GRS Gabriel Roeder Smith & Company
Consultants & Actuaries

COMMONWEALTH OF VIRGINIA
JOINT LEGISLATIVE AUDIT AND REVIEW COMMISSION

2013 QUADRENNIAL ACTUARIAL AUDIT OF THE VIRGINIA529 PREPAID PROGRAM

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TRANSMITTAL LETTER

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May 17, 2013

Mr. Glen S. Tittermary
Director
Commonwealth of Virginia
Joint Legislative Audit and Review Commission
201 North Ninth Street, Suite 1100
General Assembly Building, Capitol Square
Richmond, VA 23219

Re: 2013 Quadrennial Actuarial Audit of the Virginia529 prePAID Program

Dear Mr. Tittermary:

Presented in this report are the results of the 2013 Quadrennial Actuarial Audit of the Virginia529 prePAID Program ("prePAID"), formerly known as the Virginia Prepaid Education Program. This audit was conducted in accordance with the Virginia College Savings Plan Oversight Act (§30-330 – §30-335 of the *Code of Virginia)* to provide the General Assembly with a comprehensive overview of the actuarial soundness of the prePAID. This audit consisted of a non-replication actuarial audit of the June 30, 2012, actuarial soundness valuation of the prePAID as performed by the retained actuary, Milliman.

The results of the audit are presented in the following format:

A. Executive Summary
B. General Audit Approach
C. Contract Data
D. Plan Assets
E. WAT Calculation
F. Economic Assumptions
G. Demographic Assumptions
H. Actuarial Soundness Valuation Methods
I. Actuarial Liability Test Life Review
J. Actuarial Report Content, Detail, Format and Clarity
K. Reasonableness of Actuarial Report Conclusions
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This study was performed at the request of the Commonwealth of Virginia Joint Legislative Audit and Review Commission ("JLARC"). It may be shared with other interested parties only with the permission of the JLARC. If shared with other parties, it should be shared in its entirety.

This study was performed by actuaries experienced with valuing prepaid tuition programs as well as public sector retirement systems.

We would like to acknowledge the cooperation of the staff of the Virginia College Savings Plan ("VA529") as well as Alan Perry of Milliman. Their full and willing cooperation was critical to the successful completion of this report.

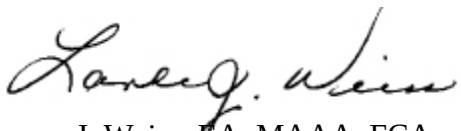
It is important to remember that actuarial calculations are based on assumptions regarding future events. Future actuarial measurements may differ significantly from the current measurements due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law.

The actuaries signing this report, Lance Weiss, Amy Williams and Paul Wood, are Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

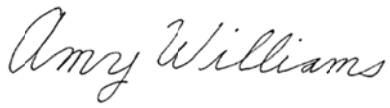
GRS is independent of the VA529.

If you have any questions on this report or need additional information, please feel free to contact us.

Respectfully submitted,



Lance J. Weiss, EA, MAAA, FCA
Senior Consultant



Amy Williams, ASA, MAAA, FCA
Consultant

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SECTION A

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

In accordance with the Virginia College Savings Plan Oversight Act (§30-330 – §30-335 of the *Code of Virginia)*, Gabriel, Roeder, Smith & Company was hired to conduct the 2013 Quadrennial Actuarial Audit of the prePAID, formerly known as the Virginia Prepaid Education Program.

This purpose of this audit is to provide the General Assembly with a comprehensive overview of the actuarial soundness of the prePAID. This audit consisted of a non-replication actuarial audit of the actuarial policy and practices of the prePAID.

Following is a high level summary of the areas addressed in the audit and our associated findings:

1. Reasonableness of the funding results and conclusions of the June 30, 2012, actuarial soundness valuation of the prePAID as produced by Milliman, Incorporated (Milliman), the prePAID actuary. This assessment includes a validation of the reasonableness of the liabilities by investigating individual test cases and using actuarial estimation techniques to approximate aggregate results that are used to compare the liabilities documented in the report.
    - GRS was able to independently replicate the present value of future obligations payable from the prePAID within about 1 percent for nine out of the 10 test lives and the present value of future installment contract payments within 2 percent for four out of the five test lives with remaining payments. We consider replicating results within 2 percent a close match which indicates that liabilities and contract receivables are being valued consistently with the actuarial assumptions and underlying contract holder census data. GRS was not able to as closely replicate results for the combination contract test life. However, combination contracts comprise less than 5 percent of current contract holders. In addition, GRS was not able to closely match the present value of future installment contract payments for one contract with a fractional remaining payment. However, GRS was able to replicate the present value of installment contract receivables for all contracts based on the full contract holder census file within 1.5 percent, assuming a discount rate of 6.75 percent. Therefore, we do not expect that the larger differences in certain test lives would have a material impact on overall results.
    - Milliman concluded that the prePAID was actuarially sound because the Fund has sufficient assets (including the value of future installment payments due under current contracts) to cover the actuarially estimated value of the tuition obligations under those contracts (including any administrative costs associated with those contracts). We agree with this conclusion.
2. The degree to which the contract data is sufficient to support the conclusions of the June 30, 2012 actuarial soundness valuation and the use and appropriateness of any assumptions made by Milliman regarding the data.
    - We performed consistency checks between the original data produced by VA529 and the retained actuary's "scrubbed" data file. We found the "scrubbed" data to be

EXECUTIVE SUMMARY

consistent with the original data and therefore, we concluded that the retained actuary's "scrubbed" data file is a reasonable representation of the original data provided by the VA529. Overall, we also found the data used in the valuation to be reasonable and appropriate.

3. Whether the June 30, 2012, actuarial soundness valuation performed by Milliman was conducted in accordance with generally accepted practices for actuaries, as well as the principles and practices prescribed by the Actuarial Standards Board.

    - Because no generally accepted standards of practice have evolved within the actuarial profession that specifically address prepaid tuition programs, we have referenced the Actuarial Standards of Practice ("ASOPs") that are used for retirement systems for purposes of conducting this 2013 Quadrennial Actuarial Audit of the prePAID. In general, we find that Milliman followed the appropriate ASOPs that are the most applicable for a prepaid tuition program.

4. The content, detail, format, clarity, and scope of the June 30, 2012, actuarial soundness report prepared by Milliman.

    - We reviewed the June 30, 2012, actuarial soundness valuation report prepared by Milliman and find that the report is generally complete and contains the appropriate information.

5. The reasonableness and appropriateness of the actuarial assumptions and methods used by Milliman in the June 30, 2012, actuarial soundness valuation.

    - In general, we find that the economic and demographic actuarial assumptions employed by Milliman in their June 30, 2012, actuarial soundness valuation are reasonable.

6. Whether the prePAID is presently being funded on an actuarially sound basis based on the results of the June 30, 2012, actuarial soundness valuation.
    - Based on our analysis and considering the current funding level (over 100 percent) and the average load of 10 percent on contract prices to increase the actuarial reserve of the program, we believe the pricing methodology is actuarially sound.

This report contains several items that we believe the VA529 should consider. A summary of these considerations follows:

- We believe the current rate of return assumption of 6.75 percent is reasonable based on the estimated probability that future returns will meet or exceed this assumption approximately 50 percent of the time. However, if the VA529 would like to increase the probability of realizing an average return that exceeds the assumed rate of return, which would provide more conservatism to account for potential future adverse experience, it could consider lowering the assumption below 6.75%.

EXECUTIVE SUMMARY

- We believe that the VA529 should consider adopting a graded schedule of tuition increases that starts out at 7.5 percent for the near term but grades down over time to a lower, more sustainable rate.
- We recommend that the VA529 review recent forfeiture experience and consider increasing the forfeiture assumption to better align with recent observed experience.
- We recommend that the VA529 consider adding a small Bias Load to the Community College contracts to recognize that prePAID contract beneficiaries on average are attending higher priced Community Colleges compared to all students enrolled in Community Colleges in Virginia.

This report also contains a series of relatively minor recommendations for the VA529 and Milliman. A summary of these recommendations follows:

- We recommend that the VA529 and Milliman provide additional disclosure on the development of the expense assumption in the valuation report so that the reasonableness of the expense assumption for only the prePAID can be ascertained during future audits.
- We recommend that Milliman review its methodology for calculating the present value of future installment contract payments that include fractional amounts to ensure the correct expected amount is being valued.
- We recommend that Milliman provide additional disclosure on all assumptions used to develop the 10 percent load on pricing to provide additional transparency.

SECTION B

GENERAL AUDIT APPROACH

GENERAL AUDIT APPROACH

In accordance with the Virginia College Savings Plan Oversight Act (§30-330 – §30-335 of the *Code of Virginia),* Gabriel, Roeder, Smith & Company was hired to conduct the 2013 Quadrennial Actuarial Audit of the prePAID, formerly known as the Virginia Prepaid Education Program.

This purpose of this audit is to provide the General Assembly with a comprehensive overview of the actuarial soundness of the prePAID. This audit consisted of a non-replication actuarial audit of the actuarial policies and practices of the prePAID.

This audit addresses the following areas:

1. Reasonableness of the funding results and conclusions of the June 30, 2012, actuarial soundness valuation of the prePAID as produced by Milliman, Incorporated (Milliman), the prePAID actuary. This assessment includes a validation of the reasonableness of the liabilities by investigating individual test cases and using actuarial estimation techniques to approximate aggregate results that are used to compare the liabilities documented in the report.
2. The degree to which the contract data is sufficient to support the conclusions of the June 30, 2012, actuarial soundness valuation and the use and appropriateness of any assumptions made by Milliman regarding the data.
3. Whether the June 30, 2012, actuarial soundness valuation performed by Milliman was conducted in accordance with generally accepted practices for actuaries, as well as the principles and practices prescribed by the Actuarial Standards Board.
4. The content, detail, format, clarity, and scope of the June 30, 2012, actuarial soundness report prepared by Milliman.
5. The reasonableness and appropriateness of the actuarial assumptions and methods used by Milliman in the June 30, 2012, actuarial soundness valuation.
6. Whether the prePAID is presently being funded on an actuarially sound basis based on the results of the June 30, 2012, actuarial soundness valuation.

GENERAL AUDIT APPROACH

Listed below is a summary of the approach and steps GRS completed on behalf of the 2013 Quadrennial Actuarial Audit of the prePAID:

TASK DESCRIPTION		
PROJECT PLANNING	1.	**Project Planning with Client and Team**
		a.) Confirm project plan with JLARC
DATA	2.	**Census Data**
		a.) Prepare and send data request
		b.) Conference call with JLARC, VA529 and Milliman to confirm data
		c.) Submit data (original data and valuation ready data)
		d.) Submit pricing reports, experience studies, assumption tables, etc.
		e.) Compare valuation data and original data
		f.) Review data assumptions utilized by Milliman
	3.	**Weighted Average Tuition (WAT) Data**
		a.) Submit tuition, fee and headcount source data
		b.) Review WAT calculation
	4.	**Financial Data**
		a.) Submit prePAID financial statements
		b.) Review prePAID financial statements
ASSUMPTIONS AND METHODS	5.	**Actuarial Assumptions and Methods**
		a.) Review demographic actuarial assumptions
		b.) Review actuarial soundness valuation methods
		c.) Review economic actuarial assumptions
		d.) Scheduled status call with GRS and JLARC
ACTUARIAL LIABILITIES	6.	**Actuarial Liabilities**
		a.) Request test lives data
		b.) Submit test lives data
		c.) Review test lives
ACTUARIAL VALUATION AND REPORT	7.	**Actuarial Soundness Valuation and Report**
		a.) Review content, detail, format and clarity of Milliman actuarial report
		b.) Review Milliman pricing reports
		c.) Review conclusions reached in Milliman report
		d.) Review actuarial principles and practices used by Milliman
		e.) Scheduled status call with GRS and JLARC
REPORT AND BRIEFINGS	8.	**Deliverable Schedule**
		a.) Draft report to JLARC
		b.) Report comments from JLARC
		c.) Final Report to JLARC
		d.) Acceptance of Report from JLARC
		e.) Final report copies to JLARC
		f.) Briefing to JLARC

SECTION C

CONTRACT DATA

CONTRACT DATA

We have reviewed the original data provided by the VA529 to the retained actuary, Milliman, for accuracy, reasonableness and appropriateness. In addition, we reviewed the data that was directly used by Milliman in the valuation. This data would commonly be referred to as "scrubbed" data. Overall, we found the data used in the valuation to be reasonable and appropriate.

Part of the "scrubbing" process employed by Milliman is to consolidate or group identical records into a single record. This technique produces a data file that is run through the valuation system with fewer records without any loss of accuracy in the valuation results. We reviewed the grouping method and concluded that it adequately represents the original data. In addition, we noted that the number of remaining payments for installment contracts was rounded in the "scrubbed" data file.

Page 1 of Appendix B in the most recent actuarial soundness valuation of the prePAID shows a summary of contract data by Plan Type (University, Community College, or a combination of the two) and Matriculation Date. Using the original data provided to Milliman, we were able to replicate this table. Furthermore, we replicated this table using Milliman's "scrubbed" data.

We performed consistency checks between the original data and Milliman's "scrubbed" data file. We found the "scrubbed" data to be consistent with the original data and therefore, we concluded that the "scrubbed" data file is a reasonable representation of the original data originally provided by the VA529.

SECTION D

PLAN ASSETS

PLAN ASSETS

One of the primary purposes of an actuarial soundness valuation of a prepaid tuition program is to determine the present value of the obligations for prepaid tuition contracts purchased through the valuation date (June 30, 2012) and compare such liabilities with the value of the assets associated with the program as of that same date. Accordingly, it is very important to make sure that the assets reported by the actuary are accurate and complete.

We reviewed the value of the prePAID assets as reported by Milliman in the June 30, 2012, actuarial valuation report. As of June 30, 2012, Milliman reported program assets of $2,004,687,168 on a market value basis. In addition, Milliman calculated the present value of installment contract receivables to equal $244,795,653 for a total value of fund assets of $2,249,482,821. Please note that it is customary and accepted practice to include the present value of installment contract receivables in the total value of fund assets for the purpose of determining the deficit/surplus of a prepaid tuition program as of a particular point in time.

We also reviewed the Annual Financial report of the VA529 for the fiscal year ended June 30, 2012, (dated November 1, 2012). The assets of the prePAID as reported in the Annual Report match the value as reported by Milliman in the June 30, 2012, actuarial soundness valuation report.

We also reasonably replicated the present value of installment contracts receivable within 1.5 percent assuming a discount rate of 6.75 percent and using the fractional remaining payments as provided in the original data.

SECTION E

WEIGHTED AVERAGE TUITION AND FEES CALCULATION

WIEGHTED AVERAGE TUITION AND FEES CALCULATION

We have reproduced the Weighted Average Tuition and Fees (WAT) development. We find the WAT development for both the 4-year Universities and the 2-year community colleges to be reasonable. The WAT is based on 2012-2013 tuition and fees and is weighted by 2010-2011 academic enrollments. Using lagged enrollment is typical for a prepaid tuition plan as more current data is not usually available at the time of the valuation. Provided there are no major shifts in enrollment from year to year, this method will produce consistent results over time.

We also calculated the WAT using enrollment data specific to the prePAID at the valuation date. This check serves as a basis for the Bias Load of 10 percent applied to University contracts. The Bias Load is included in the valuation to recognize the propensity for beneficiaries to attend the higher priced Colleges and Universities. As shown below, the University WAT specific to prePAID enrollment is approximately 6.0 percent greater than the overall WAT calculated using Undergraduate Headcount for 2010-2011. The Community College WAT specific to prePAID enrollment is approximately 1.5 percent greater than the overall WAT calculated using Undergraduate Headcount for 2010-2011.

	University	Community College
WAT Using Fall Undergraduate Headcount for 2010-2011	$ 9,856.16	$ 4,425.95
WAT Using prePAID Enrollment as of the Valuation Date	$ 10,450.36	$ 4,492.69
Percent Different	6.03%	1.51%

Based on these relationships, the 10 percent bias load applied to University contracts, while on the conservative side, is reasonable.

The VCSP may want to consider adding a small Bias Load to the Community College contracts to account for contract beneficiaries attending higher priced Community Colleges on average compared to all students enrolled in Community Colleges in Virginia. However, since Community College contracts make up a small portion of the liability, a Bias Load on those contracts would not materially impact the overall results.

SECTION F

ECONOMIC ACTUARIAL ASSUMPTIONS

ECONOMIC ACTUARIAL ASSUMPTIONS

Actuarial Assumptions

The actuarial soundness valuation report prepared by Milliman contains a description of the actuarial assumptions which were used in the actuarial valuation of the prePAID as of June 30, 2012. Additionally, Milliman provided us with supplemental material and documents that provide more details on the development of the actuarial assumptions. We have reviewed this detail, and performed additional procedures, in order to assess the reasonableness of the assumptions used in the actuarial valuation.

The set of actuarial assumptions is one of the foundations upon which an actuarial valuation is based. An actuarial valuation of a prepaid tuition program is, essentially, a statistical projection of the amount and timing of future tuition payments to be paid under the plan. In any statistical projection, assumptions as to future events will drive the process. Actuarial valuations are no exception.

It is important to understand the nature of the prepaid tuition program plan and the plan sponsor when assessing the reasonableness of the actuarial assumptions. No projection of future events can be labeled as "correct" or "incorrect." However, there is a "range of reasonableness" for each assumption. We evaluate individual elements as follows:

- Whether or not they fall within the range of reasonableness, and
- If they fall within that range, whether they are reasonable for the actuarial valuation of the plan.

Actuarial assumptions for the valuation of prepaid tuition plans are of two types:

- Economic assumptions, and
- Demographic assumptions.

We have assessed the reasonableness of both types as part of this actuarial audit.

Economic Actuarial Assumptions

Economic assumptions reflect the effects of economic forces on the projections of tuition payments payable from the plan and in the discounting of those payments to a present value.

Economic assumptions are based, at their core, on the assumed level of price inflation. Each economic assumption is then developed from expected spreads over price inflation. Since price inflation is relatively volatile and is subject to a number of influences not based on recent history, these assumptions are less reliably based on recent past experience than are the demographic assumptions.

ECONOMIC ACTUARIAL ASSUMPTIONS

The key economic assumptions applicable to the prePAID are:

1. Assumed Rate of Inflation – The rate of price inflation (as measured by the Consumer Price Index for all Urban consumers) which underlies the remainder of the economic assumptions.
2. Assumed Rate of Investment Return – The rate at which projected future tuition payments under the system are reduced to present value.
3. Assumed Rate of Tuition Increase – The annual rate at which tuition payments at Universities and Communities Colleges are expected to increase for contract holders.
4. Reasonable Rate of Interest – The rate at which contract payments are credited interest.

Inflation

By "inflation," we mean price inflation, as measured by annual increases in the Consumer Price Index (CPI). This inflation assumption underlies all of the other economic assumptions. The current annual inflation assumption is 2.50 percent.

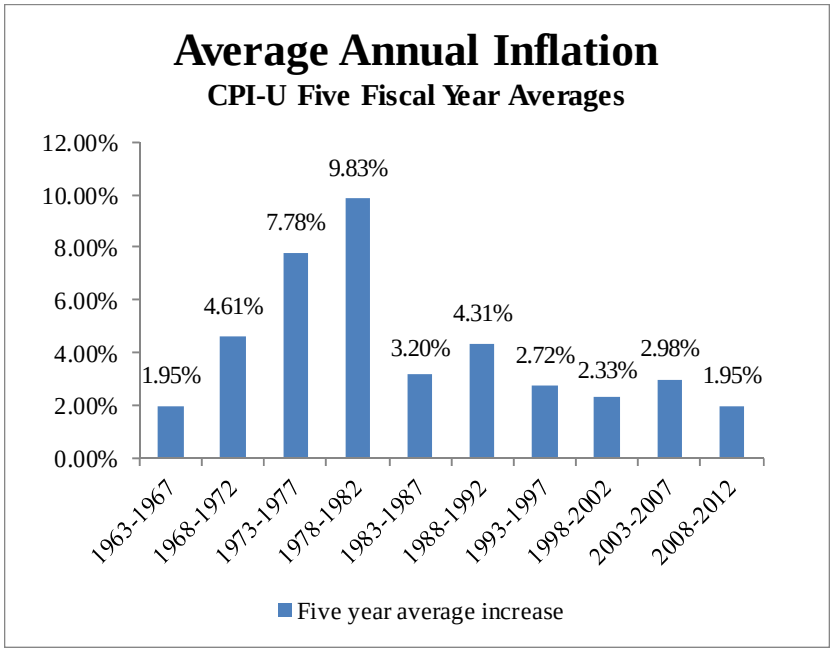
Over the five-year period from June 2007 through June 2012, the CPI-U has increased at an average rate of 1.95 percent. However, the assumed inflation rate is only weakly tied to past results.

The following table shows the average inflation over various periods, ending June 2012.

Fiscal Year	Annual Increase in CPI-U
2007-2008	5.02%
2008-2009	-1.43%
2009-2010	1.05%
2010-2011	3.56%
2011-2012	1.66%
3-Year Average	2.09%
5-Year Average	1.95%
10-Year Average	2.46%
20-Year Average	2.50%
25-Year Average	2.85%
30-Year Average	2.91%
40-Year Average	4.35%
50-Year Average	4.14%

ECONOMIC ACTUARIAL ASSUMPTIONS

The graph below shows the average inflation over 5-year periods over the last 50 years:



We surveyed the inflation assumption used by investment consulting firms. In our sample of seven firms, the inflation assumption ranged from 2.16 percent to 3.26 percent, with an average of 2.55 percent.

In the Social Security Administration's 2012 Trustees Report, the Office of the Chief Actuary is projecting a long-term average annual inflation rate of 2.8 percent under the intermediate cost assumption. (The inflation assumption is 1.8 percent and 3.8 percent respectively in the low cost and high cost projection scenarios.)

Therefore, we believe the current 2.5 percent inflation assumption is reasonable.

ECONOMIC ACTUARIAL ASSUMPTIONS

Actuarial Standards of Practice

Because no generally accepted standards of practice have evolved within the actuarial profession that specifically address prepaid tuition programs, we have referenced the ASOPs that are used for retirement systems. We chose such standards because prepaid tuition programs, like retirement plans, generally provide for the payment of a benefit at a future date.

Although the Board of the Virginia College Savings Plan is the ultimate decision-making body with regard to approval of the actuarial assumptions used in the actuarial soundness valuations, Milliman is still bound by the Actuarial Standards of Practice to provide advice or recommendations to the Board on the selection of actuarial assumptions.

With respect to setting economic assumptions for retirement plans, including the assumed investment return rate, actuaries are required to comply with Actuarial Standard of Practice No. 27 (ASOP 27). The current ASOP 27 requires the actuary to identify the components of each assumption, to evaluate relevant data, and to set a best-estimate range. Then the actuary selects a point within this best-estimate range. Alternatively, the actuary may simply set the assumption without specifying a best-estimate range. All economic assumptions are required to be individually reasonable and consistent in the aggregate.

The best-estimate range is "the narrowest range within which the actuary reasonably anticipates that the actual results, compounded over the measurement period, are more likely than not to fall." That is, there is a 50 percent likelihood that the compound rate of return will fall within the best estimate range. This is equivalent to establishing a confidence interval that ranges from the 25th to 75th percentile.

Please note that the provisions of ASOP 27 are currently being reviewed and may be revised. The revised standard is expected to be adopted in 2013. Since the revised standard is still pending, we have used the current provisions of ASOP 27. The proposed revisions to ASOP 27 are not expected to materially impact the recommendations contained in this report. Should the revised version of ASOP 27 become available before the next experience study, the economic assumptions may need to be reviewed.

ECONOMIC ACTUARIAL ASSUMPTIONS

Real Return

The allocation of assets within the universe of investment options will significantly impact the overall performance. Therefore, it is meaningful to identify the range of expected returns based on the fund's targeted allocation of investments and an overall set of capital market assumptions.

Based on information developed by Mercer and provided to us by Milliman, following is a table with the plan's current target asset allocation:

Asset Category	Allocation Percentage
Equities	
Domestic Large Cap	7.5%
Domestic Small Cap	7.5%
International Developed	10.0%
Emerging Markets	7.5%
Total Equity	**32.5%**
Core Fixed Income	
Aggregate Fixed Income	10.0%
Inflation Index Bonds	10.0%
Stable Value	5.0%
Total Core Fixed Income	**25.0%**
Non-Core Fixed Income	
Convertibles	7.5%
High Yield	10.0%
Emerging Market Debt	10.0%
Total Non-Core Fixed Income	**27.5%**
Alternatives	
Real Estate (Private)	2.5%
Private Equity	7.5%
Hedge Funds	5.0%
Total Alternatives	**15.0%**
Total All Asset Categories	**100.0%**

ECONOMIC ACTUARIAL ASSUMPTIONS

Because GRS is an actuarial and benefits consulting firm and does not provide investment advice, we reviewed capital market assumptions developed and published by seven independent investment consulting firms, including Mercer.

These investment consulting firms periodically issue reports that describe their capital market assumptions, that is, their estimates of expected returns, volatility, and correlations among the different asset classes. While some of these assumptions may be based upon historical analysis, many of these investment consulting firms also incorporate forward looking adjustments to better reflect near-term and long-term expectations. The estimates for core investments (i.e., fixed income, equities, and real estate) are generally based on anticipated returns produced by passive index funds.

Given the Plan's current target asset allocation (as shown on the previous page) and the capital market assumptions from the seven investment consultants, the development of the average one-year nominal return, net of investment expenses, is provided in the following table. Based on each firm's assumptions, we estimated the expected real return of the Plan's portfolio (col. (4)). Next, based on the actuary's recommended inflation and investment expense assumption, we estimated the nominal return net of investment expenses (col. (8)).

Investment Consultant	Investment Consultant Expected Nominal Return	Investment Consultant Inflation Assumption	Expected Real Return (2)–(3)	Actuary Inflation Assumption	Expected Nominal Return (4)+(5)	Plan Incurred Expense Assumption	Nominal Return Net of Expenses (6)-(7)	Deviation of Expected Return (1-Year)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	7.05%	2.50%	4.55%	2.50%	7.05%	0.25%	6.80%	12.20%
2	7.18%	2.40%	4.78%	2.50%	7.28%	0.25%	7.03%	8.40%
3	7.50%	2.50%	5.00%	2.50%	7.50%	0.25%	7.25%	11.30%
4	7.53%	2.50%	5.03%	2.50%	7.53%	0.25%	7.28%	11.50%
5	8.38%	3.26%	5.12%	2.50%	7.62%	0.25%	7.37%	14.60%
6	7.65%	2.50%	5.15%	2.50%	7.65%	0.25%	7.40%	11.10%
7	7.78%	2.16%	5.62%	2.50%	8.12%	0.25%	7.87%	11.00%
Average	**7.58%**	**2.55%**	**5.03%**	**2.50%**	**7.53%**	**0.25%**	**7.28%**	**11.44%**

As the table shows, the average one-year nominal return (net of expenses) of the seven firms is 7.28 percent, which is 0.53 percent greater than the current assumption of 6.75 percent. However, this one-year nominal return statistic does not reflect the drag in the compounding growth of plan assets due to the year-to-year volatility in investment returns.

Therefore, in addition to examining the expected one-year return, it is important to review anticipated volatility of the investment portfolio and understand the range of long-term net return that could be expected to be produced by the investment portfolio. The following table provides the

ECONOMIC ACTUARIAL ASSUMPTIONS

25th, 50th, and 75th percentiles of the 20-year geometric average of the expected nominal return, net of expenses, as well as the probability of exceeding the current 6.75 percent assumption.

Investment Consultant	Distribution of 20-Year Average Geometric Net Nominal Return 25th	50th	75th	Probability of exceeding 6.75%*
(1)	(2)	(3)	(4)	(5)
1	4.29%	6.09%	7.93%	40.4%
2	5.44%	6.69%	7.96%	48.8%
3	4.97%	6.64%	8.35%	48.3%
4	4.96%	6.66%	8.39%	48.6%
5	4.22%	6.37%	8.57%	45.3%
6	5.18%	6.82%	8.49%	51.1%
7	5.67%	7.30%	8.96%	58.9%
Average	**4.96%**	**6.66%**	**8.38%**	**48.8%**

As the analysis shows, there is a 50 percent likelihood that the 20-year average net nominal return will be between 4.96 percent and 8.38 percent, assuming annual inflation of 2.50 percent. This becomes the best-estimate range under ASOP 27. Furthermore, the average results of all seven firms indicate there is about a 49 percent chance that the plan will produce an average return that exceeds 6.75 percent over the next 20 years. (However, only two of the capital market assumption sets provided by the investment consulting firms produce more than a 50 percent chance of exceeding the current assumption of 6.75 percent.) Since the 6.75 percent assumption falls well within the range of reasonable assumptions and there is a 49 percent chance of producing an average return that exceeds 6.75 percent over the next 20 years, we believe it is a reasonable assumption. If the VA529 would like increase the chance of average returns exceeding the assumed rate of return, it could consider lowering the assumption below 6.75 percent.

Review of Tuition Increase Assumption

The current tuition increase assumption is 7.5 percent for the fall of 2013 and each year thereafter for both Universities and Community Colleges.

The historical compounded increase in average tuition reported in the Milliman report follows:

Period	University	Community College
Over last five years	7.2%	13.0%
Over last 10 years	9.1%	10.2%
Over last 15 years	6.0%	7.7%
Over last 20 years	5.5%	6.6%
Over last 25 years	6.1%	n/a

ECONOMIC ACTUARIAL ASSUMPTIONS

One point to note is that beginning with the 2011-2012 year, Community College Tuition and Fees was measured as an enrollment weighted average and prior to that, a non-enrollment weighted average was used. This resulted in a one-year 27 percent increase, thus raising the average tuition increases for Community Colleges. The University Tuition and Fees was always measured as an enrollment weighted average so there is some difference in the statistics between the two different categories of schools.

The historical compounded increase in average tuition over the last 15 to 25 years suggests a long term tuition increase assumption in the range of 5.5 percent to 6.5 percent for Universities and 6.5 percent to 7.5 percent for Community Colleges. However, both types of institutions have experienced higher tuition increases in the more recent years. Based solely on such historical information, the current 7.5 percent assumption is reasonable.

However, one important consideration is whether the current tuition increase assumption of a 7.5 percent increase for the fall of 2013 and each year thereafter for both Universities and Community Colleges is really sustainable over the long term. Since the rate of tuition increase has a material impact on the pricing of new contracts, it is important that the assumption not only be reasonable, but also sustainable over the long term. With a 7.5 percent increase in tuition each year going forward, the cost of college may become unaffordable to future generations of students. For example, if over a 12 to 18 year period, tuition increases at a rate of 7.5 percent and wages increase at a rate closer to 3.0 percent, then the cost of tuition may not be reasonable in relation to wages (tuition would have increased by about 270 percent over an 18 year period compared to increased wages of 70 percent). Further, Virginia's governance structure for higher education is decentralized, which makes it difficult to predict future tuition increases. For these reasons, we believe that the assumption for tuition increases should be reviewed annually, and consideration should be given to a graded schedule of tuition increases that is initially 7.5 percent for the near term but grades down over an extended period of time to a lower sustainable rate.

Reasonable Rate of Interest

At redemption, each contract pays the current tuition and mandatory fees at the Virginia public university or community college that the beneficiary attends. The benefits vary if the beneficiary does not attend a Virginia public university or community college. With the establishment of the Virginia Education Savings Trust, contract holders have the option of rolling over the value of their prepaid contract into a savings account. The value of the prepaid contract for such rollovers is the accumulated contributions at the reasonable rate of interest set by the Board. This option to roll over the contract has effectively added a minimum benefit to the Program.

The reasonable rate of interest tracks the quarterly performance of the Institutional Money Funds as reported on the Money Fund Monitor by iMoneyNet. Effective 1/1/2002, the Board approved a change in determining the reasonable rate of return. The rate will continue to track the Institutional Money Funds Index as reported in the Money Fund Monitor by iMoneyNet, formerly IBC

ECONOMIC ACTUARIAL ASSUMPTIONS

Donoghue. The rate will be updated quarterly versus annually to more accurately reflect the fluctuating market conditions.

The current assumption for the reasonable rate was changed from 4.0 percent in all years to 0.04 percent for 2012-2013 and then 4.0 percent thereafter. The actual reasonable rate has been less than 1.0 percent since the second quarter of 2009 and has averaged about 1.4 percent between 1996 and 2011. We believe the assumption of 4.0 percent is probably reasonable over the longer-term, but on the conservative side when considering more recent experience.

SECTION G

DEMOGRAPHIC ACTUARIAL ASSUMPTIONS

DEMOGRAPHIC ACTUARIAL ASSUMPTIONS

Matriculation, Bias and Utilization of Tuition Years Assumptions

In general, we find these assumptions to be reasonable; however, they do contain some degree of conservatism. Based on contract experience reports provided by Milliman, payouts have been approximately 6 percent higher than the WAT (compared to the bias load for university contracts of 10 percent) and participants have started utilizing their contracts slightly earlier than the utilization assumption. Because the investment return assumption is lower than the tuition increase assumption, assuming a delay in utilization produces higher liabilities than earlier commencement of benefits.

Payouts for community college contracts have been about 12 percent higher than if the WAT had been used based on experience through 2010. In addition, the Community College WAT specific to prePAID enrollment is approximately 1.5 percent greater than the overall WAT calculated using Undergraduate Headcount for 2010-2011. We recommend that the VA529 consider adding a small Bias Load to the Community College contracts to account for beneficiaries attending higher priced Community Colleges compared to all students enrolled in Community Colleges in Virginia. The Community College contracts make up a small portion of the liability, so a Bias Load on those contracts would not materially impact the overall results.

Forfeiture Assumptions

Currently, there is a very low rate of assumed forfeitures prior to matriculation and commencement of tuition benefits. The forfeiture rates would result in less than 2 percent of contracts being cancelled. This compares with a complete contract cancellation rate of approximately 10 percent based on a distribution analysis provided by Milliman. There have been consistent gains over the past five years due to “other” sources, which would include gains from forfeitures. We recommend that the VA529 and Milliman further review recent forfeiture experience for consistently higher rates over the current assumption and consider increasing the forfeiture assumption to better align with observed experience. The current assumption provides additional conservatism. If higher forfeiture rates were implemented, there would be a slight decrease in liabilities because the value of a forfeiture benefit is less than the value of tuition benefits. The impact would be minimal.

Administrative Expenses

Administrative fee revenue was approximately $35.2 million and administrative expenses were approximately $16.6 million per year in FY 2012 for all of the Virginia College Savings Plan Programs (including the defined contribution plans). Excess administrative fees over expenses increased the reserve of prePAID. Assumed maintenance expenses of $55.37 per contract and annual distribution costs per contract of $13.84 are included in the present value of future obligations for prePAID. This produces projected expenses of approximately $4.1 million for fiscal year 2013 for prePAID.

Because the administrative fees and expenses are for all VA529 programs combined, we are unable to ascertain the reasonableness of the expense assumption for only the prePAID.

DEMOGRAPHIC ACTUARIAL ASSUMPTIONS

We recommend that the VA529 and Milliman provide additional disclosure on the development of the expense assumption in the valuation report so that the reasonableness of the expense assumption for only the prePAID can be ascertained during future audits.

SECTION H

ACTUARIAL SOUNDNESS VALUATION METHODS

ACTUARIAL SOUNDNESS VALUATION METHODS

The common practice by actuaries who conduct valuations of prepaid tuition programs is to determine the present value of obligations for future tuition payments and administrative expenses under a "deterministic" valuation approach, under which the liabilities are projected based on a specific set of variables and assumptions (i.e., one investment return assumption, one inflation assumption and one tuition increase assumption, etc.) In effect, the purpose of a deterministic valuation is to develop expected results. However, only if actual future experience duplicates the underlying variables will the liabilities of the plan be exactly as determined.

Because the probability of one set of assumptions being exactly realized is rather low, Milliman utilized a "stochastic" projection (sometimes called a Monte Carlo simulation) in order to simulate multiple sequences of outcomes so that a range of results was obtained. This method resulted in a distribution of possible outcomes, which reflects the uncertainty and volatility of the real world. Instead of using assumptions that specifically represent future outcomes, stochastic projections use parameters that characterize the conditions underlying future events.

Based on Milliman's stochastic analysis, they determined that the amount of assets necessary to have a 50 percent probability of meeting all program obligations, including administrative expenses, associated with contracts issued as of June 30, 2012, is $2,175 million. The actual prePAID fund balance as of June 30, 2012, was $2,249.5 million, which results in the prePAID being 103.4 percent funded as of June 30, 2012.

We find the use of a stochastic valuation approach by Milliman to determine the present value of obligations for future tuition payments and administrative expenses, as compared to a deterministic valuation approach, to be an appropriate valuation methodology for the purpose for which it is used. In fact, it is a robust methodology and has the potential to provide more information than a deterministic approach.

Milliman also prepared a cash flow projection based on a set of deterministic assumptions that produce the same Present Value of Obligations for Future Payments as the "best estimate" actuarial assumptions used in their Monte Carlo simulations. They concluded that at the end of the 2037 Fiscal Year all tuition obligations associated with contracts already purchased are expected to have been paid resulting in a final cumulative surplus of $359.8 million. We find the deterministic approach to the cash flow projections found in the valuation report to be reasonable.

SECTION I

ACTUARIAL LIABILITY TEST LIFE REVIEW

ACTUARIAL LIABILITY TEST LIFE REVIEW

GRS reviewed and replicated the liabilities for 10 test lives in order to assess that the liabilities were being calculated consistently with the contract holder census data provided and the actuarial assumptions and methods as disclosed in the actuarial soundness report as of June 30, 2012, and a deterministic investment return assumption of 6.75 percent.

Test Life	Number of Contract Years (Community College/University)	PV Obligations Milliman	PV Obligations GRS	Difference	PV Future Installment Payments Milliman	PV Future Installment Payments GRS	Difference
1	0 CC/2.7281 Univ	27,001.11	27,097.19	0.36%	-	-	
2	0 CC/4 Univ	39,315.14	39,526.40	0.54%	-	-	
3	0 CC/4 Univ	47,799.78	47,958.14	0.33%	28,834.82	28,937.05	0.35%
4	0 CC/2.3343 Univ	23,381.77	23,640.52	1.11%	-	-	
5	1 CC/0 Univ	5,742.35	5,731.57	-0.19%	5,629.03	5,752.20	2.19%
6	0 CC/2 Univ	20,465.21	20,537.04	0.35%	-	-	
7	0 CC/1 Univ	12,914.16	12,939.30	0.19%	12,045.13	12,160.96	0.96%
8	2 CC/2 Univ	34,433.14	32,878.32	-4.52%	16,149.63	16,238.81	0.55%
9	2 CC/0 Univ	9,486.54	9,485.77	-0.01%	-	-	
10	0 CC/5 Univ	58,107.54	58,290.50	0.31%	1,075.30	753.18	-29.96%

GRS was able to independently replicate the present value of future obligations payable from the prePAID within about 1 percent for all of the test lives for which the contract holder purchased only either community college or university years and within 5 percent for the test life for which the contract holder purchased a combination contract that included both community college and university years.

GRS was able to independently replicate the present value of future installment contract payments within 2 percent for four out of the five test lives with remaining payments. There was a larger difference for the fifth test life with remaining payments. Based on the data provided, a partial payment was remaining. GRS based the present value of future installment contract payments on the partial payment, whereas Milliman bases the present value on the rounded number of remaining payments. For example, if there were 1.7 remaining installment contract payments, Milliman would round the remaining number of payments up to two and slightly overstate the present value of future installment payments. If there were 1.2 remaining payments, Milliman would round down to one remaining payments and slightly understate the present value of future installment payments. This issue impacts approximately 6,900 contracts that have remaining payments that include a fractional amount. We recommend that Milliman review its methodology for calculating the present value of future installment contract payments that include fractional amounts to ensure the correct expected amount is being valued.

GRS was able to replicate the present value of installment contract receivables for all contracts based on the full contract holder census file within 1.5 percent, assuming a discount rate of 6.75 percent. Therefore, we do not believe that the refinement for fractional remaining payments would have a material impact on the valuation results.

ACTUARIAL LIABILITY TEST LIFE REVIEW

We consider replicating results within 2 percent a close match which indicates that liabilities and contract receivables are being valued consistently with the actuarial assumptions and underlying contract holder census data. GRS was not able to as closely replicate results for the combination contract test life. However, combination contracts comprise less than 5 percent of current contract holders. Therefore, we do not expect that the larger difference would have a material impact on overall results.

SECTION J

ACTUARIAL REPORT CONTENT, DETAIL, FORMAT AND CLARITY

ACTUARIAL REPORT CONTENT, DETAIL, FORMAT AND CLARITY

Actuarial Standards of Practice

Because no generally accepted standards of practice have evolved within the actuarial profession that specifically address prepaid tuition programs, we have referenced the ASOPs that are used for retirement systems. We chose such standards because prepaid tuition programs, like retirement plans, generally provide for the payment of a well defined benefit at a future date.

ASOP No. 4

ASOP No. 4, Measuring Pension Obligations and Determining Pension Plan Costs, provides guidance for measuring pension obligations and communicating the results. The Standard lists specific elements to be included, either directly or by references to prior communication, in pension actuarial communications. The pertinent items that should be included in actuarial valuation report on a pension plan should include:

- The name of the person or firm retaining the actuary and the purposes that the communication is intended to serve.
- A statement as to the effective date of the calculations, the date as of which the participant and financial information were compiled, and the sources and adequacy of such information.
- An outline of the benefits being discussed or valued and of any significant benefits not included in the actuarial determinations.
- A summary of the participant information, separated into significant categories such as active, retired, and terminated with future benefits payable. Actuaries are encouraged to include a detailed display of the characteristics of each category and reconciliation with prior reported data.
- A description of the actuarial assumptions, cost method and the asset valuation method used.
- Changes in assumptions and methods from those used in previous communications should be stated and their effects noted. If the actuary expects that the long-term trend of costs resulting from the continued use of present assumptions and methods would result in a significantly increased or decreased cost basis, this should also be communicated.
- A summary of asset information and derivation of the actuarial value of assets. Actuaries are encouraged to include an asset summary by category of investment and reconciliation with prior reported assets showing total contributions, benefits, investment return, and any other reconciliation items.
- A statement of the findings, conclusions, or recommendations necessary to satisfy the purpose of the communication and a summary of the actuarial determinations upon which these are based. The communication should include applicable actuarial information regarding financial reporting. Actuaries are encouraged to include derivation of the items underlying these actuarial determinations.
- A disclosure of any facts which, if not disclosed, might reasonably be expected to lead to an incomplete understanding of the communication.

ACTUARIAL REPORT CONTENT, DETAIL, FORMAT AND CLARITY

Findings and Recommendations

We have reviewed the June 30, 2012, actuarial soundness valuation report prepared by Milliman and generally find that the report is complete and contains the appropriate information. However, we have the following minor suggestions for modifications to the report that would allow it to adhere more closely with ASOP No. 4.

- The date as of which the participant and financial information were compiled could be identified more clearly in the text of the certification letter.
- The summary/outline of the benefits being discussed or valued could be expanded to be more robust, and an explicit statement regarding whether there are (or are not) any significant benefits not included in the actuarial determinations could be added.
- A reconciliation of the data with the prior reported data could be included.

As previously stated, Milliman utilized a "stochastic" projection (sometimes called a Monte Carlo simulation) in order to simulate multiple sequences of outcomes so that a range of results was obtained. This method resulted in a distribution of possible outcomes, which reflects the uncertainty and volatility of the real world. Instead of using assumptions that specifically represent future outcomes, stochastic projections use parameters that characterize the conditions underlying future events.

Based on Milliman's stochastic analysis, they determined and illustrated in their report the amount of assets necessary to have different percentage probabilities of meeting all program obligations, including administrative expenses based on capital market assumptions, adjusted to result in a median return of 6.75 percent, as set by the Virginia College Savings Plan. For example, Milliman indicates that the amount of assets necessary to have a 50 percent probability of meeting all program obligations, including administrative expenses, associated with contracts issued as of June 30, 2012, is $2,175 million. In a similar manner, they indicate that the amount of assets necessary to have a 59 percent probability of meeting all program obligations, including administrative expenses, associated with contracts issued as of June 30, 2012, is $2,249.5 million, which is the actual prePAID fund balance as of June 30, 2012.

The Board may consider also reviewing results based on the unadjusted capital market assumptions in order to assess the probability of the current assets meeting all program obligations.

In addition, we find it more common when presenting stochastic results, that the 5^{th}, 25^{th}, 50^{th}, 75^{th}, and 95^{th} percentiles are shown. Consideration may be given to showing the hypothetical asset values associated with these probabilities.

SECTION K

REASONABLENESS OF ACTUARIAL REPORT CONCLUSIONS

REASONABLENESS OF ACTUARIAL REPORT CONCLUSIONS

The basic conclusions presented in the June 30, 2012, actuarial soundness valuation report prepared by Milliman for the Program include the following:

- Milliman indicates that the main purpose of the June 30, 2012, actuarial soundness valuation of the Program is to calculate the actuarial present value of the obligations under the prepaid tuition contracts purchased through June 30, 2012, and compare the value of those obligations with the assets in the Program as of that date.
    - We find that this is the appropriate main purpose of the soundness valuation.

- Milliman concluded that the phrase "actuarially sound," when applied to the Program means that the Fund has sufficient assets (including the value of future installment payments due under current contracts) to cover the actuarially estimated value of the tuition obligations under those contracts (including any administrative costs associated with those contracts).
    - We agree with this conclusion.

- Milliman concluded that actuarial liabilities of the program should be evaluated using sound actuarial principles that are generally consistent with the practices and principles widely used for retirement programs. They based this conclusion on the fact that no generally accepted standards of practice have evolved within the actuarial profession specifically addressing prepaid tuition programs and they chose the standards applicable to retirement programs because such programs generally provide for payments at some future date where that payment has a high probability of payment at, or close to, some specific age.
    - We agree with this conclusion.

- Milliman concluded that based on the results of the June 30, 2012, actuarial soundness valuation, the Program had assets that exceed the "best estimate" of the obligations by roughly $74.2 million or 3.4 percent.
    - Based on our analysis, we believe this conclusion is reasonable.

- Milliman concluded that the amount of assets necessary to have a 50 percent probability of meeting all program obligations, including administrative expenses, associated with contracts issued as of June 30, 2012, is $2,175 million. The actual prePAID fund balance as of June 30, 2012, was $2,249.5 million, which results in the prePAID being 103.4 percent funded as of June 30, 2012.
    - Based on our analysis, we believe this conclusion is reasonable.

- Milliman prepared a cash flow projection based on a set of deterministic assumptions that produce the same Present Value of Obligations for Future Payments as the "best estimate" actuarial assumptions used in their Monte Carlo simulations. They concluded that at the end of the 2037 Fiscal Year all tuition obligations associated with contracts already purchased are expected to have been paid resulting in a final cumulative surplus of $359.8 million.
    - Based on our analysis, we believe this conclusion is reasonable.

REASONABLENESS OF ACTUARIAL REPORT CONCLUSIONS

Based on our review, we find that the conclusions included in the Milliman June 30, 2012, actuarial valuation report are generally reasonable, and that Milliman used reasonable assumptions, and complied with actuarial guidelines.

SECTION L

ACTUARIAL PRINCIPLES AND PRACTICES EMPLOYED BY ACTUARY

ACTUARIAL PRINCIPLES AND PRACTICES EMPLOYED BY ACTUARY

Actuarial Standards of Practice

Because no generally accepted standards of practice have evolved within the actuarial profession that specifically address prepaid tuition programs, we have referenced the ASOPs that are used for retirement systems for purposes of conducting this 2013 Quadrennial Actuarial Audit of the prePAID. We chose such standards because prepaid tuition programs, like retirement plans, generally provide for the payment of a benefit at a future date. These include the following Actuarial Standards of Practice:

- ASOP No. 4, *Measuring Pension Obligations and Determining Pension Plan Costs or Contributions;*
- ASOP No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*;
- ASOP No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*; and
- ASOP No. 44, *Selection and Use of Asset Valuation Methods for Pension Valuations*.

In general, we find that Milliman followed the appropriate ASOPs that are the most applicable for a prepaid tuition program.

SECTION M

REASONABLENESS OF PRICING FOR ACTUARIALLY SOUND FUNDING

REASONABLENESS OF PRICING FOR ACTUARIALLY SOUND PRICING

Reasonableness of Pricing for Actuarially Sound Pricing

GRS performed a brief review of the 2012 pricing analysis performed by Milliman. Based on Milliman's analysis, an average load of 10 percent between university and community college plans is included in order to increase the actuarial reserve of the program. The average load for community college contracts is approximately 2 percent compared with 10 percent for university contracts.

We compared the estimated present value of obligations contained in the pricing against the present value of obligations for one year contracts from the test life output for the applicable matriculation year. We were able to match the sample amounts within 1 percent and therefore believe that the comparison of the price against the present value of obligations is appropriate for the one year contract.

We recommend that Milliman provide additional disclosure on the pricing including:

- Any additional expenses or adjustments included in the pricing for installment payments; and
- The assumed distribution of the 3,000 expected contracts sold by age and contract type in the development of the 10 percent load

The additional disclosure will provide further transparency and allow for the reasonable replication of pricing.

Based on the current funding level (over 100 percent) and the average load of 10 percent on contract prices to increase the actuarial reserve of the program, we believe the pricing methodology is actuarially sound.