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January 24, 2017

Mr. Henry Jones  
Chairman of the Investment Committee  
California Public Employees' Retirement System  
400 P Street, Suite 3492  
Sacramento, CA 95814

Re: Divestment Analysis

Dear Mr. Jones:

You requested Wilshire's updated comprehensive analysis of the impact of the various divestment activities within the CalPERS Global Equity portfolio. Our analysis, which is summarized below, provides estimates of the historical impact and potential future impact of the divestment of restricted securities as of CalPERS' most recent fiscal yearend (June 30, 2016). This report does not pass judgment or comment on the political, social, health, or moral merits of these divestment activities, but simply calculates or estimates their gain or loss to the CalPERS investment portfolio.

The historical return impact figures in this latest review differ from estimates presented in prior analyses for various reasons. Most notably, we've modified the methodology to take advantage of greater periodicity, utilizing quarterly data and quarterly return compounding in place of annual periodicity wherever available. We expect the use of greater frequency data to add to the quality of estimates. Other variances are due to the receipt of updated return data from FTSE/Russell, which we assume to be more accurate than previous inputs as well as addressing other data issues in reconstructing the overall methodology. We anticipate using this current methodology in future analyses of the impacts from CalPERS' divestment activities.

## Summary of Findings

The following table summarizes Wilshire's estimates of the transaction cost and return impacts from divestment activities.<sup>1</sup> The present value figures below have been calculated to show the estimated impact on the total fund through June 2016, whereby prior period gains and losses are carried forward at the PERF's total return. The percent (%) impacts express these present value dollar amounts against the PERF's June 2016 market value of \$295.1 billion. The appendices include an annual display of these present value estimates within each divestment area along with annual inflation-adjusted (CPI) estimates of the historical return impacts.

	Present Value Estimate	
	\$MM	% PERF
<b>Active</b>		
Tobacco	(3,681)	(1.2%)
EM Principles	482	0.2%
Iran/Sudan	293	0.1%
Firearms	(7)	(0.0%)
<b>Active Total</b>	<b>(2,913)</b>	<b>(1.0%)</b>
<b>Inactive</b>		
EM Countries	(519)	(0.2%)
South Africa	(4,421)	(1.5%)
<b>Inactive Total</b>	<b>(4,940)</b>	<b>(1.7%)</b>
<b>Overall Total</b>	<b>(7,853)</b>	<b>(2.7%)</b>

Within each of the active divestment areas, we have also analyzed the probabilistic return impacts on a forward-looking basis by calculating tracking error estimates between the restricted indexes and CalPERS' unrestricted global equity market index. All calculations were based on June 2016 holdings and were performed using Wilshire's Atlas GR6 global risk model, a software system that is generally recognized as an industry-leading risk system. The following table provides the restricted securities' weight within the unrestricted global equity index, the projected annual tracking error and estimates of the expected gain or loss to the portfolio in one out of five, ten and twenty years. Note that in any given period, these tracking error estimates should be viewed as being equally likely to generate outperformance as underperformance.

<sup>1</sup> Present value estimates of transaction costs, where included, are based on initial \$ estimates provided by Staff

Divestment Area	Restricted as % of CalPERS GE Index	Projected Annual Tracking Error	1 in X Years Gain/Loss (\$MM)		
			5	10	20
Tobacco	1.45%	0.145%	\$284	\$365	\$435
EM Principles	0.17%	0.018%	\$35	\$45	\$54
Iran / Sudan	0.20%	0.035%	\$69	\$88	\$105
Firearms	0.01%	0.002%	\$4	\$5	\$6
<b>All Active</b>	<b>1.82%</b>	<b>0.143%</b>	<b>\$281</b>	<b>\$360</b>	<b>\$429</b>

The following pages provide more historical details within each divestment area. Please do not hesitate to contact us should you require anything further or have any questions.

Sincerely,



**Tobacco**

## Annual Return Impact Estimates

Year	Annual Impact (\$MM)	Cumulative Impact of Tobacco Exclusion			
		Total Fund (PV)		CPI (PV)	
		Return	Value (\$MM)	Rate	Value (\$MM)
2001	(9.3)	-6.12%	(13.7)	1.55%	(8.8)
2002	(144.5)	-9.55%	(151.2)	2.38%	(154.4)
2003	(124.8)	23.23%	(311.3)	1.88%	(282.8)
2004	(217.5)	13.21%	(574.9)	3.26%	(510.2)
2005	(293.9)	10.41%	(947.1)	3.42%	(822.9)
2006	(109.8)	15.41%	(1,200.3)	2.54%	(951.4)
2007	(172.5)	9.99%	(1,497.5)	4.08%	(1,164.0)
2008	(102.2)	-27.12%	(1,187.5)	0.09%	(1,266.1)
2009	116.5	11.89%	(1,206.3)	2.72%	(1,184.1)
2010	(103.1)	12.45%	(1,462.5)	1.50%	(1,305.3)
2011	(423.3)	1.16%	(1,902.8)	2.96%	(1,767.4)
2012	(283.6)	13.28%	(2,466.4)	1.74%	(2,083.0)
2013	182.8	16.22%	(2,678.8)	1.50%	(1,932.0)
2014	(88.1)	6.51%	(2,941.1)	0.76%	(2,033.2)
2015	(321.0)	-0.09%	(3,263.6)	0.73%	(2,366.8)
1H 2016	(290.2)	3.68%	(3,677.5)	1.91%	(2,704.4)

## Transaction Cost Estimates

Year	Total Fund (PV)		CPI (PV)	
	Return	Value (\$MM)	Rate	Value (\$MM)
Divestment Cost		(1.4)		(1.4)
2002	-9.55%	(1.3)	2.38%	(1.4)
2003	23.23%	(1.6)	1.88%	(1.5)
2004	13.21%	(1.8)	3.26%	(1.5)
2005	10.41%	(2.0)	3.42%	(1.6)
2006	15.41%	(2.3)	2.54%	(1.6)
2007	9.99%	(2.5)	4.08%	(1.7)
2008	-27.12%	(1.8)	0.09%	(1.7)
2009	11.89%	(2.0)	2.72%	(1.7)
2010	12.45%	(2.3)	1.50%	(1.7)
2011	1.16%	(2.3)	2.96%	(1.8)
2012	13.28%	(2.6)	1.74%	(1.8)
2013	16.22%	(3.0)	1.50%	(1.9)
2014	6.51%	(3.2)	0.76%	(1.9)
2015	-0.09%	(3.2)	0.73%	(1.9)
1H 2016	3.68%	(3.3)	1.91%	(1.9)

**Emerging Markets Principles**

## Annual Return Impact Estimates

Year	Annual Impact (\$MM)	Cumulative Impact of EM Principles Exclusion			
		Total Fund (PV)		CPI (PV)	
		Return	Value (\$MM)	Rate	Value (\$MM)
2008	8.9	-27.12%	51.3	0.09%	11.1
2009	90.6	11.89%	154.8	2.72%	102.0
2010	(68.8)	12.45%	107.3	1.50%	34.9
2011	(132.8)	1.16%	(20.3)	2.96%	(98.6)
2012	15.5	13.28%	(9.0)	1.74%	(84.7)
2013	284.3	16.22%	301.4	1.50%	198.3
2014	107.4	6.51%	428.3	0.76%	307.4
2015	47.1	-0.09%	477.0	0.73%	356.4
1H 2016	(12.7)	3.68%	481.6	1.91%	350.3

**Iran / Sudan**

## Annual Return Impact Estimates

Year	Annual Impact (\$MM)	Cumulative Impact of Iran/Sudan Exclusion			
		Total Fund (PV)		CPI (PV)	
		Return	Value (\$MM)	Rate	Value (\$MM)
2H 2011	28.7	-4.49%	29.2	-0.02%	28.6
2012	(2.4)	13.28%	31.4	1.74%	26.6
2013	131.7	16.22%	179.1	1.50%	158.7
2014	38.8	6.51%	230.6	0.76%	199.3
2015	71.2	-0.09%	303.2	0.73%	271.7
1H 2016	(17.9)	3.68%	296.2	1.91%	258.8

## Transaction Cost Estimates

Year	Total Fund (PV)		CPI (PV)	
	Return	Value (\$MM)	Rate	Value (\$MM)
Divestment Cost		(2.4)		(2.4)
2H 2011	-4.49%	(2.3)	-0.02%	(2.4)
2012	13.28%	(2.6)	1.74%	(2.4)
2013	16.22%	(3.0)	1.50%	(2.5)
2014	6.51%	(3.2)	0.76%	(2.5)
2015	-0.09%	(3.2)	0.73%	(2.5)
1H 2016	3.68%	(3.3)	1.91%	(2.6)

**Firearms**

## Annual Return Impact Estimates

Year	Annual Impact (\$MM)	Cumulative Impact of Firearms Exclusion			
		Total Fund (PV)		CPI (PV)	
		Return	Value (\$MM)	Rate	Value (\$MM)
2013	0.1	16.22%	0.1	1.50%	0.1
2014	3.5	6.51%	3.7	0.76%	3.6
2015	(2.6)	-0.09%	1.1	0.73%	1.1
1H 2016	1.4	3.68%	2.6	1.91%	2.5

## Transaction Cost Estimates

Year	Total Fund (PV)		CPI (PV)	
	Return	Value (\$MM)	Rate	Value (\$MM)
Divestment Cost		(8.1)		(8.1)
4Q 2013	4.93%	(8.5)	-0.47%	(8.1)
2014	6.51%	(9.1)	0.76%	(8.1)
2015	-0.09%	(9.0)	0.73%	(8.2)
1H 2016	3.68%	(9.4)	1.91%	(8.3)

**Emerging Market Countries**

## Annual Return Impact Estimates

Year	Annual Impact (\$MM)	Cumulative Impact of Iran/Sudan Exclusion			
		Total Fund (PV)		CPI (PV)	
		Return	Value (\$MM)	Rate	Value (\$MM)
4Q 2002	10.5	4.77%	10.5	-0.06%	10.5
2003	(215.9)	23.23%	(220.8)	1.88%	(205.1)
2004	21.3	13.21%	(228.4)	3.26%	(190.1)
2005	(9.5)	10.41%	(262.8)	3.42%	(206.8)
2006	(198.4)	15.41%	(511.4)	2.54%	(411.8)
2007	(195.7)	9.99%	(761.1)	4.08%	(625.6)
2008	305.1	-27.12%	(280.6)	0.09%	(327.8)
2009	0.0	11.89%	(313.9)	2.72%	(336.7)
2010	0.0	12.45%	(353.0)	1.50%	(341.7)
2011	0.0	1.16%	(357.1)	2.96%	(351.8)
2012	0.0	13.28%	(404.5)	1.74%	(358.0)
2013	0.0	16.22%	(470.2)	1.50%	(363.3)
2014	0.0	6.51%	(500.7)	0.76%	(366.1)
2015	0.0	-0.09%	(500.3)	0.73%	(368.8)
1H 2016	0.0	3.68%	(518.7)	1.91%	(375.8)

**South Africa**

## Annual Return Impact Estimates

Year	Total Fund (PV)		CPI (PV)	
	Return	Value (\$MM)	Rate	Value (\$MM)
Impact at Dec 1989		(590.2)		(590.2)
1990	-0.79%	(585.5)	6.11%	(626.2)
1991	22.96%	(720.0)	3.06%	(645.4)
1992	6.94%	(769.9)	2.90%	(664.2)
1993	13.42%	(873.2)	2.75%	(682.4)
1994	-0.94%	(865.1)	2.67%	(700.7)
1995	25.39%	(1,084.7)	2.54%	(718.4)
1996	12.81%	(1,223.6)	3.32%	(742.3)
1997	19.04%	(1,456.6)	1.70%	(755.0)
1998	18.44%	(1,725.2)	1.61%	(767.1)
1999	15.99%	(2,001.0)	2.68%	(787.7)
2000	-1.24%	(1,976.3)	3.39%	(814.4)
2001	-6.12%	(1,855.2)	1.55%	(827.0)
2002	-9.55%	(1,678.0)	2.38%	(846.7)
2003	23.23%	(2,067.8)	1.88%	(862.6)
2004	13.21%	(2,340.8)	3.26%	(890.7)
2005	10.41%	(2,584.6)	3.42%	(921.1)
2006	15.41%	(2,983.0)	2.54%	(944.5)
2007	9.99%	(3,281.1)	4.08%	(983.1)
2008	-27.12%	(2,391.3)	0.09%	(984.0)
2009	11.89%	(2,675.7)	2.72%	(1,010.7)
2010	12.45%	(3,008.9)	1.50%	(1,025.8)
2011	1.16%	(3,043.8)	2.96%	(1,056.2)
2012	13.28%	(3,448.1)	1.74%	(1,074.6)
2013	16.22%	(4,007.2)	1.50%	(1,090.8)
2014	6.51%	(4,268.0)	0.76%	(1,099.0)
2015	-0.09%	(4,264.2)	0.73%	(1,107.0)
1H 2016	3.68%	(4,421.2)	1.91%	(1,128.2)