

Houston Firefighters' Relief and Retirement Fund

Actuarial Valuation Report
As of July 1, 2008

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Summary of Key Results (\$000)

	July 1, 2008	July 1, 2007
Actuarial Contribution Rate		
• Normal Cost (City Portion)	20.1%	21.5%
• Amortization of Unfunded Actuarial Accrued Liability (Surplus)	4.0	7.9
• Additional Statutory Requirement	<u>0.0</u>	<u>0.0</u>
• City's Actuarial Contribution Rate	24.1%	29.4%
• Employee Contribution Rate	9.0%	9.0%
Summary of Assets		
• Market Value	\$ 3,029,159	\$ 2,966,082
<i>Rate of Return</i>	3.7%	16.4%
• Actuarial Value	2,945,086	2,633,625
<i>Rate of Return</i>	13.7%	14.6%
Summary of Liabilities		
• Actuarial Accrued Liability	\$ 3,080,487	\$ 2,892,292
• Actuarial Value of Assets	<u>(2,945,086)</u>	<u>(2,633,625)</u>
• Unfunded Actuarial Accrued Liability	\$ 135,401	\$ 258,667
• Funded Ratio	95.6%	91.1%
Summary of Data		
Number of Participants Included in the Valuation		
Active participants	2,755	2,662
DROP participants	1,121	1,157
Retirees and beneficiaries	2,460	2,315
Vested terminated participants	<u>8</u>	<u>8</u>
Total	6,344	6,142
Projected Annual Payroll		
Active participants	\$ 158,393	\$ 151,941
DROP participants	<u>80,779</u>	<u>80,456</u>
Total	\$ 239,172	\$ 232,397

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Summary of Market Value of Assets (\$000)

Investment Category	<u>July 1, 2008</u>		<u>July 1, 2007</u>		<u>July 1, 2006</u>	
	Amount	Percent	Amount	Percent	Amount	Percent
Cash & Short Term Investments	\$ 94,691	3.1%	\$ 138,883	4.7%	\$ 139,715	5.4%
Fixed Income Investments	954,753	31.5%	952,587	32.1%	839,208	32.6%
Equity Securities	1,322,162	43.6%	1,620,334	54.6%	1,165,275	45.3%
Other Assets						
Alternative Investments - Partnerships	476,713	15.7%	117,697	4.0%	290,559	11.3%
Real Estate	165,779	5.5%	122,626	4.1%	122,941	4.8%
Land, Building, etc.	7,814	0.3%	8,474	0.3%	9,464	0.4%
Other Net Assets, Receivables & Payables:						
Accrued Interest & Dividends	17,154	0.6%	15,192	0.5%	13,686	0.5%
Accrued City Contributions	2,556	0.1%	2,139	0.1%	1,953	0.1%
Accrued Member Contributions	965	0.0%	808	0.0%	736	0.0%
Net Other	(13,428)	(0.4)%	(12,658)	(0.4)%	(9,653)	(0.4)%
Total Market Value of Assets	\$3,029,159	100.0%	\$2,966,082	100.0%	\$2,573,884	100.0%

Change in Market Value Assets Since the Prior Report

	<u>Fiscal Year End June 30, 2008</u>	<u>Fiscal Year End June 30, 2007</u>
1. Beginning of Year Market Value	\$2,966,081,728	\$2,573,884,346
2. Increases Due to:		
a. Contributions:		
i. City	\$ 54,051,414	\$ 52,821,473
ii. Members	20,431,049	19,981,657
iii. Total	<u>\$ 74,482,463</u>	<u>\$ 72,803,130</u>
b. Investment Income	\$ 118,393,476	\$ 437,157,659
c. Court Judgment	N/A	1,273,490
d. Total increases	<u>\$ 192,875,939</u>	<u>\$ 511,234,279</u>
3. Decreases Due to:		
a. Benefit payments	\$ 112,163,836	\$ 100,965,331
b. Refund of member contributions	347,112	202,679
c. Investment expenses	9,986,181	10,182,092
d. Administrative expenses	6,372,986	6,800,953
e. Professional Services	<u>929,000</u>	<u>885,842</u>
f. Total decreases	<u>\$ 129,799,115</u>	<u>\$ 119,036,897</u>
4. End of Year Market Value	\$3,029,158,552	\$2,966,081,728

Development of the Actuarial Value of Assets (\$000)

Actuarial Investment Gain (Loss)

1. Market Value of Assets on July 1, 2007	\$	2,966,082
2. 2007/2008 Net Cash Flow		
a. Contributions		74,482
b. Disbursements		112,511
c. Net Cash Flow		<u>(38,029)</u>
2.a.- 2.b.		
3. Expected Investment Return		250,501
[1. x .085] + [2.c. x .0425]		
4. Expected Market Value of Assets on July 1, 2008		3,178,554
1. + 2.c. + 3.		
5. Market Value of Assets on July 1, 2008		3,029,159
6. Investment Gain / (Loss)	\$	(149,395)
5. - 4.		

Development of Actuarial Value of Assets, continued (\$000)

Schedule of Actuarial Investment Gains (Losses)

Plan Year Ending	Initial Actuarial Gain (Loss)	Five-Year Amortization	Unrecognized Gain (Loss)* As of July 1, 2008
June 30, 2008	\$ (149,395)	\$ (29,879)	\$ (119,516)
June 30, 2007	202,988	40,598	121,792
June 30, 2006	121,568	24,314	48,627
June 30, 2005	165,853	33,171	33,170
June 30, 2004	153,926	30,785	-
			\$ 84,073

Actuarial Value of Assets

1. Market Value of Assets on July 1, 2008	\$ 3,029,159
2. (Gain) Loss to be Recognized in Future Years	(84,073)
3. Actuarial Value as of July 1, 2008	\$ 2,945,086

* Deferred for recognition in future years.

Unfunded Actuarial Accrued Liability (\$000)

	July 1, 2008	July 1, 2007
Actuarial Present Value of:		
Future Benefits		
Active	\$ 910,912	\$ 914,418
DROP	1,160,354	1,262,283
Deferred Vested	1,523	1,423
Retired	1,567,043	1,244,062
Total for All Participants	<u>\$ 3,639,832</u>	<u>\$ 3,422,186</u>
 Future Employee Contributions	 \$ 162,718	 \$ 163,391
 Future Normal Cost - City Portion	 \$ 396,627	 \$ 366,503
 Actuarial Accrued Liability	 \$ 3,080,487	 \$ 2,892,292
 Actuarial Value of Assets	 \$ (2,945,086)	 \$ (2,633,625)
 Unfunded Actuarial Accrued Liability	 \$ 135,401	 \$ 258,667
 Total Normal Cost (BOY)	 \$ 66,546	 \$ 67,829

Change in Key Results Since the Prior Valuation (\$000)

1. Analysis of Change in Unfunded Liability

	<u>2007/2008</u>	<u>2006/2007</u>
a. Unfunded at Beginning of Period	\$ 258,667	\$ 345,901
b. Estimated Change Due to Normal Operation		
Normal Cost	\$ 67,829	\$ 63,916
Contributions	(74,482)	(72,803)
Interest	24,587	31,740
Net Change	\$ 17,934	\$ 22,853
c. Estimated Change due to Actuarial Experience		
Actuarial (gain) loss from asset sources	\$ (127,248)	\$ (140,572)
Actuarial (gain) loss from liability sources	(13,952)	30,485
Net change	\$ (141,200)	\$ (110,087)
d. Change due to Change in Actuarial Assumptions	\$ 0	\$ 0
e. Unfunded Actuarial Accrued Liability at End of Period	\$ 135,401	\$ 258,667

2. Analysis of Change in Actuarial Asset Value

	<u>2007/2008</u>	<u>2006/2007</u>
a. Value at Beginning of Period	\$ 2,633,625	\$ 2,324,999
b. Contributions	\$ 74,482	\$ 72,803
c. Distributions	\$ (112,511)	\$ (101,168)
d. Expected Investment Return at 8.5%	\$ 222,242	\$ 196,419
f. Expected Value at End of Period	\$ 2,817,838	\$ 2,493,053
g. Actual Actuarial Asset Value	\$ 2,945,086	\$ 2,633,625
h. Actuarial Gain (Loss) Due to Asset Sources	\$ 127,248	\$ 140,572
i. Final Actuarial Asset Value	\$ 2,945,086	\$ 2,633,625

Change in Key Results Since the Prior Valuation, continued (\$000)

3. Analysis of Change in Actuarial Accrued Liability

	<u>2007/2008</u>	<u>2006/2007</u>
a. Actuarial Accrued Liability at Beginning of Period	\$ 2,892,292	\$ 2,670,900
b. Increase Due to Normal Cost	\$ 67,829	\$ 63,916
c. Decrease Due to Distributions	\$ (112,511)	\$ (101,168)
e. Interest and Other	\$ 246,829	\$ 228,160
f. Expected Actuarial Accrued Liability at End of Period	\$ 3,094,439	\$ 2,861,808
g. Actual Actuarial Accrued Liability before change in actuarial assumptions	\$ 3,080,487	\$ 2,892,292
h. Actuarial Loss (Gain) from Liability Sources	\$ (13,952)	\$ 30,484
i. Change due to Change in Actuarial Assumptions	\$ 0	\$ 0
j. Actuarial Accrued Liability	\$ 3,080,487	\$ 2,892,292

Historical Unfunded Actuarial Accrued Liability (\$000)

Valuation Date	Actuarial Accrued Liability (AAL)	Actuarial Value of Assets (AVA)	AVA as a Percentage of AAL	Unfunded AAL	Projected Covered Payroll	UAAL as a Percentage of Covered Payroll
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	109h	(136,952)	163,630	(84)
July 1, 2001	1,650,810	1,863,098	113	(212,288)	164,315	(129)
July 1, 2002	1,970,154	1,922,405	98	47,749	190,578	25
July 1, 2004	2,266,823	2,000,302	88	266,521	181,527	147
July 1, 2005	2,461,142	2,119,203	86	341,939	192,084	178
July 1, 2006	2,670,900	2,324,999	87	345,901	218,746	158
July 1, 2007	2,892,292	2,633,625	91	258,667	232,397	111
July 1, 2008	3,080,487	2,945,086	96	135,401	239,172	57

* 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	
July 1, 2002	406,522	698,964	864,668	1,922,405	100	100	94	
July 1, 2004	307,036	909,085	1,050,702	2,000,302	100	100	75	
July 1, 2005	351,112	997,506	1,112,524	2,119,203	100	100	69	
July 1, 2006	354,007	1,162,755	1,154,138	2,324,999	100	100	70	
July 1, 2007	408,856	1,245,485	1,237,951	2,633,625	100	100	79	
July 1, 2008	431,132	1,568,566	1,080,789	2,945,086	100	100	87	

Analysis of Financial Experience (\$000)

Year Ended	Gain (Loss) During the Year From Financial Experience			Gain (Loss) Due to Non-Recurring Items*	Composite Net 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
June 30, 2002	(163,358)	(39,336)	(202,694)	0	(202,694)
June 30, 2004	(8,019)	(175,458)	(183,477)	5,142	(178,335)
June 30, 2005	(10,841)	(21,995)	(32,836)	(15,038)	(47,874)
June 30, 2006	(25,268)	52,355	27,087	(12,459)	14,628
June 30, 2007	(30,485)	140,572	110,087	0	110,088
June 30, 2008	13,952	127,248	141,200	0	141,200

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

Actuarially Determined City Contribution Rates

	Actuarial Valuation as of July 1, 2008	Actuarial Valuation as of July 1, 2007
1. Normal Cost (City Portion)	20.1%	21.5%
2. Amortization of Unfunded Actuarial Accrued Liability (Surplus)	4.0	7.9
3. Additional Statutory Requirement	<u>0.0</u>	<u>0.0</u>
4. City's Contribution Rate	24.1%	29.4%
5. Employee Contribution Rate	9.0%	9.0%

Change in Actuarially Determined City Contribution Rate Since the Prior Valuation

1. City Contribution Rate as of July 1, 2007	29.4%
2. Change in the City Contribution Rate Due To:	
a. Normal operation of the plan	(1.3)
b. Actuarial (gain)/loss from liability sources	(0.4)
c. Actuarial (gain)/loss from asset sources	(3.6)
d. Change in Employee Contribution Rate	0.0
e. Change in actuarial assumptions & amortization methods	<u>0.0</u>
3. City Contribution Rate as of July 1, 2008	24.1%
4. Additional Statutory Requirement	<u>0.0%</u>
5. Total City Contribution Rate as of July 1, 2008	<u>24.1%</u>

Analysis of Actual Contribution Rates

	Contribution Rate	
	City*	Employee
Fiscal Year 2005	18.0%	9.00%
Fiscal Year 2006	23.8%	9.00%
Fiscal Year 2007	23.8%	9.00%
Fiscal Year 2008	23.8%	9.00%

*Payable Monthly

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⁾	July 1, 2001 through June 30, 2002	15.4
July 1, 2001	14.9 ⁽³⁾	July 1, 2002 through June 30, 2003	15.4
July 1, 2002	23.8	July 1, 2003 through June 30, 2004	16.5 ⁽³⁾
July 1, 2003	N/A ⁽⁴⁾	July 1, 2004 through June 30, 2005	18.0
July 1, 2004	31.1	July 1, 2005 through June 30, 2006	23.8
July 1, 2005	33.5	July 1, 2006 through June 30, 2007	23.8
July 1, 2006	32.7	July 1, 2007 through June 30, 2008	23.8
July 1, 2007	29.4	July 1, 2008 through June 30, 2009	29.4
July 1, 2008	24.1	July 1, 2009 through June 30, 2010	TBD

⁽¹⁾ Before application of statutory minimum contribution.

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

⁽³⁾ Average for the year.

⁽⁴⁾ No valuation performed.

Projection of Estimated Assets and Liabilities (\$000)

Year Beginning July 1	Annual Payroll	Estimated Contributions City Amount	City Percent	City Shortfall	Market Value of Assets (BOY)	Market Return	Actuarial Value of Assets (BOY)	Actuarial Accrued Liability (BOY)	Unfunded Liability Amount (BOY)	Funded Percent (BOY)
2008	\$ 239,172	\$ 70,317	29.4%	-5.3%	\$ 3,029,159	8.5%	\$ 2,945,086	\$ 3,080,487	\$ 135,401	96%
2009	246,347	72,426	29.4%	-7.9%	3,235,582	8.5%	3,219,709	3,268,085	48,376	99%
2010	253,738	74,599	29.4%	-9.5%	3,438,938	8.5%	3,458,098	3,450,320	(7,779)	100%
2011	261,350	51,965	19.9%	-0.9%	3,638,296	8.5%	3,668,175	3,626,044	(42,131)	101%
2012	269,190	51,042	19.0%	0.8%	3,808,636	8.5%	3,808,636	3,795,932	(12,703)	100%
2013	277,266	54,806	19.8%	0.1%	3,973,865	8.5%	3,973,865	3,963,277	(10,588)	100%
2014	285,584	56,632	19.8%	0%	4,137,795	8.5%	4,137,795	4,127,270	(10,525)	100%
2015	294,151	58,359	19.8%	0%	4,298,687	8.5%	4,298,687	4,288,071	(10,616)	100%
2016	302,976	60,126	19.8%	0%	4,456,767	8.5%	4,456,767	4,446,047	(10,720)	100%
2017	312,065	61,945	19.9%	0%	4,611,654	8.5%	4,611,654	4,600,827	(10,827)	100%
2018	321,427	63,819	19.9%	0%	4,761,911	8.5%	4,761,911	4,750,977	(10,934)	100%
2019	331,070	65,750	19.9%	0%	4,976,676	8.5%	4,976,676	4,965,634	(11,042)	100%
2020	341,002	67,738	19.9%	0%	5,197,100	8.5%	5,197,100	5,185,949	(11,151)	100%
2021	351,232	69,786	19.9%	0%	5,422,913	8.5%	5,422,913	5,411,651	(11,262)	100%
2022	361,769	71,896	19.9%	0%	5,652,834	8.5%	5,652,834	5,641,461	(11,373)	100%
2023	372,622	74,070	19.9%	0%	5,886,143	8.5%	5,886,143	5,874,657	(11,486)	100%
2024	383,801	76,308	19.9%	0%	6,147,292	8.5%	6,147,292	6,135,692	(11,600)	100%
2025	395,315	78,614	19.9%	0%	6,435,984	8.5%	6,435,984	6,424,269	(11,715)	100%
2026	407,174	80,990	19.9%	0%	6,754,228	8.5%	6,754,228	6,742,397	(11,831)	100%
2027	419,390	83,437	19.9%	0%	7,103,096	8.5%	7,103,096	7,091,147	(11,948)	100%

Participant Data Reconciliation

	<u>Active</u>	<u>DROP</u>	Deferred <u>Vested</u>	<u>Retired</u>	<u>Total</u>
1. Number of members as of July 1, 2007	2,662	1,157	8	2,315	6,142
2. Change in status during the plan year:					
a. Actives who retired	(3)	(116)		120	1
b. Actives who entered D.R.O.P.	(95)	95			0
c. Inactives who retired					0
d. Participants who became disabled	(1)	(11)		12	0
3. No longer members due to:					
a. Death	(3)	(4)		(21)	(28)
b. Nonvested terminations	(20)				(20)
c. Child attained cut-off age					
4. New member due to:					
a. Initial membership	206				206
b. Death of another member				32	32
c. Correction	9			2	11
5. Number of members as of July 1, 2008	2,755	1,121	8	2,460	6,344

Summary of Active Participants as of July 1, 2008

Attained Age	<u>Completed Years of Service</u>										
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up	Total
Under 25	74	49	0	0	0	0	0	0	0	0	123
Avg.Pay	34,905	42,943	0	0	0	0	0	0	0	0	38,107
25 to 29	86	350	85	0	0	0	0	0	0	0	521
Avg.Pay	33,989	49,983	54,668	0	0	0	0	0	0	0	48,107
30 to 34	40	345	278	47	0	0	0	0	0	0	710
Avg.Pay	33,836	49,601	56,191	64,834	0	0	0	0	0	0	52,302
35 to 39	6	180	228	228	80	0	0	0	0	0	722
Avg.Pay	36,610	49,241	57,413	64,464	66,711	0	0	0	0	0	58,460
40 to 44	0	6	75	159	142	40	1	0	0	0	423
Avg.Pay	0	42,028	54,331	63,747	67,835	71,505	71,341	0	0	0	63,893
45 to 49	0	0	2	49	93	54	35	0	0	0	233
Avg.Pay	0	0	68,357	65,073	64,658	73,384	75,753	0	0	0	68,466
50 to 54	0	0	0	0	12	3	7	0	0	0	22
Avg.Pay	0	0	0	0	64,600	65,364	95,967	0	0	0	74,685
55 to 59	0	0	0	0	0	0	1	0	0	0	1
Avg.Pay	0	0	0	0	0	0	63,383	0	0	0	63,383
60 to 64	0	0	0	0	0	0	0	0	0	0	0
Avg.Pay	0	0	0	0	0	0	0	0	0	0	0
65 & up	0	0	0	0	0	0	0	0	0	0	0
Avg.Pay	0	0	0	0	0	0	0	0	0	0	0
70 & up	0	0	0	0	0	0	0	0	0	0	0
Avg.Pay	0	0	0	0	0	0	0	0	0	0	0
Total	206	930	668	483	327	97	44	0	0	0	2,755
Avg.Pay	34,365	49,276	56,242	64,326	66,538	72,361	78,588	0	0	0	55,818
		Average	Age:	35.44			Average	Service:	8.37		

Summary of DROP Participants as of July 1, 2008

Attained Age	<u>Completed Years of Service</u>										Total	
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up		
Under 25	0	0	0	0	0	0	0	0	0	0	0	0
Avg.Pay	0	0	0	0	0	0	0	0	0	0	0	0
25 to 29	0	0	0	0	0	0	0	0	0	0	0	0
Avg.Pay	0	0	0	0	0	0	0	0	0	0	0	0
30 to 34	0	0	0	0	0	0	0	0	0	0	0	0
Avg.Pay	0	0	0	0	0	0	0	0	0	0	0	0
35 to 39	0	0	0	0	0	0	0	0	0	0	0	0
Avg.Pay	0	0	0	0	0	0	0	0	0	0	0	0
40 to 44	0	0	0	0	0	13	0	0	0	0	0	13
Avg.Pay	0	0	0	0	0	62,286	0	0	0	0	0	62,286
45 to 49	0	0	0	1	0	80	255	11	0	0	0	347
Avg.Pay	0	0	0	77,678	0	69,100	69,418	73,652	0	0	0	69,503
50 to 54	0	0	0	0	0	32	339	144	15	0	0	530
Avg.Pay	0	0	0	0	0	68,292	69,298	72,793	72,855	0	0	70,288
55 to 59	0	0	0	0	0	1	92	59	52	4	0	208
Avg.Pay	0	0	0	0	0	61,593	67,356	69,587	73,927	62,027	0	69,501
60 to 64	0	0	0	0	0	0	1	3	9	4	0	17
Avg.Pay	0	0	0	0	0	0	60,953	68,144	84,167	78,452	0	78,629
65 & up	0	0	0	0	0	0	0	0	3	1	0	4
Avg.Pay	0	0	0	0	0	0	0	0	78,468	60,128	0	73,883
70 & up	0	0	0	0	0	0	0	0	0	2	0	2
Avg.Pay	0	0	0	0	0	0	0	0	0	78,998	0	78,998
Total	0	0	0	1	0	126	687	217	79	11	0	1,121
Avg.Pay	0	0	0	77,678	0	68,133	69,070	71,901	75,063	70,913	0	69,961
		Average	Age:	52.02			Average	Service:	28.77			

Summary of Active and DROP Participants as of July 1, 2008

Attained Age	Completed Years of Service										Total	
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up		
Under 25	74	49	0	0	0	0	0	0	0	0	0	123
Avg.Pay	34,905	42,943	0	0	0	0	0	0	0	0	0	38,107
25 to 29	86	350	85	0	0	0	0	0	0	0	0	521
Avg.Pay	33,989	49,983	54,668	0	0	0	0	0	0	0	0	48,107
30 to 34	40	345	278	47	0	0	0	0	0	0	0	710
Avg.Pay	33,836	49,601	56,191	64,834	0	0	0	0	0	0	0	52,302
35 to 39	6	180	228	228	80	0	0	0	0	0	0	722
Avg.Pay	36,610	49,241	57,413	64,464	66,711	0	0	0	0	0	0	58,460
40 to 44	0	6	75	159	142	53	1	0	0	0	0	436
Avg.Pay	0	42,028	54,331	63,747	67,835	69,244	71,341	0	0	0	0	63,845
45 to 49	0	0	2	50	93	134	290	11	0	0	0	580
Avg.Pay	0	0	68,357	65,325	64,658	70,827	70,183	73,652	0	0	0	69,086
50 to 54	0	0	0	0	12	35	346	144	15	0	0	552
Avg.Pay	0	0	0	0	64,600	68,041	69,838	72,793	72,855	0	0	70,463
55 to 59	0	0	0	0	0	1	93	59	52	4	0	209
Avg.Pay	0	0	0	0	0	61,593	67,313	69,587	73,927	62,027	0	69,472
60 to 64	0	0	0	0	0	0	1	3	9	4	0	17
Avg.Pay	0	0	0	0	0	0	60,953	68,144	84,167	78,452	0	78,629
65 & up	0	0	0	0	0	0	0	0	3	1	0	4
Avg.Pay	0	0	0	0	0	0	0	0	78,468	60,128	0	73,883
70 & up	0	0	0	0	0	0	0	0	0	2	0	2
Avg.Pay	0	0	0	0	0	0	0	0	0	78,998	0	78,998
Total	206	930	668	484	327	223	731	217	79	11	0	3,876
Avg.Pay	34,365	49,276	56,242	64,353	66,538	69,972	69,643	71,901	75,063	70,913	0	59,909
		Average	Age:	40.24			Average	Service:	14.27			

Historical Active and DROP Participant Data

Valuation Date	Number of Participants	Average Age	Projected 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)
July 1, 2002	3,375	41.8	190,578	56,468	14.0
July 1, 2004	3,656	40.4	181,526	48,206	(14.6)
July 1, 2005	3,894	39.4	192,084	49,358	2.4
July 1, 2006	3,796	41.2	218,746	52,731	6.8
July 1, 2007	3,819	40.5	232,397	57,581	9.2
July 1, 2008	3,876	40.2	239,172	59,909	4.0

Summary of Inactive Participants as of July 1, 2008

	Number	Annual Benefits (\$000)	Average Annual Benefit
▪ Benefits in Pay Status			
-- Retirees	1,652	\$ 74,700	\$ 45,218
-- Beneficiaries	546	15,087	27,632
-- Disabled participants	<u>262</u>	<u>8,429</u>	32,172
-- Total	2,460	98,216	39,925
▪ Deferred Benefits			
-- Vested terminated participants	8	\$ 159,298	\$ 19,912
-- Beneficiaries	N/A	N/A	N/A
-- Disabled participants	<u>N/A</u>	N/A	N/A
-- Total	8	\$ 159,298	\$ 19,912

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
June 30, 2002	172	5,493	61	998	1,783	44,300	15.5	24,846
June 30, 2004**	377	N/A	109	N/A	2,051	57,676	30.2	28,121
June 30, 2005	135	4,353	53	1,107	2,133	62,882	9.0	29,481
June 30, 2006	195	7,231	60	1,437	2,268	70,420	12.0	31,050
June 30, 2007	106	3,822	59	1,407	2,315	74,948	6.4	32,375
June 30, 2008	166	9,334	21	828	2,460	98,216	31.0	39,925

* Six-month period

** Two-year 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 over 30 Years. The contribution is increased for interest for one-half of a year to reflect timing of payment.

KEY ECONOMIC ASSUMPTIONS

Investment Return

Real Rate of Return	5.5%
Inflation	<u>3.0%</u>
Total Nominal Rate	8.5%

General Inflation

3.0%

Payroll Growth Rate

3.0%

Individual Pay Increase Rate

<u>Age</u>	(Nominal = Real + Inflation)	
	<u>Nominal</u>	<u>Real</u>
20	7.00%	4.00%
25	6.25%	3.25%
30	5.50%	2.50%
35	5.00%	2.00%
40	4.00%	1.00%
45	3.70%	0.70%
50	3.40%	0.40%
55	3.00%	0.00%

Summary of Actuarial Methods and Assumptions, continued

Demographic Assumptions

Retirement Rates

Number of Years of Service	Probability of Retiring Within One Year
20	8%
21	6%
22	6%
23	5%
24	5%
25	6%
26	10%
27	12%
28	12%
29	12%
30	25%
31	25%
32	40%
33	40%
34	40%
35	50%
36	50%
37	60%
38	80%
39	80%
40+	100%

Summary of Actuarial Methods and Assumptions, continued

Demographic Assumptions

DROP Duration	Duration of DROP at Retirement	Percentage of Participants Electing Retirement at the Specified Duration
	0	10%
	3	10
	5	10
	8	30
	10	40

Summary of Actuarial Methods and Assumptions, continued

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

For participants terminating with at least 10 years but less than 20 years of service:

- 50% will elect a contribution refund
- 50% will elect a deferred monthly pension benefit

Marital Status at Benefit Eligibility

Percentage married

- 90% of participants are assumed to be married.
- No beneficiaries other than the spouse assumed.

Age difference

- Husbands assumed to be three years older than wives.

Summary of Actuarial Methods and Assumptions, continued

Load of Nature of Average Monthly Salaries	<ul style="list-style-type: none"> Active liabilities and normal costs were increased 3% to account for differences between the plan's definition of average monthly salary (average of the highest 78 pay periods), and the average of the final 78 pay periods.
Development of Valuation Pay	<ul style="list-style-type: none"> Valuation pay is developed by increasing the prior year's pay with the nominal individual pay increase rate.
Age at which Benefits End for Child Beneficiaries	<ul style="list-style-type: none"> Benefits are assumed to stop once the child beneficiary reaches age 23.

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				
	Non-disabled Mortality		Disabled Mortality		Disability
	Male	Female	Male	Female	All
20	0.05	0.03	2.30	0.70	0.75
25	0.07	0.03	2.60	1.30	0.75
30	0.08	0.04	2.90	1.90	0.75
35	0.09	0.05	2.80	2.20	1.50
40	0.11	0.07	3.10	2.30	1.50
45	0.16	0.10	3.50	2.30	1.50
50	0.26	0.14	4.10	2.60	1.50
55	0.44	0.23	5.30	3.00	1.50
60	0.80	0.44	6.50	3.40	3.00

Changes in Assumptions and Methods since the prior year

Assumptions and methods used in the July 1, 2008 valuation are the same as those in the prior valuation.

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, continued

Standard Service Pension (cont.)	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.
Maximum	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, continued

Deferred Retirement Option Plan (DROP)

Eligibility	20 years of service.
Benefit	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, continued

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).

Summary of Plan Provisions, continued

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, continued

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

9% 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, 2008 valuation are the same as those in the prior valuation.

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 fairly presents the actuarial position of the Houston Firefighters' Relief & Retirement Fund as of July 1, 2008.

The Board of Trustees of the fund can use this report for determining the Actuarial City Contribution Rate. Use of this report for any other purpose or by anyone other than the Board may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of the report for that purpose. No one may make any representations or warranties based on any statements or conclusions contained in this report without Buck Consultants' written consent.

In preparing the actuarial results, we have relied upon information provided by the Board of Trustees regarding plan provisions, plan participants, plan assets, contribution rates and other matters used in the actuarial valuation. Although we did not audit the data, we reviewed the data for reasonableness and consistency with the prior year's information. The results of the valuation are dependent on the accuracy of the data. The prior actuaries prepared historical information for 2004 and prior fiscal years. We did not verify or provide an actuarial review of this historical information.

The Board of Trustees selected the actuarial methods and assumptions used in this valuation. 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.

We are members of the American Academy of Actuaries and we meet the Academy's Qualification Standards to issue this Statement of Actuarial Opinion. This report has been prepared in accordance with all applicable Actuarial Standards of Practice and we are available to answer questions about it.

Buck Consultants, LLC



Lee James, FSA, MAAA, EA, FCA



Carly Nichols, FSA, EA, MAAA

March 2009