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South  
Dakota  
Department  
of Labor  
Retirement  
Plan

Retirement Plan Discussion

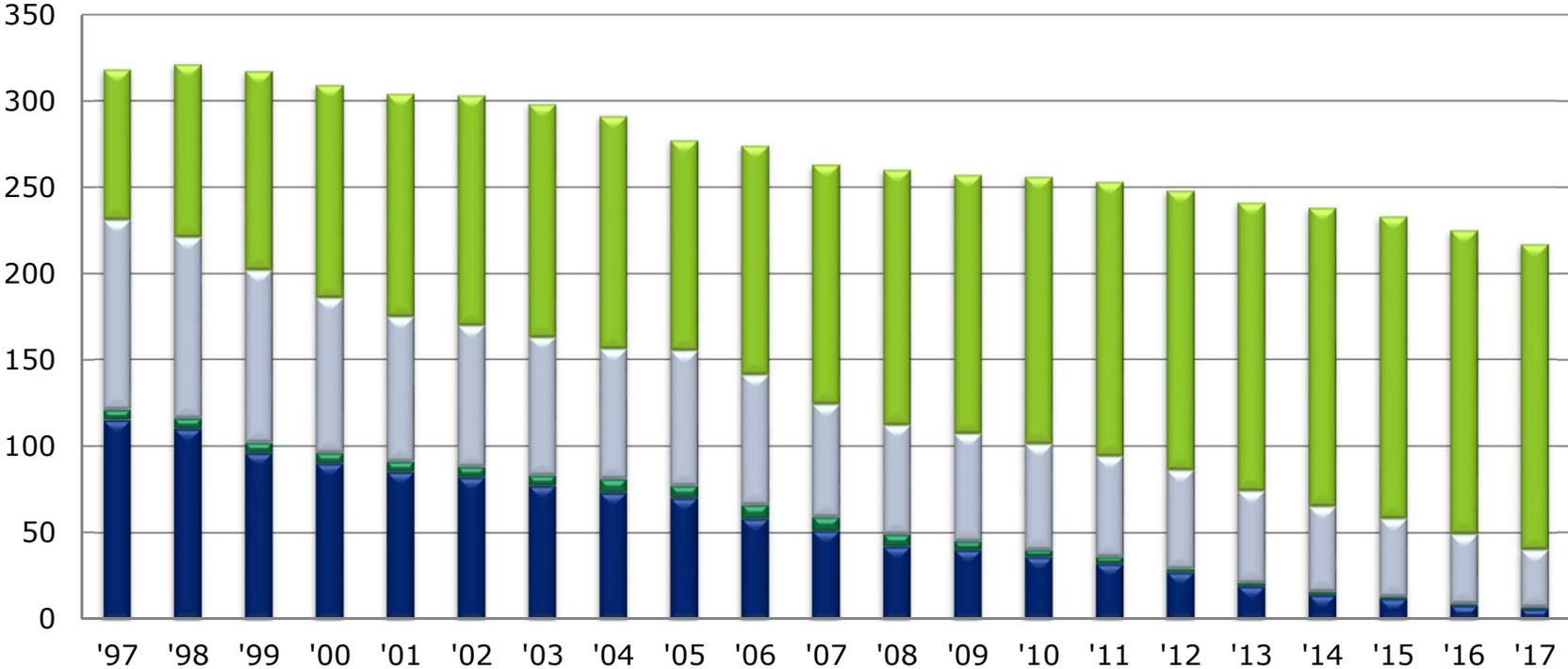
May 23, 2018

# July 1, 2017 Retirement Plan Valuation Results

## Summary of Valuation Results

	Actuarial Liability	Market Value of Assets	Unfunded Actuarial Liability	Change in Unfunded Actuarial Liability
Amounts disclosed as of July 1, 2016	\$55.2	\$56.0	(\$0.8)	
Expected amounts as of July 1, 2017	\$53.3	\$54.1	(\$0.8)	\$0.0
Change due to actual investment return	\$53.3	\$57.7	(\$4.4)	(\$3.6)
Change due to 1% 2017 COLA	\$53.6	\$57.7	(\$4.1)	\$0.3
Change due to mortality projection assumption	\$53.1	\$57.7	(\$4.6)	(\$0.5)
Change due to COLA assumptions	\$57.2	\$57.7	(\$0.5)	\$4.1

# Plan Participation - History



■ Post-1987 Retirees & Beneficiaries ■ 1987 Purchased Annuities ■ Vested Terminations ■ Active Employees

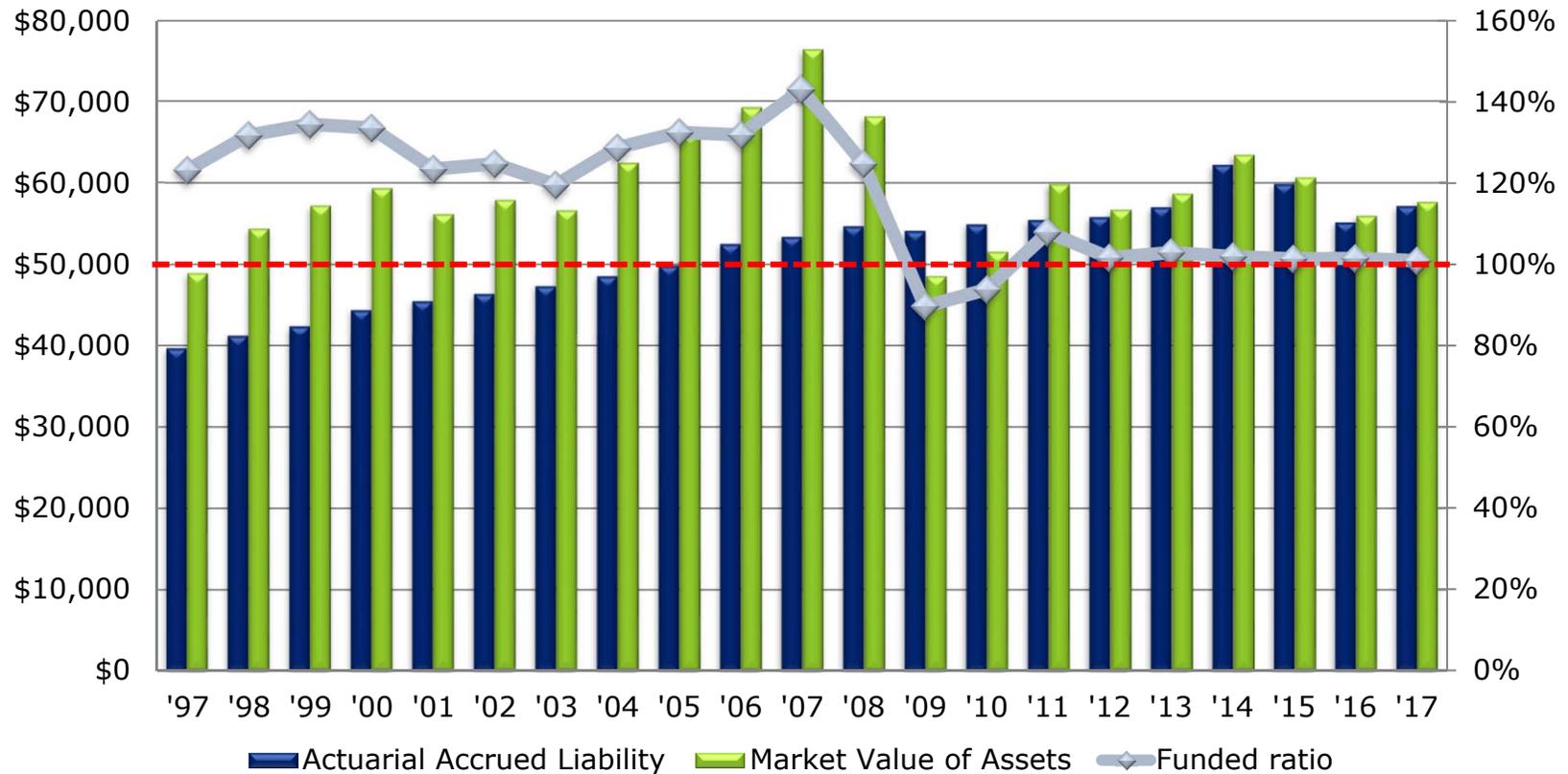
Demographic Information as of 7/1/2017	Post 1987 Retirees & Beneficiaries	1987 Purchased Annuities	Vested Terminations	Active Employees
Counts	176	33	1	6
Average Age	72.2	87.4	57.4	64.3

# Plan Participation – Projection



# Assets and Liabilities as of July 1

(Results are in \$thousands)



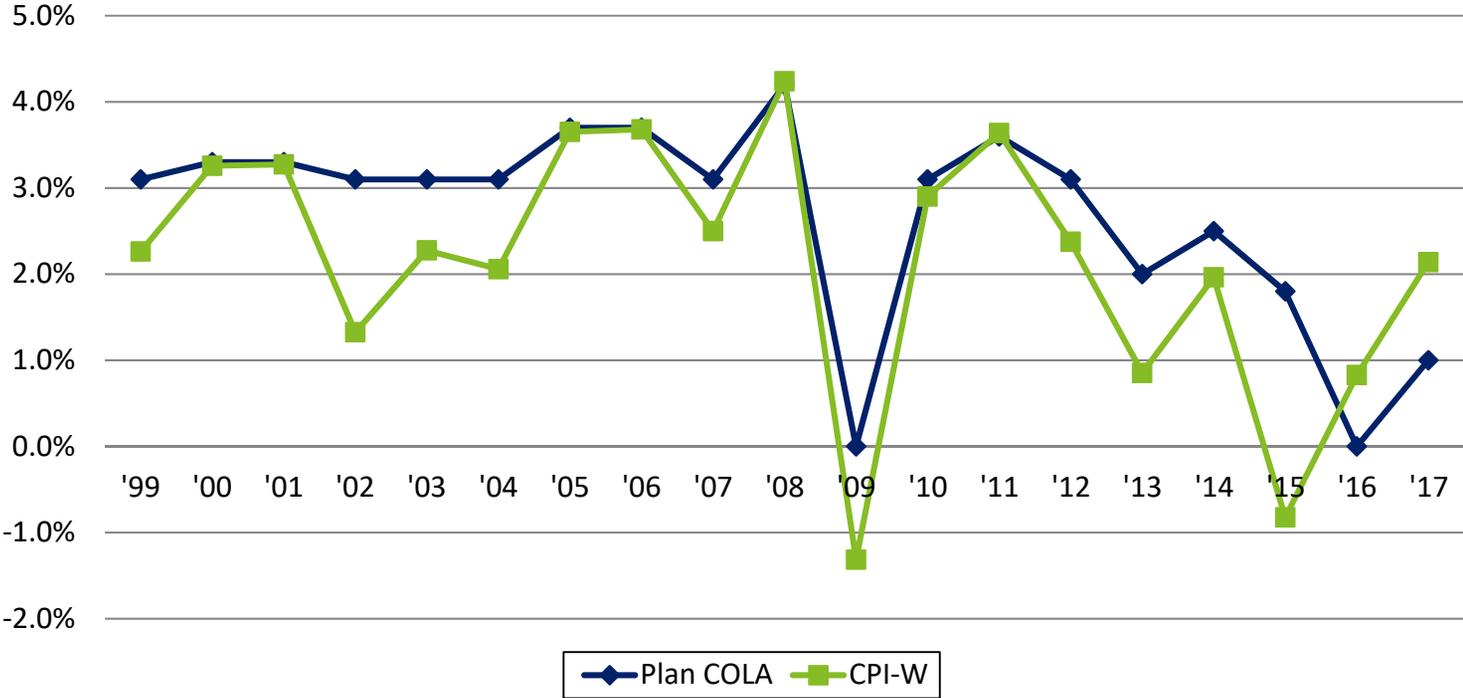
6% of the 2017 Actuarial Accrued Liability was attributable to active employees.

# Determination of Cost of Living Adjustment for July 1, 2018

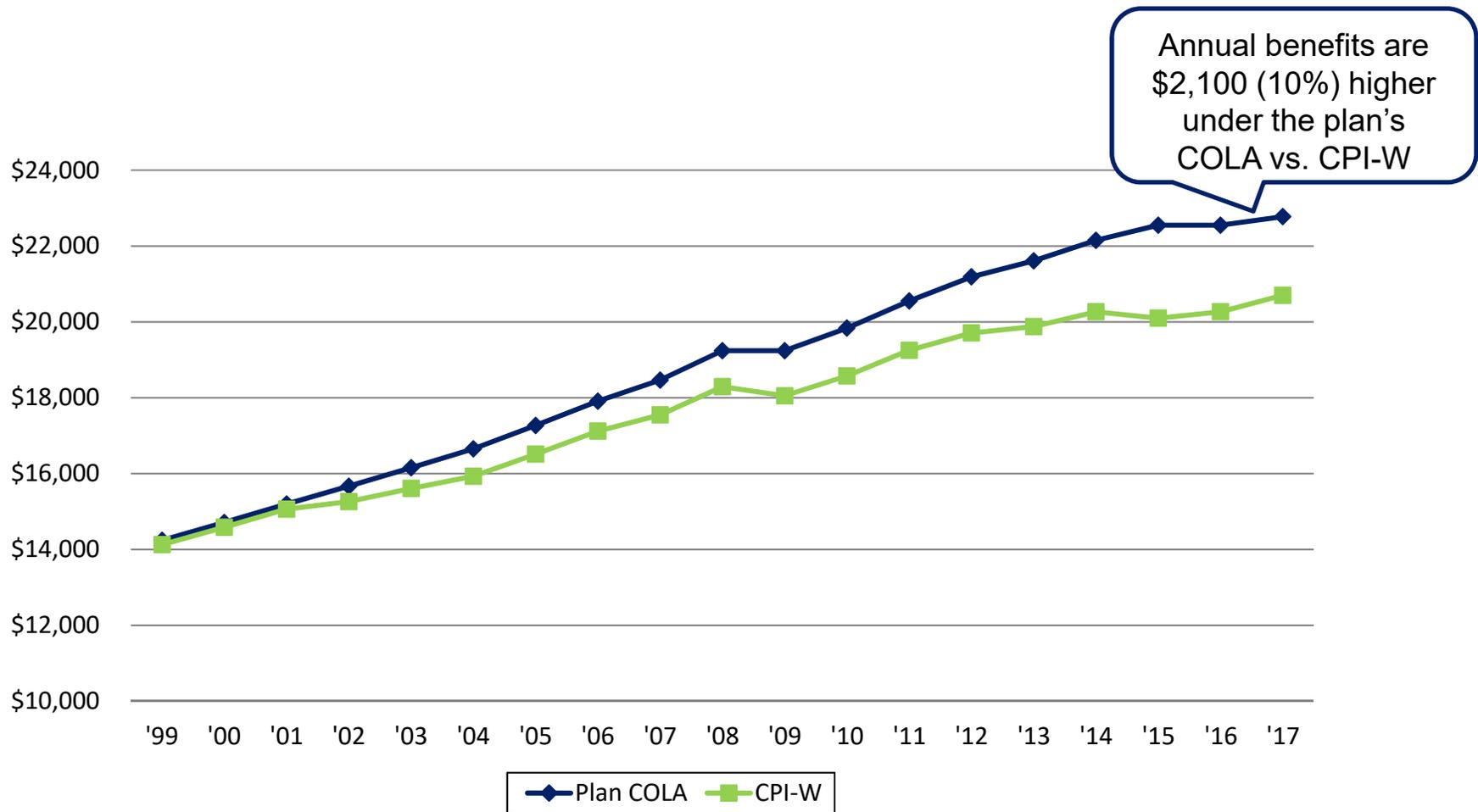
The average asset value during April 2018 was \$58,267,730 which provides for a 1.8% COLA to be paid on July 1, 2018 if approved by the Board.

COLA	PVFB	COLA	PVFB	COLA	PVFB
0.1%	\$48,944,000	1.3%	\$55,168,000	2.5%	\$62,592,000
0.2%	\$49,423,000	1.4%	\$55,737,000	2.6%	\$63,274,000
0.3%	\$49,909,000	1.5%	\$56,901,000	2.7%	\$63,966,000
0.4%	\$50,401,000	1.6%	\$56,901,000	2.8%	\$64,670,000
0.5%	\$50,901,000	1.7%	\$57,496,000	2.9%	\$65,384,000
0.6%	\$51,408,000	1.8%	\$58,100,000	3.0%	\$66,109,000
0.7%	\$51,922,000	1.9%	\$58,713,000	3.1%	\$66,846,000
0.8%	\$52,444,000	2.0%	\$59,335,000	3.2%	\$67,595,000
0.9%	\$52,973,000	2.1%	\$59,967,000	3.3%	\$68,355,000
1.0%	\$53,510,000	2.2%	\$60,608,000	3.4%	\$69,128,000
1.1%	\$54,055,000	2.3%	\$61,260,000	3.5%	\$69,913,000
1.2%	\$54,607,000	2.4%	\$61,921,000		

# Comparison of Actual COLA Rates to Inflation (CPI-W)

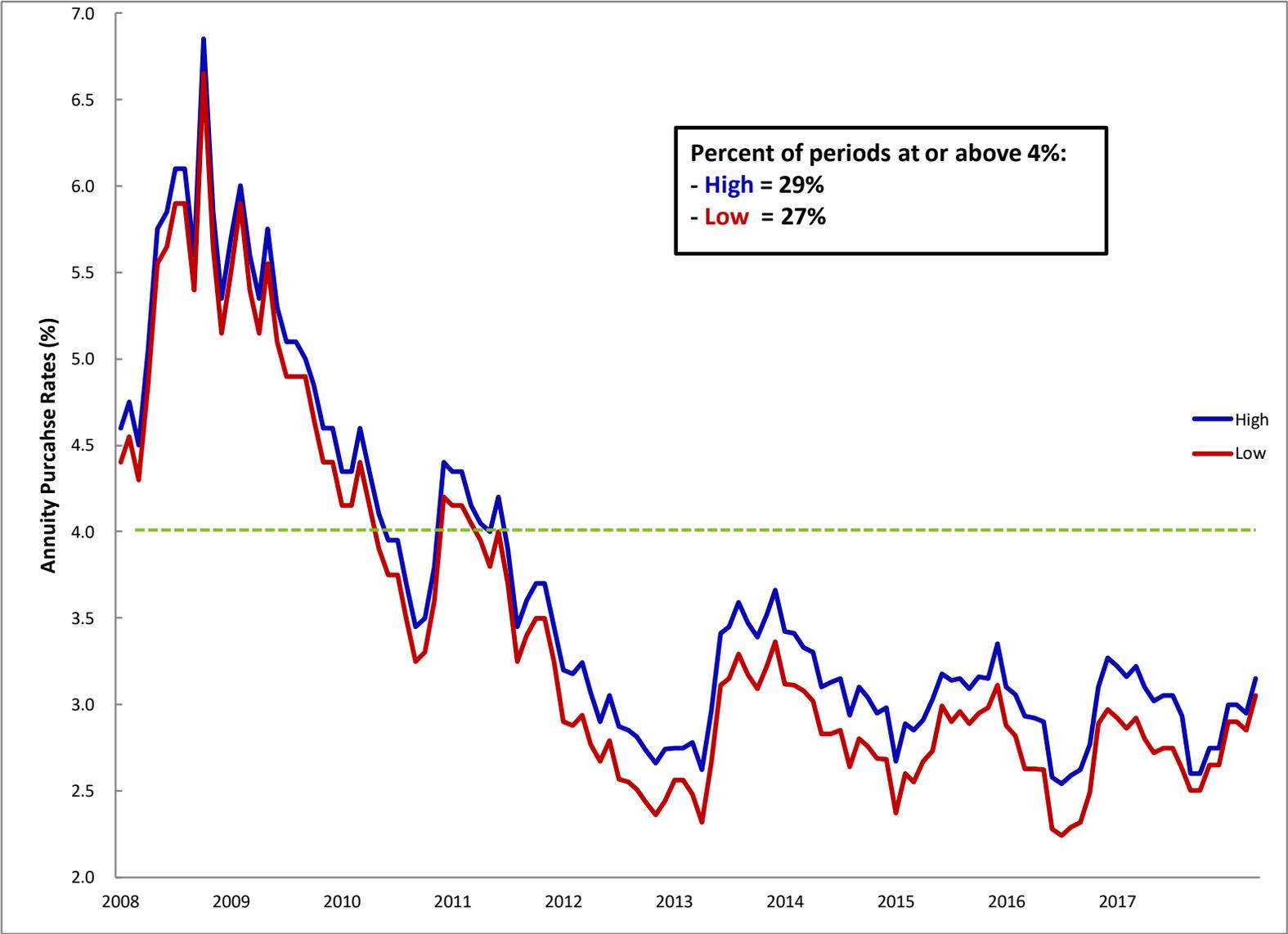


# Sample Annual Benefit for pre-1999 Retiree\* Comparing Actual COLA paid to Inflation (CPI-W)



\*Sample retiree with \$22,776 annual benefit as of July 1, 2017

# 10-year History of Biweekly Ranges of Annuity Purchase Rates\*



\*Source for pre-2012 data (Brentwood), post 2012 data (Aon), post 2017 (Brentwood)

# Purchasing Annuities – Current Market

- The current estimated discount rate for purchasing annuities is 3.1%\*
- The table below provides an estimate of the current cost\*\* of purchasing annuities based on the participants in the plan on July 1, 2017 with various levels of guaranteed COLAs:

Guaranteed COLAs	Cost to Purchase Annuities for All Participants
0.0%	\$52,500,000
0.5%	\$55,200,000
1.0%	\$58,200,000
1.5%	\$61,400,000

- Based on recent asset values, the plan is currently estimated to be able to provide a guaranteed COLA of 1.0%
- Requesting quotes from insurers based on plan provisions and current participants would provide a more accurate estimate of the guaranteed COLA level that can be purchased.

\* Based on the midpoint of the May 1, 2018 range of immediate annuities published by The Brentwood Companies

\*\* Based on the most recent mortality tables published by the Society of Actuaries: REHP-2014 Employees and Healthy Annuitants Collarless tables with MP-2017 scale (see valuation report for additional details)

# Stochastic Analysis of Assets and Projection of Purchasable COLA

# Stochastic Analysis and COLA Projection – Assumptions

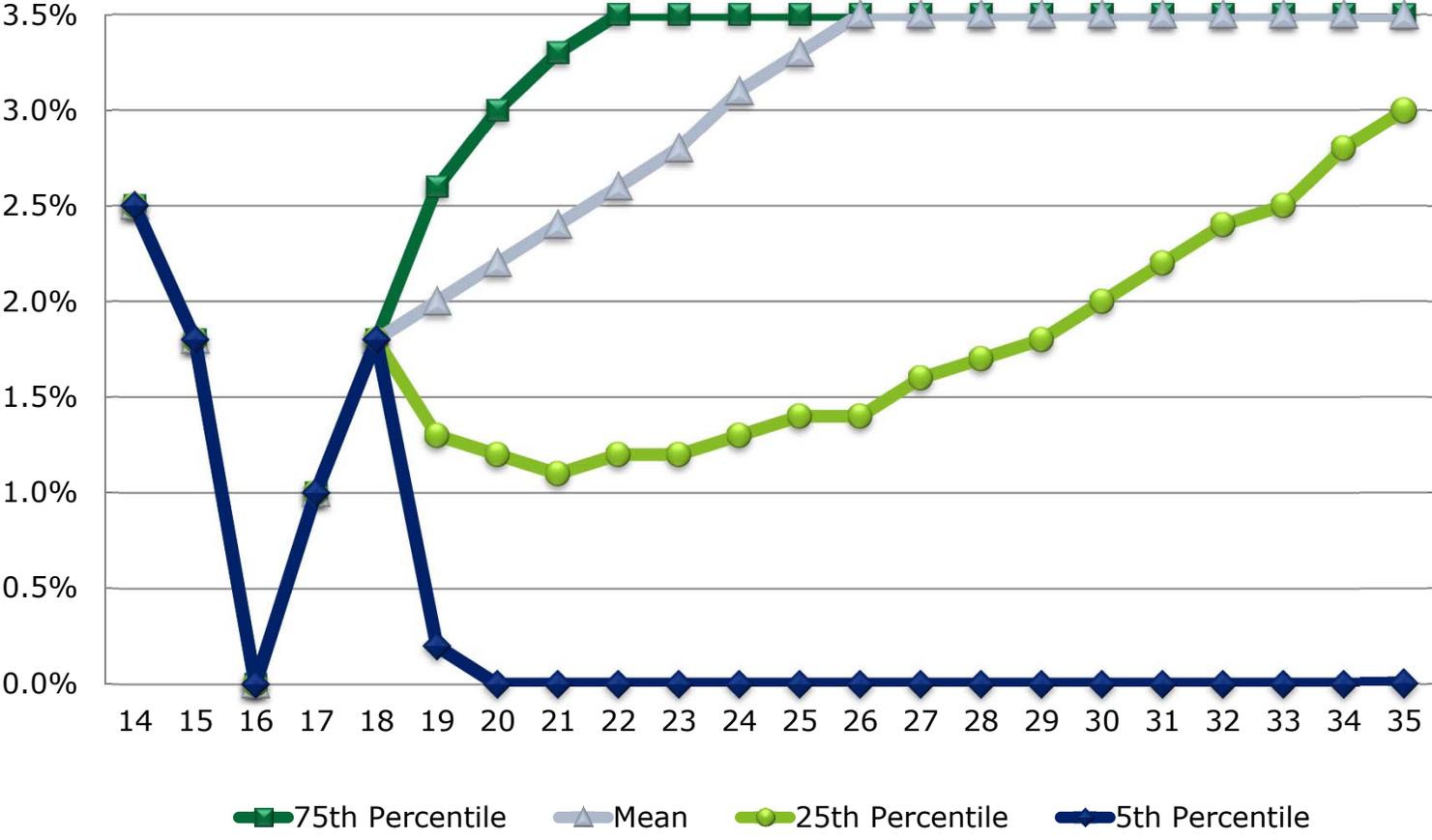
## Data Underlying Projections

- All projections throughout our analysis are based on assumptions, data, plan provisions, and methods used in the July 1, 2017 actuarial valuation except the starting asset value
- The starting asset value is based on the actual average assets for April 2018 of \$58.3 million

## “Stochastic” Funded Ratio Projections (see appendix for methodology)

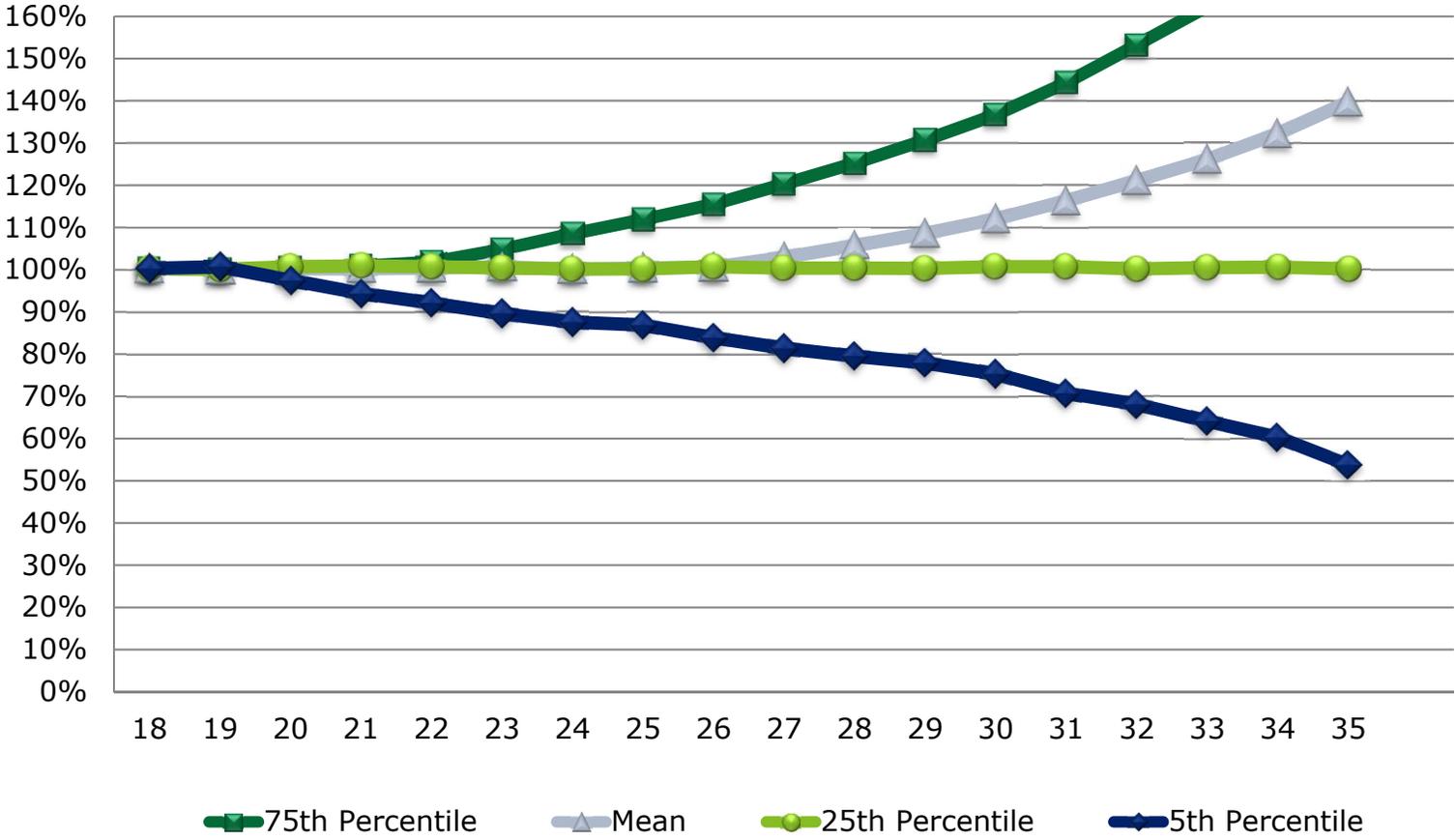
- Our analysis are based on plan assets and liabilities projected as of April 15 of each year
- The expected assets (mean) is shown along with the 75th, 25th, and 5th percentiles
- The 5th percentile means that out of 100 scenarios, the five worst cases are at or below the projected funded ratio shown by the 5th percentile line

# Settlement with Purchasable COLA up to a Maximum of 3.5%\*



\*Assumes liabilities are settled at 4.0%

# Funded Ratio after Settlement with Purchasable COLA up to a Maximum of 3.5%\*



\*Assumes liabilities are settled at 4.0%

## Settlement – Surplus/(Shortfall) in \$Millions after COLA Purchase\*

Year	75 <sup>th</sup>	Mean	25 <sup>th</sup>	5 <sup>th</sup>
2018	-	-	-	-
2019	-	-	-	-
2020	-	-	-	(\$1.1)
2021	-	-	-	(\$2.4)
2022	\$1.1	-	-	(\$3.1)
2023	\$2.8	-	-	(\$3.9)
2024	\$4.8	-	-	(\$4.4)
2025	\$6.4	-	-	(\$4.3)
2026	\$8.0	\$0.3	-	(\$4.9)
2027	\$10.0	\$1.4	-	(\$5.3)

Year	75 <sup>th</sup>	Mean	25 <sup>th</sup>	5 <sup>th</sup>
2028	\$11.8	\$2.6	-	(\$5.4)
2029	\$13.6	\$3.6	-	(\$5.3)
2030	\$15.4	\$4.8	-	(\$5.5)
2031	\$17.5	\$6.2	-	(\$5.9)
2032	\$19.7	\$7.5	-	(\$5.9)
2033	\$21.6	\$8.6	-	(\$6.0)
2034	\$23.5	\$9.9	-	(\$6.0)
2035	\$26.0	\$11.3	-	(\$6.3)

\*Assumes liabilities are settled at 4.0%

# Investment Policy

Asset Class	Current: 40% Fixed Income
U.S. Core Fixed Income	36.0%
High Yield Bonds	4.0%
U.S. Equity	39.0%
International Equity	13.0%
Real Assets	2.0%
Private Property	6.0%
<b>Total Asset Mix (FI / EQ / Real Estate)</b>	<b>40 / 54 / 6</b>
<b>Expected Annual Geometric Return</b>	<b>5.39%</b>
<b>Expected Risk (Std. Dev.)</b>	<b>12.2%</b>

*Expected annual returns and risk along with current asset allocation was provided by the plan's investment advisor – Principal. Asset allocation for alternative portfolios assumed to maintain a consistent split among asset classes for fixed income and equities.*

# Investment Return

Asset Class	Geometric Return	Arithmetic Return	Expected Risk
U.S. Core Fixed Income	3.65%	3.78%	5.15%
High Yield Bonds	5.35%	5.85%	10.00%
U.S. Equity	6.50%	7.95%	17.00%
International Equity	6.50%	8.12%	17.15%
Real Assets	6.30%	6.65%	8.40%
Private Property	6.00%	6.98%	14.00%

*\*Arithmetic return was derived from the geometric returns and expected risk provided by SD DOL's investment advisor (Principal) for all asset classes using the following formula:  $Arithmetic\ Return = [ Geometric\ Return + (.5 * SD^2) ]$*

# Methodology for Stochastic Forecasting

- Principal provided the following information for each asset class as of December 2016:
  - Mean geometric returns and standard deviations
  - Correlation coefficients
- Analyzed 20 projection years (2018 – 2037)
- Ran 5,000 simulations of projections per asset portfolio per projection year based on the calculated arithmetic expected return and standard deviation for each asset portfolio assuming a normal distribution
- The expected long-term rate of return for any simulation regresses to the mean
- Determined 5th through 95th percentiles of Market Value of Assets, Actuarial Accrued Liability, and Funded Ratio for 2018 – 2037 based on the results of 5,000 simulations per year

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