June 30, 1990	15.0
July 1, 1989	12.9	July 1, 1990 through June 30, 1991	15.0
July 1, 1990	13.2	July 1, 1991 through June 30, 1992	15.0
July 1, 1991	15.4	July 1, 1992 through June 30, 1993	15.0 ⁽²⁾
July 1, 1992	15.3	July 1, 1993 through June 30, 1994	15.3
July 1, 1993	15.6	July 1, 1994 through June 30, 1995	15.0
July 1, 1994	14.9	July 1, 1995 through June 30, 1996	15.0
July 1, 1995	13.4 ⁽³⁾	July 1, 1996 through June 30, 1997	15.4
July 1, 1996	14.1 ⁽³⁾	July 1, 1997 through June 30, 1998	15.4
July 1, 1997	14.9 ⁽³⁾	July 1, 1998 through June 30, 1999	15.4
July 1, 1998	11.5	July 1, 1999 through June 30, 2000	15.4
July 1, 1999	11.0	July 1, 2000 through June 30, 2001	15.4
July 1, 2000	9.9 ⁽³⁾	N/A	N/A
July 1, 2001	14.9 ⁽³⁾	N/A	N/A

(1) Before application of statutory minimum contribution.

(2) Excluding additional contribution due to settlement of lawsuit.

(3) Average for the year.

Projection of Estimated Assets and Liabilities (\$000)

Year Beginning July 1	Annual Payroll	Estimated Contributions				Benefit Payments	Net Cash Flow	Market Value of Assets at End of Year	Unfunded Actuarial Liability (Surplus) at End-of-Year
		City*		Employee					
		Amount	Percent	Amount	Percent				
2001	\$ 164,315	\$ 25,304	15.4%	\$ 12,652	7.7%	\$ 126,683	\$ (88,727)	\$ 1,775,412	\$ (136,703)
2002	172,531	26,570	15.4	13,285	7.7	131,761	(91,906)	1,830,589	(83,618)
2003	181,157	30,797	17.0	13,949	7.7	136,806	(92,060)	1,890,295	(43,236)
2004	190,215	36,331	19.1	14,647	7.7	142,143	(91,165)	1,956,010	(1,839)
2005	199,726	41,343	20.7	15,379	7.7	147,527	(90,805)	2,027,684	1,542
2006	209,712	46,766	22.3	16,148	7.7	119,066	(56,152)	2,141,547	1,891
2007	220,198	49,544	22.5	16,955	7.7	123,918	(57,419)	2,263,770	1,823
2008	231,208	52,022	22.5	17,803	7.7	129,582	(59,757)	2,393,945	1,737
2009	242,768	54,623	22.5	18,693	7.7	134,969	(61,653)	2,533,211	1,631
2010	254,906	57,354	22.5	19,628	7.7	139,231	(62,249)	2,683,693	1,505
2011	267,652	60,222	22.5	20,609	7.7	158,433	(77,602)	2,830,974	1,354
2012	281,034	63,233	22.5	21,640	7.7	161,611	(76,738)	2,991,674	1,176
2013	295,086	66,394	22.5	22,722	7.7	172,804	(83,688)	3,158,794	969
2014	309,840	69,714	22.5	23,858	7.7	180,771	(87,199)	3,336,461	728
2015	325,332	72,874	22.4	25,051	7.7	185,085	(87,160)	3,529,271	790
2016	341,599	76,518	22.4	26,303	7.7	188,338	(85,517)	3,740,182	857
2017	358,679	80,344	22.4	27,618	7.7	191,318	(83,356)	3,971,271	930
2018	376,613	84,361	22.4	28,999	7.7	194,667	(81,307)	4,224,138	1,009
2019	395,443	88,975	22.5	30,449	7.7	199,673	(80,249)	4,499,600	683
2020	415,216	93,423	22.5	31,972	7.7	207,301	(81,906)	4,796,750	309

* Based on actuarially determined rate from the prior year's valuation

Participant Data Reconciliation

	Inactive Participants				Total
	Active Participants	DROP Participants	With Deferred Benefits	Receiving Benefits	
■ As of July 1, 2000	2,107	1,164	18	1,592	4,881
■ Changes in Status					
— Service retirements	(3)	(87)	(6)	96	0
— Disability retirements	0	(1)	0	1	0
— DROP elections	(220)	220	0	0	0
— Deaths	(1)	(8)	0	(41)	(50)
— Vested terminations	(2)	0	2	0	0
— Contribution refunds	(13)	0	(1)	0	(14)
— Expiration of benefits	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
— Net	(239)	124	(5)	56	(64)
■ New Entrants	162	0	0	0	162
■ New Beneficiaries	0	0	0	25	25
■ Data Adjustments	<u>0</u>	<u>0</u>	<u>2</u>	<u>(1)</u>	<u>1</u>
■ Net Change	(77)	124	(3)	80	124
■ As of July 1, 2001	2,030	1,288	15	1,672	5,005

Summary of Active Participants as of July 1, 2001

Age Last Birthday	-----Completed Years of Service-----								Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	Over 34	
15-19									
Number									
Tot Pay									
Avg Pay									
20-24	46	1							47
Number									
Tot Pay	1394259	42207							1436467
Avg Pay	30310	42208							30563
25-29	215	52	1						268
Number									
Tot Pay	7732925	2291882	48170						10072978
Avg Pay	35967	44075	48170						37586
30-34	231	170	83	2					486
Number									
Tot Pay	8683292	7369869	3961872	106124					20121159
Avg Pay	37590	43352	47733	53062					41402
35-39	80	111	146	109					446
Number									
Tot Pay	3222536	4772444	7075342	5650801					20721125
Avg Pay	40282	42995	48461	51842					46460
40-44		39	68	283	212	7			609
Number									
Tot Pay		1699047	3283283	14811153	11628815	398315			31820615
Avg Pay		43565	48284	52336	54853	56902			52251
45-49			1	73	68	24	1		167
Number									
Tot Pay			41550	3786013	3766308	1560886	79029		9233789
Avg Pay			41550	51863	55387	65037	79030		55292
50-54					4	3			7
Number									
Tot Pay					211855	189870			401725
Avg Pay					52964	63290			57389
55-59									
Number									
Tot Pay									
Avg Pay									
60-64									
Number									
Tot Pay									
Avg Pay									
Over 64									
Number									
Tot Pay									
Avg Pay									
Total	572	373	299	467	284	34	1		2030
Number									
Tot Pay	21033014	16175451	14410219	24354093	15606979	2149072	79029		93807860
Avg Pay	36771	43366	48195	52150	54954	63208	79030		46211

Average Age = 37 0 Average Service = 11 4

Summary of DROP Participants as of July 1, 2001

Age Last Birthday	-----Completed Years of Service-----							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	
15-19	Number							
	Tot Pay							
	Avg Pay							
20-24	Number							
	Tot Pay							
	Avg Pay							
25-29	Number							
	Tot Pay							
	Avg Pay							
30-34	Number							
	Tot Pay							
	Avg Pay							
35-39	Number							
	Tot Pay							
	Avg Pay							
40-44	Number							170
	Tot Pay							8864938
	Avg Pay							52147
45-49	Number							513
	Tot Pay							27516214
	Avg Pay							53638
50-54	Number							427
	Tot Pay							23590330
	Avg Pay							55247
55-59	Number							123
	Tot Pay							7185300
	Avg Pay							58417
60-64	Number							41
	Tot Pay							2516735
	Avg Pay							61384
Over 64	Number							14
	Tot Pay							833445
	Avg Pay							59532
Total	Number							1288
	Tot Pay							70506965
	Avg Pay							54741

Average Age = 50 3 Average Service = 27 0

Summary of All Participants as of July 1, 2001

Age Last Birthday	-----Completed Years of Service-----							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	
15-19	Number							
	Tot Pay							
	Avg Pay							
20-24	46	1						47
	1394259	42207						1436467
	30310	42208						30563
25-29	215	52	1					268
	7732925	2291882	48170					10072978
	35967	44075	48170					37586
30-34	231	170	83	2				486
	8683292	7369869	3961872	106124				20121159
	37590	43352	47733	53062				41402
35-39	80	111	146	109				446
	3222536	4772444	7075342	5650801				20721125
	40282	42995	48461	51842				46460
40-44		39	68	283	369	20		779
		1699047	3283283	14811153	19788009	1104059		40685553
		43565	48284	52336	53626	55203		52228
45-49			1	73	313	282	11	680
			41550	3786013	16555503	15717931	649005	36750004
			41550	51863	52893	55737	59000	54044
50-54					65	186	177	6
					3387743	10171834	10092693	339785
					52119	54687	57021	56631
55-59					1	28	75	19
					50821	1592755	4354284	1187439
					50822	56884	58057	62497
60-64							10	31
							613958	1902776
							61396	61380
Over 64							1	13
							48295	785149
							48296	60396
Total	572	373	299	467	748	516	274	69
	21033014	16175451	14410219	24354093	39782077	28586579	15758237	4215151
	36771	43366	48195	52150	53185	55400	57512	61089

Average Age = 42 1 Average Service = 17 5

Historical Active and DROP Participant Data

Valuation Date	Number of Participants	Average Age	Annual Payroll (\$000)	Average Annual Salary	Percentage Increase in Average Salary
September 1, 1972	1,930	34.5	\$ 22,500	\$ 11,676	N/A
January 1, 1976	2,262	33.0	34,600	15,318	31.2%
January 1, 1978	2,158	33.5	40,200	18,639	21.7
January 1, 1980	2,543	32.5	49,900	19,646	5.4
January 1, 1982	2,942	32.5	73,844	25,100	27.8
July 1, 1984	3,204	34.0	86,068	26,863	7.0
July 1, 1986	3,167	33.7	99,619	31,455	17.1
July 1, 1987	3,164	35.3	99,837	31,554	0.3
July 1, 1988	3,023	36.1	96,051	31,774	0.7
July 1, 1989	2,967	36.7	98,091	33,061	4.1
July 1, 1990	2,926	37.1	97,633	33,367	0.9
July 1, 1991	2,969	37.6	104,350	35,147	5.3
July 1, 1992	2,913	38.3	102,360	35,139	0.0
July 1, 1993	2,958	38.6	119,503	40,400	15.0
July 1, 1994	2,945	39.2	120,082	40,775	0.9
July 1, 1995	3,084	39.2	126,977	41,173	1.0
July 1, 1996	3,039	40.1	131,641	43,317	5.2
July 1, 1997	3,202	40.2	141,949	44,331	2.3
July 1, 1998	3,229	40.9	149,045	46,158	4.1
July 1, 1999	3,282	41.4	158,965	48,435	4.9
July 1, 2000	3,271	42.1	163,630	50,024	3.3
July 1, 2001	3,318	42.1	164,315	49,522	(1.0)

Summary of Inactive Participants as of July 1, 2001

	Number	Annual Benefits (\$000)	Average Annual Benefit
■ Benefits in Pay Status			
— Retirees	999	\$ 25,573	\$ 25,598
— Beneficiaries	431	7,894	18,314
— Disabled participants	<u>242</u>	<u>4,880</u>	<u>20,164</u>
— Total	1,672	38,347	22,935
■ Deferred Benefits			
— Vested terminated participants	15	\$ 99	\$ 6,584
— Beneficiaries	N/A	N/A	N/A
— Disabled participants	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
— Total	15	99	6,584

Retirees and Beneficiaries Added to and Removed from Rolls

Period Ended	Added to Rolls		Removed from Rolls		Rolls at the End of the Year		Percentage Increase in Annual Benefits	Average Annual Benefit
	Number	Annual Benefits (\$000)	Number	Annual Benefits (\$000)	Number	Annual Benefits (\$000)		
December 31, 1977	98	\$ 788	17	\$ 40	745	\$ 3,708	27.0%	\$ 4,978
December 31, 1978	72	719	23	76	794	4,294	15.8	5,408
December 31, 1979	67	719	21	83	840	5,008	16.6	5,962
December 31, 1980	33	473	23	84	850	5,498	9.8	6,468
December 31, 1981	61	862	38	159	873	6,097	10.9	6,983
December 31, 1982	63	644	26	171	910	6,772	11.1	7,442
December 31, 1983	54	605	39	207	925	7,403	9.3	8,003
June 30, 1984*	41	619	17	98	949	3,952	6.8	8,328
June 30, 1985	75	968	53	290	971	8,432	6.7	8,684
June 30, 1986	54	752	38	243	987	9,550	13.3	9,676
June 30, 1987	76	1,101	33	235	1,030	10,522	10.2	10,215
June 30, 1988	121	2,002	38	311	1,113	12,754	21.2	11,459
June 30, 1989	74	1,306	42	299	1,145	14,032	10.0	12,255
June 30, 1990	111	1,996	37	288	1,219	16,428	17.1	13,477
June 30, 1991	129	1,784	38	401	1,310	17,888	8.9	13,665
June 30, 1992	78	1,588	44	401	1,344	19,866	11.1	14,781
June 30, 1993	82	1,717	48	585	1,378	21,516	8.3	15,614
June 30, 1994	112	2,006	58	660	1,432	23,297	8.3	16,269
June 30, 1995	87	1,728	28	353	1,491	25,142	7.9	16,863
June 30, 1996	67	1,402	56	660	1,502	26,379	4.9	17,563
June 30, 1997	56	1,050	37	487	1,521	27,581	4.6	18,133
June 30, 1998	54	1,064	43	477	1,532	28,675	4.0	18,717
June 30, 1999	64	1,840	28	551	1,568	30,233	5.4	19,281
June 30, 2000	95	2,364	71	1,167	1,592	34,583	14.4	21,723
June 30, 2001	127	3,581	47	775	1,672	38,347	10.9	22,935

* Six-month period

Summary of Actuarial Methods and Assumptions

Actuarial Methods

- Actuarial Value of Assets

Gains and losses in the market value of assets, based on the difference between the actual rate of return and the assumed rate of return, are recognized in the actuarial value over five years.

- Actuarial Cost Method

Entry Age Method with liabilities allocated from date of entry to 30 years of service. The Unfunded Actuarial Accrued Liability (Surplus), including the effects of actuarial gains and losses, is amortized as a level percentage of payroll ending December 31, 2022. The contribution is increased for interest for one-half of a year to reflect timing of payment.

Economic Assumptions

- General Inflation
- Investment Return
- Payroll Growth Rate
- Individual Pay Increase Rate

4.0% per year
 8.5% per year, net of expenses
 5.0% per year

<i>Age</i>	<i>Increase</i>
20	10.0%
25	7.5
30	6.0
35	5.0
40	4.5
45	4.0
50	3.5
55+	3.0

Summary of Actuarial Methods and Assumptions (cont.)

Demographic Assumptions

■ Retirement Rates

<u>Number of Years of Service</u>	<u>Probability of Retiring Within One Year</u>
20	2.0%
21	3.0
22	3.0
23	4.0
24	4.0
25	4.0
26	5.0
27	5.0
28	5.0
29	10.0
30	20.0
31	30.0
32	40.0
33	50.0
34	60.0
35	70.0
36	80.0
37	85.0
38	90.0
39	95.0
40+	100.0

■ DROP Duration

<u>Duration at Retirement</u>	<u>Percentage of Participants Electing the Duration</u>
0	10%
3	10
5	10
8	30
10	40

Summary of Actuarial Methods and Assumptions (cont.)

■ Mortality Rates

— Active participants and nondisabled pensioners

1994 Group Annuity Mortality Table (see table below for sample rates).

Note The 1994 Group Annuity Mortality Table is used to determine the mortality assumptions for the plan, including the probability of ceasing active service due to death

— Disabled pensioners

Graduated rates (see table below for sample rates).

■ Disability Rates

Graduated rates (see table below for sample rates).

■ Percentage of Deaths and Disabilities in the Line of Duty

<u>Age</u>	<u>Death</u>	<u>Disability*</u>
25	100%	60%
35	100	60
45	42	34
55	20	25

* 1% of firefighters who become disabled in the line of duty are assumed to be incapable of performing any substantial gainful activity

■ Termination Rates

<u>Age</u>	<u>Termination Rate</u>
20	1.3%
25	1.3
30	1.2
35	0.7
40	0.6
45	0.2
50	0.0

Note: The liability for the optional refund of contributions for participants who terminate with at least 10 but less than 20 years of service was determined by assuming that 50% of such participants elect a refund and 50% elect a deferred monthly benefit.

■ Marital Status at Benefit Eligibility

— Percentage married

90%. (No beneficiaries other than the spouse assumed).

— Age difference

Husbands assumed to be three years older than wives.

Summary of Actuarial Methods and Assumptions (cont.)

Missing Data Assumptions

- **Current Age:**
 - Active participants 37
 - Retirees and spouse beneficiaries 50
 - Children beneficiaries 10
 - Disabled retirees 40
 - Deferred vested terminations 45
 - DROP participants 50
- **Service for Active Participants** 17
- **Pay** \$49,500
- **Employee Contributions** Based on the prior year's contributions and current year's pay.
- **Age at First Payment for Vested Terminations** 50
- **Benefits Not Valued** The proportional retirement program between the Houston municipal, police and fire pension funds which allows for combining service credit from two or more City of Houston pension plans was not valued because its impact is expected not to be material.

Sample Rates

Age	Sample Rates per 100 Participants				
	Nondisabled Mortality		Disabled Mortality		Disability
	Male	Female	Male	Female	All
20	0.05	0.03			0.75
25	0.07	0.03	2.60	1.30	0.75
30	0.08	0.04			0.75
35	0.09	0.05	2.80	2.20	1.50
40	0.11	0.07			1.50
45	0.16	0.10	3.50	2.30	1.50
50	0.26	0.14			1.50
55	0.44	0.23	5.30	3.00	1.50
60	0.80	0.44			3.00

Changes in Methods and Assumptions Since the Prior Year

The actuarial methods and assumptions used in this valuation are the same as those used in the prior valuation except:

- The individual pay increase rates were changed as follows:

<u>Age</u>	<u>Current</u>	<u>Prior</u>
20	10.0%	16.6%
25	7.5	9.8
30	6.0	5.9
35	5.0	4.5
40	4.5	4.3
45	4.0	4.1
50	3.5	3.8
55+	3.0	3.0

- The retirement rates were changed as follows:

<u>Service</u>	<u>Current</u>	<u>Prior</u>
20	2.0%	2.0
21	3.0	1.0
22	3.0	2.0
23	4.0	2.0
24	4.0	3.0
25	4.0	3.0
26	5.0	3.0
27	5.0	4.0
28	5.0	23.5
29	10.0	16.0
30	20.0	28.0
31	30.0	18.0
32	40.0	27.0
33	50.0	27.0
34	60.0	27.0
35	70.0	36.0
36	80.0	49.5
37	85.0	63.0
38	90.0	90.0
39	95.0	100.0
40+	100.0	100.0

- DROP duration was changed as follows:

<u>Duration at Retirement</u>	<u>Current</u>	<u>Prior</u>
0	10%	10%
3	10	--
5	10	--
8	30	90
10	40	--

Summary of Plan Provisions

- **Membership**

Any firefighter who has not reached the age of 36 at the time he or she first enters employment shall automatically become a participant in the Fund upon completing the training period. Before October 1, 1990, the eligibility age was age 31. Before 1984, participants entered the Fund on January 1 or July 1
- **Average Salary**

The average of the highest 36 months of salary (or 78 pay periods), including base pay and overtime, before reduction for pre-tax employee contributions and salary deferrals.
- **Standard Service Pension**
 - **Eligibility**

20 years of service
 - **Benefit**

For retirement on or after November 1, 1997, 50% of average monthly salary; plus 3% of average monthly salary per year of service in excess of 20 years.

For retirement on or after November 1, 1996 and prior to November 1, 1997, 48.334% of average monthly salary, plus 2.834% of average monthly salary per year of service in excess of 20 years.

For retirement on or after November 1, 1995 and prior to November 1, 1996, 46.667% of average monthly salary, plus 2.667% of average monthly salary per year of service in excess of 20 years.

For retirement on or after September 1, 1991 and prior to November 1, 1995, 45% of average monthly salary, plus 2.5% of average monthly salary per year of service in excess of 20 years, up to 30 years, plus 1.0% of average monthly salary in excess of 30 years.

For retirement on or after September 1, 1989 and prior to September 1, 1991, 45% of average monthly salary, plus 2.5% of average monthly salary per year of service in excess of 20 years.

For retirement on or after September 1, 1987 and prior to September 1, 1989, 45% of average monthly salary, plus 2% of average monthly salary per year of service in excess of 20 years.

For retirement on or after July 1, 1986 and prior to September 1, 1987, 40% of average monthly salary plus 2% of average monthly salary per year of service in excess of 20 years.

Summary of Plan Provisions (cont.)

- **Standard Service Pension (cont)**
 - **Maximum**
 - For retirement on or after January 1, 1970 and prior to July 1, 1986, 35% of average monthly salary plus 3% of average monthly salary per year of service in excess of salary per year of service in excess of 25 years.
 - For retirement on or after September 1, 1991, 80% of average monthly salary.
 - For retirement on or after September 1, 1989 and prior to September 1, 1991, 70% of average monthly salary
 - For retirement on or after September 1, 1987 and prior to September 1, 1989, 65% of average monthly salary
 - For retirements on or after January 1, 1970 and prior to September 1, 1987, 60% of average monthly salary
- **Alternate Service Pension**
 - **Eligibility**

Firefighters who became participants prior to September 1, 1987 and who attain age 50 with 20 years of service will receive the greater of the standard or alternate pension
 - **Benefit**

50% of average monthly salary plus 1% of average monthly salary per year of service after becoming eligible to retire on an alternate pension.
 - **Maximum**

65% of average monthly salary.
- **Supplemental Bonus Check**

Supplemental payments totaling up to \$5 million will be payable on a prorated basis determined by the Board of Trustees to all retirees and survivors.

Summary of Plan Provisions (cont.)

■ Deferred Retirement Option Plan (DROP)

- Eligibility
- Benefit

20 years of service.

Effective July 1, 2000, eligible participants may elect to participate in the DROP for up to ten years or until they leave active service. The member's standard or alternate service pension (whichever is greater) will be calculated based on service and earnings at the time the DROP is elected.

A notional account will be maintained for each DROP participant. This account will be credited with the following amounts while the member is a participant of the DROP:

- The member's monthly retirement pension, including applicable cost-of-living adjustments,
- The member's contribution to the Retirement Fund, and
- Investment earnings/losses as the rate of the Retirement Fund's earnings/losses averaged over a five-year period.

A benefit equal to the DROP account balance would be paid at the time the member leaves active service. The payment would be made as a single lump sum or as three annual installments, if the member chooses.

Effective on July 1, 2000, a three-year back DROP is available for all eligible participants. The DROP account would be recalculated based on what the account balance would have been had the participant elected the DROP up to 3 years earlier than he/she actually did. The initial DROP entry date cannot be backdated prior to September 1, 1995, or prior to 20 years of credited service, and must be on the first of the month selected.

The monthly benefit for a participant at actual retirement will increase 2% for every year of DROP participation (Phased in at 1% effective September 1, 2000 and 1% effective September 1, 2001)

Summary of Plan Provisions (cont.)

- Deferred Retirement Option Plan (DROP) (cont.)

If a DROP participant suffers an on-duty disability resulting in the inability to perform any gainful activity or dies in the line of duty, the death or disability annuity benefit would be calculated as though the participant had not entered the DROP. In addition, the DROP account would be payable to the participant or beneficiary.

- Service-Connected Disability Pension
 - Eligibility
No age or service requirements.
 - Benefit
50% of average monthly salary or service pension if greater and eligible. Firefighters who are not capable of performing any substantial gainful activity will receive 75% of average monthly salary, or service pension, if greater and eligible.

- Non-Service-Connected Disability Pension
 - Eligibility
No age or service requirements.
 - Benefit
25% of average monthly salary, plus 2.5% of average monthly salary per year of service
 - Maximum
50% of average monthly salary or service pension, if greater and eligible.

- Vested Pension
 - Eligibility
At least 10 but less than 20 years of service.
 - Benefit
1.7% of average monthly salary per year of service, payable beginning at age 50 or optional refund of contributions with interest at a flat rate of 5% not compounded.

- Death Benefits
 - Payable as specified below if survived by a spouse, dependent children, or dependent parents. Effective November 1, 1997 dependent children can continue to receive benefits between the ages of 18 and 22 if they are in college
 - Non-service-connected: Monthly benefit that would have been payable had the participant retired for non-service-connected disability on the date of his or her death (or service pension if greater).
 - Service-connected: 100% of average monthly salary

Summary of Plan Provisions (cont.)

■ Death Benefits (cont)

Postretirement: Monthly benefit which was payable to the participant prior to his or her death. Effective July 1, 1998, a "graded" postretirement death benefit is payable to a surviving spouse if the retiree was not married at the time of retirement. This "graded" benefit is equal to 20% of the postretirement death benefit for each year of marriage to a maximum 100% after five years of marriage.

Preretirement: Refund of contributions made if no eligible survivors. If death occurs after 10 years of service, interest is credited on the contributions at the flat rate of 5% not compounded. If death occurs before 10 years of service, no interest is credited.

Lump sum: A one-time \$5,000 lump sum death benefit for any active or retired firefighter. This benefit applies to active members, current retirees, and disabled participants.

■ Additional Benefit

Effective on or after July 1, 2001, an extra monthly benefit of \$150 is payable for life to any retired or disabled member or to an eligible survivor of a deceased member. This benefit is not subject to the postretirement adjustment.

■ Excess Benefit

Benefit equal to the excess of any members' standard service pension benefit over the limit imposed by Section 415 of the code.

■ Postretirement Adjustment

Prior to October 1, 1990: Pensions adjusted each year based on changes in the CPI-U, but not below original amount or above original amount increased 3% each year, not compounded.

Pension adjustments for participants who retire after March 1, 1982 begin at age 55.

Pension adjustments begin immediately for participants whose benefits become payable on or after July 1, 1986 and are based upon 30 or more years of service.

On or after October 1, 1990 and prior to November 1, 1997: Pensions adjusted each year based on changes in the CPI-U. The adjustment is based on the amount of benefits payable at the time of adjustment. The maximum annual increase shall be 3% of the benefits payable at the time of adjustment.

Summary of Plan Provisions (cont.)

■ Postretirement Adjustment (cont.)

Pension adjustments begin immediately for participants whose benefits become payable on or after July 1, 1986 and are based upon 30 or more years of service.

On or after November 1, 1997: Pensions adjusted each year at a fixed rate of 3%. The adjustment is based on the amount of benefits payable at the time of adjustment.

Pension adjustment for participants who retire or terminate with a vested benefit after March 1, 1982 begin at age 48. Pension adjustments begin immediately for participants who become disabled and cannot perform any substantial gainful activity (current and future) and qualify for general on-duty disability benefits. Participants whose benefits become payable on or after July 1, 1986 and are based upon 30 or more years of service are also eligible for pension adjustments to begin immediately.

■ Contribution Rates

— Members

7.7% of salary. Refund of contributions without interest in the event of termination before 10 years of service.

— City

Beginning in 1983, the rate required to fund the Retirement Fund on an actuarial reserve basis. However, a minimum contribution of twice the employee contribution rate is required by statute.

Changes in Plan Provisions Since the Prior Year

Plan provisions reflected in the July 1, 2001 valuation are the same as those in the prior valuation except for the following changes:

- The additional benefit paid to all retirees and beneficiaries increased from \$125 to \$150 per month. This benefit does not increase with COLA (effective July 1, 2001).
- The participant's monthly benefit at actual retirement is increased from 1% to 2% for every year of DROP participation. The additional benefit accrual is applied to his or her original annuity upon actual retirement but not added to payments into the DROP account (Effective September 1, 2001.)

Actuarial Certification

We certify that the information contained in this Actuarial Report has been prepared in accordance with generally accepted actuarial principles and practices. To the best of our knowledge, the information is accurate and fairly presents the actuarial position of the Fund as of July 1, 2001

In preparing the actuarial results, we have relied upon information provided by the Board of Trustees regarding plan provisions, plan participants, plan assets, and other matters. Historical information for years prior to 1984 was prepared by the prior actuaries and was not subjected to our actuarial review.

The actuarial methods and assumptions used in this valuation were selected by the Board of Trustees. The Board has sole authority to determine the actuarial assumptions. In our opinion, the actuarial assumptions used are appropriate for purposes of the valuation and, in the aggregate, are reasonably related to the experience of the Fund and to reasonable expectations.

Towers Perrin



Alan S. Taper, F.S.A., M.A.A.A.

March, 2002