February 18, 2020

State of Alaska
The Alaska Retirement Management Board
The Department of Revenue, Treasury Division
The Department of Administration, Division of Retirement and Benefits
P.O. Box 110203
Juneau, AK 99811-0203

Re: Judicial Retirement System and National Guard and Naval Militia Retirement System Roll-Forward Actuarial Valuations as of June 30, 2019

Dear Members of The Alaska Retirement Management Board, The Department of Revenue and The Department of Administration:

We have completed the roll-forward actuarial valuations for the State of Alaska Judicial Retirement System (JRS) and the National Guard and Naval Militia Retirement System (NGNMRS) as of June 30, 2019. The valuations have been performed by a projection or "roll forward" of results from the last valuation date of June 30, 2018 to June 30, 2019. Actual asset values as of June 30, 2019 were reflected. A summary of results and description of assumptions and methods are included in this report.

The purposes of these roll-forward valuations are to (i) determine the employer contributions necessary to meet the Board's funding policy for each System, (ii) disclose the funding assets and liability measures as of the valuation date, and (iii) review the current funded status of each System and assess the funded status as an appropriate measure for determining future actuarially determined contributions.

The Board and staff of the State of Alaska may use this report for the review of the operations of JRS and NGNMRS. Use of this report, for any other purpose or by anyone other than the Board or staff of the State of Alaska 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. Because of the risk of misinterpretation of actuarial results, you should ask Buck to review any statement you wish to make on the results contained in this report. Buck will not accept any liability for any such statement made without review by Buck.

Summary of Results

The results of the June 30, 2019 roll-forward valuations are shown below (results from the June 30, 2018 valuations are shown for comparison purposes):

	June 30, 2018	June 30, 2019
Judicial Retirement System		
• Funded Status[1]		
○ Pension	78.8%	84.2%
○ Healthcare	189.2%	184.2%
○ Total	86.4%	91.7%
• Employer/State Contribution Rates[2]		
○ Pension	77.8%	71.0%
○ Healthcare	6.1%	6.3%
○ Total	83.9%	77.3%
National Guard and Naval Militia Retirement System		
• Funded Status[1]	187.1%	185.6%
• Recommended Contribution, not less than zero[3]	$ 0	$ 0

Actuarial Assumptions and Methods

In lieu of collecting new participant data as of June 30, 2019 and performing a full actuarial valuation, the actuarial liabilities are projected or "rolled forward" from the June 30, 2018 valuation date to June 30, 2019 by assuming the actuarial assumptions during the year are exactly realized. All data, actuarial assumptions, methods, and plan provisions are the same as those shown in the June 30, 2018 valuation reports dated August 9, 2019, with the following exceptions:

- For JRS, the salary increase assumption and the pensioner benefit increase assumption were modified to be 0% per year for two years, and 3.62% per year thereafter.
- For JRS, the administrative expense assumption is the average of the actual administrative expenses paid in the prior two years. For the June 30, 2018 valuation, the administrative expense assumptions were $71,050 (pension) and $19,250 (healthcare). For the June 30, 2019 valuation, these amounts were updated to $61,000 (pension) and $21,600 (healthcare).
- For NGNMRS, the administrative expense assumption is the average of the actual administrative expenses paid in the prior two years. For the June 30, 2018 valuation, the administrative expense assumption was $242,000. For the June 30, 2019 valuation, this amount was updated to $254,000.

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[1] The funded status shown is based on the Actuarial Value of Assets. The funded status is different based on the Market Value of Assets.
[2] The June 30, 2018 valuation determined the contribution rates for FY21. The June 30, 2019 valuation determines the contribution rates for FY22. Total contribution rates are not less than the Normal Cost rate.
[3] The June 30, 2018 valuation determined the recommended contribution for FY21. The June 30, 2019 valuation determines the recommended contribution for FY22.

The actuarial value of assets was calculated as of June 30, 2019 using actual assets and cash flows during FY19. Investment gains and losses are recognized at a rate of 20% per year. The actuarial value of assets must be within 20% plus/minus of the market value.

The FY19 actuarial gains/(losses) are shown below:

	JRS	NGNMRS
Asset gain/(loss)	$ (3,555,000)	$ (1,159,000)
Salary scale assumption change gain/(loss)	14,649,000	N/A
Healthcare benefit payment gain/(loss)	(27,000)	N/A
Contribution gain/(loss)	375,000	881,000
Administrative expense gain/(loss)	17,000	(33,000)
Total gain/(loss)	$ 11,459,000	$ (311,000)

Net actuarial gains/losses have the effect of decreasing/increasing the unfunded actuarial accrued liability versus what was expected based on the previous valuation. These gains/losses decrease/increase the employer contributions.

Where presented, references to “funded ratio”, “funded status”, and “unfunded actuarial accrued liability” typically are measured on an actuarial value of assets basis. It should be noted that the same measurements using market value of assets would result in different funded ratios and unfunded actuarial accrued liabilities. Moreover, these measures presented are appropriate for evaluating the need and level of future contributions but make no assessment regarding the funded status of the plan if the plan were to settle (i.e. purchase annuities) for a portion or all of its liabilities.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law. In particular, retiree group benefits models necessarily rely on the use of approximations and estimates and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements. An analysis of the potential range of such future differences is beyond the scope of these valuations.

In our opinion, the actuarial assumptions used are reasonable, taking into account the experience of each System and reasonable long-term expectations, and represent our best estimate of the long-term anticipated experience under each System.

Assessment of Risks

Actuarial Standard of Practice No. 51 (“ASOP 51”) applies to actuaries performing funding calculations related to a pension plan. ASOP 51 does not apply to actuaries performing services in connection with other post-employment benefits, such as medical benefits. Accordingly, ASOP 51 does not apply to the retiree medical portion of JRS. Additional details regarding ASOP 51 are provided beginning on page 15 of this report.

This report was prepared under our supervision and in accordance with all applicable Actuarial Standards of Practice. David Kershner and Scott Young are Fellows of the Society of Actuaries, Enrolled Actuaries, and Members of the American Academy of Actuaries. We meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained in this report.

Please let us know if you have any questions or if you would like to discuss these results in more detail. David can be reached at 602-803-6174 and Scott can be reached at 216-315-1929.

Sincerely,

David J. Kershner, FSA, EA, MAAA, FCA
Principal
Buck

Scott Young, FSA, EA, MAAA
Director
Buck

Attachments

cc: Mr. Kevin Worley, State of Alaska

Judicial Retirement System

		June 30, 2018		June 30, 2019
Pension				
Actuarial Accrued Liability	$	226,559,580	$	221,159,289
Actuarial Value of Assets (AVA)		178,489,284		186,117,830
Unfunded Actuarial Accrued Liability	$	48,070,296	$	35,041,459
Funded Ratio based on AVA		78.8%		84.2%
Market Value of Assets (MVA)	$	176,794,969	$	184,625,818
Funded Ratio based on MVA		78.0%		83.5%
Normal Cost with Administrative Expense Load	$	6,421,700	$	6,138,783
Healthcare				
Actuarial Accrued Liability	$	16,846,959	$	18,089,100
Actuarial Value of Assets (AVA)		31,868,079		33,319,896
Unfunded Actuarial Accrued Liability	$	(15,021,120)	$	(15,230,796)
Funded Ratio based on AVA		189.2%		184.2%
Market Value of Assets (MVA)	$	31,497,603	$	33,092,326
Funded Ratio based on MVA		187.0%		182.9%
Normal Cost with Administrative Expense Load	$	819,763	$	840,972
Total				
Actuarial Accrued Liability	$	243,406,539	$	239,248,389
Actuarial Value of Assets		210,357,363		219,437,726
Unfunded Actuarial Accrued Liability	$	33,049,176	$	19,810,663
Funded Ratio based on Actuarial Value of Assets		86.4%		91.7%
Market Value of Assets	$	208,292,572	$	217,718,144
Funded Ratio based on Market Value of Assets		85.6%		91.0%
Normal Cost with Administrative Expense Load	$	7,241,463	$	6,979,755

	FY21	FY22
Pension Contribution Rate		
Employer Normal Cost Rate	42.04%	39.72%
Past Service Cost Rate	35.78%	31.25%
Total Employer Contribution Rate, not less than Normal Cost Rate	77.82%	70.97%
Healthcare Contribution Rate		
Employer Normal Cost Rate	6.12%	6.28%
Past Service Cost Rate	(6.45)%	(6.64)%
Total Employer Contribution Rate, not less than Normal Cost Rate	6.12%	6.28%
Total Contribution Rate		
Employer Normal Cost Rate	48.16%	46.00%
Past Service Cost Rate	35.78%	31.25%
Total Employer Contribution Rate, not less than Normal Cost Rate	83.94%	77.25%

Judicial Retirement System (continued)

Pension					
	Amortization Period		Balances		
Charge	Date Created	Years Left	Initial	Outstanding	Beginning-of-Year Payment
Initial Unfunded Liability[1]	06/30/2002	8	$ 5,864,449	$ 4,775,895	$ 693,024
FY03/FY04 Loss[1]	06/30/2004	10	855,068	774,005	93,628
Loss due to revaluation of plan liabilities[1]	06/30/2005	11	9,115,451	8,560,541	960,741
FY05/FY06 Loss[1]	06/30/2006	12	18,186,558	17,575,368	1,844,959
FY07 Loss	06/30/2007	13	1,364,721	1,348,642	133,326
FY08 Gain	06/30/2008	14	(29,014,739)	(29,181,416)	(2,732,533)
FY09 Loss	06/30/2009	15	21,273,454	21,667,076	1,931,321
Change in Assumptions	06/30/2010	16	13,976,981	14,354,146	1,223,185
FY10 Loss	06/30/2010	16	6,474,780	6,649,499	566,635
FY11 Loss	06/30/2011	17	7,397,917	7,648,503	625,436
FY12 Loss	06/30/2012	18	11,916,371	12,361,447	973,206
FY13 Loss	06/30/2013	19	7,033,497	7,053,234	536,200
Change in Assumptions	06/30/2014	20	4,219,851	4,369,484	321,595
FY14 Gain	06/30/2014	20	(14,458,986)	(14,971,699)	(1,101,920)
FY15 Gain	06/30/2015	21	(3,325,706)	(3,427,850)	(244,827)
FY16 Gain	06/30/2016	22	(9,932,623)	(10,169,050)	(706,312)
FY17 Gain	06/30/2017	23	(1,137,538)	(1,154,576)	(78,135)
Change in Assumptions	06/30/2018	24	10,343,783	10,389,947	686,282
FY18 Gain	06/30/2018	24	(12,096,419)	(12,150,406)	(802,565)
Change in Assumptions	06/30/2019	25	(14,775,890)	(14,775,890)	(954,103)
FY19 Loss	06/30/2019	25	3,344,559	3,344,559	215,964
Total				**$ 35,041,459**	**$ 4,185,107**

[1] Pension and healthcare split was done using a ratio of unfunded actuarial accrued liability as of June 30, 2006.

Judicial Retirement System (continued)

Healthcare					
	Amortization Period		Balances		
Charge	Date Created	Years Left	Initial	Outstanding	Beginning-of-Year Payment
Initial Unfunded Liability	06/30/2002	8	$ 2,295,257	$ 1,869,214	$ 271,239
FY03/FY04 Loss	06/30/2004	10	334,660	302,933	36,645
Loss due to revaluation of plan liabilities	06/30/2005	11	3,567,649	3,350,464	376,019
FY05/FY06 Loss	06/30/2006	12	7,117,943	6,878,733	722,089
FY07 Gain	06/30/2007	13	(810,073)	(800,529)	(79,140)
Change in Assumptions	06/30/2008	14	789,072	793,606	74,313
FY08 Gain	06/30/2008	14	(14,011,596)	(14,092,089)	(1,319,576)
FY09 Loss	06/30/2009	15	901,355	918,035	81,830
Change in Assumptions	06/30/2010	16	2,006,196	2,060,333	175,571
FY10 Gain	06/30/2010	16	(1,930,656)	(1,982,752)	(168,960)
FY11 Loss	06/30/2011	17	550,376	569,018	46,530
Change in Assumptions	06/30/2012	18	353,605	366,811	28,879
FY12 Gain	06/30/2012	18	(5,516,210)	(5,722,242)	(450,507)
FY13 Loss	06/30/2013	19	226,259	234,807	17,850
Change in Assumptions	06/30/2014	20	772,305	799,690	58,857
FY14 Gain	06/30/2014	20	(3,342,464)	(3,460,987)	(254,729)
FY15 Gain	06/30/2015	21	(1,416,996)	(1,460,517)	(104,315)
Change in Method	06/30/2016	22	(3,567,789)	(3,652,714)	(253,707)
FY16 Gain	06/30/2016	22	(425,711)	(435,845)	(30,273)
FY17 Gain	06/30/2017	23	(586,113)	(594,892)	(40,259)
Change in Assumptions/EGWP	06/30/2018	24	1,009,960	1,014,467	67,008
FY18 Gain	06/30/2018	24	(2,148,478)	(2,158,066)	(142,546)
Change in Assumptions	06/30/2019	25	126,754	126,754	8,185
FY19 Gain	06/30/2019	25	(155,028)	(155,028)	(10,011)
Total				**$ (15,230,796)**	**$ (889,008)**

Judicial Retirement System (continued)

Total					
	Amortization Period		Balances		
Charge	Date Created	Years Left	Initial	Outstanding	Beginning-of-Year Payment
Initial Unfunded Liability	06/30/2002	8	$ 8,159,706	$ 6,645,109	$ 964,263
FY03/FY04 Loss	06/30/2004	10	1,189,728	1,076,938	130,273
Loss due to revaluation of plan liabilities	06/30/2005	11	12,683,100	11,911,005	1,336,760
FY05/FY06 Loss	06/30/2006	12	25,304,501	24,454,101	2,567,048
FY07 Loss	06/30/2007	13	554,648	548,113	54,186
Change in Assumptions	06/30/2008	14	789,072	793,606	74,313
FY08 Gain	06/30/2008	14	(43,026,335)	(43,273,505)	(4,052,109)
FY09 Loss	06/30/2009	15	22,174,809	22,585,111	2,013,151
Change in Assumptions	06/30/2010	16	15,983,177	16,414,479	1,398,756
FY10 Loss	06/30/2010	16	4,544,124	4,666,747	397,675
FY11 Loss	06/30/2011	17	7,948,293	8,217,521	671,966
Change in Assumptions	06/30/2012	18	353,605	366,811	28,879
FY12 Loss	06/30/2012	18	6,400,161	6,639,205	522,699
FY13 Loss	06/30/2013	19	7,259,756	7,288,041	554,050
Change in Assumptions	06/30/2014	20	4,992,156	5,169,174	380,452
FY14 Gain	06/30/2014	20	(17,801,450)	(18,432,686)	(1,356,649)
FY15 Gain	06/30/2015	21	(4,742,702)	(4,888,367)	(349,142)
Change in Method	06/30/2016	22	(3,567,789)	(3,652,714)	(253,707)
FY16 Gain	06/30/2016	22	(10,358,334)	(10,604,895)	(736,585)
FY17 Gain	06/30/2017	23	(1,723,651)	(1,749,468)	(118,394)
Change in Assumptions/EGWP	06/30/2018	24	11,353,743	11,404,414	753,290
FY18 Gain	06/30/2018	24	(14,244,897)	(14,308,472)	(945,111)
Change in Assumptions	06/30/2019	25	(14,649,136)	(14,649,136)	(945,918)
FY18 Loss	06/30/2019	25	3,189,531	3,189,531	205,953
Total				**$ 19,810,663**	**$ 3,296,099**

Judicial Retirement System (continued)

Changes in Fair Value of Assets	Pension	Healthcare	Total
1. Fair Value of Assets as of June 30, 2018	$ 176,794,969	$ 31,497,603	$ 208,292,572
2. Additions:			
a. Employee Contributions	$ 813,374	$ 0	$ 813,374
b. Employer Contributions	5,347,675	591,397	5,939,072
c. State Appropriation	4,909,000	0	4,909,000
d. Interest and Dividend Income	3,292,478	587,184	3,879,662
e. Net Appreciation/(Depreciation) in Fair Value of Investments	7,229,170	1,327,208	8,556,378
f. Medicare Part D Subsidy	0	96,542	96,542
g. Other	0	2,291	2,291
h. Total Additions	$ 21,591,697	$ 2,604,622	$ 24,196,319
3. Deductions:			
a. Medical Benefits	$ 0	$ 978,813	$ 978,813
b. Retirement Benefits	13,627,946	0	13,627,946
c. Investment Expenses	73,808	13,136	86,944
d. Administrative Expenses	59,094	17,950	77,044
e. Refunds of Contributions	0	0	0
f. Total Deductions	$ 13,760,848	$ 1,009,899	$ 14,770,747
4. Fair Value of Assets as of June 30, 2019	$ 184,625,818	$ 33,092,326	$ 217,718,144
Approximate Fair Value Investment Return Rate During FY19 Net of Investment Expenses	6.0%	6.1%	6.0%

Judicial Retirement System (continued)

Development of Actuarial Value of Assets		Pension	Healthcare	Total
1.	Deferral of Investment Gain/(Loss) for FY19			
a.	Fair Value of Assets as of June 30, 2018	$ 176,794,969	$ 31,497,603	$ 208,292,572
b.	Contributions	11,070,049	591,397	11,661,446
c.	Medicare Part D Subsidy	0	96,542	96,542
d.	Benefit Payments	13,627,946	978,813	14,606,759
e.	Administrative Expenses	59,094	17,950	77,044
f.	Actual Investment Return (net of investment expenses)	10,447,840	1,903,547	12,351,387
g.	Expected Return Rate (net of investment expenses)	7.38%	7.38%	7.38%
h.	Expected Return, Weighted for Timing	13,095,028	2,313,330	15,408,358
i.	Investment Gain/(Loss) for the Year, (f) - (h)	(2,647,188)	(409,783)	(3,056,971)
2.	Actuarial Value as of June 30, 2019			
a.	Fair Value as of June 30, 2019	$ 184,625,818	$ 33,092,326	$ 217,718,144
b.	Deferred Investment Gain/(Loss)	(1,492,012)	(227,570)	(1,719,582)
c.	Preliminary Actuarial Value at June 30, 2019, (a) - (b)	186,117,830	33,319,896	219,437,726
d.	Upper Limit: 120% of Fair Value as of June 30, 2019	221,550,982	39,710,791	261,261,773
e.	Lower Limit: 80% of Fair Value as of June 30, 2019	147,700,654	26,473,861	174,174,515
f.	Actuarial Value as of June 30, 2019, [(c) limited by (d) and (e)]	$ 186,117,830	$ 33,319,896	$ 219,437,726
g.	Ratio of Actuarial Value of Assets to Fair Value of Assets	100.8%	100.7%	100.8%
h.	Approximate Actuarial Value Investment Return Rate During FY19 Net of Investment Expenses	5.8%	5.6%	5.8%

Judicial Retirement System (continued)

Pension				
Fiscal Year Ending	Asset Gain/(Loss)	Gain/(Loss) Recognized in Prior Years	Gain/(Loss) Recognized This Year	Gain/(Loss) Deferred to Future Years
6/30/2015	$ (6,914,160)	$ (5,531,328)	$ (1,382,832)	$ 0
6/30/2016	(12,208,288)	(7,324,974)	(2,441,658)	(2,441,656)
6/30/2017	7,229,597	2,891,838	1,445,919	2,891,840
6/30/2018	292,590	58,518	58,518	175,554
6/30/2019	(2,647,188)	0	(529,438)	(2,117,750)
Total	**$ (14,247,449)**	**$ (9,905,946)**	**$ (2,849,491)**	**$ (1,492,012)**

Healthcare				
Fiscal Year Ending	Asset Gain/(Loss)	Gain/(Loss) Recognized in Prior Years	Gain/(Loss) Recognized This Year	Gain/(Loss) Deferred to Future Years
6/30/2015	$ (1,375,481)	$ (1,100,384)	$ (275,097)	$ 0
6/30/2016	(2,359,113)	(1,415,469)	(471,823)	(471,821)
6/30/2017	1,282,441	512,976	256,488	512,977
6/30/2018	98,500	19,700	19,700	59,100
6/30/2019	(409,783)	0	(81,957)	(327,826)
Total	**$ (2,763,436)**	**$ (1,983,177)**	**$ (552,689)**	**$ (227,570)**

Total				
Fiscal Year Ending	Asset Gain/(Loss)	Gain/(Loss) Recognized in Prior Years	Gain/(Loss) Recognized This Year	Gain/(Loss) Deferred to Future Years
6/30/2015	$ (8,289,641)	$ (6,631,712)	$ (1,657,929)	$ 0
6/30/2016	(14,567,401)	(8,740,443)	(2,913,481)	(2,913,477)
6/30/2017	8,512,038	3,404,814	1,702,407	3,404,817
6/30/2018	391,090	78,218	78,218	234,654
6/30/2019	(3,056,971)	0	(611,395)	(2,445,576)
Total	**$ (17,010,885)**	**$ (11,889,123)**	**$ (3,402,180)**	**$ (1,719,582)**

National Guard and Naval Militia Retirement System

	June 30, 2018	June 30, 2019
Actuarial Accrued Liability	$ 21,934,014	$ 22,592,882
Actuarial Value of Assets	41,031,353	41,939,204
Unfunded Actuarial Accrued Liability	$ (19,097,339)	$ (19,346,322)
Funded Ratio based on Actuarial Value of Assets	187.1%	185.6%
Market Value of Assets	$ 39,418,117	$ 40,964,997
Funded Ratio based on Market Value of Assets	179.7%	181.3%
Normal Cost	$ 483,551	$ 483,551
Past Service Cost	(2,988,961)	(3,027,930)
Administrative Expense Load	242,000	254,000
Total Contribution, not less than zero	$ 0	$ 0
Fiscal Year Contribution Applies to	FY21	FY22

National Guard and Naval Militia Retirement System (continued)

Changes in Fair Value of Assets

1.	Fair Value of Assets as of June 30, 2018	$	39,418,117
2.	Additions:		
	a. Employer Contributions	$	851,686
	b. Investment Income		2,335,887
	c. Other		0
	d. Total Additions	$	3,187,573
3.	Deductions:		
	a. Retirement Benefits	$	1,343,753
	b. Investment Expenses		14,602
	c. Administrative Expenses		282,338
	d. Total Deductions	$	1,640,693
4.	Fair Value of Assets as of June 30, 2019	$	40,964,997

Approximate Fair Value Investment Return Rate During FY19 Net of Investment Expenses	5.9%

National Guard and Naval Militia Retirement System (continued)

Development of Actuarial Value of Assets

1.	Deferral of Investment Gain/(Loss) for FY19		
a.	Fair Value of Assets as of June 30, 2018	$	39,418,117
b.	Contributions		851,686
c.	Benefit Payments		1,343,753
d.	Administrative Expenses		282,338
e.	Actual Investment Return (net of investment expenses)		2,321,285
f.	Expected Return Rate (net of investment expenses)		7.00%
g.	Expected Return, Weighted for Timing		2,728,698
h.	Investment Gain/(Loss) for the Year, (e) - (g)		(407,413)
2.	Actuarial Value as of June 30, 2019		
a.	Fair Value as of June 30, 2019	$	40,964,997
b.	Deferred Investment Gain/(Loss)		(974,207)
c.	Preliminary Actuarial Value at June 30, 2019, (a) - (b)		41,939,204
d.	Upper Limit: 120% of Fair Value as of June 30, 2019		49,157,996
e.	Lower Limit: 80% of Fair Value as of June 30, 2019		32,771,998
f.	Actuarial Value as of June 30, 2019, [(c) limited by (d) and (e)]	$	41,939,204
g.	Ratio of Actuarial Value of Assets to Fair Value of Assets		102.4%
h.	Approximate Actuarial Value Investment Return Rate During FY19 Net of Investment Expenses		4.1%

Fiscal Year Ending	Asset Gain/(Loss)	Gain/(Loss) Recognized in Prior Years	Gain/(Loss) Recognized This Year	Gain/(Loss) Deferred to Future Years
6/30/2015	$ (2,241,223)	$ (1,792,980)	$ (448,243)	$ 0
6/30/2016	(2,606,836)	(1,564,101)	(521,367)	(521,368)
6/30/2017	704,309	281,724	140,862	281,723
6/30/2018	(681,054)	(136,211)	(136,211)	(408,632)
6/30/2019	(407,413)	0	(81,483)	(325,930)
Total	**$ (5,232,217)**	**$ (3,211,568)**	**$ (1,046,442)**	**$ (974,207)**

Actuarial Standard of Practice No. 51 (ASOP 51)

Funding future retirement benefits prior to when those benefits become due involves assumptions regarding future economic and demographic experience. These assumptions are applied to calculate actuarial liabilities, current contribution requirements, and the funded status of the plans. However, to the extent future experience deviates from the assumptions used, variations will occur in these calculated values. These variations create risk to the plans. Understanding the risks to the funding of the plans is important.

A new Actuarial Standard of Practice (ASOP) has been adopted for measurements on or after November 1, 2018 - Actuarial Standard of Practice No. 51 ("ASOP 51")[1]. ASOP 51 requires certain disclosures of potential risks to the plans and provides useful information for intended users of actuarial reports that determine plan contributions or evaluate the adequacy of specified contribution levels to support benefit provisions.

Under ASOP 51, risk is defined as the potential of actual future measurements deviating from expected future measurements resulting from actual future experience deviating from actuarially assumed experience.

It is important to note that not all risk is negative, but all risk should be understood and accepted based on knowledge, judgement and educated decisions. Future measurements may deviate in ways that produce positive or negative financial impacts to the plan.

In the actuary's professional judgment, the following risks may reasonably be anticipated to significantly affect the pension plans' future financial condition and contribution requirements.

- Investment Risk – potential that the investment return will be different than the return (7.38% (JRS) and 7.00% (NGNMRS)) expected in the actuarial valuation
- Contribution Risk – potential that the contribution actually made will be different than the recommended contribution in the actuarial valuation
- Long-Term Return on Investment Risk – potential that changes in long-term capital market assumptions or the plan's asset allocation will create the need to update the long-term return on investment assumption
- Longevity Risk – potential that participants live longer than expected compared to the valuation mortality assumptions
- Salary Increase Risk[2] – potential that future salaries will be different than expected in the actuarial valuation
- Other Demographic Risk – potential that other demographic experience will be different than expected

The following information is provided to comply with ASOP 51 and furnish beneficial information on potential risks to the plan. **This list is not all-inclusive**; it is an attempt to identify the more significant risks and how those risks might affect the results shown in this report.

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[1] ASOP 51 does not apply to the healthcare portion of JRS. Accordingly, all comments in this section relate to the pension portion of JRS.
[2] Salary increase risk applies to JRS only.

Note that ASOP 51 does not require the actuary to evaluate the ability or willingness of the plan sponsor to make contributions to the plans when due, or to assess the likelihood or consequences of potential future changes in law. In addition, this valuation report is not intended to provide investment advice or to provide guidance on the management or reduction of risk.

Assessment of Risks

Investment Risk

Plan costs are very sensitive to the market return.

- Any return on assets lower than assumed will increase costs.
- The plans use an actuarial value of assets that smooths gains and losses on market returns over a five-year period to help control some of the volatility in costs due to investment risk.
- Historical experience of actual returns is shown in Section 2.5 (JRS) and Section 2.4 (NGNMRS) of the June 30, 2018 reports dated August 9, 2019. This historical experience illustrates how returns can vary over time.

Contribution Risk

There is a risk to the plans when the actual contribution amount and the recommended amount differ.

- If the actual contributions are lower than the recommended contributions, the plans may not be sustainable in the long term.
- Any underpayment of the contribution will increase future contribution amounts to help pay off the additional Unfunded Actuarial Accrued Liability associated with the underpayment(s).

Long-Term Return on Investment Risk

Inherent in the long-term return on investment assumption is the expectation that the current rate will be used until the last benefit payment of the plan is made. There is a risk that sustained changes in economic conditions, changes in long-term future capital market assumptions, or changes to the plans' asset allocations will necessitate an update to the long-term return on investment assumption used.

- Under a lower long-term return on investment assumption, less investment return is available to pay plan benefits. This may lead to a need for increased employer contributions.
- The liabilities will be higher at a lower assumed rate of return because future benefits will have a lower discount rate applied when calculating the present value.
- A 1% decrease in the long-term return on investment assumption will increase actuarial accrued liability by approximately 11% for JRS and 9% for NGNMRS.

Longevity Risk

Plan costs will be increased as participants are expected to live longer.

- Benefits are paid over a longer lifetime when life expectancy is expected to increase. The longer duration of payments leads to higher liabilities.
- Health care has been improving, which affects the life expectancy of participants. As health care improves, leading to longer life expectancies, costs to the plans will increase.
- The mortality assumptions for the plans mitigates this risk by assuming future improvements in mortality. However, any improvement in future mortality greater than that expected by the current mortality assumptions would lead to increased costs for the plans.

Salary Increase Risk[1]

Plan costs will be increased if actual salary increases are larger than expected.

- Higher than expected salary increases will produce higher benefits.
- The higher benefits may be partially offset by increased employee contributions due to higher salaries.
- If future payroll grows at a rate different than assumed, contributions as a percentage of payroll will be affected.

Other Demographic Risk

The plans are subject to risks associated with other demographic assumptions (e.g., retirement and termination assumptions). Differences between actual and expected experience for these assumptions tend to have less impact on the overall costs of the plans. The demographic assumptions used in the valuations are re-evaluated regularly as part of the 4-year experience studies to ensure the assumptions are consistent with long-term expectations.

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[1] Salary increase risk applies to JRS only.