Chapter One

AUDITOR GENERAL'S SUMMARY

REPORT CONCLUSIONS

On June 18, 2012, Public Act 097-0694 was signed into law which directed the Auditor General to contract with or hire an actuary to serve as the State Actuary. Cheiron was selected as the State Actuary. The Public Act directed the State Actuary to:

- Review assumptions and valuations prepared by actuaries retained by the boards of trustees of the State-funded retirement systems;
- Issue preliminary reports to the boards of trustees of the State-funded retirement systems concerning proposed certifications of required State contributions submitted to the State Actuary by those boards; and
- Identify recommended changes to actuarial assumptions that the boards must consider before finalizing their certifications of the required State contributions.

Cheiron reviewed the actuarial assumptions used in each of the five systems' actuarial valuations for the year ended June 30, 2015 and **concluded that they generally were reasonable. Cheiron did not recommend any changes to the assumptions used in the June 30, 2015 actuarial valuations.**

Cheiron made recommendations for additional disclosures for the 2015 valuations and recommended changes for future valuations. Recommendations included the following:

- The Boards should periodically retain the services of an independent actuary to conduct a full scope actuarial audit. Such an audit should fully replicate the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the System's actuary.
- Cheiron continues to recommend the Boards annually review the economic assumptions (interest rate and inflation) prior to commencing the valuation work and adjust assumptions accordingly.
- For three of the systems (TRS, SURS, and SERS), Cheiron recommends the Boards consider lowering the interest rate assumption next year and develop the rate taking into account the negative cash flow of the systems.

Cheiron verified the arithmetic calculations made by the systems' actuaries to develop the required State contribution and reviewed the assumptions on which the calculations were based.

The Illinois Pension Code requires that the systems' actuaries calculate the required State contribution using a prescribed funding method that achieves 90 percent funding in the year

2045. Cheiron concluded that **this funding method does not meet** generally acceptable actuarial principles because the systems are never targeted to be funded to 100 percent and the funding of the systems is significantly deferred into the future. **Cheiron recommended that the funding method be changed to at least fully fund future plan benefit accruals to avoid continued systematic underfunding of the systems.**

Based on the systems' 2015 actuarial valuation reports, the funded ratio of the systems ranged from 43.3 percent (SURS) to 16.0 percent (GARS), based on the actuarial value of assets as a ratio over the actuarial liability. Cheiron has concerns about the solvency of the systems if there is a significant market downturn. Cheiron recommended the systems include stress testing within the valuation reports. This would include a detailed explanation of the implications that volatile investment returns and other stressors (e.g., membership declines, lower salary growth) would have on the systems. This should include an analysis and discussion of the impact on the annual contribution requirement of the alternative scenarios tested.

INTRODUCTION AND BACKGROUND

On June 18, 2012, Public Act 097-0694 was signed into law which directed the Auditor General to contract with or hire an actuary to serve as the State Actuary. The Public Act amended the Illinois State Auditing Act as well as sections of the Illinois Pension Code for each of the five State-funded retirement systems. The five State-funded retirement systems are:

- The Teachers' Retirement System (TRS);
- The State Universities Retirement System (SURS);
- The State Employees' Retirement System (SERS);
- The Judges' Retirement System (JRS); and
- The General Assembly Retirement System (GARS).

Requirements of Public Act 097-0694

Public Act 097-0694 requires the State Actuary to conduct an annual review of the valuations prepared by the actuaries of the State-funded retirement systems. Specifically the Act requires the State Actuary to:

- Review assumptions and valuations prepared by actuaries retained by the boards of trustees of the State-funded retirement systems;
- Issue preliminary reports to the boards of trustees of the State-funded retirement systems concerning proposed certifications of required State contributions submitted to the State Actuary by those boards; and
- Identify recommended changes to actuarial assumptions that the boards must consider before finalizing their certifications of the required State contributions.

On or before November 1 of each year, beginning November 1, 2012, the boards of each of the systems must submit to the State Actuary a proposed certification of the amount of the required State contribution to the system for the next fiscal year, along with all of the actuarial assumptions, calculations, and data upon which that proposed certification is based.

On or before January 1, 2013, and each January 1 thereafter, the Auditor General shall submit a written report to the General Assembly and Governor documenting the initial assumptions and valuations prepared by actuaries retained by the boards of trustees of the State-funded retirement systems, any changes recommended by the State Actuary in the actuarial assumptions, and the responses of each board to the State Actuary's recommendations.

On or before January 15, 2013, and every January 15 thereafter, each Board shall certify to the Governor and the General Assembly the amount of the required State contribution for the next fiscal year. The Board's certification must note any deviations from the State Actuary's recommended changes, the reason or reasons for not following the State Actuary's recommended changes, and the fiscal impact of not following the State Actuary's recommended changes on the required State contribution.

Contracting with the State Actuary

On July 12, 2012, the Office of the Auditor General issued a Request for Proposals for the services of a State Actuary. On August 24, 2012, the contract was awarded to Cheiron. Cheiron is a full-service actuarial and consulting firm with offices in nine locations throughout the United States. Cheiron has experience working with multiple public pension plans around the country.

REVIEW OF THE ACTUARIAL ASSUMPTIONS

Cheiron reviewed each of the actuarial assumptions used in each of the five systems' actuarial valuations for the year ended June 30, 2015 and **concluded that they generally were reasonable. Cheiron did not recommend any changes to the assumptions used in the June 30, 2015 actuarial valuations.**

Cheiron did recommend additional disclosures for the 2015 valuations and also recommended changes for future valuations. The systems' responses to Cheiron's preliminary reports can be found in Appendix C of this report.

Exhibit 1-1 summarizes the recommendations made to the retirement systems. At the end of each of the reports located in Chapters Two through Six is a chart summarizing the status of recommendations made by the State Actuary in the 2014 report.

Exhibit 1-1
RECOMMENDATIONS TO THE RETIREMENT SYSTEMS

Recommendations	TRS	SURS	SERS	JRS	GARS
Recommended Changes to Actuarial Assumptions used in the 2015 Actuarial Valuations:					
Cheiron reviewed the actuarial assumptions and concluded that they were reasonable. Consequently, Cheiron did not have any recommended changes to assumptions this year.					
Recommended Additional Disclosures for the 2015 Actuarial Valuations:					
• Expand/include stress testing of the System within the valuation report	X		X	X	X
• Include the statutory State contribution development in the Executive Summary	X				
• Review the discount rate calculation regarding the treatment of future expenses	X				
Recommended Changes for Future Actuarial Valuations:					
• Annually review the economic assumptions (interest rate and inflation rate) and adjust assumptions accordingly	X	X	X	X	X
• Consider lowering the interest rate next year and develop the rate taking into account negative cash flow	X	X	X		
• Evaluate the implications of the one year delay in data used for the valuation to substantiate if it is immaterial	X				
• Include stress testing of the System within the valuation report		X			
• Regarding the wage inflation assumption, provide justification for the 1.0% productivity assumption		X			
• Request investment consultants provide longer term market expectations		X	X	X	X
• Consider the use of generational mortality improvement assumptions			X	X	X
• For the Boards of the three systems whose assets are commingled, consider whether different interest rate assumptions for these systems are appropriate			X	X	X
• Consider if additional revisions to demographic assumptions for Tier 2 members are appropriate			X		
• When the next experience study is performed, review the RP-2000 Annuitant and Non-Annuitant mortality tables to determine if such tables result in a better fit and thus more reasonably project anticipated future plan experience				X	X
• Regarding mortality improvement, disclose which projection scale is being utilized				X	X
• Review appropriateness of the wage inflation assumption				X	X
• Breakout the classification of “Other” activity further so that the resulting impact can be understood and reviewed for reasonableness					X
• Include an additional disclosure on how the 10% load on inactive vested liabilities was developed					X

Exhibit 1-1
RECOMMENDATIONS TO THE RETIREMENT SYSTEMS

Recommendations	TRS	SURS	SERS	JRS	GARS
Other Recommendations:					
• Periodically retain the services of an independent actuary to conduct a full scope actuarial audit in which the results of the valuation are fully replicated	X	X	X	X	X
• Change the funding method to at least fully fund future plan benefit accruals to avoid continued systematic underfunding of the system	X	X	X	X	X

Source: OAG summary of Cheiron's preliminary reports to the five State-funded retirement systems.

The following sections discuss some of the key assumptions and recommendations. Further details on the assumptions and recommendations, including those not discussed in this summary chapter, are contained in the State Actuary's preliminary reports for each of the five systems, found in Chapters Two through Six of this report.

Economic Assumptions

Cheiron reviewed the economic assumptions utilized in the actuarial valuations for each of the five State-funded retirement systems. The following sections discuss two of those assumptions – the interest rate assumption and the inflation assumption.

Interest Rate Assumption

The interest rate assumption (also called the investment return or discount rate) is the most impactful assumption affecting the required State contribution amount. This assumption is used to value liabilities for funding purposes. The retirement systems use varying interest rate assumptions. Exhibit 1-2 shows the interest rate assumptions for each of the five State-funded retirement systems. As can be seen in the exhibit, the interest rate assumption for each system was unchanged for this year's actuarial valuation. As it did in last year's report, Cheiron again recommended that the Boards annually review the economic assumptions (interest rate and inflation) prior to commencing the valuation work and adjust assumptions accordingly.

Exhibit 1-2
INTEREST RATE ASSUMPTIONS
FOR THE FIVE STATE-FUNDED RETIREMENT SYSTEMS
June 30, 2015 Valuation

System	Interest Rate	Notes
Teachers' Retirement System	7.50%	Lowered from 8.00% for the June 30, 2014 actuarial valuation
State Universities Retirement System	7.25%	Lowered from 7.75% for the June 30, 2014 actuarial valuation
State Employees' Retirement System	7.25%	Lowered from 7.75% for the June 30, 2014 actuarial valuation
Judges' Retirement System	7.00%	Lowered from 8.00% for the June 30, 2010 actuarial valuation
General Assembly Retirement System	7.00%	Lowered from 8.00% for the June 30, 2011 actuarial valuation

Source: Retirement system actuarial reports and experience studies.

After reviewing all of the materials that were made available, Cheiron concluded that the interest rate assumptions were reasonable. However, for three of the systems (TRS, SURS, and SERS), Cheiron recommended the Boards consider lowering the interest rate next year. Cheiron's recommendation was based on several factors, including some projected rates of return that were lower than the assumed rate of return.

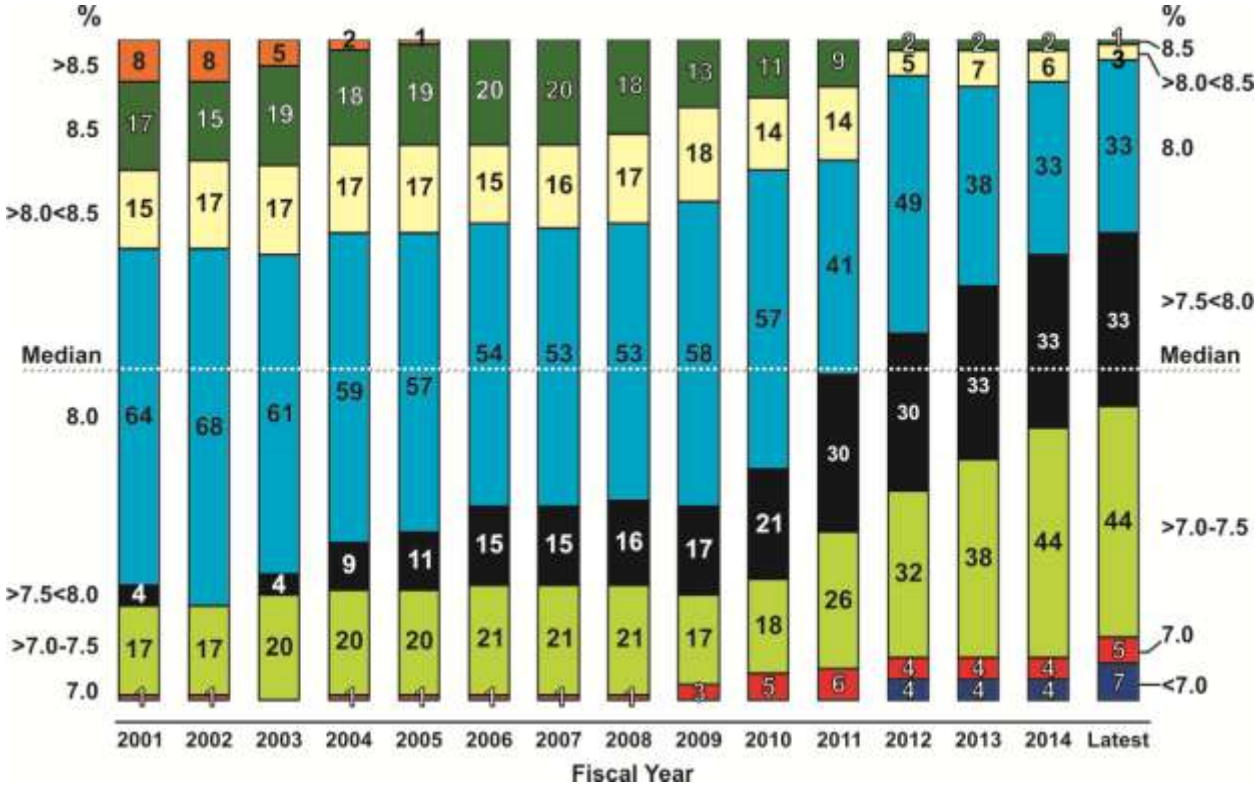
Another factor was that the systems are, or will be, experiencing negative cash flows which may impact the interest rate returns that are realized. Negative cash flow is measured as contributions less benefits and expenses. TRS, SURS, and GARS are experiencing negative cash flows while SERS and JRS are projected to begin having negative cash flows in the near future. Negative cash flows result in actuarial returns (i.e., "dollar weighted" returns) being less than "time weighted" returns, which is what investment consultants base their reported and projected returns. As a result, even if an investment consultant's expected long term return is, for example, 7.40 percent, it is expressed as a time weighted return figure. For plans with negative cash flows, we would expect the dollar weighted returns to be less. Cheiron recommended that the rate be developed taking into account the negative cash flows of the systems and the anticipated future interest rate environment.

Cheiron noted that there has been emerging actuarial practice throughout the country to reduce the discount rates even below the level that the investment consultants believe is achievable. This is because of the very low interest rate environment we are currently experiencing. The lower the interest rate environment, the greater the investment risk that must be taken to achieve an assumed rate of return.

Cheiron also discussed the nationwide movement among pension plans to lower the interest rate assumption. The National Association of State Retirement Administrators (NASRA) conducts the Public Fund Survey which is an online compendium of key characteristics covering 126 public pension plans. Exhibit 1-3 shows the change in the interest rate assumptions, since the inception of the Public Fund Survey in 2001, for 126 public pension plans.

Exhibit 1-3

CHANGE IN INTEREST RATE ASSUMPTIONS SINCE 2001
126 PENSION PLANS IN THE NATION'S LARGEST PUBLIC RETIREMENT SYSTEMS



Source: NASRA Public Fund Survey.

The exhibit shows the shift to lower interest rate assumptions. In 2001, 104 of the 126 plans (83%) used an interest rate assumption of 8.0 percent or higher. The most recent data shows that this number has dropped to only 37 of 126 plans (29%) that use an interest rate of 8.0 percent or higher. The median assumption has fallen below 8.0 percent. In addition, 12 plans have adopted a rate of 7.0 percent or lower.

Inflation Assumption

The inflation assumption primarily impacts the salary increase assumption. The five State-funded retirement systems use inflation assumptions ranging from 2.75 percent to 3.00 percent. Exhibit 1-4 shows the inflation assumptions for each of the five systems.

Exhibit 1-4
INFLATION ASSUMPTIONS
FOR THE FIVE STATE-FUNDED RETIREMENT SYSTEMS
June 30, 2015 Valuation

System	Inflation Rate	Notes
Teachers' Retirement System	3.00%	Lowered from 3.25% for the June 30, 2014 actuarial valuation
State Universities Retirement System	2.75%	Lowered from 3.75% for the June 30, 2011 actuarial valuation
State Employees' Retirement System	3.00%	Lowered from 3.50% for the June 30, 2002 actuarial valuation
Judges' Retirement System	3.00%	Lowered from 4.00% for the June 30, 2011 actuarial valuation
General Assembly Retirement System	3.00%	Lowered from 4.00% for the June 30, 2011 actuarial valuation

Source: Retirement system actuarial reports and experience studies.

Cheiron concluded that the inflation assumptions used by the five State-funded retirement systems were reasonable. Cheiron's rationale for concurring with the inflation assumptions included:

- The 2015 Old-Age, Survivors, and Disability Insurance Trustees Report projects that over the long-term (next 75 years) inflation will average somewhere between 2.0% and 3.4%.
- Cheiron's comparison of other public sector retirement systems' inflation assumptions as shown by a study published by the National Conference on Public Employee Retirement Systems (NCPERS). The study shows that the 3.0% assumption used by four of the five State-funded systems is a prevalent assumption while the 2.75% assumption, which SURS uses, is on the lower end of inflation assumptions. The average rate amongst the 179 systems who responded to the study was 3.2%.

Demographic Assumptions

The retirement systems utilize a number of demographic assumptions such as mortality rates, disability rates, and termination rates. Cheiron reviewed the demographic assumptions and concluded that they were reasonable. Cheiron did, however, make recommendations for future valuations concerning various demographic assumptions.

Cheiron made recommendations involving the mortality assumptions for three of the systems. Cheiron recommended SERS, JRS, and GARS consider the use of generational mortality assumptions in future valuations. Also for JRS and GARS, when the next experience study is performed, the system actuaries should review the RP-2000 Annuitant and Non-Annuitant mortality tables to determine if such tables result in a better fit and thus more reasonably project anticipated future plan experience.

As it did last year, Cheiron included additional analysis in its reports on each of the five systems. Cheiron collected data from past valuation reports dating back to 2009 and presented a historical review of past demographic and salary increase experience gains and losses. Results were presented in a chart which showed the pattern of annual gains and losses attributable to different sources. These charts can be found in Chapters Two through Six. Different measures were used for each system depending on the information available but sources used included:

- Active and retiree mortality;
- Disability;
- New entrants;
- Benefit recipients;
- Salary increases;
- Retirement; and
- Terminations.

An examination of these trends can be used to determine if adjustments need to be made to assumptions or if additional disclosures need to be made in the actuarial valuation reports. As shown previously, Exhibit 1-1 summarizes the recommendations made for the various retirement systems. Additional details on the demographic assumptions examined can be found in the chapters for each of the five State-funded retirement systems.

PROPOSED CERTIFICATION OF REQUIRED STATE CONTRIBUTION

As required by Public Act 097-0694, each of the five State-funded retirement systems submitted to the State Actuary a proposed certification of the amount of the required State contribution for that system. **Cheiron verified the arithmetic calculations made by the systems' actuaries to develop the required State contribution and reviewed the assumptions on which the calculations were based.** Exhibit 1-5 shows the amounts of proposed State contributions submitted by the systems for Fiscal Year 2017.

Exhibit 1-5
AMOUNTS OF STATUTORILY REQUIRED STATE CONTRIBUTIONS

System	State Contribution (for Fiscal Year 2017)
Teachers' Retirement System	$ 3,986,583,351
State Universities Retirement System	1,671,426,000
State Employees' Retirement System	2,014,461,000
Judges' Retirement System	131,334,000
General Assembly Retirement System	21,721,000
Total	**$7,825,525,351**

Source: 2015 retirement system actuarial valuation reports.

Cheiron noted that, in accordance with 30 ILCS 5/2-8.1, its review does not include a replication of the actuarial valuation results. Given the size of the Plans (TRS, SURS, and SERS), the Plans' low funded ratios, the recent changes in legal requirements, and guidance issued by the Government Finance Officers Association, **Cheiron recommended that the**

Boards periodically undertake a full scope actuarial audit, utilizing the services of a reviewing actuary. Such an audit should fully replicate the original actuarial valuation, based on the same census data, assumptions, and actuarial methods used by the Plans' actuaries. A replication audit will uncover any potential problems in the processing and certification of valuation results.

ACTUARIAL METHODS

Actuarial methods consist of three components: (1) the funding method, which is the attribution of total costs to past, current, and future years; (2) the method of calculating the actuarial value of assets (i.e., asset smoothing); and (3) the amortization basis of the Unfunded Actuarial Liability (UAL). The amortization basis is discussed under the State Mandated Funding Method in the next section.

Funding Method

All of the five State-funded retirement systems use the Projected Unit Credit (PUC) cost method to assign costs to years of service. This method is required under the Illinois Pension Code. Cheiron had no objection to using the PUC cost method as it is an acceptable method that is used by other public sector pension funds. However, Cheiron would prefer the Entry Age Normal (EAN) funding method as it is more consistent with the Pension Code's requirement for level percent of pay funding.

Under the PUC method, the benefits of active participants are calculated based on their compensation projected with assumed annual increases to ages at which they are assumed to leave the active workforce by any of these causes: retirement, disability, turnover, or death. Only past service (through the valuation date but not beyond) is taken into account in calculating these benefits. The cost of providing benefits based on past service and future compensation is the actuarial accrued liability for a given active participant. Under the PUC cost method, the value of an active participant's benefits tends to increase more sharply over their later years of service than over their earlier ones.

As a result of this pattern of benefit values increasing, while the PUC method is not an unreasonable method, more plans use the EAN funding method to mitigate this effect. It should also be noted that the EAN method is the required method to calculate liability for the Governmental Accounting Standards Board Statements 67 and 68.

Asset Smoothing Method

The actuarial value of assets for the systems is a smoothed market value. Unanticipated changes in market value are recognized over five years in the actuarial value of assets. The primary purpose for smoothing out gains and losses over multiple years is that the fluctuations in the actuarial value of assets will be less volatile over time than fluctuations in the market value of assets. Cheiron concurred with the use of the asset smoothing method noting that smoothing the market gains and losses over a period of five years to determine the actuarial value of assets is a generally accepted approach in determining actuarial cost.

Another aspect of asset smoothing methods is whether or not to limit the maximum spread between the actuarial value of assets and the market value of assets. Many public sector pension plans limit the actuarial value of assets to be in any year no more than 120% of market value, or no less than 80% of market value. In fact, the Internal Revenue Service Code 26 U.S.C. §430(g)(3)(B)(iii) mandates this "corridor" for private sector pension plans (a 90%-110% corridor is mandated). Even though it is not mandated for public plans, Cheiron believes that the use of this type of corridor is a sounder actuarial practice, and according to ASOP No. 44 in Section 3.3 b. 1, the actuarial value of assets should "...fall within a reasonable range around the corresponding market values."

In past reports, Cheiron recommended that the Boards consider moving to this approach in future valuations. However, since the Boards do not have the authority to create such a corridor, Cheiron did not repeat the recommendation in this year's reports.

STATE MANDATED FUNDING METHOD

The Illinois Pension Code requires that the systems' actuaries base the required contribution using a prescribed funding method that achieves 90 percent funding in the year 2045. In the actuarial valuation reports, the systems' actuaries discuss their concerns with this funding method.

- TRS and its actuary have been critical of the statutory funding method. In TRS' June 30, 2015 Actuarial Valuation Report, TRS' actuary comments that the statutory funding method does not meet Actuarial Standards of Practice. With support of the TRS Board, TRS' actuary reports on an alternative funding method that they consider representative of generally accepted actuarial methods and refers to this method as Actuarial Math 2.0. This method uses the Entry Age Normal method and amortizes the unfunded liability over 20 years. Cheiron concurred with TRS' actuary's recommendations and demonstration of an alternative funding approach and agreed that it conforms to a goal of full funding within a reasonable time period and is in accordance with generally accepted actuarial practices.

- In SURS' June 30, 2015 Actuarial Valuation Report, SURS' actuary comments that the Statutory funding policy defers funding for these benefits into the future and places a higher burden on future generations of taxpayers. They recommend a funding policy which would contribute the normal cost plus a closed 29 year amortization of the unfunded accrued liability as a level percentage of capped payroll.

- In the actuarial valuations for SERS, GARS, and JRS, the actuary advises "strengthening the current statutory funding policy" and provides the following examples:

    - Increasing the 90 percent funding target;

    - Reducing the projection period needed to reach 90 percent funding;

- Separating the financing of benefits for members hired before and after December 31, 2010; and

- Changing to an Actuarial Determined Contribution based funding approach with an appropriate amortization policy for each respective tiered benefit structure.

Cheiron concluded that the Pension Code funding method does not meet generally acceptable actuarial principles because the systems are not targeted to be funded to 100 percent and the funding of the System is significantly deferred into the future. Continuing the practice of underfunding future accruals increases the risk of the systems becoming unsustainable.

Based on the systems' 2015 actuarial valuation reports, the funded ratio of the systems ranged from 43.3 percent (SURS) to 16.0 percent (GARS) based on the actuarial value of assets as a ratio to the actuarial liability. Cheiron has concerns about the solvency of the systems if there is a significant market downturn.

Cheiron recommended stress testing be done or be expanded to demonstrate the likelihood there will be sufficient assets to pay benefits if there is a significant market downturn. The stress testing should be included within the valuation report and include a detailed explanation of the implications that volatile investment returns and other stressors (e.g., membership declines, lower salary growth) would have on the systems. This should include an analysis and discussion of the impact on the annual contribution requirement of the alternative scenarios tested.

RESPONSES TO THE RECOMMENDATIONS

Each of the five State-funded retirement systems provided responses to Cheiron's recommendations contained in the preliminary reports. The systems generally agreed with Cheiron's recommendations. The complete responses are in Appendix C.