New Mexico Educational Retirement Board

Limited Scope Audit of the June 30, 2013
Actuarial Valuation

Segal Consulting

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June 5, 2014

Board of Trustees
New Mexico Educational Retirement Board
P.O. Box 26129
Santa Fe, NM 87502-0129

Re: **Limited Scope Audit of the June 30, 2013 Actuarial Valuation for the New Mexico Educational Retirement Board**

Ladies and Gentlemen:

We are pleased to present the results of Segal's audit of the June 30, 2013 actuarial valuation for the New Mexico Educational Retirement Board (ERB). The purpose of this audit is to conduct a review of the actuarial methods, assumptions, and procedures employed by the ERB and the Board's actuary Gabriel Roeder Smith & Company (GRS). This audit includes the following:

1. ***Report review*** **–** a review of the valuation report and results and an opinion on whether the report is comprehensive and complies with relevant actuarial standards.

2. ***Methods and assumptions review*** – an analysis and benchmarking of the actuarial assumptions and a review of the actuarial methods (including the actuarial cost method and actuarial asset method) utilized in determining the funded status and accrued liability as of June 30, 2013 for compliance with generally accepted actuarial principles.

3. ***Test lives and data review*** **–** discussion of the procedures used to validate the participant data and the test lives selected, with a detailed review of the findings.

This review was conducted under the supervision of Kim Nicholl, a Fellow of the Society of Actuaries, a member of the American Academy of Actuaries, and an Enrolled Actuary under ERISA, and Matthew Strom, a Fellow of the Society of Actuaries, a member of the American Academy of Actuaries, and an Enrolled Actuary under ERISA. This review was conducted in accordance with the standards of practice prescribed by the Actuarial Standards Board.

The assistance of the ERB staff and GRS is gratefully acknowledged.

We appreciate the opportunity to serve as an independent actuarial advisor for the ERB and we are available to answer any questions you may have on this report.

Sincerely,

Kim Nicholl, FSA, MAAA, EA
Senior Vice President and Actuary

Matthew A. Strom, FSA, MAAA, EA
Consulting Actuary

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Table of Contents

Executive Summary

The New Mexico Educational Retirement Board (ERB) Board of Trustees retained Segal Consulting (Segal) to conduct an independent review of the ERB's current actuarial calculations, assumptions and methods. The main objectives for this engagement were as follows:

1. Determine if the actuarial methods, considerations and analyses used by GRS in preparing the June 30, 2013, valuation are technically sound and conform to the appropriate Standards of Practice, as promulgated by the Actuarial Standards Board;
2. Review and analyze the calculation results, including an evaluation of the data used for reasonableness and consistency; as well as a review of the mathematical calculations for completeness and accuracy;
3. Verify that all appropriate benefits have been valued and valued accurately, and that the data provided by the ERB is consistent with the data used by GRS;
4. Evaluate the actuarial cost method and the actuarial asset valuation method in use and whether other methods would be more appropriate for the ERB;
5. Verify the reasonableness of the calculation of the unfunded actuarial accrued liability and the amortization period used under the traditional entry age normal methodology;
6. Review the demographic and economic actuarial assumption for consistency, reasonableness and compatibility;
7. Provide an opinion as to whether the June 30, 2013, valuation report is comprehensive and conforms to the appropriate Standards of Practice, as promulgated by the Actuarial Standards Board.

The objective of a **limited scope audit** (actuarial review) of any system is to provide validation that the liabilities and costs of the System are reasonable and being calculated as intended. This audit is not a full replication of the actuarial valuation results, but rather is a review of the key components in the valuation process that encompass the derivation of the liabilities and costs for the System. These key components are the data, the benefits valued, the actuarial assumptions and funding method used, and the asset valuation method employed. The valuation report and the valuation output for a select group of test lives provide the detail necessary to validate each of these key components.

We reviewed all information supplied to us by the ERB. We also requested and reviewed additional information provided by GRS. Finally, we considered the reasonableness of the actuarial assumptions and methods in the context of our own experience, and those of other state and local pension systems.

Executive Summary

In summary, we found the following:

1. GRS is processing the data files provided to them by the ERB in a reasonable and accurate manner;

2. In our opinion, the June 30, 2013, valuation report is comprehensive and conforms to the appropriate Standards of Practice, as promulgated by the Actuarial Standards Board;

3. The economic assumptions are within norms for the peer group, with the investment return right in the middle of the peer group range;

4. Certain of the demographic actuarial assumptions should be reviewed in detail as part of the next experience review, particularly the methodology used for setting the post-retirement mortality assumption;

5. The asset valuation method is being applied correctly and in our opinion, the five-year smoothing method used to develop the actuarial value of assets is reasonable and meets actuarial standards; and

6. In general, benefits valued for selected test lives are consistent with those stated in the actuarial valuation report, and we believe the results of the June 30, 2013, actuarial valuation are substantially accurate. However, there are a few calculations that we recommend be reviewed and modified to more accurately value the plan's liabilities.

These items and recommendations are described in more detail throughout this report.

Conclusions

This audit validates the findings of the June 30, 2013, actuarial valuation. We believe the stated methods and assumptions were properly employed in determining the cost of the ERB.

The data appears complete and with a cursory analysis of the information supplied by the ERB staff, we were able to closely match the participant counts reported by GRS. For the most part, we were able to match test life results within an acceptable degree of accuracy. In general, the items identified in Section II of this report (regarding sample life verification) are minor relative to the total liability of the plan and do not have a significant impact on plan costs. All parameters and methods appear appropriate and consistent with generally accepted actuarial practices as promulgated in the various Actuarial Standards of Practice applicable to the ERB.

Finally, we offer ideas to improve the quality and understanding of the valuation report. Several suggestions and recommendations are made throughout this document. We would classify them as either: a) "presentation" suggestions to enhance the valuation process or report; b) something to be examined during the next experience review; and c) something that may affect the cost of the plan. Where we make a comment in this regard in this report, we have identified the location in the margin with the following icons:

Enhancement to valuation process or report

Examine during next experience review

May affect the cost of the plan

Section I: Purpose, Scope and Methodology of the Audit

Purpose of the Audit

The Board of Trustees retained Segal to conduct an independent review of the ERB's current actuarial calculations, assumptions and methodology. The Board requested an assessment of the validity of the data used in the valuation, a review of the appropriateness of the current funding method and procedures, an evaluation of both economic and non-economic assumptions, a test of the valuation results, and a review of the actuarial report to determine if there is consistency in the presentation of the actuarial results and whether they are consistent with professional standards.

Scope of the Audit

This actuarial audit has a specified, limited scope in its review. A full scope audit would include performing the June 30, 2013, actuarial valuation from start to finish, in essence, a parallel valuation. This limited scope audit reviews the valuation already performed, through reviewing the benefits, assumptions, and methods, without a full replication of the actuarial valuation results. This review is conducted by analyzing detailed output of certain selected test lives from the membership group.

By not performing a full parallel valuation, the following assumptions are made:

1. The current actuary's valuation system is accurately applying each assumption consistent with the test life review; and

2. The valuation system is adding together liabilities appropriately for each decrement (retirement, turnover, disability, and death), for each member, and over the entire population (meaning no participant group is being "dropped off" and no particular liabilities are being omitted).

What a limited scope audit can provide is:

1. Assurance that appropriate benefits are being valued;

2. Confirmation that the valuation system is accurately applying decrements to the test lives;

3. Confirmation that the program is valuing benefits as described in the valuation report and consistent with applicable statutes;

4. A measurement of economic actuarial assumptions against a peer group and hence an assessment of their reasonableness;

5. A review of the reasonableness of actuarial funding and asset valuation methods;

6. An indication as to whether the liabilities and contribution rates shown are reasonable and correctly calculated; and

7. An assessment of whether the valuation appropriately reflects information required to be disclosed under required reporting standards (GASB, etc.).

Methodology of the Audit for the 2013 Actuarial Valuation

The purpose of this audit is to express an opinion regarding the reasonableness and accuracy of the actuarial assumptions, methods, valuation results, and contribution rates. The limited scope review is not the same as an actuarial valuation, but represents a "second opinion" of the findings and processes included in the valuation.

The measurement of the reasonableness of the funding levels encompasses three key analyses:

1. A verification of the benefits being projected for future payment;

2. A verification of the appropriateness of the actuarial assumptions that are used in calculating the liability; and

3. A verification of the appropriateness of the funding and asset valuation methods.

Benefits Analysis

Critical to projecting future benefits is receiving complete and accurate data. We reviewed the process by which data is prepared for the actuarial valuation, including:

1. An assessment of the completeness of the data; and

2. A review of the data screening process employed.

We developed computer models that generated test life output, which enabled us to compare our test life results with GRS's results. These models also allowed us to confirm that the GRS valuation projects benefits in a manner consistent with the Plan Provisions summary in the valuation report, and that the summary is consistent with New Mexico Statutes that govern the ERB. For purposes of this study, we regard differences of less than 3% to be acceptable for the Total Present Value of Benefits (PVB) and 5% to be acceptable for the review of census data.

Assumptions Analysis

The second critical component in assessing the reasonableness of the funding levels is in the selection and the application of the actuarial assumptions. With respect to the assumptions, we;

1. Reviewed the Actuarial Experience Study report dated April 26, 2013, which covered the six-year period ending June 30, 2012;

2. Benchmarked the economic assumptions against a survey of state and local employee retirement systems; and

3. Examined individual test life calculations.

Methods Analysis

The third component in assessing funding levels is the selection and application of the actuarial cost method (including the method for amortizing the unfunded actuarial accrued liability) and the asset valuation method (including smoothing techniques).

Data Used in the Valuation

We independently obtained data files directly from the ERB and GRS. With minimal data scrubbing, we found that the counts for the active and retired files were relatively close, and well within the 5% threshold we established for determining materiality of differences.

All data for actives, inactives, annuitants and beneficiaries was provided as of the valuation date (June 30, 2013). In situations where there is missing or invalid data, the GRS valuation software applies adjustments to the data records for completeness. These adjustments, as communicated to us when the data was provided and as summarized in the actuarial valuation report and experience study report, appear reasonable and within standard practices for handling census data. Given the large size of the data, this shortens the amount of staff time spent on data reconciliation (for both GRS and the ERB) without sacrificing any material accuracy in the valuation results. We would, however, recommend GRS include an upper limit on the number of records they adjust for missing data, if not done so already.

The table that follows summarizes our determination of key data elements as compared to those shown in the valuation report.

June 30, 2013 Analysis of Participant Data ($ in millions)					
Active Members		**Number**	**Total Annualized Payroll**	**Average Age**	**Average Service**
Tier 1	Segal	47,291	$2,078.1	48.9	12.4
	GRS	47,259	$2,076.8	49.2	12.4
	% Difference	**0.1%**	**0.1%**	**-0.1%**	**0.0%**
Tier 2	Segal	13,920	$426.3	39.4	1.5
	GRS	13,918	$440.1	39.4	1.5
	% Difference	**0.0%**	**-3.1%**	**0.0%**	**0.0%**
Inactive Members		**Number**			
Vested	Segal	9,814			
	GRS	8,615			
	% Difference	**13.9%**			
Nonvested	Segal	25,490			
	GRS	25,482			
	% Difference	**0.0%**			
In-Pay Members		**Number**	**Annual Benefits**		
Retirees	Segal	35,390	$771.5		
	GRS	36,614	$804.4		
	% Difference	**-3.3%**	**-4.1%**		
Disabled	Segal	815	$8.2		
	GRS	814	$8.2		
	% Difference	**0.1%**	**0.0%**		
Beneficiaries	Segal	2,882	$42.1		
	GRS	2,882	$42.1		
	% Difference	**0.0%**	**0.0%**		

GRS includes inactive vested members who are immediately eligible to retire in the retiree counts rather than the inactive vested counts, which accounts for the differences in participant counts and annual benefits for these two groups. We were able to match other information reported by GRS to within 5% with minimal data scrubbing. We recognize that GRS spends a considerable amount of time reconciling the data. We believe their process is sound, and are not concerned with the differences in the table above.

Valuation Report

While the accuracy of the actuarial valuation is the primary focus of an actuarial review, the content and presentation of the actuarial valuation results to a layperson and professional are also important. Our report recommendations are to provide clarity to the existing report. Based on our review of the actuarial valuation report, we offer the following comments:

1. On Table 1 (page 9), considering adding a line to display funded percentage.

2. Expand the description of item number 8 – Service (page 30) to reflect that allowed service credit may be purchased for some in-state circumstances as well as for service with commissioned corps of the Public Health Service and non-USERRA military service.

3. Item number 9 – Tier (page 30) should be clarified to reflect that only members who repaid their refund to the ERB prior to June 30, 2013, could rejoin their previous tier.

4. Consider modifying the description of item number 11b – Normal Retirement, Monthly Benefit (page 31) so that the sentence regarding Tier 3 members who receive an actuarially reduced benefit is moved to the Early Retirement section.

5. Regarding the descriptions under item number 17 – Optional Forms of Payment (page 33), we reviewed the conversion factors used by the ERB and did not find the calculation to provide any subsidy.

6. Modify the description of cost-of-living increases (page 37) to indicate that increases do not begin until age 67 for members hired after July 1, 2013.

7. Modify the description of contribution accumulation (page 37) to clarify that the 5.5% contribution increase assumption is applied to the past only and that actual contribution rates are applied in the future.

8. Modify the description of the termination assumption (page 42) to reflect that the assumption format is only service-based (not select and ultimate and not based on age).

9. Consider incorporating information related to GASB financial reporting into the actuarial valuation report, rather than issuing as a standalone report.

Projected Benefits in the Valuation

We requested specific test lives in order to compare the benefit amounts projected in the valuation against our understanding of the ERB benefits summarized in the valuation report as well as Chapter 22, Article 11 of the New Mexico Statutes Annotated that govern the ERB. We reproduced the benefits payable and the present value of future benefits for 10 active members (six from Tier 1 and four from Tier 2), four deferred vested members, two nonvested inactive members, two beneficiaries, three disability retirees, and five healthy retirees to verify their accuracy. We did not run a "parallel" valuation, which is beyond the scope of this audit. We reviewed in detail the calculations for these test lives to determine whether GRS correctly projected plan benefits and whether the costs and liabilities were determined in accordance with the actuary's stated methods and assumptions.

Based on our review of the individual test life calculations, we have the following observations and/or recommendations:

1. Deferred vested participants are assumed to commence benefits at the earliest age they are eligible for unreduced benefits. Since deferred vested participants are eligible for early retirement benefits calculated with reduction factors that are not based on true actuarial equivalence, we recommend valuing the benefit, including any early retirement subsidies, by assuming that benefits commence at the participant's earliest retirement age. Of the four deferred vested sample lives we reviewed in our study, one had an early retirement age prior to the commencement age assumed in the valuation. When valuing her liabilities assuming a commencement age at her earliest retirement age, the present value of benefits increased by 17.4%.

2. With the passage of SB 115, actual COLA increases will average closer to 1.6% until the funded percentage improves to 90%, and will average approximately 1.8% until the funded ratio achieves 100%. GRS maintained the COLA increase assumption at 2% per year, and intends to recognize the lower actual COLA increases as actuarial experience gains each year as they emerge. This systematic overstatement of the COLA results in a higher actuarial accrued liability and understates the funded percentage of the ERB. We recognize that COLAs that are tied to the future funded status of the plan are problematic to value. Some possible alternatives that maintain a level of conservatism, but also recognize the reduced value of the COLA in the actuarial accrued liability are: 1) use a select and ultimate approach (1.6% assumption for a fixed number of years, and 2% thereafter), or 2) value retired liabilities with a 1.6% COLA and non-retired lives assuming a 2% COLA.

3. Liabilities are calculated based on the assumption that single life annuities will be elected by all participants upon retirement from active, vested or disabled status. Since reductions for the available optional forms of payment are actuarially equivalent, this has little effect on the ERB's liabilities. However, the payment form assumption does affect the timing of projected cash flows to future retired participants and their spouses. If cash

flow projections are ever a concern, this assumption should be changed to include appropriate optional form elections.

4. Liabilities are valued using middle-of-year decrements, benefit amounts and interest, but beginning-of-year early retirement factors, where applicable. When valuing liabilities associated with early retirement from active status, applying mid-year early retirement factors would be consistent with the decrement timing assumption. We also recommend that GRS review that early retirement factors are calculated consistently among all actives of the same tier at projected valuation ages. For example, two active test lives eligible for reduced retirement benefits at age 55 were valued with different early retirement factors – one with a factor applicable to age 55 ("Active 2") and the other with a factor applicable to age 56 ("Active 5").

5. When valuing the return of contributions option for the mortality and refunds decrements, the projected account balance is calculated as a mid-year value. However, the return of contributions option for the turnover decrement is calculated as a beginning-of-year value, understating the value of turnover liabilities. We recommend using mid-year benefits for all decrements.

6. We were unable to match the projected salary increases for one of the active test lives ("Active 7") and recommend that GRS review that projected salary increases are applied consistently among all active members as described in the report.

7. Allowed Service Credit does not apply towards meeting retirement eligibility under one of the age and service options. Separate fields exist in the data for Allowed Service Credit and Earned Service Credit. None of the active test lives we examined had Allowed Service Credit. GRS should verify that their program does not include Allowed Service Credit when determining retirement eligibility under the age and service options.

The test life comparison exhibits on the following pages summarize the calculations performed by Segal and GRS and show the differences by each decrement in the present value of benefits (PVB), as well as the ratio of Segal's result to GRS's results. We regard differences of less than 3% to be acceptable for the total PVB and in most cases, we matched results well within this 3% range. Therefore, we believe the liabilities of the ERB are being valued consistently with the description of plan provisions, actuarial assumptions, and actuarial methods stated in GRS's valuation report.

GRS also provided a closed group projection of benefit payments for the active and inactive population as of June 30, 2013. We calculated the present value of the projected benefit stream and the result was within 0.06% of the total PVB reported on page 11 of the valuation report.

June 30, 2013 Valuation

Active Test Life Comparison

Active Members	Active 1 – Tier 2 GRS	Active 1 – Tier 2 Segal	Active 2 – Tier 1 GRS	Active 2 – Tier 1 Segal	Active 3 – Tier 1 GRS	Active 3 – Tier 1 Segal
Present Value of Benefits						
Retirement	$673,481	$670,780	$13,124	$12,842	$11,151	$11,177
Withdrawal	64,146	61,790	2,720	2,716	2,215	2,216
Disability	15,512	15,710	409	402	223	228
Death	6,624	7,028	326	347	155	166
Refunds	0	0	2,117	2,146	1,769	1,796
Total PVB	$759,763	$755,308	$18,696	$18,453	$15,514	$15,583
Ratio of Segal/GRS		99.4%		98.7%		100.4%

Active Members	Active 4 – Tier 2 GRS	Active 4 – Tier 2 Segal	Active 5 – Tier 1 GRS	Active 5 – Tier 1 Segal	Active 6 – Tier 1 GRS	Active 6 – Tier 1 Segal
Present Value of Benefits						
Retirement	$5,052	$5,004	$220,754	$218,699	$128,364	$128,308
Withdrawal	679	679	12,915	12,440	15,550	15,017
Disability	121	123	3,260	3,315	145	153
Death	58	89	2,319	2,437	1,705	1,875
Refunds	579	587	0	0		
Total PVB	$6,489	$6,482	$239,247	$236,891	$145,763	$145,353
Ratio of Segal/GRS		99.9%		99.0%		99.7%

June 30, 2013 Valuation

Active Test Life Comparison

	Active 7 – Tier 2[1]		Active 8 – Tier 1	
Active Members	**GRS**	**Segal**	**GRS**	**Segal**
Present Value of Benefits				
Retirement	$18,895	$17,754	$44,269	$43,995
Withdrawal	3,814	3,135	3,607	3,458
Disability	455	433	2	3
Death	250	321	268	303
Refunds	1,770	2,117	1,476	1,502
Total PVB	$25,184	$23,760	$49,622	$49,261
Ratio of Segal/GRS		94.3%		99.3%

	Active 9 – Tier 1		Active 10 – Tier 2	
Active Members	**GRS**	**Segal**	**GRS**	**Segal**
Present Value of Benefits				
Retirement	$499,524	$500,862	$33,337	$33,098
Withdrawal	0	0	0	0
Disability	4,024	4,262	0	0
Death	2,269	2,463	20	0
Refunds	0	0	4,002	4,064
Total PVB	$505,817	$507,587	$37,359	$37,162
Ratio of Segal/GRS		100.3%		99.5%

[1] We were unable to match the salary projection for this participant based on his service at the valuation date and the salary increase assumptions described in the valuation report.

June 30, 2013 Valuation

Inactive Test Life Comparison

	Deferred Vested 1		Deferred Vested 2		Deferred Vested 3	
Inactive Members	**GRS**	**Segal**	**GRS**	**Segal**	**GRS**	**Segal**
Present Value of Benefits						
Pension		$7,511		$79,290		$22,486
Death		282		521		372
Total PVB	$7,940	$7,794	$81,344	$79,811	$23,046	$22,858
Ratio of Segal/GRS		98.2%		98.1%		99.2%

	Deferred Vested 4		Nonvested 1		Nonvested 2	
Inactive Members	**GRS**	**Segal**	**GRS**	**Segal**	**GRS**	**Segal**
Present Value of Benefits						
Pension		$5,569				
Death		204				
Total PVB	$5,828	$5,772	$10,938	$10,878	$5,377	$5,377
Ratio of Segal/GRS		99.0%		99.5%		100.0%

June 30, 2013 Valuation

Annuitant Test Life Comparison

	Retiree 1		Retiree 2		Retiree 3	
In Pay Status Members	**GRS**	**Segal**	**GRS**	**Segal**	**GRS**	**Segal**
Present Value of Benefits	$211,711	$209,887	$778,325	$766,393	$618,182	$617,787
Ratio of Segal/GRS		99.1%		98.5%		99.9%

	Retiree 4		Retiree 5		Disabled 1	
In Pay Status Members	**GRS**	**Segal**	**GRS**	**Segal**	**GRS**	**Segal**
Present Value of Benefits	$409,854	$413,643	$220,263	$221,473	$170,976	$172,049
Ratio of Segal/GRS		100.9%		100.5%		100.6%

	Disabled 2		Disabled 3		Beneficiary 1	
In Pay Status Members	**GRS**	**Segal**	**GRS**	**Segal**	**GRS**	**Segal**
Present Value of Benefits	$116,281	$115,977	$45,599	$46,504	$278,949	$279,923
Ratio of Segal/GRS		99.7%		102.0%		100.3%

	Beneficiary 2	
In Pay Status Members	**GRS**	**Segal**
Present Value of Benefits	$90,699	$91,414
Ratio of Segal/GRS		100.8%

Section III: Analysis of Actuarial Assumptions Employed

As part of our analysis, we have reviewed the principal assumptions used in the actuarial valuation report for the valuation as of June 30, 2013, for consistency, reasonableness and compatibility. For this purpose, we have reviewed the 2012 Experience Study report, and have also compared the current set of economic assumptions to those used by a peer group of 126 systems covering state and local employees, the Public Fund Survey published by the National Association of State Retirement Administrators.

Inflation: The underlying price inflation assumption of 3.00% is towards the middle of the range of 2.75% to 3.50% (based on valuations primarily covering fiscal years ending in 2012 and 2013). However, it should be noted that the U.S. Federal Reserve formally targets long-term inflation of 2%, so this assumption should be monitored in future experience studies to identify how the Federal Open Market Committee's policy decisions are actually working to achieve this goal.

Investment Return: The ERB's 7.75% assumption, when compared to the peer group, is also towards the middle of the range of 7.00% to 8.50%. The assumption for real rate of return (4.75%) is in the 60th percentile of the peer group, but is within reason.

In testing the real rate of return assumption for reasonableness, we used Segal Rogerscasey's capital market assumptions and the ERB's current target asset allocation policy. The Segal Rogerscasey assumptions are based on a 15-year horizon and include an adjustment for investment market cyclicality. Based on this information, we calculated the median real rate of return to be 5.48%.

The real rate of return for the portfolio is reduced to account for expenses. Since the ERB investment return assumption is net of administrative and investment expenses, the 5.48% is reduced by GRS's estimated expense provision of 45 basis points. The result is a median real rate of return, net of all expenses, of 5.03%. We believe the 4.75% real rate of return assumption provides ample margin for adverse experience, and adequate cushion if actual inflation does, in fact, run less than the 3.00% assumption in the future.

Overall, the 7.75% assumption appears reasonable for the ERB.

Salary Scale: For all members, the salary scale assumption is comprised of a promotional component ranging from 0.50% to 8.75% applicable to members with less than ten years of service and a real wage inflation rate of 4.25% (reflecting 3.00% salary inflation and 1.25% productivity increases). The investment return and salary progression assumptions are internally consistent, and seem reasonable for the purpose of the actuarial valuation.

In addition, the relevant section of the experience study report includes commentary on the compensation structure in place for New Mexico teachers and reasons why certain adjustments were made to the look back period of actual pay increases when analyzing salary increase data. We highlight this as an example of a best practice approach for researching and knowing the limitations of the available data when conducting an experience review.

Mortality: The mortality rates assumed for healthy annuitants and beneficiaries are based on 90% of the RP-2000 Combined Mortality Table with White Collar Adjustment, projected with Scale AA to 2014, sex-distinct, with a one-year setback for females. The assumed mortality rates for active members are based on non-standard tables. Mortality rates for disabled annuitants are based on the 1981 Disability Table, adjusted by 90% for females. The illustrative rates shown in the report are consistent with the underlying tables, with adjustments as described.

The actuary's guide for determining the reasonableness of demographic assumptions is Actuarial Standard of Practice (ASOP) No. 35. The following is an excerpt from this ASOP that provides guidance on setting the mortality assumptions. Note that the ASOP quoted below was modified in September 2010 and is applicable for actuarial valuations with measurement dates on or after June 30, 2011.

Excerpt from ASOP 35, Section 3.5.3 – Mortality and Mortality Improvement Assumptions:

The actuary should consider the effect of mortality improvement both prior to and subsequent to the measurement date. With regard to mortality improvement, the actuary should do the following:

i. adjust mortality rates to reflect mortality improvement prior to the measurement date. For example, if the actuary starts with a published mortality table, the mortality rates may need to be adjusted to reflect mortality improvement from the effective date of the table to the measurement date. Such an adjustment is not necessary if, in the actuary's professional judgment, the published mortality table reflects expected mortality rates as of the measurement date.

ii. include an assumption as to expected mortality improvement after the measurement date. This assumption should be disclosed in accordance with section 4.1.1, even if the actuary concludes that an assumption of zero future improvement is reasonable as described in section 3.1. Note that the existence of uncertainty about the occurrence or magnitude of future mortality improvement does not by itself mean that an assumption of zero future improvement is a reasonable assumption.

The valuation report states that the current mortality assumption for nondisabled annuitants was chosen so that the assumed mortality rates are smaller than the rates observed during the six-year period ending June 30, 2012, with a ratio of 111% actual to expected deaths for males and 107% for females. The report also states that no mortality improvement assumption was made for disabled retirees or active members. We believe this is an adequate margin to be in compliance with the revised ASOP standard. Alternatively, mortality tables with no margin in the valuation year, but with generational improvement applied in the future also satisfy the ASOP requirement.

We do wish to point out an alternative (and probable improvement in methodology) that could be considered in the future. Rather than perform the actual versus expected analysis using headcounts (i.e., the number of retirees that died), another approach is to perform the analysis on a benefits-weighted basis. This methodology takes into account the correlation, if any, between the health of the annuitants and their benefit size.

<u>Disability Rates</u>: Age-based, sex-distinct disability rates are applied only to eligible members (those with at least 10 years of service). For disabilities that occur after vesting but before eligibility for a disability benefit, a deferred vested benefit is payable. We did notice that the rates of disability did tend to be higher for the ERB members, particularly for ages below age 55, compared to other teacher systems that we

work with. For example, the average disability rate for a female age 45 from four recent valuation reports is 0.08%, compared to the ERB assumption of 0.16%.

Retirement Rates: The valuation employs retirement rates from first eligibility to age 70. Since this plan covers educators and staff, the 100% retirement age of 70 is reasonable and consistent with other statewide teacher plans that we work with. GRS made reasonable adjustments to retirement rates to create a retirement assumption for Tier 3 members, given that no actual retirement data for these members exist.

Turnover Rates: GRS has used a sex-distinct service-based table for separation from active service that applies to all members. We agree that this simple, service only approach is often the most appropriate format for the turnover rate assumption. In fact, at many of the ages (particularly after the first five years of service), the rates for males and females are similar enough that experience could be aggregated when evaluating and setting this assumption in future studies.

Overall, the economic and demographic actuarial assumptions adopted by the ERB are reasonable and consistent with generally accepted actuarial standards and practices contained in Actuarial Standard of Practice No. 27 covering economic assumptions and Actuarial Standard of Practice No. 35 covering demographic and non-economic assumptions.

Funding Method for Liabilities

The funding method employed is the entry age normal (EAN) actuarial cost method and is the same method used by more than three-quarters of the plans in the Public Funds Survey. The description of the method stated in the report is sufficient. We would point out, however, that the language describing the "Individual Entry Age Normal" cost method on page 30 of the Experience Study report is misusing the term "individual" within the context of the paragraph and should be modified for future reports. In any event, we find the current method to be reasonable.

Asset Valuation Method

The June 30, 2013, actuarial valuation uses an "actuarial" value of assets for purposes of establishing the required employer contributions. The current method smoothes investment gains and losses for each fiscal year by recognizing these gains and losses evenly over a five-year period. This method does not impose a corridor, which would place a limit on the spread between actuarial value of assets (AVA) and market value of assets (MVA).

An essential part of the public sector budgeting process is that material budget items, including pension contributions, should have a level cost pattern from year to year to the extent possible. Segal recognizes the importance of this requirement and assists clients in establishing reasonable methodologies for recognizing investment gains and losses and limiting the potential volatility that may result in increased contributions due to investment results.

The actuary's guide for determining the reasonableness of an asset smoothing method is ASOP No. 44. The following is an excerpt from this ASOP that establishes the qualities a reasonable asset smoothing method must exhibit.

From the Actuarial Standard of Practice No. 44

3.3 Selecting Methods Other Than Market Value -- If the considerations in section 3.2 have led the actuary to conclude that an asset valuation method other than market value may be appropriate, the actuary should select an asset valuation method that is designed to produce actuarial values of assets that bear a reasonable relationship to the corresponding market values. The qualities of such an asset valuation method include the following:

- *a. The asset valuation method is likely to produce actuarial values of assets that are sometimes greater than and sometimes less than the corresponding market values.*
- *b. The asset valuation method is likely to produce actuarial values of assets that, in the actuary's professional judgment, satisfy both of the following:*
    - *1. The asset values fall within a reasonable range around the corresponding market values.*

For example, there might be a corridor centered at market value, outside of which the actuarial value of assets may not fall, in order to assure that the difference from market value is not greater than the actuary deems reasonable.

2. *Any differences between the actuarial value of assets and the market value are recognized within a reasonable period of time. For example, the actuary might use a method where the actuarial value of assets converges toward market value at a pace that the actuary deems reasonable, if the investment return assumption is realized in future periods.*

In lieu of satisfying both (1) and (2) above, an asset valuation method could satisfy section 3.3(b) if, in the actuary's professional judgment, the asset valuation method either (i) produces values within a sufficiently narrow range around market value or (ii) recognizes differences from market value in a sufficiently short period.

Two key principles arise from ASOP 44. These are that acceptable asset smoothing must create asset values that fall within a reasonable range around market value and are recognized in a reasonable period of time. In lieu of satisfying both of these principles, a smoothing method could satisfy the requirements if, in the actuary's professional judgment, the range around market value is sufficiently narrow or the differences are recognized in a sufficiently short period.

Segal has established an internal policy, which is consistent with others in the actuarial community, that five years is a sufficiently short period to constitute a reasonable asset smoothing method even if no corridor is used. Therefore, it is our opinion that the method utilized by the ERB is reasonable.

Funding Policy Contribution

The funding policy set by the Board of Trustees provides that the period for amortizing the unfunded actuarial accrued liability should not extend beyond June 30, 2042 (30 years from June 30, 2012). This type of closed period amortization provides a contribution schedule that, if actual experience is reasonably close to expected, will amortize the existing unfunded liability over time. We believe this funding policy is sufficient and provides a reasonable benchmark for which to compare employer statutory contribution rates.

Section V: Conclusions and Recommendations

This limited scope audit reviewed the data used, the benefits valued, and the actuarial methods and assumptions employed in the June 30, 2013, actuarial valuation. The test lives provided by the actuary reflect the plan provisions of the ERB as stated in the 2013 actuarial valuation report. These test lives also demonstrate the application of the actuarial assumptions to the benefits as stated in the valuation report. The actuarial assumptions, methods, and procedures are reasonable and reflect the benefit promises made to the ERB members. All parameters and methods appear consistent with Actuarial Standards of Practice.

Below we summarize our recommendations for your consideration:

A. Valuation Report

1. Consider adding the funded percentage measure to Table 1.

2. Modify certain descriptions (identified on page 9 of this report) to improve accuracy and/or clarity.

3. Consider incorporating GASB financial reporting information into the valuation report, rather than issuing a standalone report.

B. Projected Benefits

1. We recommend that the liabilities for participants with a deferred vested benefit be valued with any early retirement subsidies by assuming that benefits will commence at the earliest possible eligibility date.

2. Reflect (at least a portion of) the value of the lower COLA from SB 115 in the actuarial accrued liability.

3. Evaluate and address potential timing issues related to early retirement reduction factors under the retirement decrement and return of contributions benefits under the turnover decrement.

4. Ensure that projected salary increases are applied consistently among all active members.

5. Confirm that Allowed Service Credit is not included in the determination of retirement eligibility under the age and service option.

C. <u>Assumptions and Methods</u>

1. Monitor the inflation assumption in future actuarial investigations and compare to the U.S. Federal Reserve's formal long-term inflation target of 2%.

2. Study and evaluate post-retirement mortality experience on a benefits-weighted basis.

3. Carefully review the underlying disability incidence data when performing the next experience study analysis.

To reiterate our summary from Section 1, the plan's actuary appears to have reasonably valued the expected liability of the ERB. They have applied the methodology consistently and their report generally conforms to accepted actuarial principle and practices. In this report, we have noted areas that we believe will improve the usefulness and clarity of the ERB's annual actuarial valuation. We are available to discuss any aspect of our review with the ERB staff or the ERB's actuary.