

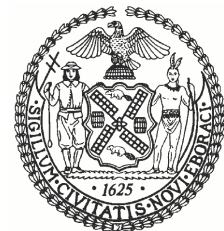
December 5, 2011

City of New York
New York City Retirement Systems
Final Administrative Review Report
Second Engagement



Prepared By:

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December 5, 2011

The Honorable John C. Liu
Comptroller of the City of New York
The Office of the Comptroller - City of New York
One Centre Street
New York, New York 10007

Re: Administrative Review of the New York City Retirement Systems (“NYCRS”)

Dear Comptroller Liu:

Hay Group is pleased to submit this Administrative Review Report, which is a key deliverable under our second biennial engagement to serve as Independent Actuary under Section 96 of the New York City Charter. This report covers our review of:

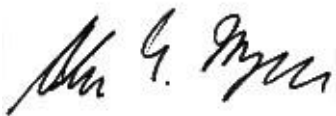
- The processes, procedures, systems and database tools used to collect and manage the data used by the NYCRS and the City of New York Office of the Actuary (“OA”) for actuarial purposes;
- Each Retirement System’s recordkeeping practice and database; and
- The implementation status of recommendations resulting from previous Administrative Reviews.

In general, we believe:

- The valuation data processes and procedures used by the NYCRS, in conjunction with those utilized by the OA, are structured to produce member data that is of sufficient quality and appropriateness to be suitable for use by the OA in performing the City’s actuarial valuations. Such data is also suitable for actuarial experience studies.
- The benefit calculation processes in place at the NYCRS, in conjunction with the certification process used by the OA, are structured to produce accurate benefit calculations for retiring members.
- The technology, recordkeeping practices and databases used by the NYCRS and the OA have improved overall since the last Administrative Review, and planned computer system upgrades will provide even more process improvement.

Please do not hesitate to contact us if you have any questions relating to this report.

Respectfully submitted,



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Introduction

The Office of the Comptroller, on behalf of the City of New York (the “City”), retained Hay Group to perform a range of actuarial audit and related review services. These services relate to the five actuarially-funded City retirement systems (collectively, the “Systems”) which provide benefits to the employees of the City and various City agencies.

The five Systems are:

- New York City Employees’ Retirement System (“NYCERS”)
- Teachers’ Retirement System of the City of New York (“TRS”)
- Board of Education Retirement System of the City of New York (“BERS”)
- New York City Police Pension Fund (“POLICE”)
- New York City Fire Department Pension Fund (“FIRE”)

The contract covers two consecutive engagements covering two biennial periods. Each engagement includes the following for each of the five Systems:

1. Experience Study
2. Audit of Employer Pension Contribution Calculations
3. Administrative Review
4. Independent Actuary’s Statement

This is the Administrative Review Report, and is a key deliverable under the second engagement. This report covers Hay Group’s review of:

- The processes, procedures, systems and database tools used to collect and manage the data used by the Systems and the City of New York Office of the Actuary (“OA”) for actuarial purposes;
- Each System’s recordkeeping practice and database; and
- The implementation status of recommendations resulting from previous Administrative Reviews.

Hay Group’s investigation could not have proceeded as smoothly as it did without the cooperation of the OA and the Systems, who generously gave us as much time as we needed to gather the information we needed to perform the Review. The individuals who assisted us in this endeavor are listed in Appendix A. We are grateful to them.

Executive Summary

Based on the project methodology outlined below, Hay Group has completed its investigations under the second engagement of the Administrative Review. It is important to note that Hay Group's first engagement Administrative Review report was finalized in April, 2010. Thus, because so little time has elapsed since the conclusion of the first engagement, many findings in this report are similar to the those noted in the first engagement report.

The following are our general conclusions:

- The valuation data processes and procedures used by each of the Systems, in conjunction with those utilized by the OA, are structured to produce member data that is of sufficient quality and appropriateness to be suitable for use by the OA in performing the City's actuarial valuations. Such data is also suitable for actuarial experience studies.
- The benefit calculation processes in place at each of the Systems, in conjunction with the certification process used by the OA, are structured to produce accurate benefit calculations for retiring members.
- The technology, recordkeeping practices and databases used by the Systems and the OA have improved overall since the Administrative Review prepared by the prior auditor, and planned computer system upgrades at FIRE, BERS and NYCERS will provide even more process improvements.

The member data that is maintained by the Systems and used by the OA is an important component of the valuation process for each System and the payment of correct member benefits. For each task undertaken by the OA for which member data is needed, the data must be appropriate for the task, and must be of the highest possible quality. Data should be handled in as efficient a manner as possible, and the data should be secured to maintain confidentiality and avoid accidental loss. Two important subsets of efficient data handling are: (i) use of technology that allows for efficient data manipulation and transmission, and (ii) an adequate number of staff members (both at each System and the OA) that are trained in the data process. This Administrative Review focused on all of these issues.

Although Hay Group conducted this Administrative Review using internally developed methods, a key portion of our deliverable (as noted above) is to understand the recommendations in previous Administrative Reviews, and provide an update on the status of actions taken with respect to those recommendations. Therefore, as part of our process we reviewed previous Administrative Reviews, including the most recent Review performed by The Segal Company ("Segal") dated November 30, 2006. In addition to Segal's own recommendations, that Review (the "Segal Review") included a summary of the status of all prior Administrative Review recommendations.

The OA and the Systems have made significant progress towards improving the data handling process for both funding valuations and benefit calculations since the Segal Review was conducted. Much of this progress stems from upgrading the technology used in the process. Still, there are areas that can and

should be addressed to further improve the process. These items are detailed in the sections of this report that follow.

Highlights of our findings include:

- Communications between the OA and the Systems have improved. The OA holds an annual meeting with each System to begin the valuation data collection process, and all Systems report that they have a clear understanding of the data requirements as a result of these meetings. Since our first engagement Administrative Review, the OA has added additional meetings with the Systems to the annual valuation process to maintain better control of the timing of the data collection process.
- The Pension Payroll Management System (“PPMS”) for providing pensioner data is now operational for all Systems, and has greatly enhanced the efficiency of this data collection process.
- The OA has migrated away from its historical cumbersome method of data processing, in favor of a more modern, efficient process. However, this new process is an interim solution pending the implementation of a new data system, which is expected to further enhance efficiency.
- POLICE has implemented the Comprehensive Officer Pension System (“COPS”), which is a new database and benefit calculation system that has automated many data processing and benefit calculation functions which were previously performed manually.
- The OA and the Systems take various approaches to protecting member data and disaster recovery, and most could take steps to make improvements in these areas.

SUMMARY OF KEY ISSUES

In the Sections of this Report which follow, we present issues within the scope of this Administrative Review that we believe should be addressed by the Systems and the OA, and our recommendations for resolving them. Each System and the OA are discussed in separate Sections, and issues with corresponding recommendations are numbered sequentially within each Section. Below, we list a brief summary of each issue and recommendation, numbered as they appear in each Section. Please refer to the Sections for more detail on the issues.

NYCERS

1. The valuation data process can be improved. We recommend that NYCERS: (a) be the single source of the data; (b) work with the OA to ensure that the updated computer system can provide the data elements needed by the OA for the valuation; (c) flag data changes for the OA so that the OA does not need to question the changes when performing their data analysis; and, (d) provide the OA with a year-over-year data reconciliation as a validity check of the data.
2. Data issues found in the annual data process which are not easily resolved are deferred for resolution until the following valuation. We believe that these issues should be resolved in the year in which they are identified.
3. There are ongoing valuation data issues with respect to member service and members with multiple member numbers. There are already plans to resolve these data issues, and they should be completed as soon as possible.

4. There is no specific documentation of NYCERS' process to provide active member data to the OA. NYCERS should document its active member data process in writing.
5. NYCERS does not supply Increased Take-Home Pay ("ITHP") and required employee contribution data to the OA for the valuation. When NYCERS' computer system is upgraded, this data should be included in the database and provided to the OA.
6. When NYCERS members buy back service, it causes unexpected differences in the service year-over-year in data provided to the OA. NYCERS should include a notation on the active member data provided to the OA, indicating that members have bought back service, and showing the amount of service bought back.
7. NYCERS provides certain data to the OA containing inconsistencies or omissions. NYCERS should check these items prior to sending the data to the OA and proactively correct the errors and omissions.
8. Sending paper files to the OA for benefit certification purposes is inefficient and poses a data security risk. These files should be sent electronically to the OA via a secure link.
9. NYCERS' benefit calculation process is not fully documented. NYCERS should prepare and maintain a written manual that documents the process.
10. When sending retiree payroll data to PPMS, NYCERS does not identify retirees whose pension benefits have not been finalized due to labor contract negotiations that have not been settled. NYCERS should flag this information for the OA.
11. NYCERS transfers active member data to the OA on compact disc. This is both inefficient and a data security risk. As indicated above, a secure electronic link should be established between NYCERS and the OA for the purpose of transmitting member data.
12. NYCERS instituted a pilot program to cross-train staff members across various functions. This initiative should be continued.
13. NYCERS learns of pensioner deaths by direct notification from the beneficiary, and from Social Security death sweeps. NYCERS should investigate more comprehensive methods of checking for pensioner deaths.

TRS

1. Some active member data, such as from CUNY and Charter Schools, are entered into the TRS database manually. TRS should explore secure electronic methods of receiving this data and entering it into the TRS database.
2. Historically, Charter School data has not been delivered to the OA on a timely basis for the valuation. TRS and the Charter Schools should determine ways to deliver this data earlier.
3. As TRS updates and improves active member data on their database, it does not flag data changes, which leads the OA to question the changes. TRS should provide data change indicators in the data they send to the OA, so that the OA will not need to question them.

4. TRS provides a valuation data reconciliation to the OA, but reconciles from its own prior year data to the current year. Reconciling from the OA's version of the prior year's TRS data would be more helpful to the OA.
5. TRS provided on-line benefit certification capability to the OA, but this is not utilized in all cases. TRS and the OA should work on extending this efficient procedure to all benefit certifications.
6. TRS transfers active member data to the OA on compact disc. This is both inefficient and a data security risk. A secure electronic link should be established between TRS and the OA for the purpose of transmitting member data.
7. Data security can be improved. Please see below for some general comments on data security.
8. Some of TRS' technology may no longer be supported by vendors or may become obsolete. TRS should evaluate its technology and make updates if appropriate.
9. There is no formal succession plan in place at TRS. TRS should identify which positions require a formal succession plan, establish a succession plan and then implement it.

BERS

1. There is no specific documentation of BERS' process to provide active member data to the OA. BERS should document its active data process in writing.
2. BERS does not supply ITHP and required employee contribution data to the OA for the valuation. The OA and BERS should determine whether this data is reliable, and if so, the data should be provided to the OA. When BERS' computer system is upgraded, this data should be included in the database and provided to the OA.
3. BERS does not provide a year-over-year data reconciliation to the OA to help in the valuation data process. BERS should provide a data reconciliation to the OA.
4. BERS does not supply full-time employees' service and part-time employees' hours to the OA for the valuation. The OA and BERS should work together to validate this data, and if valid, it should be provided to the OA.
5. Sending paper files to the OA for benefit certification purposes is inefficient and poses a data security risk. These files should be sent to the OA electronically via a secure link.
6. BERS' benefit calculation process is not fully documented. BERS should prepare and maintain a written manual that documents the process.
7. The transfer of member account balances to TRS and other Systems is typically delayed because the process must be initiated by the member. This should be resolved legislatively.
8. BERS should place an indicator in PPMS if a member's benefit has not been finalized.
9. The active valuation data process depends too heavily on the involvement of Prudential. BERS should complete the effort to replace the Prudential data system. The OA should be consulted on the data elements to be included in the new system, and should be given access to the new system for benefit certification purposes. An outside vendor should be engaged to provide data back-ups and business continuity protection services.

10. BERS transfers active member data to the OA on compact disc. This is both inefficient and a data security risk. As mentioned above, a secure electronic link should be established between BERS and the OA for the purpose of transmitting member data.
11. Data security can be improved. Please see below for general comments regarding data security.

POLICE

1. The active member valuation data provided to the OA is of high quality, but there is an ongoing accuracy issue with respect to the service reported for a small number of members. This accuracy issue should be resolved.
2. World Trade Center election data (whereby members registered with their System attest to their eligibility for presumptive line-of-duty disability or death benefits upon the onset of certain illnesses or upon death under certain conditions) resides in data files which are separate from COPS. World Trade Center data should include an indication of whether, and when, members reclassify their status to World Trade Center accidental disability. This data should reside in COPS.
3. POLICE does not provide a year-over-year data reconciliation to the OA to help in the valuation data process. POLICE should provide a reconciliation report to the OA.
4. Sending paper files to the OA for benefit certification purposes is inefficient and poses a data security risk. These files should be sent to the OA electronically via a secure link.
5. It continues to take a relatively long time from member initiation of the retirement process to finalization of the benefit. The POLICE and the OA should explore ways to reduce the time it takes to finalize benefits, including determining whether the OA needs to require certification of all benefits.
6. A large period of time elapses between separation from service and electing a benefit option, which could allow for anti-selection against the System. POLICE should establish a procedure whereby a member elects an option earlier in the process.
7. POLICE experienced a data security breach during the course of the first engagement Administrative Review. POLICE should share the findings of its investigation of the incident with the other Systems to help prevent similar incidents at all the Systems.
8. POLICE should continue to look for ways to streamline report creation by COPS.
9. Data security can be improved. Please see below for general comments regarding data security.
10. Tier 3 member data should be integrated into COPS.

FIRE

1. There is no specific documentation of FIRE's process to provide active member data to the OA. FIRE should document its data process for active members in writing.
2. World Trade Center election and buy-back service data reside in data files which are separate from FIRE's main database. These data items should reside in FIRE's main database. World Trade Center data should include an indication of whether, and when, members reclassify their status to World Trade Center accidental disability.

3. FIRE does not provide a year-over-year data reconciliation to the OA to help in the valuation data process. FIRE should provide a reconciliation report to the OA.
4. Sending paper files to the OA for benefit certification purposes is inefficient and poses a data security risk. These files should be sent to the OA electronically via a secure link.
5. Active member data is entered into FIRE's database manually, which increases the risk of errors. When FIRE implements a new data handling system, the system should ensure that data can be entered electronically.
6. Data used for preparing non-finalized benefit calculations must be printed out and stored on paper because the current data system cannot retain historical data. FIRE's new data system should be able to store historical data.
7. In the benefit calculation process, 3-year average salary is manually computed. We understand the new data system will contain salary history data and sufficient logic to do this computation for members appointed prior to July 1, 2000.
8. Reserve transfer calculations are calculated manually. The new computer system should contain logic to automate these calculations.
9. The OA should be given access to actual member data for benefit certification purposes.
10. A large period of time elapses between separation from service and electing a benefit option, which could allow for anti-selection against the System. FIRE should establish a procedure where a member elects an option earlier in the process.
11. With regard to disaster recovery of data, FIRE has not tested the retrieval and restoration of their data backups. This should be tested periodically.
12. Data backups are only sent offsite weekly. This should be done daily.
13. Data security can be improved. Please see below for general comments regarding data security.
14. FIRE is not corpus funded, but should be.

OFFICE OF THE ACTUARY

1. It is difficult to ascertain exactly what the underlying plan provisions are for each of the Systems. Although not currently legally required, a plan document should be drafted for each of the Systems by an independent counsel, in close consultation with the Systems and the OA.
2. Actuarial valuation reports currently exist for POLICE and FIRE. The OA should provide these reports for NYCERS, TRS and BERS as well.
3. Inconsistencies between the OA's valuation procedures and the benefit descriptions in the CAFRs for NYCERS, TRS and BERS are noted in Appendices B, C and D. There are also various inconsistencies in the description of the plan provisions between the POLICE and FIRE valuation reports and the City's Administrative Code and other sources. These inconsistencies are described in Appendices E and F of this Report. These items should be researched and resolved in the valuations, as necessary.
4. The OA should complete the written documentation of its valuation data process.

5. To ensure timely transmittal of valuation data from the Systems, the OA should consistently monitor progress by the Systems and other providers, such as Charter Schools
6. The OA should establish a consistent set of guidelines in order to judge the reasonableness of the data elements provided by the Systems.
7. BERS staff believes that the member service data provided to the OA is accurate, but the OA continues to estimate BERS active member service in the valuation. The OA should take steps to satisfy itself that the service is accurate, and if so, use it in the valuation.
8. NYCERS is updating member service in their database to improve data accuracy. The OA estimates NYCERS active member service in the valuation. NYCERS and the OA should decide when the service data is usable for the valuation.
9. The OA certifies all benefit calculations, in accordance with established policy. The OA should consider whether the process can be streamlined by spot-checking certain “clean” cases.
10. The OA receives paper files from all of the Systems for benefit certification purposes; this is inefficient and poses a data security risk. These files should be sent to the OA electronically via a secure link.
11. When certifying benefit calculations, the OA does not have access to member data for FIRE, POLICE and BERS, and so can only check the data used in the calculation for reasonableness. The OA should be given access to the data for these Systems.
12. The benefit certification steps and reasonableness checks are not documented, and the OA should do so.
13. The OA and the Systems have worked closely over the years in establishing pension calculation procedures. An independent third party should be engaged to conduct an independent review of each System’s benefit calculations against underlying laws and regulations.
14. Though the OA has migrated its valuation data processing from an off-site, mainframe City University of New York (“CUNY”) system to an in-house Microsoft Access system, the OA acknowledges that even this improved process is an interim solution. The OA should follow through on its stated intent to implement a new data handling system.
15. Some of the steps taken by the OA to store data are not adequate in case of a disaster. Backup files should be sent offsite, and files stored on-site should be kept in fireproof cabinets.
16. Data transmissions between the Systems and the OA are less secure than they could be. Systems may transfer active member data to the OA on compact disc, and do not always comply with the OA’s encryption requirements. This is both inefficient and a data security risk. A secure electronic link should be established between each System and the OA for the purpose of transmitting member data.
17. In the OA’s Benefit Certification Division, sensitive data may be left on employees’ desks overnight. A policy should be established requiring this information to be locked up overnight.
18. The OA should consider issuing Blackberry (or similar) devices to, at a minimum, senior staff members, in order to enhance productivity.
19. The OA should actively maintain its website.

20. The OA's workload has increased recently, and there are vacant senior positions at the OA. The OA should fill these positions to relieve some workload strains.
21. The OA should consider implementing a formal peer review process.

PRIOR AUDITOR RECOMMENDATIONS

In this Administrative Review, as noted above, Hay Group checked the status of progress made on the recommendations made by prior auditors in their Administrative Reviews. Sufficient action has been taken by the Systems and the OA to render most of the prior auditor recommendations as no longer applicable. To the extent that prior auditor recommendations are still applicable, we have included them with our current recommendations. Thus, the recommendations made by Hay Group in this Administrative Review encompass both new recommendations and all prior auditor (including the Hay Group first engagement Administrative Review) recommendations which, in our opinion, are still applicable.

DATA SECURITY

The issue of data security is very important, and the Systems and the OA handle very large quantities of sensitive data due to the nature of their work. The term "data security" itself has various aspects that are all individually critical:

Access to the data;

Physical protection of the data, against disaster and theft;

Secure transmission and storage of the data.

All of the Systems and the OA take their own approaches to these aspects of data security. We have addressed these issues in this Administrative Review. We believe it would be prudent for the Systems and the OA to review the recommendations contained in this Report, meet to share ideas and discuss best practices, and where data security is lacking, implement corrective measures as soon as possible.

Project Methodology

Hay Group approached the second engagement Administrative Review in a manner similar to the manner in which the first engagement was conducted--by collecting information from the OA and each of the Systems to gain a complete understanding of the data processes and procedures that are undertaken in the course of transferring the member data from its sources to the end-user. The sources of the data in this case are the five Systems, the Pension Payroll Management System ("PPMS"), the City's Payroll Management System ("PMS"), and various other City agencies. The end-user is the OA. Between the source and end-user the data is checked for reasonableness and appropriateness and undergoes various editing processes.

To gain a complete understanding of the data processes and procedures involved, Hay Group developed a detailed questionnaire intended to stimulate discussion about the issues faced by the OA and the Systems as they handle the large quantities of data needed for their work. The questionnaire covered data collection and processing; benefit calculations and certifications; technology and infrastructure; organizational issues; and the status of prior auditor recommendations. Hay Group then conducted a series of meetings with the OA and each System to go over some or all of the questions on the questionnaire. In a great number of cases, answers provided to us gave rise to still more questions, as we gained more details on the data handling process. Because the second engagement followed so closely on the heels of the first engagement, in many cases the responses from the Systems and the OA were updates on issues discussed in the first engagement.

Following the data collection phase, Hay Group performed an assessment of the procedures and processes, supporting information technology systems, and interactions between the OA and each of the five Systems. We compared the data collection, transmission, storage, and back-up processes described during our on-site interviews to industry standards and have developed recommendations based on our observations, knowledge and prior experience. Hay Group also interviewed the City's auditor, Deloitte & Touche, regarding the data sampling checks the auditors undertake of pension membership data in connection with their annual audit of the City's finances.

This report documents our assessment and observations of the processes and procedures used by the OA and the five Systems in the areas of data collection and processing; benefit calculations and certifications; technology and infrastructure; miscellaneous issues including organizational structure; and the status of prior auditor recommendations for each entity. The detailed explanations of the issues, and our recommendations, are separately documented with respect to the OA and each System.

Results

I. NYCERS

A. Overview

NYCERS is the largest of the Systems, and the collection of active member data is complicated by the number of sources from which payroll and other information must be collected. Pensioner payroll data is collected from PPMS. At the time of the first engagement Administrative Review, NYCERS indicated an intention to upgrade its active member data system. That modernization effort has not yet begun. NYCERS' procedures for guarding member confidential information continue to be state-of-the-art.

B. Data Collection and Processing

As reported in the first engagement Administrative Review, the annual valuation process begins with the OA providing a data request to NYCERS. A kick-off meeting is held so that all parties understand the data requirements for the current year. The OA collects payroll data from PMS and other City payroll agencies, and then sends all the collected payroll data to NYCERS. NYCERS performs aggregate checks on the payroll data, updates the valuation data files based on the payroll data, and returns the updated file to the OA on compact disc. NYCERS uses a series of programs to collect the data that it provides to the OA from its system. The updates provided by NYCERS include members' service, contributions and status changes. Once the OA receives the data file, the OA conducts reasonableness checks on the data. The OA generates data questions and exceptions based on this review, and these are discussed and dealt with as needed at the following year's data meeting.

Improving the quality of the data is an ongoing process. When a City employee becomes a NYCERS member, NYCERS creates a membership application containing basic information about the member. The member verifies this data. Members receive annual statements which include their basic data, and have the opportunity to identify errors by completing a form and providing documentation of the correct information. NYCERS also runs reasonableness checks on the member data quarterly, and an error report is generated. These possible data errors are researched and corrected as appropriate. All data corrections are stored permanently so that errors are not repeated in the future.

One ongoing data quality issue relates to member service data provided by NYCERS to the OA. Historically, the OA has not used this service data in the valuation because the OA has deemed it to be unreliable. As a result of ongoing data clean-up efforts, NYCERS has recently provided service files to the OA. The OA is testing these files to determine whether the service data is now suitable for use in the valuation.

NYCERS is planning an internal data audit that will commence in fiscal year 2012. Goals of the audit include identification of areas of redundancy, and to ensure that data matches

business rules. NYCERS has indicated that they are open to input from the OA on this process.

NYCERS intends to modernize its data system, which should result in a much more efficient process by which data will be provided to the OA. However, that project is not expected to begin before fiscal year 2013.

1. NYCERS Issue 1: The efficiency of the data collection process can be improved.

NYCERS Recommendation 1a: NYCERS should be the single source of all active member valuation data required by the OA. NYCERS should collect payroll information from PMS and the other City agency payroll sources. NYCERS should then consolidate the payroll data into their system and provide the OA with the initial active member data for the valuation. NYCERS and the OA should coordinate to ensure that NYCERS has a clear understanding of the OA's data requirements.

NYCERS Recommendation 1b: In its planning and implementation of the new computer system, NYCERS should work with the OA to ensure that the system will produce the data elements required by the OA for the valuation.

NYCERS Recommendation 1c: The OA performs a year over year data comparison when reviewing and preparing the NYCERS data for the valuation. Part of this process is identifying data elements that have unexpectedly changed (for example, date of birth, or service due to service buy-backs) from one year to the next. Many of these changes were made for a valid reason, as a result of ongoing efforts by NYCERS to clean up the data. However, these data changes are not flagged by NYCERS. NYCERS should flag these known data changes in the data file so that there is no need for the OA to question them. Because current system limitations do not support flagging data changes, NYCERS should examine whether flagging such data changes will be possible in its new computer system. Until a method of flagging data changes is automated, NYCERS should examine whether providing a list of data changes to the OA periodically (e.g., weekly or monthly) is feasible.

NYCERS Recommendation 1d: In the process of validating the census data for use in the valuation, the OA reconciles the current year's data with data from the previous year. The reconciliation effectively traces each member's status from the previous year to the current year. NYCERS should provide its own reconciliation of membership to the OA. This will increase the efficiency of the OA's valuation data process, and the resulting cross-check with the OA's process should increase accuracy. Because current system limitations do not support such a reconciliation, NYCERS should examine whether performing the reconciliation will be possible in its new computer system. NYCERS and the OA should coordinate efforts on this issue, to ensure that the system provides the information that would be most useful to the OA.

2. NYCERS Issue 2: All data errors for which there is a reliable and easily accessible data source for resolution are resolved in the year they are found and are communicated back

to NYCERS by the OA. Otherwise, data exceptions and questions identified in the data review process are resolved the following year, potentially decreasing the overall data quality for the valuation.

NYCERS Recommendation 2: Ideally, all data exceptions should be resolved for the valuation year in which the exception is identified. As a practical matter, given the number of members in NYCERS, it is sufficient to resolve only those issues that would be of a potential material impact on the valuation.

3. **NYCERS Issue 3:** Ongoing data issues relate to the accuracy of member service, and some employees with multiple member numbers.

NYCERS Recommendation 3a: A multi-year project is currently under way to clean up member service contained in the NYCERS data (service is being examined member by member); this process should be completed as soon as possible.

NYCERS Recommendation 3b: The OA should formulate a list of employees with multiple member numbers, and coordinate with NYCERS for resolution.

4. **NYCERS Issue 4:** There is no specific documentation of NYCERS' process to provide active member data to the OA.

NYCERS Recommendation 4: Data handling processes should be thoroughly documented in writing, so that consistent steps are used each year, and so that an inexperienced person can review the documentation and still be able to carry out the procedures, if necessary. Thus, NYCERS should establish documentation of the annual data process. In implementing this recommendation, NYCERS should take into account planned or contemplated data system changes. Though this documentation's usefulness with respect to the current valuation data process may be short-lived, as NYCERS updates its computer system, it may be useful in the implementation of the new process. Once the data system is updated, the documentation would be helpful in providing a historical perspective on procedures used in the annual data process.

5. **NYCERS Issue 5:** Though some estimates are available in NYCERS' files, the OA continues to calculate actual ITHP, required ITHP and required employee contributions in the valuation.

NYCERS Recommendation 5: NYCERS should supply these items to the OA with the valuation data. However, NYCERS does not consider the current data for these items to be reliable because they are estimates. When the new computer system is implemented, it is expected that the quality of this data will be improved, and these should be among the data items included in the database.

6. **NYCERS Issue 6:** NYCERS active members buy back service, causing unexpected service changes that must be questioned when the OA performs their valuation data process.

NYCERS Recommendation 6: NYCERS should include an indicator on the active member data provided to the OA, flagging which members are buying back service, and the amount of service being bought back. Current system limitations hamper NYCERS' ability to provide this information. NYCERS should work with the OA to have a clear understanding of the OA's requirements, and ensure that the new computer system has this capability.

7. **NYCERS Issue 7:** NYCERS provides data to the OA that have the following issues: (i) inconsistencies among entry age, date of birth and date of hire, (ii) inconsistent plan, group and title codes, and (iii) missing retiree option information.

NYCERS Recommendation 7: NYCERS should check these items prior to submitting valuation data to the OA, and proactively correct issues where possible.

C. Benefit Calculations and Certifications

The benefit calculation and certification process is largely unchanged since the first engagement Administrative Review. The retirement process is initiated when the member completes a retirement application. Upon receipt of the application, NYCERS determines whether the member is eligible to retire. An advance partial payment is calculated and reviewed. The percentage varies by plan. The member number is withdrawn and a pensioner number is assigned. The member information is added to PPMS. A more formal determination of member service, required employee contributions and final average pay is then performed. For the majority of cases, a computerized program is used to perform an updated calculation based on this data and the calculation is reviewed by another NYCERS staff member. An Excel spreadsheet is used for a small number of "manual" calculations. This calculation is included in the "option letter." The member has 60 days to select an optional form of payment based on the option letter. (If the member does not select an option within the 60-day period, they are given an additional 15 days to select an option, as a courtesy. If they still do not select an option after the 15-day period, they are assumed to have selected the single life annuity option.) Upon receipt of the option selection from the member, the benefit is updated in PPMS from partial to full payment. After 12 months, the case is checked to determine whether any revisions are required. Changes are reviewed. The OA has access to NYCERS' Document and Imaging System, providing an electronic means for retrieving all case details. However, the "Report of Actuary" generated by NYCERS is sent to the OA on paper, by messenger, for certification. The OA has access to the data and the NYCERS mainframe to facilitate the certification process. The certification procedures at the OA are addressed in the OA section of this Report.

8. **NYCERS Issue 8:** Sending paper files to the OA for certification decreases the efficiency of the process. There are also security issues associated with paper transfer via an outside party.

NYCERS Recommendation 8: The process should be modified to avoid sending paper files to the OA for certification. A secure electronic link should be established between the OA and NYCERS to facilitate transfer of calculations for certification.

9. NYCERS Issue 9: The benefit calculation process should be fully documented.

NYCERS Recommendation 9: A manual should be developed that fully documents the benefit calculation process. The manual should be maintained and updated as circumstances change. The manual will serve as a training tool, and ensure that consistent procedures are used in the calculation process. The OA should provide input on the manual's contents. The manual can be in electronic form for automated calculations, if appropriate.

10. NYCERS Issue 10: NYCERS possesses data on which retirees have non-finalized benefits due to an unsettled labor agreement, but does not indicate this in PPMS. The OA currently estimates the impact of these non-finalized benefits in the valuation. More actual data may improve the OA's valuation process.

NYCERS Recommendation 10: NYCERS should explore the feasibility of providing an indicator on PPMS with this data. If not feasible, then a list should be provided to the OA with this data.

D. Technology/Infrastructure

NYCERS has been using its current data system for the past 30 years, and intends to modernize the system. One intended outcome of this modernization will be a secure electronic link with the OA. Since the first engagement Administrative Review, NYCERS has begun the planning process for elimination of the need for Excel spreadsheets to perform non-standard benefit calculations. Paper records have been converted to digital images; the paper records have been retained and are stored at a secure offsite location. NYCERS has a contract with IBM for disaster recovery services, and this is tested twice per year. NYCERS has a business continuity plan, and mainframe recovery is estimated to take 48 to 72 hours. NYCERS is implementing site-to-site replication of data between their current offices and an additional disaster recovery location in Long Island City. This is expected to allow NYCERS to be up and running following a disaster within four hours, and limit data loss to a one hour timeframe.

NYCERS has taken advanced steps to protect member data. Access to data and programs are managed using software called "Top Secret." Access is recertified every 3 months. User login identifiers and passwords are changed monthly. Disk drives and USB ports are disabled on employee workstations. Logs are created of data traffic in and out of NYCERS. Attempts to copy data are known. NYCERS allows no laptop computers. NYCERS maintains a clear desk policy (under which all sensitive data must be cleared from an employee's desk and securely stored when the employee leaves the office), including random inspections for unsecured confidential data; photos are taken and infractions are reported to the Executive Director. Network penetration tests are conducted. Employees receive annual data security training. When members call the interactive voice response system, their voices are matched against a voice print taken during enrollment.

11. NYCERS Issue 11: NYCERS continues to transfer active member data for the valuation to the OA on a compact disc.

NYCERS Recommendation 11: A more efficient and secure way to transmit data is over a secure, encrypted electronic link. NYCERS can accommodate secure file transfers. Therefore, this procedure should be established between NYCERS and the OA.

E. Miscellaneous

Since the first engagement Administrative Review, NYCERS experienced high turnover among long-time provisional employees. However, NYCERS was able to maintain service goals during this time, which testifies to the effectiveness of NYCERS' staffing levels and redundancy of knowledge within departments.

NYCERS learns of pensioner deaths by direct notification from the surviving beneficiary, or through weekly Social Security death sweeps.

12. NYCERS Issue 12: Prior to the first engagement Administrative Review, NYCERS performed a risk assessment regarding its organizational structure to identify areas for improvement, and for succession planning. As a result, NYCERS instituted a pilot program for cross-training employees across divisions, but this program has not been fully developed. NYCERS has been monitoring employee leaves, so that member services (and the OA's needs) are appropriately staffed at all times.

NYCERS Recommendation 12: NYCERS should continue the program of cross-training employees to build more redundancy of knowledge within the organization.

13. NYCERS Issue 13: Though NYCERS' methods for learning of pensioner deaths should be effective for the great majority of cases, more effective methods are available.

NYCERS Recommendation 13: NYCERS should investigate more comprehensive methods of checking for pensioner deaths. For example, some vendors check state tax records.

F. Status of Prior Auditor Recommendations

The following is a status update on the findings from Segal's Administrative Review:

1. Data Elements: Include, as part of the annual meeting with the OA, a detailed review of the data elements needed.

Status: This recommendation has been implemented. NYCERS and the OA understand what data elements are needed, and know how to populate them.

2. PPMS Data: Meet with the OA to review the data elements to be populated into PPMS and verify that these elements are being populated correctly.

Status: At the time of the last Administrative Review, PPMS was not yet in use. PPMS is now in use and the data fields have been verified.

3. Collection of Active Data: Work with the OA to ensure all valuation data elements for active employees are tracked and maintained in the new computer system. Establish a mechanism, in conjunction with the OA, for secure electronic file transfers to facilitate collection of active data, so that CUNY support is no longer needed.

Status: The new computer system is not in place. Thus, this recommendation is not yet implemented. It should be noted that the OA has migrated away from the CUNY system for data handling, in favor of a process utilizing Microsoft Access.

4. Reconciliation Reports: NYCERS should provide OA with a data reconciliation showing all member status changes since the prior year's valuation data was provided.

Status: NYCERS does not provide a data reconciliation report. The OA can provide its prior year data reconciliation to NYCERS as an example, and based on that NYCERS can produce the reconciliation that would be helpful to the OA, but as of this Review, this has not been done.

5. Expired Labor Contracts: NYCERS should identify those retired members with non-finalized benefits due to expired labor contracts.

Status: NYCERS possesses the data on which retired members are subject to a non-finalized labor agreement, but still does not provide this information to the OA. (Also see item 9 below.)

6. Actual ITHP, Required ITHP, and Required Employee Contributions: NYCERS should provide the OA with actual ITHP, required ITHP and required employee contribution data for the valuation, so that the OA does not have to estimate these values..

Status: Actual ITHP, required ITHP and required employee contribution amounts are calculated at retirement. Although NYCERS has some estimated required employee contribution information available before retirement, it does not consider the information to be reliable. When NYCERS implements its new computer system, it is expected that the new system will reflect accruals for these items in real time.

7. Buyback Service: NYCERS should provide OA an indicator of which members are buying back service, and the amounts of service the members are buying back.

Status: Buy-back service is updated within eight weeks of the member paying for the service in full. The service is not determined until after the full payment is received. (See item #1 below.) However, NYCERS does not currently provide an indicator to the OA, flagging the fact that service has been bought-back.

8. Collection of Pensioner Data: NYCERS should work with the OA to determine whether PPMS can serve effectively as the source of pensioner data for the valuation, so that payment data from multiple sources does not have to be reconciled by the OA. NYCERS should identify payment differences (between the payment data maintained by NYCERS and the Comptroller's BIS) when setting up the data in PPMS and when submitting the data to the OA.

Status: PPMS is now the source of pensioner data submitted to the OA, thus eliminating the need for multiple reconciliations of payment amounts.

9. Benefits in Partial Payment or Estimated Status: NYCERS should identify members whose benefit payments have not been finalized when providing valuation data to the OA. NYCERS and OA should work together to establish PPMS coding for this information.

Status: Non-finalized benefits are flagged in PPMS (“P” = partial, “E” = estimate), and this data is made available to the OA.

10. Benefit Certifications: NYCERS and the OA should develop and implement an automated benefit certification process, and determine the necessity of the OA reviewing all certifications.

Status: An automated certification process has not been established. In accordance with current established policy, the OA is required to certify all benefit calculations.

There are several recommendations applicable to NYCERS from the 2003 and earlier prior auditors’ reports that had not been resolved at the time of the Segal Administrative Review. Other recommendations from those reports, while referring to NYCERS, had been resolved, or are no longer applicable. The prior auditor recommendations, which were shown as unresolved in the Segal Administrative Review, are:

1. NYCERS should provide the OA with annual service updates resulting from employee buy-backs so that the OA may reflect this data in the valuation.

Status: NYCERS is currently updating buyback service within eight weeks of when service is fully paid. This information is transmitted to the OA with the valuation data.

2. Streamlining of Reporting of Employee Data for the Valuation
NYCERS and the OA should consider revising current coordination procedures and streamlining the reporting of employee census data in order to avoid delays in data gathering for the valuation.

Status: No additional changes to the data collection process have been made since the 2006 Administrative Review conducted by Segal.

3. NYCERS has data available on actual accumulated ITHP balances, minimum employee contribution balances and minimum ITHP balances for those Tier 1 and Tier 2 employees who are eligible to retire and it should report this data to the OA.

Status: NYCERS does not report this data to the OA. It was noted that this issue applies to a small group of employees.

II. TRS

A. Overview

Since the first engagement Administrative Review, there have been a few new developments at TRS. TRS continues to utilize excellent technology and a highly experienced staff to provide for a smooth valuation data process. The quality of the active member data provided to the OA continues to improve, though there are a few ongoing data issues. PPMS is the source of pensioner payroll data. The benefit calculation process is structured to produce accurate benefits. TRS has no formal succession plan, though a process has begun to develop one. TRS has also begun a program to cross-train staff.

B. Data Collection and Processing

The annual valuation data collection process includes a project kick-off meeting with OA staff to review the prior year's process. The purpose of the meeting is to ensure that any legislation or other changes are incorporated into the current year's data collection; discuss any data clean up that has been undertaken and any population changes that have occurred; and, agree on any changes to the data format. The primary source of active member data is TRS. (The Department of Education has switched its source of data, but this should be transparent to the OA.) PMS supplies salary data. Pensioner payroll data is produced from PPMS. Data is captured as of the end of the fiscal year (June 30), and cannot be provided to the OA until all June data is posted, which takes place in mid-July. The active member data file for the OA is run and provided to the OA along with a reconciliation from the prior year. The reconciliation is from TRS' prior and current year files.

TRS undertakes efforts to improve data quality. Data for the TRS members' Annual Benefit Statements ("ABS") and OA data are run at about the same time and require similar data. The ABS data is used as a quality check for the OA data.

In the past, after the ABS was sent to members, TRS would receive as many as 5,000 to 6,000 inquiries from members, but in recent years the volume of inquiries is much lower (which reflects the overall improvement in data quality). The most common questions relate to service and the member's ability to purchase service. There is a manual process to verify data corrections provided by members; once verified, the corrected data item is stored in the main database permanently.

When the OA has a question about data or suspects an error, the problem is reported to a designated point of contact within TRS who tracks all questions and distributes them to the appropriate person within TRS. Data questions are researched, resolved, and stored in the main database permanently.

1. **TRS Issue 1:** Member data from sources such as CUNY and Charter Schools are input into the TRS database manually. Although the manual data feeds are checked before they are sent to the OA, the manual process lends itself to potential errors.

TRS Recommendation 1: TRS should explore getting electronic data submissions from any entity that currently sends data manually. These transmissions should be sent to TRS in an encrypted file under appropriate security protocols.

2. **TRS Issue 2:** Transmission of Charter School data after established deadlines creates timing issues for the valuation data process. Charter Schools employ approximately 400 TRS active members, but this group is likely to grow as more Charter Schools open. TRS relies on each Charter School's Administrator to enter data into TRS's database in a timely manner. There are instances where data is incomplete, requiring TRS to request more information from the Charter School.

TRS Recommendation 2: TRS and the Charter Schools should work together to develop a method for providing the Charter School data to the OA on or before established deadlines.

3. **TRS Issue 3:** TRS, in the course of data improvement efforts, often updates member data without indicating that a change has taken place on the data. When the OA performs its reasonableness checks, these changes are flagged as problems to be resolved.

TRS Recommendation 3: TRS should place an indicator on the data to inform the OA that TRS has intentionally changed the data. This will avoid many unnecessary data questions from the OA. For example, TRS can provide a data flag indicating that service has been purchased.

4. **TRS Issue 4:** TRS provides a data reconciliation to the OA when transmitting the valuation data to the OA, but the starting point is the prior year TRS file, as opposed to the prior year OA file. This makes the reconciliation less useful than it could be, in terms of increasing the efficiency of the valuation data process.

TRS Recommendation 4: TRS should use the prior year OA valuation data as a starting point when providing the reconciliation of member data to the OA.

C. Benefit Calculations and Certifications

A TRS member can apply to retire up to 90 days in advance of his or her proposed retirement date. After a member submits an application, the Member Status Unit manually reviews service and the benefit is calculated in TRS' Unified Pension System ("UPS"). Prior to finalization, pensions are entered into PPMS at 75% - 80% of the initial calculated amount (Advance Payment). The majority of retirement cases are finalized within 3 months.

All retirement calculations are certified by the OA. The OA can complete most of the certifications electronically by accessing the TRS system via a secure VPN connection.

All active death benefit calculations are done manually and sent by messenger to the OA for certification. Revised retirement allowance calculations are done by the automated system but the OA does not certify them electronically. (Revisions result from the settlement of

expired labor agreements, legislative changes or law suits.) For revision cases, “old” and “new” calculations are sent to OA on paper by messenger for certification. There is an effort underway to extend electronic certification to revision cases. This will increase the amount of automated certifications to about 90%.

TRS has training manuals for new hires which are updated often to account for changes.

5. TRS Issue 5: Revision cases, and certain other cases, are certified manually.

TRS Recommendation 5: TRS is currently implementing electronic certification capability to their new Mass Revision process. TRS and the OA should jointly determine how best to implement extending electronic certification to include the remaining manual cases.

D. Technology/Infrastructure

TRS currently makes file transfers to the OA on compact disc with encryption code sent via messenger. TRS data security protocols include the data being stored in EBCDIC rather than ASCII format. Most TRS staff members use desktop computers, but some use laptops. To protect member data on the laptops, the laptop hard drives are encrypted and wireless access to the TRS database is not permitted. Laptops have tracking software that allows the laptop to be located if it is lost or stolen. Annually, TRS utilizes an outside vendor to try to “break in” to their data system to identify vulnerabilities. Nightly backups are performed, and the backup files are stored offsite. Backup tapes are encrypted and stored in a locked case. Paper files have been digitized and are stored offsite. Disaster recovery procedures include real time replication with an offsite facility in New Jersey.

TRS is currently assessing whether any system modernization is needed. Some of the technology currently in use is more than ten years old and may become obsolete. There is the related concern that some of the technology currently in use will no longer be supported by their vendors.

6. TRS Issue 6: The method of data transfer with the OA (on compact disc, via messenger) is not as efficient as it could be, and could present a data security issue.

TRS Recommendation 6: The OA and TRS should establish a method of secure electronic data submission.

7. TRS Issue 7: Data security can be further improved.

TRS Recommendation 7: Consider implementing or enhancing the following data security procedures: (i) recertify such access every 3 months; (ii) allow no network or data access through laptop computers; and (iii) train employees on data security procedures.

- 8. TRS Issue 8:** Some of TRS' technology may no longer be supported by vendors or may become obsolete.

TRS Recommendation 8: TRS should continue the evaluation of its technology and make updates where appropriate.

E. Miscellaneous

TRS has begun the process of long-term succession planning. However, the organization's current focus is on developing junior staff, by implementing a formal cross-training program.

- 9. TRS Issue 9:** Although TRS staff members generally have long service, there is no formal succession plan in place at TRS.

TRS Recommendation 9: TRS should identify which positions require a formal succession plan, and implement it, in case current staff members retire or otherwise terminate employment with TRS.

F. Status of Prior Auditor Recommendations

The following is a status update on the findings from Segal's Administrative Review:

1. Data Elements: Include, as part of annual meeting with the OA, a detailed review of the data elements needed, so that TRS will provide the exact information required by the OA.

Status: Data elements that change, or are new, are discussed at the annual data planning meeting between TRS and the OA, and TRS understands the OA's requirements.

2. Collection of Active Data: TRS should be responsible for transmitting all required valuation data to the OA. Establish a mechanism, in conjunction with the OA, for secure electronic file transfers to facilitate collection of active data, so that CUNY support is no longer needed.

Status: TRS transmits active valuation data to the OA. Data is transmitted in a secure fashion to the OA. Smaller files on CD are encrypted.

3. Reconciliation Reports: TRS should provide the OA with a data reconciliation report showing all member status changes since the prior valuation.

Status: TRS now provides a reconciliation report to the OA showing active member status changes, but the reconciliation is between previous year and current year files produced by TRS.

4. Advance Payment Status: TRS should identify those retirees in advance payment status (member is receiving 80% of estimated benefit).

Status: For TRS retirees as of June 30 who are in advance payment status, TRS will confirm that such data is available to be provided directly to the OA. TRS members who retire as of July 1 are shown as active on the valuation file, but are reflected as retired in PPMS by July 31, and the OA collects this information to correctly capture the members' status for the valuation.

5. Benefit Certifications: Together with the OA determine when to fully utilize the on-line benefit certification tool, and determine whether it is necessary for the OA to review all certifications.

Status: At the time of the Segal Review, the on-line certification tool had been developed but was not yet in use. At this time, the OA utilizes the on-line certification tool for all first-time certifications. For “revision cases,” the OA continues the manual certification process. In accordance with current established policy, the OA is required to certify all benefit calculations.

There is one recommendation applicable to TRS from the 2003 prior auditor’s report that had not been resolved at the time of the Segal Administrative Review. Other recommendations from that report, while referring to TRS, had been resolved, or are no longer applicable. The prior auditor recommendation, which was shown as unresolved in the Segal Administrative Review, is:

Encourage TRS to continue cleanup of valuation data and recommend TRS communicate proposed enhancements to the UPS Valuation Reporting Process to the OA and obtain input from the OA during the development process.

Status: Data issues highlighted in that audit have been resolved. There are no pending data process enhancements to communicate to the OA.

III. BERS

A. Overview

BERS is unique among the five Systems in that it utilizes the services of Prudential, an outside vendor, to maintain active member data, including the data that is used by the OA for the annual valuation. Prudential receives payroll data from PMS, and receives member data changes from BERS on a monthly basis. In the first engagement Administrative Review, BERS was actively searching for a new data system that will be more technologically advanced. A new development is that a vendor has been identified to produce and implement a new data system, and the new system development is in process. The current system, though less efficient than it could be, is structured to produce active member data that is reliable and appropriate for valuation and benefit calculation purposes. Pensioner payroll data is obtained by the OA from PPMS.

B. Data Collection and Processing

The annual valuation process begins with the OA providing a data request to BERS. A kick-off meeting is held between OA, BERS and Prudential so that all parties understand the data requirements for the current year. Both the OA and BERS agree that the outcome of this meeting is an agreement on what data elements will be provided to the OA, an understanding is reached regarding the specific data requirements, and the due date is established for providing the data to the OA. This is especially true for new data elements required as a result of new legislation, labor agreements, and any other changed circumstances. Prudential conducts data checks for items such as missing member numbers and withdrawal numbers to ensure that the files are complete. BERS staff checks the Prudential files for validity before forwarding them to the OA. The OA is notified of any systematic changes to member data, such as systematic changes resulting from efforts by BERS to clean up the issue of members who had been assigned multiple member numbers. Data is sent to the OA on password-protected compact discs. Once the OA receives the data and performs its own series of edits and reasonableness checks, the OA reports any data errors it discovers to BERS. BERS researches the errors identified for resolution, and if a data change is necessary, the data is corrected and stored permanently on both Prudential and BERS systems so that they are not repeated in future years. The new data system currently being developed should result in a more streamlined process for producing the actuarial valuation data. BERS will work with the OA to develop specifications for the valuation data methodology.

1. **BERS Issue 1:** There is no specific documentation of this process.

BERS Recommendation 1: Data handling processes should be thoroughly documented in writing, so that consistent steps are used each year, and so that an inexperienced person can review the documentation and still be able to carry out the procedures, if necessary. Thus, BERS and Prudential should establish documentation for the annual data process. We recognize, however, that BERS is working with a vendor to establish a new data handling system, so that the usefulness of such a document may be short-lived. However,

documentation of the current process and data requirements would be useful when developing the new data system. Once the new data system is established, the documentation would be helpful in providing a historical perspective on procedures used in the annual data process. BERS intends to fully document the new data system.

2. **BERS Issue 2:** Though these items are available in BERS' files, the OA continues to estimate required ITHP and required employee contributions in the valuation.

BERS Recommendation 2: BERS and the OA should determine whether these items, as they currently exist in BERS' files, are of sufficient reliability for valuation purposes. If so, BERS should supply these items to the OA with the valuation data. When the new computer system is implemented, it will have the capability to track these amounts and calculate accumulations with interest.

3. **BERS Issue 3:** The OA must perform a complete reconciliation of BERS membership from the prior to the current valuation date.

BERS Recommendation 3: In the process of validating the census data for use in the valuation, the OA reconciles the current year's data with data from the previous year. The reconciliation effectively traces each member's status from the previous year to the current year. BERS should provide the reconciliation of membership to the OA. This will increase the efficiency of the OA's valuation data process, and the resulting cross-check with the OA's process should increase accuracy.

4. **BERS Issue 4:** Regarding the BERS valuation data, (i) the OA would like to receive both part-time and full-time employees' service from BERS (currently, only part-time employees' service is provided, but it is not used by the OA because it does not include full-time service); and (ii) the OA does not receive part-time employees' hours, which would be useful in determining member service in the valuation.

BERS Recommendation 4: For full-time members, the new data system will be designed to accrue service by pay period, and to provide part-time employees' hours. The OA and BERS should work together on a process to validate this data and provide it to the OA for the actuarial valuation.

C. Benefit Calculations and Certifications

The benefit calculation and certification process is largely unchanged since the last Administrative Review. Members apply for retirement to the BERS retirement counseling unit, which sends the case for calculation. Calculations are performed by a BERS staff member, checked by a second staff member, and approved by a supervisor. The initial calculation includes a thorough check of the member's records to confirm all data elements used in the calculation. Sources of data include paper files, Prudential's system, PMS, and imaged records. The initial estimated amount is entered into PPMS for payments to the retiree to commence. BERS adds data to PPMS based on 100% of the estimated benefit,

rather than 70% - 90% of the estimated benefit, as was done when the prior auditor's Administrative Review was done. BERS does not provide an indicator of non-finalized benefits on the data. Once all collective bargaining and legislative issues are resolved, and the calculation is finalized, both the original and finalized calculations are sent to the OA for final certification. All calculations are sent on paper, via messenger, to the OA for certification. The new data system under development will provide the OA access to the member data for benefit certifications.

5. **BERS Issue 5:** Sending paper files to the OA for certification decreases the efficiency of the process. There are also security risks associated with paper transfer via an outside party.

BERS Recommendation 5: The process should be modified to avoid sending paper files to the OA for certification. A secure electronic link should be established between the OA and BERS to facilitate transfer of calculations for certification.

6. **BERS Issue 6:** The benefit calculation process should be fully documented. A manual exists in draft form.

BERS Recommendation 6: The existing draft manual should be finalized, and be maintained and updated as circumstances change. The manual will serve as a training tool, and ensure that consistent procedures are used in the calculation process. The OA should provide input on the manual's contents.

7. **BERS Issue 7:** Transfer of member account balances to TRS or other Systems is delayed in many cases because timing is dependent on members filling out the appropriate paperwork to initiate the transfer.

BERS Recommendation 7: A legislative initiative to provide for automatic transfer of account balances would resolve this issue. BERS has encouraged members to file for the transfer.

8. **BERS Issue 8:** Though BERS adds data to PPMS based on 100% of the estimated benefit, BERS does not provide an indicator of non-finalized benefits on the data. Also, there have been cases in which the member was overpaid.

BERS Recommendation 8: BERS should provide an indicator of a non-finalized benefit in PPMS. BERS should consider implementing the prior practice of commencing non-finalized pensions at less than 100% to avoid overpayments.

D. Technology/Infrastructure

As stated above, Prudential plays a key role in providing active data to the OA. Prudential has supported BERS for approximately 35 years, providing data processing and storage for BERS. To produce the data files needed by the OA, Prudential uses a series of batch programs. Prudential and BERS collaborate on cleaning up the data, and a secure data link called Pru Messenger is used for data transmissions between Prudential and BERS.

Prudential stores data in its data center in Roseland, NJ. Access to the mainframe data storage area is restricted. An audit trail of data changes is maintained.

Access to the BERS system requires an application password and data level password. The Security Officer at BERS is responsible for granting access to the system. BERS also maintains paper files dating back to 1921. Since the first engagement Administrative Review, the imaging process of these files has been completed. To gain access to the imaged files, a valid LAN identification and additional password are required. BERS is currently undertaking a security enhancement process, and has received vendor proposals to facilitate this process. However, the process may be delayed due to budgetary concerns.

BERS backs up data nightly, and back-ups are stored offsite.

Mainframe data maintained by Prudential in the Roseland data center is replicated offsite in real time by IBM (the vendor Prudential has contracted for this service). Data could be reconstructed by Prudential and BERS, if necessary.

Prudential conducts business continuity testing twice each year. It is believed that less than one day's worth of data updates would be lost in the event of a disaster. However, BERS has not verified that data has actually been recovered in the test.

9. BERS Issue 9: The active data process is too dependent on the involvement of Prudential. Though BERS and the OA agree that the ultimate data provided to the OA is acceptable, the process is inefficient.

BERS Recommendation 9: A single data repository is more efficient, provides more control over the process, and provides for greater data security than multiple sources of data. Like the other Systems, BERS should consolidate the active data into one system. The effort is now under way to replace the Prudential system with a single system. In the course of developing the new system, (i) the OA should be consulted regarding data elements to be maintained in the system, (ii) the OA should be granted access to the system, to improve processing time for benefit certifications, and (iii) BERS should engage an outside vendor for data back-ups and business continuity services.

10. BERS Issue 10: Prudential and BERS exchange active data using a secure electronic method, but no such method exists between BERS and the OA.

BERS Recommendation 10: A secure, encrypted method of data transfer between BERS and the OA would increase efficiency and data security in the valuation data handling process.

11. BERS Issue 11: Given the current data system arrangement, efficiency and data security should be improved.

BERS Recommendation 11a: Verify and validate that data updates made by Prudential are done correctly. If a data update is incorrect, it will cause additional data exceptions requiring resolution, decreasing efficiency of the valuation data process.

BERS Recommendation 11b: Verify that data is recovered when IBM tests the business continuity plan.

BERS Recommendation 11c: Follow through on the data security enhancement effort. BERS should evaluate whether these efforts are worth undertaking at this time in light of the timing of obtaining the proposed new data system. The data security enhancements to be considered should include the following: (i) Manage employees' and consultants' access to data and programs; (ii) recertify such access every 3 months; (iii) change user login passwords monthly; (iv) disable disk drives and USB ports on employee workstations; (v) create logs of data traffic in and out of BERS; (vi) allow no network or data access through laptop computers; (vii) maintain a clear desk policy, including random inspections for unsecured confidential data; (viii) conduct network penetration tests; and (ix) train employees on data security procedures.

E. Miscellaneous

To ensure continuity of services to members and for providing data to the OA, BERS rotates staff members among the various units, and (for most processes) employs a triple-check quality assurance process that allows at least three staff members to learn how various tasks are performed.

F. Status of Prior Auditor Recommendations

The following is a status update on the findings from Segal's Administrative Review:

1. Data Elements: The OA needs to include, as part of its annual meeting with BERS, a detailed review of the data elements needed, and discuss with BERS exactly what type of information is required for each element.

Status: As a result of the annual data project kick-off meeting, BERS now has a clear understanding of the OA's data requirements.

2. PPMS Data: BERS and the OA should meet to review the data elements to be populated into PPMS and verify that elements are being populated correctly when PPMS goes "live" at the end of 2006/first part of 2007.

Status: PPMS is operational, has been tested, and is the source of pensioner data for the BERS valuation.

3. Collection of Active Data: Establish a mechanism, in conjunction with the OA (and Prudential), for secure electronic file transfers to facilitate collection of active data, so that CUNY support is no longer needed.

Status: Prudential and BERS transmit data via a secure link called Pru Messenger. There is no such secure link between BERS and the OA.

4. Required ITHP and Required Employee Contributions: BERS should provide ITHP and employee contributions to the OA so that the OA does not have to estimate these values.

Status: This recommendation has not been implemented. The issue of incomplete data affects fewer than 400 members, and the actual data is maintained on paper records.

5. Reconciliation Reports: BERS or Prudential should provide the OA with a data reconciliation.

Status: This recommendation has not been implemented. However, the OA is, for the most part, satisfied with the data received for the valuation, and conducts its own reconciliation.

6. Supplemental Payment Status: BERS should identify those retired members with non-finalized benefits due to expired labor contracts.

Status: BERS adds data to PPMS based on 100% of the estimated benefit, rather than 70% - 90% of the estimated benefit, as was done when the prior auditor's Administrative Review was done. BERS does not provide an indicator of non-finalized benefits on the data. The issue of how to handle unexpired labor contracts is addressed at the annual project kick-off meeting.

7. Transfer of Account Balances: Resolve delay in transfer of account balances to TRS or other Systems, possibly via a legislative initiative to allow for automatic transfer.

Status: Member action is still required in order for account balances to be transferred to TRS or other Systems. Thus, this recommendation has not been resolved.

8. Benefit Certifications: Implement an automated benefit certification tool, and determine necessity of OA reviewing all certifications.

Status: Calculations to be certified are still transmitted by sending paper copies of calculations to the OA via messenger. In accordance with current established policy, the OA is required to certify all benefit calculations.

There is one recommendation applicable to BERS from the 2003 prior auditor's report that had not been resolved at the time of the Segal Administrative Review. Other recommendations from that report, while referring to BERS, had been resolved, or are no longer applicable. The prior auditor recommendation, which was shown as unresolved in the Segal Administrative Review, is:

Issue: Historically, the OA has estimated service in the valuation for BERS active members. The OA should obtain information on part-timers either from the Office of Payroll Administration or BERS in order to determine whether a more refined approach is required in the valuation for part-timers.

Status: BERS met with Prudential to address the issue of timely reporting of part-timer data (service, salary and contributions). By the time data is reported to the OA for purposes of the valuation, these issues are resolved and the part-timer data should be suitable for valuation purposes. However, the OA still estimates service for part-timers in the valuation.

IV. POLICE

A. Overview

The Comprehensive Officer Pension System (“COPS”) is used for storage and administration of POLICE active member data. COPS also calculates member benefits, and can be used by POLICE employees to generate pension estimates for members. COPS was first used to provide data to the OA as of June 30, 2007.

It was clearly a significant undertaking to design and populate COPS, while ensuring data quality. POLICE digitized legacy paper records to form a database for COPS. Data was populated from paper human resources files (“Blue Cards”) into COPS by a vendor. The data was validated through a process in which two people independently completed the data entry and then the data was compared. Exceptions were reviewed and corrected. After the data entry from the Blue Cards was completed, information was sent to members for review.

There is an ongoing effort to improve data quality in COPS. For example, members are provided annual statements, and members can respond to POLICE with data corrections. These member-provided corrections are reviewed, and if found to be valid, are stored in COPS permanently, thus avoiding the repetition of errors. Since the first engagement Administrative Review, the annual pension statements have been reformatted to include a detailed breakdown of member service, including purchased buy-back service and transfer service. POLICE established a member hotline to field members’ questions about their service credit. This member feedback should result in improved service data maintained by COPS and provided to the OA.

The implementation of COPS and the ongoing efforts by POLICE to improve the quality of the data have resulted in the transmission of very “clean” data (for a retirement system of this size) to the OA.

The process from member initiation of the retirement process to benefit certification continues to take a very long period of time in some cases. For example, if labor agreements remain unsettled, pension benefits cannot be finalized. The implementation of COPS has improved the process by automating many calculations and handling such items as computation of optional forms of payment.

POLICE’s technology and steps taken to protect member data are at a very high level. Unfortunately, during the course of the first engagement Administrative Review an alleged data breach occurred, as described more fully below.

POLICE has taken appropriate actions to cross-train staff to provide continuity of services.

B. Data Collection and Processing

Each year, POLICE and the OA staff meet to go over the valuation data request. The discussion focuses on data issues from the previous year and new data requirements. During the meeting, time is spent ensuring that POLICE staff understand the definitions underlying any new data requirements. COPS is the source of POLICE active member data provided to the OA. PPMS is the source of pensioner payroll data provided to the OA.

COPS houses the same payroll information as the member payroll data stored in PMS, including summary data prior to 1997 and detailed data beginning in 1997. Salary data reflecting retroactive payments (which can take place after a union contract is settled) is stored on COPS. The OA collects salary data from PMS and compares it to the salary data provided by POLICE.

World Trade Center election data (i.e., member registration to be treated as accidental disability cases upon the onset of certain diseases related to work at the World Trade Center site) is not currently stored in COPS. It is provided from a separate data source for the OA.

Quality checks are performed on the data extracted for the OA, including a review of data which appears to be outside a reasonable range (e.g., highs, lows, negative member contributions). Samples are taken to ensure validity.

Data is sent to the OA via email, in an Excel file with 256 bit encryption. Once the OA reviews the data, the OA sends POLICE a set of inquiries. These data issues are researched and, if a problem is discovered, corrected and made part of the permanent database.

1. **POLICE Issue 1:** Although overall the active member data is of high quality, there is an ongoing accuracy issue with respect to the service fields (total, buy-back, transfer) sent to the OA, affecting a small number of records.

POLICE Recommendation 1: POLICE should continue the process of updating and improving the service fields. As noted above, the improved member feedback on their service credit as a result of the reformatted annual pension statement, should improve the quality of the service data provided to the OA.

2. **POLICE Issue 2:** The World Trade Center election data currently resides in a file that is separate from COPS.

POLICE Recommendation 2a: A single source of active member data should be maintained to increase efficiency of the valuation data process. Thus, POLICE should consolidate the WTC election data into COPS.

POLICE Recommendation 2b: World Trade Center data residing in COPS should include information that will allow the OA to determine whether (and when) a member has reclassified their status to be a World Trade Center accidental disability retiree.

3. **POLICE Issue 3:** The OA must perform a complete reconciliation of POLICE membership from the prior to the current valuation date.

POLICE Recommendation 3: In the process of validating the census data for use in the valuation, the OA reconciles the current year's data with data from the previous year. The reconciliation effectively traces each member's status from the previous year to the current year. In addition to the quality checks POLICE already performs, POLICE should provide the reconciliation of membership to the OA. This will increase the efficiency of the OA's valuation data process, and the resulting cross-check with the OA's process should increase accuracy.

C. Benefit Calculations and Certifications

A member must apply for normal retirement at least 30 days in advance of the proposed retirement date. A full review of COPS data and the member's personnel folder is performed to ensure data accuracy prior to running the benefit calculation. Once the calculation is completed, the member is added to PPMS at 90 percent of the projected total pension. This partial payment is paid to the retired member until such time as the pension is finalized.

A second review of data is done by the POLICE pension computations unit before sending the calculation to the OA for certification. Also, calculations are not sent for certification until all applicable labor contracts are settled. Paper copies of "old" and "new" calculations are sent to the OA via courier. The entire process, from initiation by the member, to certification, can take a very long time due to such factors as outstanding labor contracts.

Generally, if the OA finds errors in the certification process, they tend to be clerical (for example, typographical errors) in nature.

4. **POLICE Issue 4:** Sending paper files to the OA for certification decreases the efficiency of the process. There are also security issues associated with paper transmission via an outside party.

POLICE Recommendation 4: The process should be modified to avoid sending paper files to the OA for certification. POLICE and the OA should explore the feasibility of using the same method employed for transmitting the POLICE valuation data to send calculations to the OA. Otherwise, a secure electronic link should be established between the OA and POLICE to facilitate transfer of calculations for certification.

5. **POLICE Issue 5:** One of the intended outcomes in implementing COPS was to decrease the time taken from member initiation of the retirement application to final certification. This has not materialized, however.

POLICE Recommendation 5: One reason for the length of benefit calculation and finalization process is the length of the collective bargaining process. Recommendations for shortening that timeframe are beyond the scope of this Review. However, as

mentioned in prior Administrative Reviews, the OA and POLICE should decide whether there are certain calculations that do not need to be certified once bargaining agreements are reached. This should decrease the processing time for a subset of all retirees.

- 6. POLICE Issue 6:** A large period of time elapses between separation from service and electing a benefit option. This allows for anti-selection against the System, if, for example, a retiree's health changes in the interim.

POLICE Recommendation 6: POLICE should consider establishing a procedure whereby the benefit option is elected by the member earlier in the process.

D. Technology/Infrastructure

The implementation of COPS and the utilization of PPMS have greatly upgraded the technology being used to produce valuation data and perform benefit calculations, when compared to the state of affairs at the time of the prior auditor's Administrative Review. Since Hay Group's first Administrative Review, COPS has been enhanced for improved tax reporting.

Data is replicated by POLICE staff (with high frequency, in nearly real-time) off-site in a facility in Staten Island, and disaster recovery is tested four times per year. The disaster recovery testing indicates that data could be recovered in 3 to 4 hours.

An audit trail is created in COPS, showing when data is changed, what data was changed, and who created the change. Outgoing e-mail attachments are monitored to ensure they are zipped and encrypted. With respect to paper files, every document has been scanned and digitized. The file room is secured and has video surveillance. An access control card is required for entrance. Desktop computers require fingerprint identification to be used. Since the first engagement Administrative Review, steps are being implemented to prevent use of USB ports.

- 7. POLICE Issue 7:** POLICE maintains very strict internal data security measures. Unfortunately, during the course of the first engagement Administrative Review, data security was allegedly breached. The alleged data breach occurred when an unauthorized POLICE employee gained access to POLICE's disaster recovery storage facility where legacy (prior 2007) unencrypted backup tapes were stored in a locked safe and removed tapes from storage. POLICE also stores secure encrypted backup tapes with an off-site tape storage vendor.

POLICE Recommendation 7: After concluding their thorough investigation of how data security may have been breached, and the vendor's security procedures, POLICE should implement steps to prevent a possible recurrence, and share their findings and action steps with the other Systems.

- 8. POLICE Issue 8:** In the first engagement Administrative Review, POLICE staff noted that COPS' capability to produce the valuation data files needed by the OA in the data collection process is not as automated as it could be (i.e., it is not a "push-button" process). Since then, POLICE has developed procedures to automate the computer runs needed to produce the valuation data for the OA.

POLICE Recommendation 8: Though POLICE has taken steps to enhance COPS' file creation capability, in order to streamline the process for creating the data files needed by the OA, POLICE should continue to look for ways to improve the process.

- 9. POLICE Issue 9:** Data security can be further improved.

POLICE Recommendation 9: Consider implementing the following data security enhancements: (i) recertify such access every 3 months; (ii) change user login passwords monthly; (iii) create logs of data traffic in and out of POLICE; and (iv) train employees on data security procedures. Also, follow through on effort to disable disk drives and USB ports on employee workstations.

- 10. POLICE Issue 10:** Tier 3 member data is not yet integrated into COPS; therefore, these members' pension calculations cannot be completed in COPS.

POLICE Recommendation 10: Though this population is relatively small, it is expected to grow. The data and calculation routine should be programmed into COPS.

E. Miscellaneous

Units within POLICE contain 6 to 14 people. Cross-training takes place within various departments, so that at least two people know how to do each task. The Director of Training is developing training materials. POLICE, as an organization, has very low employee turnover. POLICE appears to be taking appropriate actions to ensure that there is redundancy of knowledge within the organization, and succession planning.

F. Status of Prior Auditor Recommendations

The following is a status update on the findings from Segal's Administrative Review:

1. Data Elements: Include, as part of the annual meeting with the OA, a detailed review of the data elements needed, so that POLICE will provide the exact information required by the OA.

Status: POLICE meets with OA staff each year. POLICE personnel understand the OA's data needs and are now able to provide data from COPS.

2. PPMS Data: Meet with OA to review data elements to be populated into PPMS and verify that elements are being populated correctly.

Status: At the time of the prior auditor's Administrative Review, PPMS was not yet in use for POLICE data. PPMS is live and has been tested.

3. Collection of Active Data: Work with OA to ensure all valuation data elements are tracked and maintained in new computer system. Establish a mechanism, in conjunction with the OA, for secure electronic file transfers to facilitate collection of active data, so that CUNY support is no longer needed.

Status: The new COPS system includes the valuation data elements needed by the OA. Data is sent via email to the OA, in an encrypted Excel file.

4. Expired Labor Contracts: POLICE should identify those retired members with non-finalized benefits due to expired labor contracts.

Status: PPMS contains flags for finalized and non-finalized benefit amounts.

5. Reconciliation Reports: POLICE should provide the OA with a data reconciliation report, showing changes in member status in the prior year.

Status: POLICE provides status codes and conducts quality checks on the data, but does not provide a full reconciliation.

6. Buyback Service: POLICE should provide OA with an indicator showing which members are buying back service, and the amount of service they are buying back. POLICE should verify that the new computer system can track buyback service and service eligible for buyback.

Status: Service buy-back is member initiated. Once an application is submitted, it is entered into COPS. Service that is potentially eligible for buyback is not tracked in COPS.

7. Collection of Pensioner Data: POLICE should ensure that the new computer system is providing an accurate, up-to-date list of pensioners, and should develop a secure electronic method of file transfer.

Status: PPMS is the source of pensioner data. Files are transmitted electronically to the OA via encrypted email.

8. Benefits in Partial Payment or Estimated Status: POLICE should identify which pensioners have partial payment amounts shown in the valuation data.

Status: PPMS contains a flag for finalized and non-finalized benefit amounts.

9. Joint & Survivor Calculations: POLICE should ensure that Joint & Survivor factor tables are included in the new computer administration system.

Status: J&S factor tables were provided by OA and are included in COPS.

10. Benefit Certifications: Implement an automated benefit certification process with the OA, and determine whether it is necessary for the OA to review all certifications.

Status: An automated process for benefit certification has not been implemented. The issue of whether all benefits should be certified will be addressed with OA staff, but has not yet been addressed. In accordance with current established policy, the OA is required to certify all benefit calculations.

11. Transfers of Reserves: POLICE should (i) ensure that data elements for reserve calculations are tracked in the new computer system; (ii) consider automating these calculations; and (iii) develop a secure electronic mechanism to transfer these files to the OA for certification.

Status: Members complete an application to request the transfer of reserves. COPS contains the data to perform the calculations, but transfers are still calculated and sent to the OA for certification manually. Transfers are done on a monthly basis. Once complete, transfer information is stored in COPS.

There are several recommendations applicable to POLICE from the 2003 and earlier prior auditors' reports that had not been resolved at the time of the Segal Administrative Review. Other recommendations from those reports, while referring to POLICE, had been resolved, or are no longer applicable. The prior auditor recommendations, which were shown as unresolved in the Segal Administrative Review, are:

1. POLICE should aim to provide the OA data on actual ITHP balances for all members within the next two years and minimum employee contributions and minimum ITHP balances as a later step.

Status: ITHP is not provided to the OA, but POLICE states that they will try to incorporate this information into COPS.

2. As POLICE builds its systems and applications, it should provide the OA annual updates on prior service and employee buy-backs.

Status: This has been implemented, but needs improved accuracy.

3. POLICE is implementing a new administration system that should fully automate the tracking and maintenance of all valuation and benefits data.

Status: The COPS system, for practical purposes, accomplishes this. There is a handful of members whose benefits are handled manually (these are special-case benefits that would require large amounts of computer programming to automate their calculations); however, once these benefits are calculated, they are saved in the COPS system.

V. FIRE

A. Overview

FIRE's data system and process for providing active member valuation data to the OA are largely unchanged since the first engagement Administrative Review. FIRE remains unique among the Systems in that it is not corpus funded. The most significant development since the first engagement Administrative Review is that the effort to implement a more technologically advanced data handling system is now well under way and is expected to result in many process improvements. FIRE's goal was to test the new system beginning in November 2010, and begin fully utilizing the system in the first quarter of 2011. Further, there are plans to produce member statements in 2011 using the new system. Allowing members to provide feedback on the accuracy of data contained in the statements will further improve data quality.

However, until the new system is operational, the legacy system continues to be used. The benefit calculation process is also largely unchanged since the first engagement Administrative Review, and includes more manual steps than would otherwise be desired for maximum efficiency. Nevertheless, the current process has been structured to result in accurate calculations. The staff at FIRE is highly experienced and is cross-trained among different functions. This provides service continuity if a staff member is out of the office.

B. Data Collection and Processing

FIRE has used the same mainframe system to maintain member data since 1981. FIRE uses a supplemental Access database to maintain some member data, such as buy-back service. The annual valuation process begins with a data request letter from the OA. FIRE responds to the data request by providing files of data changes to the OA, rather than the full data set. This includes files for new entrants, withdrawals, and stopped pensions. Each of these files is manually checked by staff at FIRE for accuracy and completeness. Data is sent to the OA electronically, in encrypted form and with password protection. Once the OA receives the data, it performs a series of data checks and prepares a list of any discrepancies or data issues to send to FIRE. The staff at FIRE researches these issues using the mainframe data system or the original source documents and cross references with FIRE's human resources database system. Corrections are made to the main database when errors are discovered and are shared with the OA. Active member salary data is derived from PMS. PPMS and the OA's Benefit Certification Division files are the sources of pensioner data.

1. **FIRE Issue 1:** There is no specific documentation of the process to provide data to the OA.

FIRE Recommendation 1: Data handling processes should be thoroughly documented in writing so that consistent steps are used each year and new staff can review the documentation and carry out the procedures, if necessary. Therefore, FIRE should establish documentation of the annual data handling processes. We recognize that FIRE

has begun the process of working with a vendor to develop a new data handling system, so the usefulness of a document that describes the current process may be short lived. Once the new data system is established, the documentation would be helpful in providing a historical perspective on procedures used in the annual data process. The new system should be fully documented. We understand that it is intended that the new system will be fully documented and more user-friendly than the legacy system.

2. **FIRE Issue 2:** Data for such items as buy-back service and World Trade Center elections exist on separate files and are not contained in the main active member database.

FIRE Recommendation 2a: Data for active members should be consolidated into a single database for efficiency and accuracy. FIRE should explore the feasibility of doing so within the current system, and plan to include this data in the new system. The members' World Trade Center elections were required to be filed by September 10, 2010, and we understand that this data will be tracked within the new data system. FIRE encouraged members to apply for available buy-back service in July 2009, and received a large response, and we understand that FIRE plans to store this data in the new system as well. FIRE should provide listings of buy-back service purchases to the OA.

FIRE Recommendation 2b: World Trade Center data residing in FIRE's new data system should include information that will allow the OA to determine whether (and when) a member has reclassified their status to be a World Trade Center accidental disability retiree.

3. **FIRE Issue 3:** The OA must perform a complete reconciliation of FIRE membership from the prior to the current valuation date.

FIRE Recommendation 3: In the process of validating the census data for use in the valuation, the OA reconciles the current year's data with data from the previous year. The reconciliation effectively traces each member's status from the previous year to the current year. FIRE should provide the reconciliation of membership to the OA. This will increase the efficiency of the OA's valuation data process, and the resulting cross-check with the OA's process should increase accuracy.

C. Benefit Calculations and Certifications

The benefit calculation and certification process is largely unchanged since the first engagement Administrative Review. Members initiate retirement by completing an application at FIRE's retirement desk. The benefit is calculated using the Unisys mainframe system and a pension number is issued. The member's earnings and contributions are verified manually against the mainframe data. Overtime is manually added to the Unisys mainframe system from an Access database. Data is retrieved from the Unisys mainframe system, the member's paper file, and independent Access database files. Each calculation is completed by one person and checked by another.

The member's pension amount, which is calculated by FIRE, is entered into PPMS at 90 percent of the maximum single life annuity benefit, pending certification. The partial benefit amount is flagged in PPMS to signify that it is uncertified. If the initial benefit is calculated when a bargaining contract is not settled, the benefit calculation is re-done after the contract is settled. (Other reasons for benefits needing to be revised include election of optional forms of payment, and reclassification of retirement status, such as from service retirement to accidental disability.) At that point, the benefit calculation is taken to the OA for certification by a member of the FIRE staff.

A procedures manual is maintained and updated as needed for benefit changes.

4. **FIRE Issue 4:** Sending paper files to the OA for benefit certification decreases the efficiency of the process and can present a data security risk.

FIRE Recommendation 4: A secure electronic link should be established between the OA and FIRE to facilitate transfer of calculations for certification.

5. **FIRE Issue 5:** Data is maintained in the Unisys mainframe system and in independent Access database programs. Because data must be manually entered, there is an increased opportunity for errors in the process.

FIRE Recommendation 5: As FIRE develops a new system, it should ensure that all necessary data can be stored in the new system, eliminating the need for independent database files and manual data transfer. We understand that the new data system will be capable of calculating a member's age at appointment and contribution rate.

6. **FIRE Issue 6:** Data used for preparing non-finalized calculations must be printed out and placed in paper files because this data is not retained electronically (i.e., it may be overwritten by updated data).

FIRE Recommendation 6: The new data system should be capable of storing historical as well as current member data. We understand this is planned for the new data system.

7. **FIRE Issue 7:** Because of the complexity of the calculation in certain instances, the computation of 3-year average salary is manual.

FIRE Recommendation 7: The new data system should include sufficient logic to compute average salary for most, if not all, complex situations. We understand the new data system will contain salary history data and have logic to calculate the 3-year average salary for members appointed prior to July 1, 2000.

8. **FIRE Issue 8:** Reserve transfers are required in order for prior service to be recognized when a member transfers between FIRE and POLICE. The reserve transfer calculations continue to be initiated by FIRE members. These calculations continue to be performed manually, and sent to the OA manually for certification.

FIRE Recommendation 8: The new computer system should store the data needed for the transfer calculations, and contain logic to automate those calculations. FIRE and the OA should establish a method to transfer the calculations to the OA via a secure electronic link to increase efficiency and eliminate a data security risk.

9. **FIRE Issue 9:** The OA does not have access to the actual member data used to perform the pension calculations, and so can only do reasonableness checks on the data when certifying pensions.

FIRE Recommendation 9: The OA should be given access to actual member data.

10. **FIRE Issue 10:** A large period of time elapses between separation from service and electing a benefit option. This allows for anti-selection against the System, if, for example, a retiree's health changes in the interim.

FIRE Recommendation 10: FIRE should consider establishing a procedure whereby the benefit option is elected by the member earlier in the process.

D. Technology/Infrastructure

As described above, the current mainframe system FIRE uses to collect and maintain active member data has been in place since 1981. This system is supplemented with Access database files to maintain additional data, such as member overtime. Data from PMS is populated into the mainframe system. The system is updated as needed whenever a benefit change takes place, such as when a labor contract is finalized.

Access to the mainframe system is controlled with login identifiers and passwords. Some data, such as social security numbers, cannot be seen by all users. A volume backup of the mainframe system is completed daily and the tapes are sent offsite weekly for storage. FIRE believes that backup tapes can be returned from the vendor within 24 hours. The mainframe is in a secure data center with restricted access. FIRE staff accesses the mainframe using terminal emulation from desktop computers.

As mentioned above, FIRE is currently working with a vendor to develop a new database system.

11. **FIRE Issue 11:** FIRE has not tested the retrieval and restoration of a backup tape from their vendor. It is critical to test backup and recovery of data to ensure backups are successful and data can be recovered in the event of data loss or a disaster.

FIRE Recommendation 11: Backup retrieval and restoration should be tested for effectiveness. Periodically, but at least once per year, FIRE should randomly select a previous backup tape to recall from storage, restore the data and verify that it is readable.

12. **FIRE Issue 12:** Volume backups of FIRE data are only sent offsite on a weekly basis.

FIRE Recommendation 12: Backups should be sent offsite on a daily basis. FIRE should send volume backups to the offsite storage facility more frequently. We understand the new data system will have a backup server located in 11 Metrotech Center.

13. FIRE Issue 13: Data security can be improved.

FIRE Recommendation 13: Consider implementing the following data security enhancements: (i) Manage employees' and consultants' access to data and programs; (ii) recertify such access every 3 months; (iii) change user login passwords monthly; (iv) disable disk drives and USB ports on employee workstations; (v) create logs of data traffic in and out of FIRE; (vi) allow no network or data access through laptop computers; (vii) maintain a clear desk policy, including random inspections for unsecured confidential data; (viii) conduct network penetration tests; and (ix) train employees on data security.

E. Miscellaneous

Each staff member has multiple functions and employees within individual units are cross-trained. Most staff members have more than 20 years of service with the System.

FIRE is unique among the Systems in that it is not corpus funded, which at times has contributed to budgetary constraints that have delayed process improvements. An important characteristic of being corpus funded is that a System's Board is able to set the annual budget for the System's expenditures on such items as technology and other items that will enhance the services which are delivered to members.

14. FIRE Issue 14: FIRE is not corpus funded. Based on feedback obtained in our meetings with the other Systems, the consensus is that corpus funding allows the Systems to best focus resources on their mission of serving retirees and members.

FIRE Recommendation 14: FIRE should be approved for corpus funding.

F. Status of Prior Auditor Recommendations

The following is a status update on the findings from Segal's Administrative Review:

1. Data Elements: Include, as part of an annual meeting with the OA, a detailed review of the data elements needed, and discuss exactly what is needed by the OA for each data element.

Status: FIRE understands the OA's data needs and open lines of communication are maintained between FIRE and OA staff for resolving data issues or concerns. The OA and FIRE meet several times each year to ensure the data process runs smoothly.

2. PPMS data: Meet with the OA to review data elements to be populated into PPMS and verify that elements are being populated correctly.

Status: PPMS was not yet in use at the time of the prior auditor's last Administrative Review; it is currently live and has been tested.

3. Collection of Active Data: Work with the OA to ensure all valuation data elements for active employees are tracked and maintained in new computer system. Establish a mechanism, in conjunction with the OA, for secure electronic file transfers to facilitate collection of active data.

Status: A new data system has not been implemented, but as noted above, the process is well under way.

4. Collection of Pensioner Data: Work with the OA to ensure all valuation data elements for pensioners are tracked and maintained in new computer system. Continue to utilize a mechanism, in conjunction with the OA, for secure electronic file transfers to facilitate collection of pensioner data.

Status: A new data system has not been implemented. The OA and FIRE continue to use a secure electronic file transfer mechanism.

5. Expired Labor Contracts: FIRE should identify those retired members with non-finalized benefits due to expired labor contracts.

Status: Almost all occurrences of partial benefits in the data are due to contract issues. PPMS identifies which pensioners are receiving a partial benefit.

6. Reconciliation Reports: FIRE should provide the OA with a data reconciliation report through its new computer system.

Status: The new computer system is not in place yet. Most data that FIRE provides to the OA is checked manually. A full data reconciliation is not performed.

7. Benefit Certifications: Implement an automated benefit certification process with the OA, and determine whether the OA needs to review all certifications.

Status: Calculations and supporting documentation continue to be hand carried by FIRE staff to the OA for certification. In accordance with current established policy, the OA is required to certify all benefit calculations.

8. Transfers of Reserves: The OA and FIRE should work together to complete outstanding NYCERS transfer calculations. FIRE should ensure that data for reserve calculations is accurately tracked and maintained in the new computer system. FIRE should consider automating these calculations within its new computer system, and the OA should consider the degree to which they review these calculations. FIRE and the OA should also develop a secure electronic file transfer mechanism to facilitate processing and certification of these calculations.

Status: These recommendations have not been implemented. Due to a change in the law, NYCERS reserve transfers are no longer required, negating the need for those transfer calculations. The new computer has not been implemented.

9. FIRE should be approved for corpus funding.

Status: FIRE has not been approved for corpus funding.

There are several recommendations applicable to FIRE from the 2003 and earlier prior auditors' reports that had not been resolved at the time of the Segal Administrative Review. Other recommendations from those reports, while referring to FIRE, had been resolved, or are no longer applicable. The prior auditor recommendations, which were shown as unresolved in the Segal Administrative Review, are:

1. FIRE should use encryption when sending sensitive valuation census information to the OA via e-mail.

Status: FIRE is using encryption and password protection on data sent to the OA.

2. FIRE should consider storing back-up tapes and back-up hard copies at a location sufficiently far from the primary location so as not to be subject to the same hazards.

Status: FIRE is using an external vendor to store back-up tapes and copies at a remote storage facility. Data is supposedly recoverable from the offsite facility (1 to 3 days for return).

3. Adequate funding for investment in technology and staffing for FIRE should be recommended, so that FIRE can provide state of the art services to its members and avoid backlogs in pension calculations.

Status: FIRE has received additional funding to do a computer system upgrade.

VI. Office of the Actuary

A. Overview

The OA performs various actuarial functions for the Systems and the City, including annual valuations to determine the contributions payable for each of the Systems, and certifying benefit calculations for the Systems' members. The processes used by the OA to perform these functions are key subjects of this Administrative Review. The OA is striving to improve the operations of these processes in a number of ways. Prior to the first engagement Administrative Review, the OA upgraded the process used to collect data for the valuation of the Systems, by migrating away from the cumbersome CUNY mainframe data handling system in favor of a flexible process utilizing Microsoft Access databases. The OA plans to implement a more sophisticated data handling system that will further improve their valuation data handling process. This is expected to occur following the awarding of a new actuarial services contract. PPMS is the primary source of pensioner data for all of the Systems. Communication between the OA and the Systems continues to improve. The OA and each System meet at the beginning of the annual valuation process, and cover the annual data process and requirements. The OA has begun meeting more frequently with the entities that supply the valuation data. The OA continues its contractual relationship with Buck Consultants, who work with the OA to finalize the valuation data and produce the valuation results on their proprietary computer system, though an RFP has been issued to seek proposals from qualified firms to perform the functions currently provided by Buck, due to the expiration of the current contract. The OA continues the historical practice of certifying all benefit calculations. The OA has made several organizational changes designed to enhance its performance of actuarial services for the Systems and the City.

B. Plan Provisions

The definitive sources for the underlying plan provisions for each System are contained in a variety of documents, including:

- the Administrative Code of the City of New York (the "ACNY"),
- the State of New York's Retirement and Social Security Law ("RSSL"),
- the State of New York's Education Law, and
- multiple other laws and regulations.

Other documents which contain plan provisions, but are not intended to be definitive, are: the summary plan description (the "SPD," a plain-language description of the plan which is distributed to plan participants) for each System; the plan summary contained in the Comprehensive Annual Financial Report (the "CAFR," which includes a plain-language summary of plan provisions available to the general public) for each System; and, the actuarial valuation report for POLICE and FIRE. Notably, professional actuarial standards require the actuarial valuation report to include a plan summary that describes the plan

provisions the actuary is valuing. Although these are not intended to be the definitive source of plan provision information, they are intended to accurately represent the plan provisions to various audiences. Ideally, these various sources of plan provisions would be consistent.

Plan provisions for a given retirement plan should ideally be contained in a single governing document, usually referred to as the Plan Document, that is held to be the highest authority in describing the plan terms. Other documents which describe the plan terms typically state that, in case of a discrepancy between the Plan Document and the other document, the provisions of the Plan Document will control. The OA and Buck share a Summary of Benefits that is updated annually, as of each valuation date. This document is prepared by the OA.

1. **OA Issue 1:** It is difficult to ascertain exactly what the underlying plan provisions are for each of the Systems.

OA Recommendation 1: Although it is not currently a legal requirement, the City should establish, for each of the Systems, a formal plan document of plan provisions, which could then be updated as new laws and regulations emerge. Hay Group has not surveyed the governmental employer marketplace to determine the prevalence of plan documents for governmental employer pension plans; however, Hay Group is aware that some governmental employers who have not historically had plan documents are beginning to produce formal plan documents and to request IRS determination letters as to the qualified status of their plans in view of increased IRS scrutiny of state and local retirement plans. Moreover, more clarity of plan provisions is desirable. Given the complexity of the plans, we believe it would be prudent for each System to have a governing plan document drafted by independent legal counsel, in close consultation with the OA and the Systems' legal advisors. The feasibility of legislating that the plan documents supersede all previous statutes, regulations and rules related to the plans should be explored. It should also be noted that the plan document depicts the plan provisions at a given point in time. In the case of the Systems, such a document would need to be consistently updated, also by legal counsel, to maintain the accuracy of the document.

2. **OA Issue 2:** For three of the five Systems, there is no valuation report summarizing exactly what plan provisions the OA is valuing. There are currently valuation reports available for FIRE and POLICE.

OA Recommendation 2: The OA should complete valuation reports for the TRS, BERS and NYCERS valuations. Professional actuarial standards indicate that actuarial communications in which an actuarial opinion is rendered should be fully documented, such that another actuary could review the report and be able to reproduce the incumbent actuary's results.

Comment on OA Issues 1 and 2: We recognize that it is not the OA's responsibility to produce a plan document for all of the Systems. (For example, we understand that the

City's Law Department has a Pension Section, and the Systems have in-house counsel.) However, specifically as they pertain to this Administrative Review, both of the above recommendations would be useful in determining the appropriateness of the data being requested of the Systems and used by the OA in the valuations.

3. **OA Issue 3:** There appear to be inconsistencies between the benefits valued by the OA, as we understand them, and the plan provisions listed in the CAFRs for NYCERS, TRS and BERS. These inconsistencies are shown in Appendices B, C and D, respectively. For POLICE and FIRE, there appear to be several inconsistencies between the ACNY or other primary sources of plan provisions, and the plan provision summary in the actuarial valuation report. Charts of these inconsistencies are included in this report in Appendices E and F, respectively.

OA Recommendation 3: The OA should research these potential inconsistencies, and if necessary, revise valuation procedures to reflect any updated plan provisions.

C. Data Collection and Processing

The OA begins the data collection process by sending data request letters to each of the Systems and other agencies. The letters are customized to each of the Systems' specific plan provisions, and are themselves updated each year for legislated, regulatory or collectively bargained plan changes. The OA staff then initiates a meeting with each System to go over the data request, make sure that the Systems understand the data requirements, and establish timelines for the Systems to provide the data to the OA. Data requests are also sent to PPMS, PMS and other payroll data providers. Since the first engagement Administrative Review, the OA is improving communication between the OA and those entities that provide valuation data to them.

The data cleansing process is customized to some degree for each of the Systems, because of differences in files and data elements. However, once data is collected, the general process used to prepare each System's data for the valuation is:

- i. Reconcile the plan participants from one year to the next, so that all participants from the prior valuation are accounted for on the current valuation date. The goals of this part of the process are to ensure that the data is complete and to append status codes to each participant data record to enhance the data reconciliation process.
- ii. Analyze the demographic information contained in the data for completeness and reasonableness, to ensure that the data is of the quality necessary to perform the valuation. This is accomplished using a series of data editing programs.

Since the first engagement Administrative Review, senior staff at the OA reviewed the valuation data checks used in the clean-up process. Additional tests have been added to the process to check for data errors. Additional back-up materials are provided to Buck Consultants, including more detailed census distributions, to facilitate Buck's data cleansing

process. If Buck finds any data issues, they are added to the OA's data checking process the following year.

The OA sends questions on the data to each System for resolution. If a systematic error is found that affects one or more essential data elements, the OA may request a revised or supplemental file from the System. Each System has its own process for researching and resolving the OA's data questions, but the responses, once sent back to the OA, are stored in the OA's database and used for the valuation. The errors and corrections are documented and included as an agenda item in the following year's data meeting.

For each annual actuarial valuation, a notebook is maintained for each System relating to System-specific valuation procedures and issues. For example, the POLICE and FIRE notebooks contain newspaper clippings about members killed in the line of duty; this information is part of the annual process the OA uses to check death reporting by those Systems.

After the OA has reconciled and analyzed each System's data, the data is transmitted, along with the OA's full reconciliation of plan participants and other metrics, to Buck Consultants, which also performs a thorough data analysis before running the actual valuation programs.

The City has retained Deloitte & Touche ("Deloitte") as its financial auditor. In that role, Deloitte performs a reasonableness check of the valuation data of each System, including random sampling of the data to test its accuracy and appropriateness for the valuations. Hay Group, in the course of this Administrative Review, did not sample the valuation data because it would duplicate actions taken by the City's auditor.

4. **OA Issue 4:** The OA processes the data using a series of Microsoft Access and Excel programs. Though the process of updating documentation of the data processing procedures has begun, it is not yet complete.

OA Recommendation 4: Data handling processes should be thoroughly documented in writing, so that consistent steps are used each year, and so that an inexperienced person can review the documentation and still be able to carry-out the procedures, if necessary. Thus, the OA should update its documentation of the annual data process. We recognize that, if the OA follows through on its plan to migrate to a new data processing system, the usefulness of such documentation may be short-lived. However, such documentation should be useful for historical purposes and in the development of the new data system.

5. **OA Issue 5:** Data from the Systems are not always transmitted to the OA in accordance with timelines established at the initial data meeting.

OA Recommendation 5: Since the first engagement Administrative Review, the OA has included, as part of the formal timeline, additional meetings with each System to get an update on the status of the Systems' data collection efforts, and to help the Systems stay

on track for timely data submissions. The OA should consistently monitor progress by the Systems and other data providers, such as Charter Schools.

6. **OA Issue 6:** In the data cleansing process, the OA judges the reasonableness of various data elements by comparing current to the previous year's data. However, different standards of data "reasonableness" exist among the Systems, and the standards are in many cases not documented.

OA Recommendation 6: The OA should establish a standard set of data reasonableness guidelines, taking into account how essential each particular data element is, and other System-specific factors that would justify differences in reasonableness parameters. These parameters should be fully documented and followed consistently.

7. **OA Issue 7:** BERS staff believes that service data provided to the OA is accurate, yet the OA continues to estimate BERS active service updates in the valuation.

OA Recommendation 7: The OA should take the steps necessary to be satisfied that BERS service data is accurate, and use that in the valuation. Such steps may include random sampling and checking against PMS information.

8. **OA Issue 8:** NYCERS is currently in the process of updating member service in their database. The OA currently estimates NYCERS member service in the valuation. NYCERS has provided service data to the OA, and the OA is reviewing it.

OA Recommendation 8: The OA should assess whether the service data is suitable for valuation purposes, and if so, use it in the NYCERS valuation.

D. Benefit Calculations and Certifications

The OA's benefit certification process is largely unchanged since the first engagement Administrative Review. The OA receives a large number of pension calculations to be certified each week (on average, approximately 400 each week for all Systems combined). Each certification involves the work of three OA staff members: one performs the certification computations, another checks them, and a third reviews them. The OA staff members that perform these services have long service and a great depth of experience with this work. People are trained on multiple Systems.

The certification process goal is 100% accuracy of pension calculations. Accuracy of pension calculations involves verification of the member data that is used as input in the calculation routines, and proper interpretation and application of the governing plan provisions¹, which are the source of the pension calculation methodology.

¹ As stated in Section B above, determining the plan provisions is difficult based on the lack of formal plan documents. If plan documents are developed, they would need to be shared with the OA's Benefit Certification Division to ensure proper certifications of benefits.

The OA has adapted its certification procedures to each System, because (i) the technology among the Systems varies, (ii) each System has its own unique set of plan provisions and data issues.

When pension benefit changes are enacted due to legislation or collective bargaining, the OA advises the affected Systems how to handle such changes in their pension calculation procedures, and the OA then checks that each affected System has correctly adapted its procedures to the change.

The City's financial auditor, in the course of its annual audit process, randomly samples benefit calculations and verifies input data and reasonableness of the calculations. Hay Group, in the course of this Administrative Review, did not sample the benefit calculations because it would duplicate actions taken by the City's auditor.

9. OA Issue 9: As has been noted in previous Administrative Reviews, the OA continues to certify all benefit calculations.

OA Recommendation 9: In accordance with current established policy, the OA is required to certify all benefit calculations. In light of the continuing improvements to the Systems' data and calculation processes, the OA should consider whether there are certain types of "clean" benefit calculation cases that do not require certification.

10. OA Issue 10: The OA receives benefit certification requests from the Systems on paper, via messenger (100% of cases for FIRE, POLICE and BERS, and about 25% for TRS and NYCERS). This procedure is not efficient, and can present a data security issue.

OA Recommendation 10: To the extent possible, secure electronic links should be established (or more fully utilized) between each System and the OA for the benefit certification process.

11. OA Issue 11: With regard to FIRE, POLICE and BERS certifications, the OA does not have access to the System's underlying data used as input to the pension calculation. Therefore, the OA can only check data for reasonableness.

OA Recommendation 11: The OA should be given access to the Systems' member data.

12. OA Issue 12: The certification steps and reasonability checks used by the OA are not documented.

OA Recommendation 12: A written set of procedures should be kept for the steps required to certify pension calculations, and for the steps to be taken to check the reasonableness of the member data. This will ensure that practices are applied consistently, and will facilitate training of less experienced staff.

13. OA Issue 13: The OA and the Systems have worked very closely over the years establishing pension calculation procedures. Thus, the certification process may not be a purely independent review of the Systems' calculations.

OA Recommendation 13: An independent review of the pension calculation procedures should be performed, based on actual legislative, regulatory and collective bargaining plan provision language. If plan documents are established for each System, as recommended in this Administrative Review, these should be used as the basis for this procedural review. This will provide an additional level of assurance that the underlying plan provisions are being interpreted correctly when pension benefits are calculated.

E. Technology/Infrastructure

Prior to the first engagement Administrative Review, the OA migrated most of the data handling system from the CUNY mainframe system to a series of Microsoft Access programs residing on in-house OA servers. At this time, the CUNY system is used only to clean up old data, a purpose for which the Access system would be less efficient or impractical. The OA staff has been trained in Access. Although Access appears to be working well for the valuation data process, it is an interim solution. The OA's ultimate goal is to migrate to a self-contained data processing system.

Over the past several years, the OA has updated its servers and desktop workstations.

Member data is transmitted between the OA and the Systems either electronically or by compact disc.

The OA performs nightly back-ups of its servers, and stores the resulting encrypted tapes in a locked cabinet in the office. The OA is planning to implement off-site data storage by the end of 2010. All valuation data also resides at Buck.

Access to valuation data is limited to members of the OA's valuation services division. Passwords for access to the data are changed every 30 days. We understand that currently four OA users have remote access to the data handling system. Any data released by the OA has multiple layers of security. The file is password protected and then also encrypted. Passwords and encryption codes are sent in separate E-Mails. Documents containing member data are shredded. Sensitive member information, such as Social Security numbers, cannot be transmitted by E-Mail. Electronic files must be transmitted by hand on compact disc or DVD.

Data on the OA's server is protected behind two firewalls (the City's and the OA's).

The OA does not issue Blackberrys (or similar devices) to staff members.

The OA has installed but is not actively maintaining a website.

14. OA Issue 14: As noted above, using Microsoft Access appears to be an effective means of processing the valuation data, but it does have its shortcomings. For example, it does not provide for an audit trail of data updates as the data is edited for the valuation and questions are resolved. The OA recognizes this issue, and has indicated that this method is an interim solution before a data processing software package is installed.

OA Recommendation 14: The OA should follow through on their stated intent to install a data processing system.

15. OA Issue 15: The back-up files are stored on-site at the OA. The storage cabinets are not fire-proof.

OA Recommendation 15: The OA should follow through on its intention to store back-up files off-site, because in the event of a physical disaster, such as a fire, files can be restored and operations can continue. If the OA continues to store the files on-site, they should be kept in fire-proof cabinets.

16. OA Issue 16: As noted in previous Administrative Reviews, data transmissions between the Systems and the OA are not as secure as they might be. Incoming data from the Systems may be sent to the OA on compact disc, and at times Systems do not comply with the OA's encryption requirements. Sending data on compact disc, whether by messenger or through the mail, creates a risk of theft.

OA Recommendation 16: The OA should follow through on its intention to establish a secure File Transfer Protocol (FTP) site to securely transfer data files, and work with the Systems to fully utilize it.

17. OA Issue 17: In the OA's Benefit Certification Division, there are instances where paper files (which may contain sensitive member data) are not locked up overnight, and are left on staff members' desks.

OA Recommendation 17: Although physical access to the OA's offices is restricted, the OA should implement and enforce a policy requiring staff members' desks to be cleared of sensitive materials overnight. Enforcement could include random inspections.

18. OA Issue 18: The OA does not issue Blackberry (or similar devices) to staff members. Use of these devices could potentially enhance productivity.

OA Recommendation 18: The OA should consider issuing Blackberry (or similar devices) to, at a minimum, senior staff members.

19. OA Issue 19: Although the Systems and many other City agencies do so, the OA does not actively maintain its recently established website. Maintenance of a website should enhance communication with the public and government agencies who are interested in the OA's work products. This in turn could potentially enhance productivity, by obviating the need to respond to multiple requests for the same information.

OA Recommendation 19: The OA should actively maintain its website.

F. Miscellaneous

Since 2004, the OA has taken steps on an organizational level to better serve the actuarial needs of the Systems and the City. These steps include expansion of actuarial staffing at junior levels, and the introduction of an actuarial student program. Importantly, in the context of the Administrative Review, the OA has implemented a cross-training program among the junior staff members to provide for redundancy of knowledge and skills such that services to the City and the Systems will not suffer if a staff member is out of the office. Depth of knowledge among more of the staff should also facilitate quality assurance for work products.

Other than retirements, there has been very little voluntary turnover of staff since 2004. However, the three retirements that did occur were among senior level staff. These positions remain vacant.

Though both the Valuation Services Division and the Certification Services Division have taken steps to ensure quality of work products, there is no formal peer review process in either Division.

20. OA Issue 20: At least two recent developments are increasing the OA's workload: the implementation of GASB 43 and 45 (i.e. requiring large, complex valuations of the City's postretirement benefits other than pensions), and the need for the OA to produce Fiscal Notes for all proposed pension-related legislation affecting the Systems.

OA Recommendation 20: The OA should fill the vacant senior positions, to relieve some of the workload strains caused by these recent developments.

21. OA Issue 21: There is no formal peer review process at the OA. Such a process is used in many actuarial firms as an additional layer of quality assurance, whereby an actuary who is not involved in the given project provides an independent review of the work product.

OA Recommendation 21: The OA should consider implementing a formal peer review process. Such implementation is hampered at this time due to the aforementioned vacant senior positions at the OA.

G. Status of Prior Auditor Recommendations

The following is a status update on the findings from Segal's Administrative Review:

1. Data Elements: Include, as part of annual meeting with each System, a detailed review of the data elements needed, so that each System will provide the exact information required by the OA.

Status: This is now done.

2. PPMS Data: Meet with each System to review the data elements to be collected through PPMS, and verify that each System will be populating that data correctly.

Status: At the time of the last Administrative Review, PPMS was in the process of being implemented. PPMS is now up and running, and verification that each System is populating PPMS properly has been completed. Thus, this finding is no longer applicable.

3. Collection of Active Data: Establish a mechanism, in conjunction with each System, for secure electronic file transfers to facilitate collection of active data, so that CUNY support is no longer needed.

Status: The OA has plans for establishing a File Transfer Protocol (“FTP”) site to ease the process of securely transferring census data. CUNY support is no longer needed, so the concern about how data is transmitted from CUNY has been resolved.

4. Editing of Active Data: Improve active data editing technology, tracking all data edits by user ID, date and time.

Status: The OA is currently using Access to modify data, but this method does not track edits. It is expected that the new data system will track edits.

5. Rate of Salary: Communicate with each System directly to obtain data elements including rate of salary, rather than relying on the Financial Information Services Agency (FISA) to create a salary file that is sent to CUNY for loading onto the CUNY computer systems, where it is accessed by the OA.

Status: Data now is transmitted from PMS to the OA in the format needed by the OA. The Systems would probably need to get the information from PMS in order to provide it to OA.

6. Expired Labor Contracts: Each System should identify those participants in the valuation data whose benefits have not been finalized due to expired labor contracts. OA should review the feasibility of accounting for non-finalized benefits on an individual basis in the valuation.

Status: Non-finalized benefits are identified in the pensioner data. However, the recommendation regarding accounting for non-finalized benefits on an individual basis is unnecessary. The OA’s aggregate methodology should be equivalent to valuing the non-finalized benefits (due to expired labor contracts) on an individual basis.

7. Pensioner Information: Review data specifications in PPMS to determine if it contains all required valuation data.

Status: PPMS was new at the time of the last Administrative Review, and is now fully operational. The OA participated in the implementation of PPMS, and has confirmed that PPMS contains the required data.

8. Pensioner Record Length: Leverage new technology to accommodate variable-length pensioner records.

Status: This recommendation is no longer applicable. Microsoft Access can handle long record-lengths.

9. Final Data Edits: Communicate data edits back to the Systems so the Systems can correct their information.

Status: The OA now communicates data edits to the Systems.

10. Calculation Spreadsheets: Improve documentation/technology of spreadsheet procedures used for each System's benefit calculations.

Status: The long-term recommendation (20 years ago) was to have the Systems produce and certify the benefit calculations. Having the calculations go through the OA increases the likelihood that the calculations are correct. This recommendation still needs to be done.

There are several recommendations applicable to the OA from the 2003 and earlier prior auditors' reports that had not been resolved at the time of the Segal Administrative Review. Other recommendations from those reports, while referring to the OA, had been resolved, or are no longer applicable. The prior auditor recommendations, which were shown as unresolved in the Segal Administrative Review, are:

1. The OA should evaluate the extent to which the understatement of liabilities on account of ignoring future buy-backs may be offset by the overstatement of liabilities due to the simplified treatment of breaks in service. If the net impact is significant, the OA should make appropriate buy-back assumptions and adjustments for purposes of determining the employer pension contributions.

Status: No action has been taken on this recommendation. In some cases (e.g., FIRE and POLICE) members choose to buy back service at the time they are ready to retire, and in other cases employees do not join the System until they are sure that they intend to spend a long career as a member (in which case, they may be eligible to buy back service, but do not because it is not needed). Because data does exist relating to past service buy-backs, the OA should collect such data for a particular year, determine how prevalent a practice service buybacks are, and determine whether ignoring the buy-backs has created a material actuarial loss in that year. If so, more data can be collected on service buybacks in other prior years, and an assumption for future buy-backs can and should be developed. As of June 30, 2010, some buy-back data has been collected.

2. The Systems should each consider appointing a staff member as a backup to the liaison to the OA who would be able to provide continuity and knowledge in the event the primary liaison is no longer available.

Status: This has not been done. It should be noted, however, that while each System has a primary contact for the OA, there are informal backup contacts for the OA at each of the Systems.

3. a) When an employee transfers from one System to another, the Sending System should send the service and salary record to the Receiving System immediately upon being notified of the transfer. The Receiving System should update the employee's service in its records

immediately upon receipt of information from the Sending System and not wait for the transfer of reserves to be completed.

b) The Receiving Systems generally are not providing updated prior service information in the annual data provided to the OA.

Status: a) Service is now automatically updated by the Receiving System, as a result of legislation.

b) The Receiving Systems now provide the updated service data to the OA.

4. The Systems should provide status reconciliation reports for actives and pensioners along with the valuation data to the OA.

Status: The Systems still do not provide reconciliations to the OA.

5. A group designated by the Office of the Comptroller should meet on a periodic basis to track progress on implementing the recommendations.

Status: No such group has been established, and we understand that there are no plans to do so. However, over the long term, most of the recommendations contained in prior Administrative Review reports have been implemented, especially with the advent of corpus funding at four of the five Systems, and the implementation of PMS and PPMS.

6. The OA should store the large number of hard-copy files that are on-site in fire resistant cabinets. It should also explore the use of imaging technology for electronic storage of hard copy documents.

Status: Many files have been imaged, but more hard copy documents remain. The documents are not stored in fire resistant cabinets.

7. The OA should include or reference a clear outline of plan provisions used for the valuation in the document used to communicate the employer pension contribution to each System.

Status: This is done for FIRE and POLICE, but not the other Systems. The OA has long-term plans to produce actuarial valuation reports for the other Systems.

Appendix A: Acknowledgements

Hay Group expresses its gratitude to the following individuals who helped us in the preparation of the first and second engagement Administrative Review reports:

<u>FIRE</u>	<u>POLICE</u>	<u>TRS</u>	<u>BERS</u>	<u>NYCERS</u>
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Appendix B: NYCERS Benefit Formula Comparisons

Definitions:

Final Average Salary (FAS) – The greater of the average annual *Wages* earned during any three consecutive calendar year periods, or the final 36 months immediately preceding the member's retirement date. But, if the salary earned during any year included in the calculation of the member's FAS exceeds the specific limits for Tier 2, Tier 3 or Tier 4 members, the amount in excess of such limits is excluded from the computation.

Years of Service (YOS)

FAS-5 – final 5-year average salary (as defined under the Valuation Provisions)

FAS-3 – final 3-year average salary (as defined under the Valuation Provisions)

Increased Take Home Pay (ITHP) - Contributions for Tier 1 and Tier 2 members that are contributed by their employer equal to 2% of the members' gross salaries.

Initial Reserve - the total of the Annuity Savings Fund and the Pension Reserve Fund at the time of retirement (as defined by the Tier 1 and Tier 2 SPDs)

Final Compensation –

As defined under the Tier 1 and Tier 2 SPDs –

Final Compensation is the greater of the average earnable or Earned Salary during (a) the 5 year period immediately preceding your retirement; or (b) any consecutive 5 calendar year period prior to your retirement; or (c) any two periods totaling 5 calendar years designated by you. If you became a member after June 17, 1971, the Wages used in this calculation for any year during the 5 year period cannot exceed 120% of the preceding year.

As defined under the CAFR –

The average compensation earned during (a) the five-year period immediately preceding the member's retirement date, or (b) any consecutive five calendar-year period prior to the member's retirement date that would provide for the greatest average compensation.

Issue	Valuation Provisions	CAFR	SPD
Tier 1, Plan A, Service Retirement Eligibility	Eligibility attained through the following: 1. Age 55 (50 for physically taxing) and 25 YOS 2. 20 YOS with benefits payable when would have completed 25 YOS <u>and</u> reached age 55	Same as Valuation Provisions with the phrase "Career Pension Plan Qualifying Service" in place of YOS	Eligibility attained through the following: 1. Age 55 (50 for physically taxing) and 25 years of Career Pension Plan Qualifying Service

Issue	Valuation Provisions	CAFR	SPD
			2. 20 years of Career Pension Plan Qualifying Service with benefits payable when would have completed 25 YOS <u>or</u> reached age 55
Tier 1, Plans A and B, Tier 2 Plans C and D Accidental Disability Retirement Benefit	Benefit calculated using FAS-5 (see definition above)	Benefit calculated using Final Compensation (see definition above)	Same as CAFR (see definition above)
Tier 1, Plans A and B, Tier 2, Plans C and D Accidental Disability Retirement Benefit	If eligible for immediate payability of service retirement, choice of either accidental disability benefit and service retirement benefit	No mention of provision used in valuation (although unlikely that beneficiary would receive a greater benefit under service retirement).	Same as CAFR
Tier 1, Plans A and B, Benefit for death after termination before retirement benefit commences (Death Gamble)	If <20 years credited service, 6 months earnable salary. If at least 20 years credited service and not eligible for deferred retirement, 1 x earnable salary. Plus return of member's accumulated contributions and ITHP	Greater of the ordinary death benefit or Pension Reserve	Greater of the ordinary death benefit or the Initial Reserve
Tier 1, Plans A and B, Accidental Death Benefit	No mention of CAFR provision	Benefit reduced by 100% of workers' compensation	Same as CAFR
Tier 2, Plans A and B, Service Retirement Benefit, Ordinary Disability Benefit	Benefit calculated using Final 3-year average salary	Benefit calculated using FAS	Same as CAFR
Tier 2, Plans C and D, Tier 3, Tier 4, Ordinary Death	Death benefit 2 reduced by 5% per year after age 60 but not less than 50% of the	No reduction after age 60	Same as Valuation Provisions (Tier 3?)

Issue	Valuation Provisions	CAFR	SPD
Benefit	benefit at age 60.		
Tier 2, Plans C and D, Tiers 3 and 4, Ordinary Death Benefit	Death benefits 1 and 2 detailed. Members who elected Death Benefit 1 receive greater of 1 and 2.	Only death benefit 2 detailed	Same as Valuation Provisions. Additionally, as of 1/1/2001, only Death Benefit 2 can be selected. (Tier 3?)
Tier 2, Plans C and D, Accidental Death Benefit	Pension = 50% x FAS-5 plus lump sum equal to balance in Annuity Savings and ITHP funds.	Pension = 50% x Final Compensation plus lump sum of Accumulated Deductions and ITHP, less 100% of Workers' Compensation	Pension = 50% x wages earned in last year of service
Tiers 3 and 4, Service Retirement Benefit, Ordinary and Accidental Disability Benefit; Tier 3 Accidental Death Benefit	Benefit calculated using FAS-3	Benefit calculated using FAS	Same as CAFR
Tier 3 Ordinary Disability Benefit	2% x FAS-3 x credited service (not > 30), not less than 33-1/3% x FAS-3, less 50% x Soc. Sec, less 100% x workers' comp Alternatively, tier 4 benefit if greater	2% x FAS x credited service, not less than 33-1/3% x FAS, less 50% x Soc. Sec, less 100% x workers' comp	2% x FAS-3 x credited service (not > 30), not less than 33-1/3% x FAS-3, less 50% x Soc. Sec, less 100% x workers' comp
Tiers 2 and 4 Alternative Ordinary Death Benefit for pre-7/26/86 Members	Alternative benefit detailed for Tier 4	No alternative benefit detailed	Alternative benefit detailed Tiers 2 and 4
Tiers 3 and 4 Accidental Death Benefit Minimum	Minimum payout = Ordinary Death Benefit	Valuation provision not detailed.	Valuation provision not detailed.

Appendix C: TRS Benefit Formula Comparisons

Definitions:

Annuity Savings Accumulation Fund (ASAF)

Credited Service (CS) – Terminology used in the CAFR and RSSL. Under the CAFR, CS is not defined. Under the RSSL, CS is defined as all service which has been credited to a member pursuant to section six hundred nine of article a5 of the RSSL.

Final Average Salary (FAS) - A calculation used to compute the retirement allowance of TRS members. Calculation defined in chart below

Total Service Credit (TSC) – As defined in the SPD, generally the sum of a member's TRS membership service, transferred service, and credited prior service. Under certain circumstances, members may also be eligible to receive service credit for certain leaves of absence without pay

Years of Service (YOS) – Terminology used in the CAFR and RSSL but undefined.

Years Credited Service (YCS) – Terminology used in the Valuation provisions but undefined

Issue	Valuation Provisions	CAFR	SPD	RSSL
Tiers 1, 2, 3, and 4 Plan Provisions	All Tier provisions detailed	Tier 4 provisions detailed	Tier 3 and 4 provisions detailed	Tier 4 provisions detailed (Article 15 of the RSSL)
Tier 4 Normal Service Retirement Eligibility	Eligibility attained under the following circumstances 1. Age 62, 5 YCS 2. Age 55, 30 YCS 3. After 2/27/2008, new members are eligible at age 55 with 27 YCS (if application submitted) 4. As of 2/27/2008, current members were permitted to join a plan	Same as Valuation provisions with “YCS” replaced by “YOS”	Eligibility attained only under circumstances 1 and 2 of the Valuation provisions with “YCS” replaced by “TSC”	(Article 15, 603) Eligibility attained under the following circumstances 1. Age 62, 5 YCS 2. Age 55, 30 YOS (Missing data from Chapter 274 of the Laws of 1970)

Issue	Valuation Provisions	CAFR	SPD	RSSL
	which allowed for eligibility at age 55 with 25 YCS			
FAS Calculation	Final 3-year average salary (other than Tier 1, which is FAS-1).	Same as SPD	Average of the highest 3 consecutive annual salaries. If the salary earned during any 1 year in the 3 year period exceeds the average of the other two years by more than 10%, the amount in excess of 10% is excluded from the calculation.	(Article 15, 608) Same as SPD
Tier 4 Early Retirement Reduction Factors	Only current set of reduction factors detailed.	Only current set of reduction factors detailed.	Prior to 10/1/2000, reduction factors differed from those currently applied.	(Article 15, 603) Only current set of reduction factors detailed.
All Tier Automatic COLA Eligibility	Beneficiaries receiving accidental death benefits for at least 5 years are eligible.	Same as Valuation provisions.	Beneficiaries receiving accidental death benefits are not eligible.	Same as Valuation provisions.
Tier 4 Ordinary and Accidental Disability Retirement Benefit	Benefit paid as an annuity.	Same as Valuation provisions.	Under certain circumstances, benefit can be received as a lump sum payment.	Same as Valuation provisions.
Tiers 3 and 4	No annuity based	Same as	In addition to	Same as Valuation

Issue	Valuation Provisions	CAFR	SPD	RSSL
Ordinary and Accidental Disability Retirement Benefit	on the ASAF balance is received.	Valuation provisions.	the pension benefit received, an annuity is also received based on the beneficiary's ASAF balance.	provisions.
Tier 4 Accidental Disability Retirement Benefit	Benefit equal to $\frac{2}{3} * \text{FAS-3}$	Benefit equal to the greater of 1. $\frac{2}{3} * \text{FAS}$ 2. $\frac{1}{60} * \text{FAS} * \text{CS}$	Same as Valuation provisions.	Same as Valuation provisions.
Tier 3 Ordinary Disability Retirement Benefit	Greater of Tier 3 or Tier 4 benefit (if eligible)	No Tier 3 benefit provisions detailed	Tier 3 benefit	No Tier 3 benefit provisions detailed (under Article 15 of the RSSL)
Tier 4 Accidental Disability Retirement Benefit	From 6/30/2002-6/30/2003, equal to the Ordinary Disability benefit	Same as SPD.	No distinction made for benefits provided from 6/30/2002-6/30/2003	Same as SPD.
Tier 4 Ordinary Death Benefit	If chose Death Benefit #1, receive the greater of Death Benefit #1 and Death Benefit #2.	No mention of provisions described for the Valuation provisions and SPD.	Same as Valuation provisions. Additionally, after 1/1/2001 only Death Benefit #2 can be chosen.	(Article 15, 606) Same as SPD.
Tier 4 Ordinary Death Benefit Funding	No mention of provision described for the CAFR.	The first \$50,000 of each benefit for death in active service is payable from the Group Term Life Insurance Plan. Amounts in excess of \$50,000 are	Same as Valuation provisions.	Same as Valuation provisions.

Issue	Valuation Provisions	CAFR	SPD	RSSL
		payable by TRS.		
Tier 4 Accidental Death Benefit	Pension equal to 50% * last year's earned wages	Pension equal to 50% * earned wages during last year of actual service	No benefit calculation provided.	(Article 15, 607) Pension equal to 50% * wages earned during last year of actual service

Appendix D: BERS Benefit Formula Comparisons

Definitions:

Earnable Salary - regular annual wages without including any additional compensation, such as overtime pay (per the SPD, Tier 1)

Final Average Salary (FAS)

Final Salary (FS)

Final 3-Year Average Salary (FAS-3)

Final 5-Year Average Salary (FAS-5)

Increased-Take-Home-Pay (ITHP)

Annuity Reserve Fund (ARF) – the fund to which the Annuity Savings Fund is transferred at retirement or death before retirement.

Issue	Valuation Provisions	CAFR	SPD
Tier Provisions	Tiers 1, 2, 3, and 4	Tiers 1, 2, and 4. Relevant regulations are listed for Tier 3.	Tiers 1, 2, 3, and 4
FAS Calculation	Tier 1: Terminology generally used is “FS” but undefined. Tiers 2, 3, and 4: Terminology generally used is “Final 3-year average salary” or “FAS-3” but undefined.	Tier 1: Terminology of “FS” used. Defined as the salary earnable in the year ending on the date of retirement or alternatively, the average annual compensation during any 3 calendar years designated by the member. Tier 2: Terminology of “FS” used. Defined as the average salary earned during any three consecutive years which provides the highest average salary. If the salary earned during any year included in the 3-year period, however, exceeds that of the previous 2 years by more than 20%, the amount in excess of 20% will be excluded from the computation of FAS. Tier 4: Terminology of	Terminology of “FAS” used. Definitions are the same as those in the CAFR.

Issue	Valuation Provisions	CAFR	SPD
		“FAS” used. Definition is the same as Tier 2 definition of “FS” except that amount in excess of 10% is excluded.	
Tiers 1, 3, and 4 COLA	COLA detailed for all Tiers.	COLA detailed for Tiers 1 and 2. Applicable regulations are listed for Tiers 3 and 4.	States that retirement benefits are subject to periodic COLAs. For Tier 2, a portion of the provisions are listed.
Tier 4 Accidental Death Benefit	Pension equal to 50% last year’s earned wages.	Same as Valuation Provisions	Pension equal to 50% last year’s earned wages or 50% of annual wage rate if service < 1.
Tier 4 Alternate Ordinary Death Benefit for pre-7/26/86 members	Lump sum or annuity based on 1/2 x last 12 months’ earnings x service (not > 36 months)	No alternate death benefit detailed	Lump sum or annuity based on 1/12 x last 12 months’ earnings x credited service (not > 36 months)
Tiers 2, 3, and 4 Death Benefit after termination before retirement benefit commences	50% of ordinary death benefit in active service plus return of member’s regular accumulated contributions	No benefit detailed	50% of ordinary death benefit in active service
Tier 3 Ordinary Disability Retirement Benefit	Greater of: 1. 2% * FAS-3 * credited service (not > 30) 2. 1/3 * FAS-3, less 50% of Social Security, less 100% of workers’ comp	No Tier 3 provisions	Greater of: 1. 2% * FAS * credited service (not > 30), less 50% of Social Security, less 100% of workers’ comp 2. 1/3 * FAS, less 50% of Social Security, less 100% of workers’ comp
Tier 3 Ordinary Death Benefit Maximums	Maximum Benefit: service =1, \$45,500; service =2, \$91,000; service =3 or more, \$113,800 (may differ from SPD due to COLAs)	No Tier 3 provisions	Maximum Benefit: service =1, \$38,400; service =2, \$76,700; service =3 or more, \$95,900
Tier 1, Plan A	2.2% * FS * service	2.2% * FS * years of	2.2% * FAS * years of

Issue	Valuation Provisions	CAFR	SPD
Service Retirement Benefit with Service < 25 but >= 20	deferred to age 55 and 25 years	Service (not > 25) , offset by an annuity based on the Minimum Required Amount, + an annuity based on the accumulated deductions	qualifying Service, offset by an annuity based on the Minimum Required Amount, + ITHP pension based on actuarial value of ITHP Reserve Fund + annuity based on the actuarial value of ARF
Tier 1 Ordinary Disability Retirement Benefit	Workers' Compensation Benefits are not deducted from the benefit	Same as Valuation Provisions	Workers' Compensation Benefits are deducted from the benefit
Tiers 1 and 2 Accidental Death Benefit	Workers' Compensation Benefits are not deducted from the benefit	Workers' Compensation Benefits are deducted from the benefit	Same as CAFR
Tiers 1 and 2 Accidental Disability Retirement Benefit	Benefit calculated based on FAS-5 (Final 5-year average salary)	Benefit calculated based on Final Compensation	Same as CAFR
Tiers 2 and 4 Ordinary Death Benefit Eligibility	No service requirement	Same as Valuation Provisions	1 year of credited service
Tiers 1, 2, and 4 Ordinary Death Benefit Funding	No mention of provision described in the CAFR.	The first \$50,000 of each benefit for death in active service is payable from the Group Term Life Insurance Plan. Amounts in excess of \$50,000 are payable by the retirement system.	No mention of provision described in the CAFR.
Tiers 1, 2, and 3 Accidental Death Benefit	Pension calculated based on FAS-5 for Tiers 1 and 3 and FAS-3 for Tier 2	Pension calculated based on FAS for Tiers 1 and 2 (no Tier 3 provisions)	Pension calculated based on Final Compensation for Tier 1 and 2 and FAS for Tier 3.

Appendix E: POLICE Benefit Formula Comparisons

Definitions:

Final Salary (FS) – is member's final rate of base pay and holiday pay on the last day paid plus any overtime, night differential and worked vacations that are earned in the twelve (12) months preceding the retirement date plus longevity as follows. For officers with (25) or more years of pensionable service, the salary at the twenty (20) year longevity level will be used in pension computation.

Final Average Salary (FAS) – pensionable compensation earned during the final (12) months immediately preceding member's retirement date or the average of the final thirty-six (36) months immediately preceding member's retirement date, or the average of the best three consecutive calendar years of pensionable earnings, whichever is greater.

Pensionable compensation (PC) excludes longevity.

Final Compensation (FC) - the average annual compensation earnable by a member for city-service during his or her last five years of city-service, or during any other five consecutive years of city-service since he or she last became a member which such member shall designate. (admin code 13-214)

Limitation on PC: compensation for the final year cannot exceed 120% of the previous (12) months or when 3 years used no year can exceed 120% of the average of the two (2) previous years

Note: For members appointed after 7/1/2000, FAS is the pensionable compensation earned in the final (12) months of service

L5E – Average annual earnings over the last 5 years

Other Credited Service (OCS) – in years and days

Allowable Service (AS)

Annual Earnable Compensation (AEC) – This is the compensation definition used in the Admin Code, but it is not defined.

Final Year's Salary (FYS) – Last 12 months of earnings

SSI – Social Security pension

Total Service (TS) – total service (AS + OCS) at time of retirement

Shortages – annuity value of shortages in a member's pension account

The annuity value of ITHP reserve account – employee Increased Take-Home Pay contributions

(AITHP) – accumulation in excess of your required amount of member contributions remaining in your account at retirement converted to annuity.

Salary_x – Salary in year x

Accumulated Deductions – Employee Contributions plus interest earnings

Required Contributions - The amount of accumulated deductions including interest earned on these contributions that should be in the fund at the member's 20th anniversary.

Valuation Report Service Definitions:

Tier 1: Final Salary (“FS”). The contract rate of base pay and holiday pay on the last day paid plus any overtime, night differential and worked vacation earned in the previous 12 months plus applicable longevity pay.

Note: For members appointed on or after June 17, 1971, the pensionable compensation for the final year of service is limited to 120% of the pensionable compensation for the year immediately preceding the final year (the “Kingston Law”).

Tier 2: Final Average Salary (“FASR”). Total pensionable compensation (wages, overtime, night differential, worked vacation, etc.) a member earned during the twelve (12) months preceding the date of retirement not in excess of 120% of the immediate previous twelve months pensionable compensation.

Note: If greater, FASR would equal the greatest average three consecutive year pensionable compensation where each year’s salary cannot exceed 120% of the average of the two previous years.

Issue	ACNY	SPD	CAFR	Valuation Report
Salary in Tiers I & II Service Retirement Benefit	$50\% * AEC + \frac{1}{60} * \sum_{x=21}^{\infty} Salary_x + 0.75 * \frac{1}{60} * FC * OCS - \text{Shortages} + \text{ITHP reserve annuity}$	<p>Has FS in first part of formula for Tier I and FAS for Tier II</p> <p>Both: Has L5E instead of FC in OCS piece</p>	Same as SPD, except no OCS piece	Has no description of OCS part of formula. Instead of “AEC” in first part, has FS for Tier I or FASR for Tier II
Tiers I & II Vested Retirement Benefit	<p>$(1/40) * AEC * AS + 0.75 * \frac{1}{60} * FC * OCS + \text{annuity for all accumulated contributions}$</p> <p>Admin Code has vested benefit for employees hired on or after 7/1/1969.</p>	<p>NO VESTED BENEFIT FOR TIER I</p> <p>Has FAS in first piece of formula</p> <p>Both Tiers: Has L5E instead of FC in OCS piece and end piece is: – Shortages + ITHP reserve annuity instead of the annuity for all contributions</p>	<p>Does not exclude Tier I from receiving benefit</p> <p>Same as SPD for Tier II, with no OCS piece</p>	Similar to SPD, but no description of OCS part of formula. Instead of “AEC” in first part, has FS for Tier I or FASR for Tier II

Issue	ACNY	SPD	CAFR	Valuation Report
Tiers I & II Ordinary Disability Retirement Benefit	Annuity for all accumulated contributions + ITHP reserve annuity + minimum benefit of $\frac{1}{3} * \text{AEC}$ with less than 10 years of TS or $\frac{1}{2} * \text{AEC}$ with at least 10 years of TS	Has FS for Tier I and FAS for Tier II instead of AEC Has: – Shortages + ITHP reserve annuity instead of the annuity for all contributions for first piece	Same as SPD, except no provisions for annuity for accumulated contributions or ITHP reserve	Similar to SPD, but instead of “AEC,” has FS for Tier I or FASR for Tier II
Tiers I + II Accidental Disability Retirement Benefit	Annuity for all accumulated contributions + ITHP reserve annuity + $0.75 * \text{AEC}$	Has FS for Tier I and FAS for Tier II instead of AEC Also adds $\frac{1}{60} * \sum_{x=21}^{\infty} \text{Salary}_x$	Same as SPD	Similar to SPD, but instead of “AEC,” has FS for Tier I or FASR for Tier II
Tier I Ordinary Death Benefit With Less Than 10 Years of Credited Service	Lump sum of: Final six months earnings + LS of accumulated employee contributions (including ITHP City contribution)	Not included in the SPD	Same as Admin Code, first \$50,000 of payment comes from Group Life Insurance Plan (not the Pension Plan)	Lump sum of: $0.5 * \text{FS}$, first \$50,000 of payment comes from Group Life Insurance Plan (not the Pension Plan)
Tier I Ordinary Death Benefit with At Least 10 Years of Service	Lump sum of: Final 12 months earnings + LS of accumulated employee contributions (including ITHP City contribution)	Not included in the SPD	Same as Admin Code, first \$50,000 of payment comes from Group Life Insurance Plan (not the Pension Plan)	Lump sum of: $1.0 * \text{FS} + \text{LS}$ payment of employee contributions and ITHP account (plus interest for Improved Benefits Plan), first \$50,000 of payment comes from Group Life Insurance Plan (not the Pension Plan)

Issue	ACNY	SPD	CAFR	Valuation Report
Tier II Ordinary Death Benefit (less than 20 years of service)	Lump sum of: 3 * [TRUNC(last 12 months salary – 1, -3) + 1000] + LS payment of employee contributions (from RSSL)	Same	Same as Admin Code, first \$50,000 of payment comes from Group Life Insurance Plan (not the Pension Plan)	Same, with first \$50,000 of payment coming from Group Life Insurance Plan (not the Pension Plan)
Tiers I & II Death Gamble Benefit	If a member was eligible for service retirement at the time of death, the benefit is computed as though the member had retired the day before death. The member's designated beneficiary will be eligible to receive an amount equal to the reserve for the service retirement allowance that would have been payable had retirement occurred on the day before death. If the designated beneficiary predeceases the member, this benefit is paid to the member's estate.	Same	Not in CAFR	Not in Valuation Report

Issue	ACNY	SPD	CAFR	Valuation Report
Tier II Ordinary Death Benefit from Terminated Vested With Less Than 10 Years of Vesting	LS payment of employee contributions	Same	Same as Admin Code	Not mentioned
Tier II Ordinary Death Benefit from Terminated Vested With More Than 10 Years of Vesting	½ of Ordinary Death Benefit payable as of member's last day of service (RSSL)	Not mentioned	Same as Admin Code	Not mentioned
Tiers I & II Accidental (Line of Duty) Death Benefit	0.5 * FC + LS pmt of ITHP contributions + LS pmt of employee contributions	Same for Tier I For Tier II, additional benefit of FYS – SSI – 0.5 * FC, where COLAs on FC are subtracted from the additional benefit		Instead of FS, uses L5E, otherwise same as Admin Code

Appendix F: FIRE Benefit Formula Comparisons

Definitions:

Final Compensation (FC) – Original Plan Only – Annual salary at date of retirement

Final Average Salary (FAS) – Improved Plan Only – highest average salary over a consecutive 5-year period

L5E – Original Plan Only – Average annual earnings over the last 5 years

Other Credited Service (OCS) – in years and days

Allowable Service (AS)

Total Service (TS) – total service (AS + OCS) at time of retirement

Shortages – annuity value of shortages in a member's pension account

Salary_x – Salary in year x

EECWI – employee contributions with interest

Valuation Report Service Definitions:

Tier 1: Final Salary ("FS"). The contract rate of base pay and holiday pay on the last day paid plus any overtime, night differential and worked vacation earned in the previous 12 months plus applicable longevity pay.

Note: For members appointed on or after June 17, 1971, the pensionable compensation for the final year of service is limited to 120% of the pensionable compensation for the year immediately preceding the final year (the "Kingston Law").

Tier 2: Final Average Salary ("FASR"). Total pensionable compensation (wages, overtime, night differential, worked vacation, etc.) a member earned during the twelve (12) months preceding the date of retirement not in excess of 120% of the immediate previous twelve months' pensionable compensation.

Note: If greater, FASR would equal the greatest average three consecutive year pensionable compensation where each year's salary cannot exceed 120% of the average of the two previous years.

Issue	ACNY	SPD	Valuation Report
Salary in Tiers I & II Original Plan Service Retirement Benefit	$50\% * FC + 1/60 * \sum_{x=21}^{\infty} Salary_x - \text{Shortages} + (\text{for OCS only}) \max[(1/60 * \sum_{x=21}^{\infty} Salary_x \frac{TS - 20}{TS - 20} * OCS), (1/80 * FAS * OCS)]$	<p>Tier II: Has FAS for first piece of formula</p> <p>Both: Has L5E instead of FAS in OCS piece</p>	Has no description of OCS part of formula. Instead of “FC” in first part of formula, has FS for Tier I or FASR for Tier II
Salary in Tiers I & II Improved Benefits Plan Service Retirement Benefit	$50\% * FAS + 1/60 * \sum_{x=21}^{\infty} Salary_x - \text{Shortages} + (\text{for OCS only}) 1/80 * FAS * OCS + \text{excess or (shortfall) EECWI converted to annuity}$	<p>Tier I: Has FC for first piece of formula</p> <p>Both: Has L5E instead of FAS in OCS piece</p>	Has no description of OCS part of formula. Instead of “FAS” in first part, has FS for Tier I or FASR for Tier II
Tier II Improved Benefits Plan Vested Retirement Benefit	$(1/40) * FAS * AS + \text{excess or (shortfall) EECWI converted to annuity} + (\text{for OCS only}) (1/80 * FAS * OCS)$	Has L5E instead of FAS in OCS piece	Has no description of OCS part of formula. Instead of “FAS” in first part, has FS for Tier I or FASR for Tier II
Tiers I & II Original Plan Ordinary Disability Retirement Benefit	$TS * FC / 40 - \text{Shortages}$	<p>Tier II: Has FAS for first piece of formula</p> <p>Both: Has OCS-only piece: $\max[(1/60 * \sum_{x=21}^{\infty} Salary_x \frac{TS - 20}{TS - 20} * OCS), (1/80 * L5E * OCS)]$</p>	Formula is: $AS * [FS \text{ (Tier I) or FASR (Tier II)}] / 40$, with a minimum benefit of $1/3 * FAS$ with less than 10 years of TS or $1/2 * TS$ with at least 10 years of TS
Tier I Improved Benefits Plan Ordinary Disability Retirement Benefit	$TS * FC / 40 - \text{Shortages} + \text{lump sum of all excess employee contributions with interest}$	Has FAS for first piece of formula	Beginning of Formula is: $AS * [FS \text{ (Tier I) or FASR (Tier II)}] / 40$, with a minimum benefit of $1/3 * FAS$ with less than 10 years of TS or $1/2 * TS$ with at

Issue	ACNY	SPD	Valuation Report
			least 10 years of TS
Tier II Improved Benefits Plan Ordinary Disability Retirement Benefit With Less Than 10 Years of Allowable Service	$(1/3) * FC - \text{Shortages} + \text{lump sum of all excess employee contributions with interest}$	Has FAS for first piece of formula	Beginning of Formula is: $AS * \max[\text{FASR (Tier II)} / 40, 1/3 * \text{FAS}]$
Tier II Improved Benefits Plan Ordinary Disability Retirement Benefit With At Least 10, But Less Than 20 Years of Allowable Service	$0.5 * FC - \text{Shortages} + \text{lump sum of all excess employee contributions with interest}$	Has FAS for first piece of formula	Beginning of Formula is: $AS * \max[\text{FASR (Tier II)} / 40, 1/2 * \text{TS}]$
Tier II Improved Benefits Plan Ordinary Disability Retirement Benefit With At Least 20 Years of Allowable Service	$TS * FC / 40 - \text{Shortages} + \text{lump sum of all excess employee contributions with interest}$	Has FAS for first piece of formula	Has FASR for first part of formula
Tiers I + II Original Plan Accidental Disability Retirement Benefit	$0.75 * FC + 1/60 * \sum_{x=21}^{\infty} \text{Salary}_x + \text{either LS payment or actuarially equivalent annuity of employee contributions}$	Both: Has OCS only piece: $\max[(1/60 * \sum_{x=21}^{\infty} \text{Salary}_x / (TS - 20) * \text{OCS}), (1/80 * \text{L5E} * \text{OCS})]$ and can only receive LS pmt of employee contribs	Instead of “FC” in first part of formula, has FS for Tier I or FASR for Tier II and can only receive LS payment of employee contributions
Tiers I + II Improved Benefits Plan Accidental Disability Retirement Benefit	$0.75 * FC + 1/60 * \sum_{x=21}^{\infty} \text{Salary}_x + \text{ITHP reserve annuity} + \text{accumulated deductions annuity} - \text{Shortages}$	No differences	Instead of “FC” in first part of formula, has FS for Tier I or FASR for Tier II and does not include deduction of shortages
Tier I Original & Improved Benefits Plans Ordinary Death Benefit With Less Than 10 Years of Credited Service	Lump sum of: Final six months earnings + LS of accumulated employee contributions (including ITHP City contribution)	Not included in the SPD	Lump sum of: $0.5 * \text{FS}$, first \$50,000 of payment comes from Group Life Insurance Plan (not the Pension Plan)

Issue	ACNY	SPD	Valuation Report
Tier I Original & Improved Benefits Plans Ordinary Death Benefit with At Least 10 Years of Service	Lump sum of: Final 12 months earnings + LS of accumulated employee contributions (including ITHP City contribution)	Not included in the SPD	Lump sum of: $1.0 * FS + LS$ payment of employee contributions and ITHP account (plus interest for Improved Benefits Plan), first \$50,000 of payment comes from Group Life Insurance Plan (not the Pension Plan)
Tier II Original & Improved Benefits Plans Ordinary Death Benefit (less than 20 years of service)	Lump sum of: $3 * [TRUNC(\text{last 12 months salary} - 1, -3) + 1000] + LS$ pmt of employee contributions (plus interest for Improved Benefits Plan) (RSSL)	Same	Same, with first \$50,000 of payment coming from Group Life Insurance Plan (not the Pension Plan)
Tier II Original & Improved Benefits Plans Ordinary Death Benefit from Terminated Vested With Less Than 10 Years of Vesting	LS payment of employee contributions (plus interest for Improved Benefits Plan)	Same	Not mentioned
Tier II Original & Improved Benefits Plans Ordinary Death Benefit from Terminated Vested With More Than 10 Years of Vesting	$\frac{1}{2}$ of Ordinary Death Benefit payable as of member's last day of service (RSSL)	Not mentioned	Not mentioned
Tiers I & II Original & Improved Benefits Plans Accidental (Line of Duty) Death Benefit	$0.5 * FC + \frac{1}{60} * \sum_{x=21}^{\infty} \text{Salary}_x + LS$ payment of ITHP contributions + LS payment of employee contributions	Same	Instead of "FC" in first part of formula, has FS for Tier I or FASR for Tier II and does not include deduction of shortages and formula does not include " $\frac{1}{60}$ "

Issue	ACNY	SPD	Valuation Report
			* $\sum_{x=21}^{\infty} Salary_x$ ”