December 5, 2011

City of New York - New York City Retirement Systems
Final Experience Study Report

Appendix 1 – More on Hay Group Demographic Studies

Second Engagement

HayGroup®

Prepared By:

Hay Group, Inc.
Harborside Financial Center
2310 Plaza Five
Jersey City, NJ 07311-4013

HayGroup®

Appendix 1

More on Hay Group

Demographic Studies

HayGroup®

Appendix 1 – Table of Contents

More on Hay Group Demographic Studies

Hay Group Basic Rules & Procedures Underlying Experience Studies for TRS @ August 7, 2009

A. TRS Experience Study Data File (in Microsoft Access)

A1. Data Record Elements & Layout

The data record layout which follows, as noted in the heading, is the layout AFTER Hay Group reviewed the TRS 6/30/06 and 6/30/07 actuarial valuation data provided by the OA and added the following new fields: Plan07, Plan06, Tier07, Tier06, Status 2007, Status 2006, salary_base07, salary_base06, salary_overtime07, salary_overtime06, TSvc07, TSvc06, ACTSvc07, ACTSvc06, PENSvc07 and PENSvc06. While the values entered into most of these fields were straight pickups of the corresponding valuation data elements, special handling was required for certain fields (as described more fully at the end of the layout below).

The only adjustments made to the fields included in the "original" TRS experience study data file (i.e., the file underlying the prior auditor's final experience study, BEFORE Hay Group appended new data) were a limited number of retroactive Status code changes that Hay Group made through our automated mass edits to "mature" the data for experience study purposes.

TRS Experience Study Data Record Layout (in Microsoft ACCESS) (After Hay Group appends for 2006 and 2007)

UID	memnum	penum	member_type	valgrp_liability_id	member_indiv_id	Plan07

Plan06	Plan05	Plan04	Plan03	Plan02	Plan01	

		Tier07	Tier06	Tier05	Tier04	Tier03

Tier02	Tier01	GRS_Tier	VALGRP_ID	ssn	gender	Ben_Gen

DOB	DOBB	DOH	DOD	DOT	DOR	DOCB

DOM	DOW	DODB			Status2007	Status2006

Status2005	Status2004	Status2003	Status2002	Status2001	Status2000	Status1999

Status1998	Status1997	Status1996	Status1995	Status1994	Status1993	Status1992

Status1991	Status1990	Status1989	Status1988	Status2001_OA	Status2001_GRS	salary_OARate01

salary_OAOT01	salary_base07	salary_overtime07	TSvc07	ACTSvc07	PENSvc07	salary_base06

salary_overtime06	TSvc06	ACTSvc06	PENSvc06			

		salary_base05	salary_overtime05	TSvc05	salary_base04	salary_overtime04
TSvc04	salary_base03	salary_overtime03	TSvc03	salary_base02	salary_overtime02	TSvc02

salary_base01	salary_overtime01	TSvc01	salary_base00	salary_overtime00	service_standard_bft00	salary_base99

salary_overtime99	service_standard_bft99	salary_base98	salary_overtime98	service_standard_bft98	salary_base97	salary_overtime97

service_standard_bft97	salary_base96	salary_overtime96	service_standard_bft96	salary_base95	salary_overtime95	service_standard_bft95

salary_base94	salary_overtime94	service_standard_bft94	salary_base93	salary_overtime93	service_standard_bft93	salary_base92

salary_overtime92	service_standard_bft92	salary_base91	salary_overtime91	service_standard_bft91	salary_base90	salary_overtime90

service_standard_bft90	salary_base89	salary_overtime89	service_standard_bft89	salary_base88	salary_overtime88	service_standard_bft88

pensvc05	pensvc04	pensvc03	pensvc02	pensvc01

The fields that Hay Group added that required special handling and a brief description of that special handling follow:

Status2007 & Status2006: Hay Group assigned these two status codes utilizing the "appends approach" described in detail in Section B below.

ACTSvc07 and ACTSvc06: These fields were created for the first time by Hay Group only for 2007 and 2006 new retirees, respectively. The values entered into these fields were the years of Service shown in the active valuation data for 2007 and 2006, respectively.

PENSvc07 and PENSvc06: These fields were created for the first time by Hay Group, again, only for 2007 and 2006 new retirees, respectively. The values entered into these fields were the years of Service shown in the retiree valuation data for 2007 and 2006, respectively.

TSvc07 and TSvc06: The values entered by Hay Group into these fields, which, along with TSvc05, TSvc04, TSvc03, etc., are used in our studies to measure a member's service for benefit eligibility purposes, were as follows:

TSvc07 = Maximum of ACTSvc07 and PENSvc07 and

TSvc06 = Maximum of ACTSvc06 and PENSvc06

These new steps (different from steps taken by prior auditors, to the best of our knowledge) were taken by Hay Group to capture the higher level of service that often emerges at the time of a member's retirement (due to purchased service, transferred service, etc), which may not be reflected in the member's last active data record.

A2. Status Field & Code Meanings

One of the most critical fields on this data file for experience study purposes is the Status field. The meanings of the various status codes, as communicated to Hay Group by the prior auditor, are as shown in the following table.

Experience Study Data File Status Codes & Meanings

Status Code	Description	Comment
A	Active	
B1	Beneficiary of Retiree	
B2	Beneficiary of Ordinary Death	
B3	Beneficiary of Accidental Death	
B4	Beneficiary of Ordinary Disability	
B5	Beneficiary of Accidental Disability	
D	Dead	
D1	Ordinary Death w/o Ben	
D2	Accidental Death w/o Ben	
F	Active-Inactive	
I	Ordinary Disability	
J	Accidental Disability	
L	Lump Sum	
P	Duplicate	
Q	Reduced Service Retirement	
R	Service Retiree	
S	Retiree from Vested	
T	Terminated Non-Vested	
U	5 year out	
V	Deferred Vested	
WI	Missing Ordinary Disability	Terminations showing up on withdrawal table but not on valuation tables
WJ	Missing Accidental Disability	Terminations showing up on withdrawal table but not on valuation tables
WR	Missing Service Retirement	Terminations showing up on withdrawal table but not on valuation tables
WS	Missing Retirement from Vested	Terminations showing up on withdrawal table but not on valuation tables
Y	Transfer out of system	
Z	Refunded	

B. Adding TRS 2006 and 2007 Data - Hay Group Appends Approach

Hay Group Approach to Assigning 2006 & 2007 Status Codes for TRS Experience Study		
Status Code Assigned	**Meaning**	**Valuation Data Criteria Used to Make Status Assignment**
A	Active	MSTATC = 10 on Active Table
B1	Beneficiary of Retiree	Retcause is 0 or 3 on pensioner table and PAYEEPEN is 2, 3 or blank
B2	Beneficiary of Ordinary Death	Retcause is 7 on pensioner table and PAYEEPEN is 2, 3 or blank
B3	Beneficiary of Accidental Death	Retcause is 4 on pensioner table and PAYEEPEN is 2, 3 or blank
B4	Beneficiary of Ordinary Disability	Retcause is 2 on pensioner table and PAYEEPEN is 2, 3 or blank
B5	Beneficiary of Accidental Disability	Retcause is 1 on pensioner table and PAYEEPEN is 2, 3 or blank
D	Dead	Death of an active employee, or death of a retiree with no beneficiary, or a death of beneficiary of a retiree
D1	Ordinary Death w/o Ben	MSTATC = 60 on Active table, no beneficiary on pensioner table
D2	Accidental Death w/o Ben	MSTATC = 61 on Active table, no beneficiary on pensioner table
F	Active-Inactive	MSTATC = 20 on Active table
I	Ordinary Disability	Retcause is 2 on pensioner table and PAYEEPEN is 0 or 1
J	Accidental Disability	Retcause is 1 on pensioner table and PAYEEPEN is 0 or 1
L	Lump Sum	NOT USED
P	Duplicate	Duplicate record on the experience study data; status 2, 8 or 9 on active table
Q	Reduced Service Retirement	NOT USED by Segal, used status R and reduced early retirement eligibility criteria instead
R	Service Retiree	Retcause is 3 on pensioner table and PAYEEPEN is 0 or 1
S	Retiree from Vested	Retcause is 0 on pensioner table and PAYEEPEN is 0 or 1
T	Terminated Non-Vested	MSTATC = 80 on active table
U	5 year out	Last year on payroll is at least 5 years away
V	Deferred Vested	MSTATC = 10 on Terminated Vested table and MSTATC = 81 on active table if new terminated vested
WI	Missing Ordinary Disability	MSTATC = 10, MSTATP = 70 on pensioner table, with retcause = 2, PAYEEPEN is blank, 0 or 1 if retiree, or 2 or 3 if beneficiary of retiree
WJ	Missing Accidental Disability	MSTATC = 10, MSTATP = 70 on pensioner table, with retcause = 1, PAYEEPEN is blank, 0 or 1 if retiree, or 2 or 3 if beneficiary of retiree
WR	Missing Service retirement	MSTATC = 10, MSTATP = 70 on pensioner table, with retcause = 3, PAYEEPEN is blank, 0 or 1 if retiree, or 2 or 3 if beneficiary of retiree
WS	Missing retirement from vested	MSTATC = 10, MSTATP = 70 on pensioner table, with retcause = 0, PAYEEPEN is blank, 0 or 1 if retiree, or 2 or 3 if beneficiary of retiree
Y	Transfer out of system	Status = 3 on active table, transfer to another CONY pension plan
Z	Refunded	NOT USED

C. Measuring TRS Exposures and Actual Occurrences – Status Code Testing Criteria

C1. Exposures and Actual Occurrences for Demographic Assumption Studies

For each of the demographic assumption studies, we counted total exposures and total actual occurrences (i.e., actual withdrawals, deaths, disabilities, and retirements).

Counting Exposures: First, for each fiscal year included in the study, we tested each record on the experience study data file that had a status code (i.e., each record for which the applicable status code was non-blank) as of the beginning of the fiscal year to determine whether the record (member) met the exposure criteria (as described below in Item C5) to be counted as an exposure for that year. That is, to study the experience of fiscal year Z, we tested the contents of the status field corresponding to fiscal year (Z-1), which is the status as of 6/30/Z-1. If the exposure criteria was met, the exposure count was increased by 1. If the exposure criteria was not met, that member was not counted as an exposure and could not possibly be counted as an actual occurrence for that fiscal year.

Counting Actual Occurrences: Next, for each member who met the exposure criteria as of the beginning of the fiscal year, we tested the status code as of the end of the fiscal year to determine whether the member met the actual occurrence criteria (as described below in Item C5). If the actual occurrence criteria was met, the actual occurrence count was increased by 1.

For example: For a member to be counted as an exposure in fiscal year Z of our study of active member withdrawals, a member's record had to include a status of "A" (Active) in the status field for fiscal year (Z-1). For that same member to also be counted as an actual occurrence (withdrawal) in fiscal year Z, that member's record had to include a status of either "T" (Terminated Non-Vested) or "V" (Deferred Vested) in the status field for fiscal year Z.

Exposures and Actual Occurrences by Age/Service: Since the demographic actuarial assumptions being studied (all of which come from the tables of actuarial assumptions currently being utilized by the OA for their annual actuarial valuations) are probabilities based upon either the member's age (which is the case for all the demographic assumptions other than the active member withdrawal assumptions) or the member's years of service (which is the case for only the active member withdrawal assumptions), depending upon the assumption being studied, the counts of exposures/occurrences were subdivided into counts based upon the member's age or years of service in the fiscal year of the exposure/occurrence. Depending upon the System and the specific assumption being studied, further sub counts of exposures/occurrences were determined by gender and/or tier and/or other member criteria.

C2. Salary Increase and Overtime Pay Studies

For each of the salary increase and overtime pay studies, for each fiscal year included in the study, we tested each record (member) on the experience study data file to determine whether the member met the exposure criteria to be counted as an exposure (i.e., to have their pay

information included in the study) for that year. Unlike the demographic studies, for these pay-based studies, both the beginning of year status and the end of year status had to meet the exposure criteria in order for the member to be included in that year's pay study.

Salary Increase Studies: To be counted as an exposure for fiscal year Z, a member had to be active as of both the beginning and the end of the fiscal year. That is, the record had to include a status of "A" (Active) in both the status field for fiscal year Z-1 and the status field for fiscal year Z. If both these criteria were met, the study included the member's salaries as of both the beginning and the end of fiscal year Z.

Overtime Pay in All Years Studies: To be counted as an exposure for fiscal year Z, a member had to be active as of both the beginning and the end of fiscal year Z; however, if the member retired in the following fiscal year [i.e., the member's status field for fiscal year Z+1 was "R", "Q" or "WR" (Service Retiree) or "I" or "WI" or "J" or "WJ" (Disability Retiree)], the member was ruled ineligible for this study, but instead was included in one of the other overtime pay studies. If these criteria were met (namely, active as of both the beginning and end of the fiscal year, but NOT retired as of the end of the following fiscal year), the member's overtime pay for fiscal year Z, as well as the member's salaries as of both the beginning and end of fiscal year Z (for purposes of measuring overtime pay as a percentage of base salary) were included in the study.

Overtime Pay in Year Before Service Retirement Studies: To be counted as an exposure for fiscal year Z, a member had to be active as of both the beginning and the end of fiscal year Z and had to be a service retiree in the following fiscal year [i.e., the member's status field for fiscal year Z+1 had to be "R", "Q" or "WR" (Service Retiree)]. If these criteria were met, the member's overtime pay for fiscal year Z, as well as the member's salaries as of both the beginning and end of fiscal year Z (for purposes of measuring overtime pay as a percentage of base salary) were included in the study.

Overtime Pay in Year Before Disability Retirement Studies: To be counted as an exposure for fiscal year Z, a member had to be active as of both the beginning and the end of fiscal year Z and had to be a disability retiree in the following fiscal year [i.e., the member's status field for fiscal year Z+1 had to be "I" or "WI" or "J" or "WJ" (Disability Retiree)]. If these criteria were met, the member's overtime pay for fiscal year Z, as well as the member's salaries as of both the beginning and end of fiscal year Z (for purposes of measuring overtime pay as a percentage of base salary) were included in the study.

C3. Actual to Expected Ratio (A/E)

Actual: Counts of actual occurrences (or pay levels in the case of the pay-based studies) were determined following the rules described in Items C1 & C2 above.

Expected: (i) For the demographic assumption studies, counts of expected numbers of occurrences were developed by multiplying the appropriate age-based (or service-based) probabilities (from the tables of actuarial assumptions currently used for the TRS annual actuarial valuations) times the corresponding age-based (or service-based) counts of exposures, as determined following the rules/procedures described in Item C1 above. Again, depending upon the System and the specific assumption being studied, additional counts of "expecteds" were determined based upon member gender and/or tier and/or other member criteria. (ii) For the salary increase and overtime pay studies, expected salaries (or overtime pay levels) were determined by applying percentages of pay based upon the salary increase and overtime pay assumptions currently being used for the TRS annual actuarial valuations.

Actual-to-Expected Ratio (A/E): For the demographic assumption studies, the actual-to-expected ratio is the ratio of the total actual occurrences to the total expected occurrences. For the salary increase assumption study, the actual-to-expected ratio is the ratio of the actual salary increase to the expected salary increase. For the overtime pay assumption studies, the actual-to-expected ratios are the ratios of the actual overtime pay to the expected overtime pay.

C4. Status Codes & Meanings (as provided by prior auditor)

Status Code	Description	Comment
A	Active	
B1	Beneficiary of Retiree	
B2	Beneficiary of Ordinary Death	
B3	Beneficiary of Accidental Death	
B4	Beneficiary of Ordinary Disability	
B5	Beneficiary of Accidental Disability	
D	Dead	
D1	Ordinary Death w/o Ben	
D2	Accidental Death w/o Ben	
F	Active-Inactive	
I	Ordinary Disability	
J	Accidental Disability	
L	Lump Sum	
P	Duplicate	
Q	Reduced Service Retirement	
R	Service Retiree	
S	Retiree from Vested	
T	Terminated Non-Vested	
U	5 year out	
V	Deferred Vested	
WI	Missing Ordinary Disability	Terminations showing up on withdrawal table but not on valuation tables
WJ	Missing Accidental Disability	Terminations showing up on withdrawal table but not on valuation tables
WR	Missing Service Retirement	Terminations showing up on withdrawal table but not on valuation tables
WS	Missing Retirement from Vested	Terminations showing up on withdrawal table but not on valuation tables
Y	Transfer out of system	
Z	Refunded	

C5. Exposure and Actual Occurrence Criteria

For Studies 1-11, the following table shows:
Required BOFY status code(s) to be counted in exposures and to possibly be counted as an actual occurrence

Required BOFY and EOFY status code(s) to be counted as an actual occurrence

For Study 12, the following table shows:
Required BOFY and EOFY status code(s) to be counted in exposures (meaning salaries are included in study)

For Studies 13-15, the following table shows:
Required BOFY, EOFY and next EOFY status code(s) to be counted in exposures (meaning salaries and overtime pay are included in study)

Study Number	Assumption Being Studied		Status at BOFY	Status at EOFY	Status Next EOFY
1	Service Retiree Mortality		Q R S WR	D D1 B1 B2	N/A
2	Disabled Retiree Mortality		I J WI WJ	D D2 B4 B5 B1 B3	N/A
3	Active Member Withdrawals		A	T V	N/A
4/5/6/7	Active Member Service Retirements				
4	- In First Year Eligible		A	Q R WR	N/A
5	- In Second Year Eligible		A	Q R WR	N/A
6	- After Second Year Eligible		A	Q R WR	N/A
7	- Reduced		A	Q R WR	N/A
8	Active Member Ordinary Mortality		A	D D1 B2	N/A
9	Active Member Accidental Mortality		A	D2 B3	N/A
10	Active Member Ordinary Disability		A	I WI	N/A
11	Active Member Accidental Disability		A	J WJ	N/A
12	Salary Increases		A	A	N/A
13/14/15	Overtime Pay				
13	- In All Years		A	A	*
14	- In Year Before Service Retirement		A	A	R Q WR
15	- In Year Before Disability Retirement		A	A	I J WI WJ

* NOT Status R, Q, WR, I, J, WI or WJ

D. Measuring TRS Exposures & Actual Occurrences – Benefit Eligibility Testing Criteria

Hay Approach for Determining Active Member Benefit Eligibility - TRS Studies Through FY 2007

D1. Decide the Tier

If Tier07 has tier information, use that info as this record's tier; if not, consider Tier06
If Tier06 has tier information, use that info as this record's tier; if not, consider Tier05
…
If tier is still not decided after going through Tier07 to Tier01, use DOH to decide tier:

DOH	Tier
Before 7/1/1973 or blank	1
7/1/1973 - 7/26/1976	2
7/27/1976 - 8/31/1983	3
After 8/31/1983	4

D2. Decide the Plan

If Plan07 has plan information, use that info as this record's plan; if not, consider Plan06
If Plan06 has plan information, use that info as this record's plan; if not, consider Plan05
…
If plan is still not decided after going through Plan07 to Plan01, use following method to decide plan:

Tier	Plan
1	A
2	C

Special treatment for Tier 1/2
If the member is not active in 2007 (i.e., if Status2007 is not A), keep plan code from above procedure.
If the member is active in 2007 (Status2007=A), the plan codes are reassigned using the following table:

Tier	Entry Age	Plan
1	if EA<=39	A
	otherwise	B
2	if EA<=40	C
	otherwise	D

For active records in 2007, entry age is defined as: Age – Service, where Age in FY 2007 and

Service in FY 2007 are as defined in Item D3 below.
After the plan code is defined, assume the member had this plan code in all prior years.

D3. Decide Age & Service

Determine Age: Age for fiscal year of study Z = Age nearest birthday as of beginning of FY Z = (Z - 1) - YOB (from DOB field);

Determine Service: Service for fiscal year of study Z =
Service rounded to nearest whole year from service field on file as of beginning of FY Z = TSvc(z-1), rounded to integer;
Note: Used TSvcYY field for YY=01-07; service_standard_bftYY field for YY=88-00

Special adjustment to service for "Chapter 126", which applies only to:
-Tier 1 and 2 members active during/after FY2002 and
-eligibility for service retirement and ordinary disability

Increase service otherwise determined by one month per year of completed service, subject to a maximum increase of 2 years
That is, years service[z] = service[z] + Minimum (2.0, service[z] / 12.0);

D4. Benefit Eligibility Rules For Unreduced Service Retirement, Reduced Service Retirement, & Ordinary Disability Retirement Studies*

*Note: For Withdrawal studies, all active members NOT eligible for Service Retirement are deemed eligible for Withdrawal and are counted in exposure for those studies. For all other active member experience studies, all active members are deemed eligible throughout their active employment and are counted in exposure for those studies.)

Tier	Plan	Unreduced Service Retirement Eligibility (first criteria)		Unreduced Service Retirement Eligibility (second criteria)	
		Age	Service	Age	Service
1	A & Any Others (not B)	55	25	N/A	N/A
1	B	55	0	N/A	N/A
2	C & Any Others (not D)	62	25	55	30
2	D	62	5	N/A	N/A
3		62	5	55	30
4		62	5	55	30

Tier	Plan	Reduced Service Retirement Eligibility	
		Age	Service
1	A & Any Others (not B)	0	30
1	B	200*	200*
2	C & Any Others (not D)	55	25
2	D	55	5
3		55	5
4		55	5

* There is no reduced service retirement for this tier/plan; Hay Group set it to 200 to make reduced retirement impossible

Tier	Plan	Ordinary Disability Retirement Eligibility
		Service
1	A & Any Others (not B)	10
1	B	10
2	C & Any Others (not D)	10
2	D	10
3		5
4		5

D5. Decide Year That Each Member Becomes Eligible for Unreduced Retirement and Reduced Retirement

First, consider only first criteria for unreduced retirement and criteria for reduced retirement:

Start with fiscal year 1989, and based upon then Age and Service, decide whether member is eligible to retire (either unreduced or reduced)
If not eligible in 1989, try 1990
If not eligible in 1990, try 1991
…

Second, consider only second criteria for unreduced retirement:

Start with fiscal year 1989, and based upon then Age and Service, decide whether member is eligible to retire unreduced (ignoring reduced retirement for this step)
If not eligible in 1989, try 1990

If not eligible in 1990, try 1991

Third, consider only those who meet both first criteria and second criteria for unreduced retirement:

Compare retirement eligible year from first step with retirement eligible year from second step. If eligible year from second step is before eligible year from first step, use eligible year from second step. Else, use eligible year from first step.

Fourth, check to be sure reduced retirement eligible year is NOT after unreduced retirement eligible year:
If ReducedRetEligYear > UnreducedRetEligYear,
Set ReducedRetEligYear = UnreducedRetEligYear.

D6. Include Experience in Appropriate Studies, Depending Upon Above-Determined Retirement Eligibility Years

Once first year of retirement eligibility is determined:

If it is for reason of reduced retirement:
- member will be included in reduced retirement study each year until year that member is first eligible for unreduced retirement, then
- member will be included in 1st year eligible unreduced retirement study for 1 year, then
-member will be included in 2nd year eligible unreduced retirement study for 1 year, then
-member will be included in after 2nd year eligible unreduced retirement study for every year thereafter that the member remains active.

If it is for reason of unreduced retirement:
-member will be included in 1st year eligible unreduced retirement study for 1 year, then
-member will be included in 2nd year eligible unreduced retirement study for 1 year, then
-member will be included in after 2nd year eligible unreduced retirement study for every year thereafter that the member remains active.

D7. Decide Year That Each Member Becomes Eligible for Ordinary Disability Retirement

First, consider eligibility requirements for ordinary disability retirement, from the last table in Item D4 above:

Start with fiscal year 1989, and based upon then Service, decide whether member is eligible for ordinary disability retirement
If not eligible in 1989, try 1990
If not eligible in 1990, try 1991

E. TRS Experience Study Results

By applying a combination of the Status Code Testing Criteria described in Section C above and the Benefit Eligibility Testing Criteria described in Section D above, Hay Group performed all of the TRS experience studies.

E1.Comparison With Prior Auditor 4-Year (FY2002-2005) & 17-Year (FY1989-2005) Results

Prior to performing experience studies that included the FY 2006 and 2007 data, Hay Group followed the rules and procedures described herein (except that steps based upon a 2007 study end year were revised to be on the basis of a 2005 study end year) and performed studies based upon the same experience study data file used by the prior auditor for its final experience studies.
Hay Group results were generally consistent with the prior auditor's results, except with respect to the Active Member Service Retirement studies. For these studies, significant differences in calculated exposures, "expecteds" and even "actuals" were observed.

E2.Hay Group 2-Year (FY2006-2007) & 19-Year (FY1989-2007) Results

Hay Group then performed both 2-year and 19-year TRS experience studies, producing results for 15 different studies, as follows:

Study Number	Name of Study & Separate "Subgroups" Studied
1	Service Retiree Mortality
	Men
	Women
2	Disabled Retiree Mortality
	Men
	Women
3	Active Member Withdrawals
	Active Member Service Retirements
4	**In First Year Eligible**
	Men
	Women
4	**In First Year Eligible - Tiers 1 & 2**
	Men
	Women
4	**In First Year Eligible - Tiers 3 & 4**
	Men
	Women
5	**In Second Year Eligible**
	Men

	Women
5	**In Second Year Eligible - Tiers 1 & 2**
	Men Women
5	**In Second Year Eligible - Tiers 3 & 4**
	Men Women
6	**After Second Year Eligible**
	Men Women
6	**After Second Year Eligible - Tiers 1 & 2**
	Men Women
6	**After Second Year Eligible - Tiers 3 & 4**
	Men Women
	Active Member Service Retirements (Cont'd)
7	**Reduced Service Retirements**
	Men Women
7	**Reduced Service Retirements - Tiers 1 & 2**
	Men Women
7	**Reduced Service Retirements - Tiers 3 & 4**
	Men Women
8	Active Member Ordinary Mortality
	Men Women
9	Active Member Accidental Mortality
10	Active Member Ordinary Disability
	Men Women
11	Active Member Accidental Disability
	Men Women
12	Salary Increases – Total
	Salary Increases - Merit Only
	Overtime Pay
13	In All Years
14	In Year Before Service Retirement
15	In Year Before Disability Retirement

Hay Group vs. Prior Auditor Results

As noted in the Key Study Methodologies/Processes section of our Experience Study Report, Hay Group's demographic experience study results were generally consistent with the prior auditor's results, with very limited exceptions, as described below:

- We determined, upon close inspection of the experience study database, that a number of retirees had years of birth that were miscoded by 100 years. That is, their years of birth were reported as being in the 1980's or 1990's, yet their correct years of birth should have been in the 1880's and 1890's. Rather than remove these records from the database for retiree mortality study purposes (as we understand the prior auditor did), Hay Group subtracted 100 years from these years of birth (unless we considered some other aspect of their record to be suspect) and kept them in these studies. While this did not significantly impact our study results, we did notice that there were noticeable higher exposures among older retirees in a number of our studies.

- Upon observing fairly significant differences between our TRS active member ordinary disability study results and those of the prior auditor, we reran our results using a 10-year eligibility rule for all active members (instead of the proper 10-year eligibility for some, 5-year eligibility for others). Because our 10-year rule results were very consistent with the prior auditor results, we surmised that the prior auditor had performed this study without applying both eligibility conditions. Having reached this conclusion, we determined that our original results were valid and acceptable.

- After performing our studies of several assumptions for NYCERS TBTA active members, we observed that our life years of exposure in fiscal years 2004 and 2005 exceeded those shown in the prior auditor's results tables by a significant amount (25% to 50% for some studies). After investigating this further, we determined that the prior auditor had subdivided the NYCERS active population into the applicable five subgroups based upon an invalid group/employer code. Having reached this conclusion, we determined that our results were valid and acceptable.

- After performing our First Engagement TRS active member service retirement studies, we identified some significant inconsistencies versus the prior auditor results. This was communicated to the Office of the Actuary (OA) and extensive investigation of this was undertaken by Hay Group, with significant support from the OA staff. Despite these extensive follow-up efforts, we were never able to explain these inconsistencies. To safeguard against the possibility that Hay Group had made some type of error, we produced a detailed documentation of the specific rules and procedures we had utilized in performing these studies, which were reviewed by the OA. As well, Hay Group performed extensive checks (including special internal peer reviews) of the procedures used and results obtained for these studies. Finding no problems after all these special quality control steps, Hay Group published our results, which underlie the TRS results included in the Results, Observations & Recommendations section of this report.

Future Mortality Improvement

As noted in the Key Study Methodologies/Processes section of this report, in performing studies of the mortality experience of retiree populations and evaluating the appropriateness of the actuarial assumptions in use, Hay Group, like all pension actuaries, must carefully consider future mortality improvement. When retiree mortality experience study actual-to-expected ratios are close to or below a value of 1.0, Hay Group would generally conclude that the current death probabilities lack sufficient margin for future mortality improvement. Downward adjustment to the current mortality assumptions would generally be needed (thereby raising the level of actual-to expected ratios) to introduce an appropriate margin for mortality improvement.

Two common alternative actions taken by actuaries to include an appropriate margin for future mortality improvement into retiree death probabilities are (i) the creation of a new static mortality table and (ii) the creation of generational mortality tables.

For many years the NYCRS have used static mortality tables, which have been updated periodically to reflect mortality improvements (past and future), based upon the results of frequent actuarial experience studies. This is the approach most often used and favored by Hay Group. We have used this same static approach in developing our retiree mortality assumption recommendations, as explained in each of our retiree mortality study commentaries, by applying Projection Scale AA improvement factors to the year 2010 to arrive at our recommended Base Tables and to the year 2025 to arrive at our recommended Valuation Tables.

This static table approach, which is the technique most often used when retiree mortality studies reveal the need to lower future death probabilities, is favored by most pension actuaries (including Hay Group) for a number of reasons, including:

- Construction of static tables is much less rigorous and requires much less time and effort than the construction of full generational tables. This is because static tables can be built by developing a single set of age-specific downward adjustment factors and applying them to the death probabilities in a mortality table (without margin for future mortality improvement), whereas generational tables require that multiple sets of age/time-specific downward adjustment factors be developed and applied.

- Use of static tables in combination with periodic mortality experience studies ensures that new developments and factors that are affecting current and upcoming mortality expectations for the population being valued will be appropriately recognized and reflected through the creation of each new static table. Although the alternative of using generational tables may be viewed as reducing the need for frequent mortality experience studies, most pension actuaries would agree that periodic testing of the generational tables is necessary to ensure their ongoing appropriateness in light of new mortality trends. Even if such testing occurs and results in the conclusion that the generational table remains appropriate without adjustment, the time and effort such

studies require is about the same as that required to perform a full-blown mortality experience study.

- Generally, it is easier for actuaries to apply static mortality tables in their actuarial valuation programs than it is to apply generational mortality tables.

Under the generational mortality table approach, the actuary builds a projection scale into the future death probabilities (i.e., gradual automatic downward adjustments), such that, depending upon a retiree's year of birth, the table automatically projects future mortality improvements.

Since our second engagement retiree mortality experience studies resulted in the conclusion that new (static) mortality tables were warranted, Hay Group undertook the following steps:

- Determined a full set (covering the entire range of applicable ages) of recommended death probabilities and developed/constructed a 2010 mortality table without margins for future mortality improvement (to replace the "Base Tables" currently used for the NYCRS);

- Identified Projection Scale AA, the scale recommended by the Society of Actuaries committee responsible for the development of the RP-2000 mortality tables for use in projecting mortality improvement beyond the year 2000, as the most appropriate tool to use to project post-2010 mortality improvement for NYCRS (and the Office of the Actuary concurred with this decision).

- By applying the margins (downward adjustments to the death probabilities) determined in the preceding step (using Projection Scale AA) to the death probabilities in the mortality tables developed in the first step (before adjustment for future mortality improvement), Hay Group developed/constructed the mortality tables we have recommended for use in future NYCRS actuarial valuations (to replace the "Valuation Tables" currently used for the NYCRS).

HayGroup®

Special WTC vs Non-WTC Studies &
Hay Group Assumption Recommendations,

Based upon the special World Trade Center (WTC) attack related demographic experience studies Hay Group has undertaken for the City of New York and related discussions with members of the Office of the Actuary (OA), we have prepared this document. The WTC attack has had, and will continue to have, an impact on the mortality and morbidity experience of affected members of NYCRS. Due to limited availability of relevant data, especially codes that make it possible to identify members who have had exposure to the risks associated with the WTC attack and/or its aftermath, we have undertaken special studies solely for the FIRE and POLICE pension funds. Importantly, these are the two systems whose members have been, or potentially will be, most impacted by the WTC attack. This document presents Hay Group's conclusions and recommendations resulting from separate studies we conducted relating to FIRE and POLICE.

Summary of Results

Hay Group performed five Special WTC vs Non-WTC Studies, each covering the 8-year period from FY2002 through FY2009, for each of FIRE and POLICE as follows:

1. Study of Probabilities of Decrement from Active Service Due to Accidental Disability (injury/illness sustained in the line of duty) for Males and Females combined (See Tables 10A & 10C)
2. Study of Probabilities of Death Among Disabled Retirees – Males (See Tables 2C – Men)
3. Study of Probabilities of Death Among Disabled Retirees – Females (See Tables 2C – Women)
4. Study of Probabilities of Death Among Service Retirees – Males (See Tables 1C – Men)
5. Study of Probabilities of Death Among Service Retirees – Females (See Tables 1C – Women)

Immediately following this document are the tables referenced above, in the following order:

- For FIRE participants with WTC codes ("WTC"): Table 1C – Men; Table 1C – Women; Table 2C – Men; Table 2C – Women; Table 10A – Men & Women; Table 10C – Men & Women
- For FIRE participants without WTC codes ("Non-WTC"): Table 1C – Men; Table 1C – Women; Table 2C – Men; Table 2C – Women; Table 10A – Men & Women; Table 10C – Men & Women
- For POLICE participants with WTC codes ("WTC"): Table 1C – Men; Table 1C – Women; Table 2C – Men; Table 2C – Women; Table 10A – Men & Women; Table 10C – Men & Women

- For POLICE participants without WTC codes ("Non-WTC"): Table 1C – Men; Table 1C – Women; Table 2C – Men; Table 2C – Women; Table 10A – Men & Women; Table 10C – Men & Women

Study 1 Goal: This first study was for the purpose of determining whether active members of FIRE/POLICE with a WTC Code on file decrement differently from Non-WTC active members for reason of accidental disability.

Study 1 Conclusion/Recommendation:

- We concluded that for FIRE the probability of leaving active membership due to accidental disability since fiscal 2002 (year of the WTC attack) was significantly greater for those with a WTC Code than for those without a WTC Code. Therefore, we recommend "dual accidental disability assumptions" for FIRE. That is, we recommend the adoption of a new (second) set of age-related accidental disability probabilities to be applied in future actuarial valuations of active members of FIRE (both male and female) with WTC Codes on record. See below for further details.
- For POLICE, our studies did not show this same significant disparity in the WTC vs Non-WTC experience during the five fiscal years after the WTC attack. In fact, the opposite (relatively higher actual-to-expected ratios among Non-WTC than WTC) was observed. Interestingly, we saw that the "opposite" relationship actually reversed in FY 2008 and 2009, when the POLICE results became more consistent with FIRE (described above). Given this experience, and in light of the strong 8-year trends we see in the actual-to-expected ratios (with the WTC ratios increasing and the Non-WTC ratios decreasing), we concluded that "dual accidental disability assumptions" were warranted for POLICE. For POLICE however, the differences between our WTC and Non-WTC recommendations will not be nearly as significant as for FIRE. Further details relating to our recommended "dual assumptions" for POLICE are included below.

Studies 2-5 Goal: These studies were all for the purpose of determining if, following separation from active service, retirees with WTC Codes die at different rates than Non-WTC retirees.

Studies 2-5 Conclusion/Recommendation:

- Males – For both FIRE and POLICE, and for both service retirees and disability retirees, our studies showed, surprisingly, relatively lower actual-to-expected ratios among WTC retirees than among Non-WTC. Given that (i) the exposure base for WTC is considerably smaller than for Non-WTC (with the WTC studies overall providing only about 10-20% as many lives) and that (ii) the average age of the WTC populations studied is significantly lower (by around 15 years) than the Non-WTC average age, we have concluded that there are explanations for these counterintuitive study results and that, in fact, it would not be approriate to consider more favorable mortality assumptions for WTC retirees than for Non-WTC retirees. Therefore, we recommend, for both FIRE and POLICE, continuation of the current retiree mortality assumption structure and that no separate assumptions be adopted for WTC vs Non-WTC retirees.

- Females – For POLICE, for both service retirees and disability retirees, our study results and conclusions/recommendations are consistent with those described above for males. For FIRE, for both service retirees and disability retirees, there are not sufficient exposure bases for us to be able draw reliable conclusions, with only 164 life years of exposure and 2 deaths available over the 8-year study period. Therefore, for both POLICE and FIRE, we recommend continuation of the current retiree mortality assumption structure and that no separate assumptions be adopted for WTC vs Non-WTC retirees.

More On FIRE Accidental Disability Study Results and Recommendations

While our FIRE accidental disability study results, as shown in our separate WTC and Non-WTC FIRE Tables 10C, show bottom-line total actual-to-expected ratios of 2.20 and 3.26 for WTC and Non-WTC respectively, upon closer review we realized that the results for FY2002 (the year of the WTC attack and first year of our 8-year study) were not at all consistent with the other 7 years of results (due primarily to misallocation of exposures between WTC and Non-WTC in FY2002) and were significantly distorting the overall results. Therefore, we removed that year from our studies and redetermined the actual-to-expected ratios (based upon 7-year studies over FY2003-2009) to be 2.29 and 0.97 for WTC and Non-WTC respectively.

In connection with our separate study of FIRE Reclassifications (discussed below), we were able to refine our accidental disability study for WTC by (i) adding another year of experience, namely fiscal 2010, and (ii) removing from all years (2003-2010) those actual accidental disabilities who were not accidental disabilities at the time of their original retirement but later reclassified to become WTC-Accidental Disability Retirements. Therefore, our final WTC study was an 8-year study covering FY 2003 through 2010 and our final Non-WTC study was a 7-year study covering FY 2003 through 2009. We considered these two study results to be viable and based upon a sufficient volume of experience to be a reliable basis for recommending the adoption of new assumptions. Therefore, using our separate WTC and Non-WTC study results as the basis for developing dual accidental disability assumptions, we recommend the following:

- Based upon the 8-year (FY 2003-2010) study WTC actual-to-expected ratio of 2.05, we recommend the adoption of new accidental disability assumptions for WTC (for future valuation of active members of FIRE who have WTC Codes) that are roughly two times the accidental disability probabilities currently in use. Based upon our review of the age-specific results, we observed actual-to-expected ratios that were highest at ages below 40 (roughly 2.4) and lowest at ages over 50 (roughly 1.8); therefore, we arrived at our recommended probabilities (as shown in the Recommended column of Table 10A of the attached FIRE WTC tables) by adjusting the current accidental disability probabilities accordingly.
- Based upon the 7-year (FY 2003-2009) study Non-WTC actual-to-expected ratio of 0.97, we recommend that the current accidental disability assumptions be retained for Non-WTC (for future valuation of active members of FIRE who do not have WTC

Codes). (Since there was no significant age-specific variation from the current assumptions, we did not see a need for any deviation from the current assumptions.)

More On POLICE Accidental Disability Study Results and Recommendations

While our POLICE accidental disability study results, as shown in our separate WTC and Non-WTC POLICE Tables 10C, show bottom-line total actual-to-expected ratios of 0.81 and 1.45 for WTC and Non-WTC respectively, upon closer review we realized, just as was true for FIRE, that the results for FY2002 (the year of the WTC attack and first year of our 8-year study) were not at all consistent with the other 7 years of results (due primarily to misallocation of exposures between WTC and Non-WTC in FY2002) and were distorting the overall results. Therefore, we removed that year from our studies and redetermined the actual-to-expected ratios (based upon 7-year studies over FY2003-2009) to be 0.87 and 1.36 for WTC and Non-WTC respectively.

The relatively higher actual-to-expected ratios among Non-WTC than WTC at first seemed to suggest experience that was, in fact, opposite from our initial expectations. However, closer review of the year by year results revealed, interestingly, that this "opposite" relationship actually reversed in FY 2008 and 2009, when the POLICE results became more consistent with FIRE (described above). Given this experience, and in light of the strong 7-year trends we see in the actual-to-expected ratios (with the WTC ratios increasing and the Non-WTC ratios decreasing), we concluded that "dual accidental disability assumptions" were warranted for POLICE. We considered both the WTC and Non-WTC study results to be viable and based upon a sufficient volume of experience to be a reliable basis for recommending the adoption of new assumptions. Therefore, using our separate WTC and Non-WTC study results as the basis for developing dual accidental disability assumptions, we recommend the following:

- Although the 7-year (FY 2003-2009) study WTC actual-to-expected ratio was 0.87, as discussed above, we believe the more recent ratios (including the 2007-2009 ratio of 1.07 and the 2008-2009 ratio of 1.13) more appropriately capture the recent trend and the future experience most likely to occur for POLICE WTC. Therefore, we recommend the adoption of new accidental disability assumptions for WTC (for future valuation of active members of POLICE who have WTC Codes) that are roughly 1.1 times the accidental disability probabilities currently in use. Based upon our review of the age-specific results, we observed actual-to-expected ratios that were equal to or slightly greater than 1.0 at all ages, but highest (at roughly 1.15) at ages 35 to 44; therefore, we arrived at our recommended probabilities (as shown in the Recommended column of Table 10A of the attached POLICE WTC tables) by adjusting the current accidental disability probabilities accordingly.
- Although the 7-year (FY 2003-2009) study Non-WTC actual-to-expected ratio was 1.36, as discussed above, we believe the more recent ratios (including the 2007-2009 ratio of 0.87 and the 2008-2009 ratio of 0.76) more appropriately capture the recent trend and the future experience most likely to occur for POLICE Non-WTC. Therefore, we recommend the adoption of new accidental disability assumptions for Non-WTC (for future valuation of active members of POLICE who do not have WTC Codes) that are roughly 0.8 times the accidental disability probabilities currently in use. Based upon

our review of the age-specific results, we observed actual-to-expected ratios that were significantly below 1.0 at all ages below 35 (ranging as low as 0.4), but fluctuating around 1.0 at ages 35 and higher; therefore, we arrived at our recommended probabilities (as shown in the Recommended column of Table 10A of the attached POLICE Non-WTC tables) by adjusting the current accidental disability probabilities accordingly.

Hay Group WTC-ADR/Reclassification Studies, Findings & Recommendations

The various WTC laws that were implemented during the 2003 to 2008 time frame created presumptive WTC disability and death benefits, potentially payable to NYCRS members and/or survivors of NYCRS members whose health was/is impacted by the WTC attack. As a consequence of these laws, a number of years ago, the OA began to estimate and factor into their NYCRS actuarial valuations additional WTC-related liabilities to account for the certain, yet indeterminate, future incremental benefits that will arise when members (i) retire as WTC-Related Accidental Disability Retirements (hereafter WTC-ADRs) or (ii) retire with "regular benefit rights" (i.e., benefits that are unaffected by the WTC laws) but are later reclassified as WTC-Related Accidental Disability Retirements (hereafter WTC-ADRs), making them and/or their survivors eligible for enhanced accidental disability retirement annuities and/or accidental death benefits. The OA developed, and has continued to use, liability loads for estimating the value of these future incremental benefits in its NYCRS actuarial valuations.

WTC-ADR/Reclassification Analysis for FIRE – To Formulate Explicit Assumptions Re: Future Entitlements to WTC-ADR Benefits (Either Directly or Via Reclassification)

The OA provided Hay Group with 2007, 2008 and 2009 reclassification data for FIRE to review in connection with our WTC vs Non-WTC studies. The data included records of 161 FIRE members entitled to WTC disability or death benefits. Hay Group matched these records to our FIRE experience study data base and found that 158 were included in our studies as WTC (as opposed to Non-WTC) accidental disabilities that occurred during the 7-year period 2002 though 2008. The other 3 were included in our studies as WTC deaths from among retirees.

The OA also provided Hay Group with 6/30/2010 valuation census data for FIRE, which made it possible for us to develop another year of FIRE reclassification experience. By performing multiple matches using the identifying numbers on records of those who reclassified, we were able to create individual member histories spanning fiscal 2003 through 2009 for 266 reclassifications. We have prepared a summary (first page immediately following the tables that follow this document), covering fiscal years 2003 through 2010, that includes 660 WTC-ADRs, as follows: (i) 224 service retirees and 42 disability retirees who later reclassified into WTC-ADRs and (ii) 394 other retirees who were coded as WTC-ADRs from the time of their original retirement. For the 224 service retirees who reclassified, we have prepared a separate table (second page immediately following the tables that follow this document) showing the distribution of the 224 by year of original service retirement and showing the percentage of total service retirements in each year who later (through 2010) reclassified to WTC-ADR. For

all 266 reclassifications, we were able to determine the amount of time that elapsed between their original retirement dates and their dates of reclassification; therefore, we have prepared two additional tables, as follows: (i) a table (third page immediately following the tables that follow this document) showing the time elapsed between original retirement and reclassification for the 224 service retirements and (ii) a table (fourth page immediately following the tables that follow this document) showing the time elapsed between original retirement and reclassification for the 42 disability retirements.

From our analysis of the experience of FIRE over the 8 to 9-year period following the WTC attack, we were able to arrive at some expectations regarding the frequency of future WTC-ADRs for FIRE, both those that occur at the date of original retirement and those that occur as a result of reclassification. However, since no experience is available beyond the 8-year period, we can only use our actuarial judgment, combined with some degree of conservatism (and some attention to the current reclassification assumptions adopted by the OA to develop their liability loads for FIRE) to extrapolate/project what future WTC-ADR experience will be.

Based upon our observations, we recommend that the following probabilities of entitlement to future WTC-ADR benefits be applied to FIRE members that have a WTC code on their individual data record:

- For Active Members of FIRE with a WTC code, (i) the 4 probabilities in the left column should be utilized as part of the application of the FIRE service retirement decrements and (ii) the 4 probabilities in the right column should be utilized as part of the application of the FIRE accidental disability decrements
- For Service Retirees of FIRE with a WTC code, the relevant probabilities in the left column (depending upon time elapsed since retirement) should be utilized to project future reclassifications to WTC-ADR
- For Disabled Retirees of FIRE with a WTC code whose disability was accidental, the relevant probabilities in the right column (depending upon time elapsed since retirement) should be utilized to project future reclassifications to WTC-ADR

Upon:	Service Retirement	Accidental Disability Retirement*
Projected Retirement Date (Immediate WTC-ADR)	20%	50%
Projected Retirement + 5 yrs (WTC-ADR Upon Reclassification)	20%	10%
Projected Retirement + 15 yrs (WTC-ADR Upon Reclassification)	10%	5%
Projected Retirement + 25 yrs (WTC-ADR Upon Reclassification)	5%	5%

*Note: Although Ordinary Disability Retirements may reclassify to become WTC-ADRs, the number observed to have done so was few enough to be considered negligible.

We also recommend that it be assumed that the survivors of all FIRE members who are either entitled to WTC-ADR benefits or are projected to become entitled to WTC-ADR benefits in the future will be entitled to WTC Accidental Death benefits upon the death of the member.

WTC-ADR/Reclassification Assumption Recommendations for POLICE

Although data was available for Hay Group to perform some WTC vs Non-WTC studies for POLICE as described earlier in this paper, the necessary WTC-ADR and reclassification data for an analysis like that performed for FIRE was not available for POLICE.

Nevertheless, we have the benefit of our POLICE WTC and Non-WTC accidental disability study results, which provided a clear indication that, in the relevant age ranges (particularly at ages over 45), POLICE members with WTC codes will be less likely to become accidental disabilities than FIRE members with WTC codes, and this strongly suggests that POLICE members will be less likely to become WTC-ADRs than FIRE members. Here again, we must make significant use of our actuarial judgment, combined with some degree of conservatism (and some attention to the current reclassification assumptions adopted by the OA to develop their liability loads for POLICE and how those assumptions compare to the ones used for FIRE) to extrapolate/project what future WTC-ADR experience will be for POLICE.

Therefore, we recommend that the following probabilities of entitlement to future WTC-ADR benefits be applied to POLICE members that have a WTC code on their individual data record:

- For Active Members of POLICE with a WTC code, (i) the 4 probabilities in the left column should be utilized as part of the application of the POLICE service retirement decrements and (ii) the 4 probabilities in the right column should be utilized as part of the application of the POLICE accidental disability decrements
- For Service Retirees of POLICE with a WTC code, the relevant probabilities in the left column (depending upon time elapsed since retirement) should be utilized to project future reclassifications to WTC-ADR
- For Disabled Retirees of POLICE with a WTC code whose disability was accidental, the relevant probabilities in the right column (depending upon time elapsed since retirement) should be utilized to project future reclassifications to WTC-ADR

Upon:	Service Retirement	Accidental Disability Retirement*
Projected Retirement Date (Immediate WTC-ADR)	15%	40%
Projected Retirement + 5 yrs	10%	10%

(WTC-ADR Upon Reclassification)		
Projected Retirement + 15 yrs (WTC-ADR Upon Reclassification)	10%	5%
Projected Retirement + 25 yrs (WTC-ADR Upon Reclassification)	5%	5%

*Note: Although Ordinary Disability Retirements may reclassify to become WTC-ADRs, the number observed to have done so in FIRE was few enough to be considered negligible. It is our expectation that the same would be true for POLICE.

Consistent with our FIRE recommendation, we also recommend that it be assumed that the survivors of all POLICE members who are either entitled to WTC-ADR benefits or are projected to become entitled to WTC-ADR benefits in the future will be entitled to WTC Accidental Death benefits upon the death of the member.

Closing Thoughts/Recommendations

As noted in our introductory paragraph of this paper, since Systems other than FIRE and POLICE seem not to have assigned codes to their participants that would make it possible to identify members who had exposure to the risks associated with the WTC attack and/or its aftermath, we were unable to perform special WTC vs Non-WTC studies for any systems other than FIRE and POLICE. Therefore, we suggest that the Office of the Actuary (OA) coordinate with Systems other than FIRE and POLICE (especially NYCERS) to create appropriate WTC codes that can be relied upon for future WTC vs Non-WTC studies. Having such codes would make it possible to perform WTC-ADR/reclassification analyses similiar to those we performed for FIRE, to formulate explicit assumptions re: future entitlements to WTC-ADR benefits (either directly or via reclassification).

Hay Group also recommends that the OA and/or future actuarial auditors of the OA conduct (for FIRE, POLICE and relevant subgroups of NYCERS) further WTC vs Non-WTC studies similar to those undertaken here to assess the appropriateness of adopting revised and/or additional WTC-specific valuation assumptions in the future.

NEW YORK CITY FIRE DEPARTMENT PENSION FUND

Table 1C

Mortality Experience of Service Retirees - WTC **Men**

Year	Life Years Exposed	Number of Deaths			Ratio of Actual to		Mortality Rate		
		Actual	Expected	Recommended	Expected	Recommended	Actual	Expected	Recommended
2002	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
2003	205	3	0.7	0.7	4.35	4.35	1.4634%	0.3366%	0.3366%
2004	702	1	2.5	2.5	0.41	0.41	0.1425%	0.3506%	0.3506%
2005	850	0	3.2	3.2	0.00	0.00	0.0000%	0.3706%	0.3706%
2006	983	0	3.9	3.9	0.00	0.00	0.0000%	0.3950%	0.3950%
2007	1,075	2	4.6	4.6	0.43	0.43	0.1860%	0.4309%	0.4309%
2008	1,177	6	5.5	5.5	1.09	1.09	0.5098%	0.4665%	0.4665%
2009	1,223	5	6.2	6.2	0.80	0.80	0.4088%	0.5087%	0.5087%
Total	*6,215*	*17*	*26.5*	*26.5*	*0.64*	*0.64*	*0.2735%*	*0.4268%*	*0.4268%*

NEW YORK CITY FIRE DEPARTMENT PENSION FUND

Table 1C

Mortality Experience of Service Retirees - WTC **Women**

Year	Life Years Exposed	Number of Deaths			Ratio of Actual to		Mortality Rate		
		Actual	Expected	Recommended	Expected	Recommended	Actual	Expected	Recommended
2002	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
2003	2	0	0.0	0.0	0.00	0.00	0.0000%	0.2329%	0.2329%
2004	2	0	0.0	0.0	0.00	0.00	0.0000%	0.2608%	0.2608%
2005	3	0	0.0	0.0	0.00	0.00	0.0000%	0.2522%	0.2522%
2006	3	0	0.0	0.0	0.00	0.00	0.0000%	0.2865%	0.2865%
2007	5	0	0.0	0.0	0.00	0.00	0.0000%	0.2794%	0.2794%
2008	6	0	0.0	0.0	0.00	0.00	0.0000%	0.3088%	0.3088%
2009	6	0	0.0	0.0	0.00	0.00	0.0000%	0.3457%	0.3457%
Total	*27*	*0*	*0.1*	*0.1*	*0.00*	*0.00*	*0.0000%*	*0.2936%*	*0.2936%*

NEW YORK CITY FIRE DEPARTMENT PENSION FUND

Table 2C

Mortality Experience of Disability Retirees - WTC **Men**

Year	Life Years Exposed	Number of Deaths			Ratio of Actual to		Mortality Rate		
		Actual	Expected	Recommended	Expected	Recommended	Actual	Expected	Recommended
2002	1	0	0.0	0.0	0.00	0.00	0.0000%	0.9082%	0.9082%
2003	353	0	1.4	1.4	0.00	0.00	0.0000%	0.3985%	0.3985%
2004	1,094	0	4.5	4.5	0.00	0.00	0.0000%	0.4149%	0.4149%
2005	1,447	1	6.1	6.1	0.16	0.16	0.0691%	0.4214%	0.4214%
2006	1,850	2	7.9	7.9	0.25	0.25	0.1081%	0.4256%	0.4256%
2007	2,272	2	10.0	10.0	0.20	0.20	0.0880%	0.4394%	0.4394%
2008	2,671	7	12.4	12.4	0.56	0.56	0.2621%	0.4640%	0.4640%
2009	3,026	5	14.9	14.9	0.34	0.34	0.1652%	0.4914%	0.4914%
Total	*12,714*	*17*	*57.2*	*57.2*	*0.30*	*0.30*	*0.1337%*	*0.4497%*	*0.4497%*

NEW YORK CITY FIRE DEPARTMENT PENSION FUND

Table 2C

Mortality Experience of Disability Retirees - WTC **Women**

Year	Life Years Exposed	Number of Deaths			Ratio of Actual to		Mortality Rate		
		Actual	Expected	Recommended	Expected	Recommended	Actual	Expected	Recommended
2002	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
2003	4	0	0.0	0.0	0.00	0.00	0.0000%	0.1559%	0.1559%
2004	4	0	0.0	0.0	0.00	0.00	0.0000%	0.1763%	0.1763%
2005	4	0	0.0	0.0	0.00	0.00	0.0000%	0.1982%	0.1982%
2006	5	0	0.0	0.0	0.00	0.00	0.0000%	0.2669%	0.2669%
2007	6	0	0.0	0.0	0.00	0.00	0.0000%	0.2927%	0.2927%
2008	10	0	0.0	0.0	0.00	0.00	0.0000%	0.3702%	0.3702%
2009	12	0	0.0	0.0	0.00	0.00	0.0000%	0.3800%	0.3800%
Total	*45*	*0*	*0.1*	*0.1*	*0.00*	*0.00*	*0.0000%*	*0.2994%*	*0.2994%*

NEW YORK CITY FIRE DEPARTMENT PENSION FUND

Table 10A — **Fiscal Years 2002 - 2009**

Accidental Disability Experience of Active Members - WTC — **Men and Women**

Age	Life Years Exposed	Number of Disabilities			Ratio of Actual to		Disability Rate		
		Actual	Expected	Recommended	Expected	Recommended	Actual	Expected	Recommended
20	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0200%	0.0480%
21	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0200%	0.0480%
22	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0200%	0.0480%
23	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0200%	0.0480%
24	5	0	0.0	0.0	0.00	0.00	0.0000%	0.0200%	0.0480%
25	57	0	0.0	0.0	0.00	0.00	0.0000%	0.0200%	0.0480%
26	129	0	0.0	0.1	0.00	0.00	0.0000%	0.0300%	0.0720%
27	250	2	0.1	0.2	20.00	8.33	0.8000%	0.0400%	0.0960%
28	411	0	0.2	0.5	0.00	0.00	0.0000%	0.0500%	0.1200%
29	518	0	0.4	0.9	0.00	0.00	0.0000%	0.0700%	0.1680%
30	627	1	0.6	1.5	1.59	0.66	0.1595%	0.1000%	0.2400%
31	725	4	1.3	3.1	3.07	1.28	0.5517%	0.1800%	0.4320%
32	843	6	2.3	5.5	2.64	1.10	0.7117%	0.2700%	0.6480%
33	1023	8	3.8	9.1	2.11	0.88	0.7820%	0.3700%	0.8880%
34	1229	14	5.9	14.2	2.37	0.99	1.1391%	0.4800%	1.1520%
35	1384	18	8.3	19.9	2.17	0.90	1.3006%	0.6000%	1.4400%
36	1496	26	10.8	25.9	2.41	1.01	1.7380%	0.7200%	1.7280%
37	1539	35	13.1	31.4	2.68	1.11	2.2742%	0.8500%	2.0400%
38	1584	40	15.7	37.6	2.55	1.06	2.5253%	0.9900%	2.3760%
39	1593	45	18.2	43.6	2.48	1.03	2.8249%	1.1400%	2.7360%
40	1649	48	21.4	47.2	2.24	1.02	2.9109%	1.3000%	2.8600%
41	1733	55	25.6	56.4	2.14	0.97	3.1737%	1.4800%	3.2560%
42	1765	79	29.5	64.8	2.68	1.22	4.4759%	1.6700%	3.6740%
43	1746	92	32.7	71.8	2.82	1.28	5.2692%	1.8700%	4.1140%
44	1603	69	33.3	66.7	2.07	1.03	4.3044%	2.0800%	4.1600%
45	1468	81	33.8	67.5	2.40	1.20	5.5177%	2.3000%	4.6000%
46	1353	81	35.2	70.4	2.30	1.15	5.9867%	2.6000%	5.2000%
47	1322	79	38.6	77.2	2.05	1.02	5.9758%	2.9200%	5.8400%
48	1258	100	41.0	82.0	2.44	1.22	7.9491%	3.2600%	6.5200%
49	1194	69	43.2	86.4	1.60	0.80	5.7789%	3.6200%	7.2400%
50	1099	93	44.0	87.9	2.12	1.06	8.4622%	4.0000%	8.0000%
51	926	80	41.7	75.0	1.92	1.07	8.6393%	4.5000%	8.1000%
52	752	69	38.4	69.0	1.80	1.00	9.1755%	5.1000%	9.1800%
53	584	41	33.9	61.0	1.21	0.67	7.0205%	5.8000%	10.4400%
54	471	44	31.1	56.0	1.42	0.79	9.3418%	6.6000%	11.8800%
55	338	40	25.4	45.6	1.58	0.88	11.8343%	7.5000%	13.5000%
56	216	21	18.4	33.0	1.14	0.64	9.7222%	8.5000%	15.3000%
57	155	17	15.0	27.1	1.13	0.63	10.9677%	9.7000%	17.4600%
58	120	19	13.3	24.0	1.43	0.79	15.8333%	11.1000%	19.9800%
59	84	8	10.7	19.2	0.75	0.42	9.5238%	12.7000%	22.8600%
60	64	5	9.3	16.7	0.54	0.30	7.8125%	14.5000%	26.1000%
61	49	9	8.1	14.6	1.11	0.62	18.3673%	16.5000%	29.7000%
62	26	2	4.9	8.9	0.40	0.22	7.6923%	19.0000%	34.2000%
63	24	6	0.0	0.0	0.00	0.00	25.0000%	0.0000%	0.0000%
64	18	7	0.0	0.0	0.00	0.00	38.8889%	0.0000%	0.0000%
65	9	4	0.0	0.0	0.00	0.00	44.4444%	0.0000%	0.0000%
66	1	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
67	1	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
68	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
69	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
70	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
71	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
72	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
73	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
74	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
75	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
76	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
77	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
78	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
79	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
80	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
Total	*33,441*	*1,417*	*708.9*	*1,421.9*	*2.00*	*1.00*	*4.2373%*	*2.1199%*	*4.2520%*

NEW YORK CITY FIRE DEPARTMENT PENSION FUND

Table 10C - Accidental Disability Experience of Active Members - WTC,
After Removing Non-ADR's Reclassified (by 6/30/10) as WTC-ADR's **Men and Women**

Year	Life Years Exposed	Number of Disabilities			Ratio of Actual to		Disability Rate		
		Actual	Expected	Recommended	Expected	Recommended	Actual	Expected	Recommended
2002	10711	340	206.6	206.6	1.65	1.65	3.1743%	1.9289%	1.9289%
2003	11148	641	206.2	206.2	3.11	3.11	5.7499%	1.8493%	1.8493%
2004	10031	320	170.2	170.2	1.88	1.88	3.1901%	1.6967%	1.6967%
2005	9633	389	171.7	171.7	2.27	2.27	4.0382%	1.7824%	1.7824%
2006	9103	376	173.0	173.0	2.17	2.17	4.1305%	1.9005%	1.9005%
2007	8603	365	176.2	176.2	2.07	2.07	4.2427%	2.0481%	2.0481%
2008	8085	335	177.3	177.3	1.89	1.89	4.1435%	2.1929%	2.1929%
2009	7650	231	182.3	182.3	1.27	1.27	3.0196%	2.3830%	2.3830%
2010	7344	294	183.6	183.6	1.60	1.60	4.0033%	2.5000%	2.5000%
Total	*82,308*	*3,291*	*1,647.1*	*1,647.1*	*2.00*	*2.00*	*3.9984%*	*2.0011%*	*2.0011%*
2003-2010	*71,597*	*2,951*	*1,440.5*	*1,440.5*	*2.05*	*2.05*	*4.1217%*	*2.0119%*	*2.0119%*

NEW YORK CITY FIRE DEPARTMENT PENSION FUND

Table 1C

Mortality Experience of Service Retirees - Non-WTC **Men**

Year	Life Years Exposed	Number of Deaths			Ratio of Actual to		Mortality Rate		
		Actual	Expected	Recommended	Expected	Recommended	Actual	Expected	Recommended
2002	6,277	195	192.7	192.7	1.01	1.01	3.1066%	3.0699%	3.0699%
2003	6,147	189	195.1	195.1	0.97	0.97	3.0747%	3.1732%	3.1732%
2004	5,967	198	199.2	199.2	0.99	0.99	3.3183%	3.3388%	3.3388%
2005	5,778	164	200.0	200.0	0.82	0.82	2.8384%	3.4619%	3.4619%
2006	5,621	210	204.8	204.8	1.03	1.03	3.7360%	3.6430%	3.6430%
2007	5,409	204	203.9	203.9	1.00	1.00	3.7715%	3.7702%	3.7702%
2008	5,205	188	201.9	201.9	0.93	0.93	3.6119%	3.8791%	3.8791%
2009	5,021	186	205.2	205.2	0.91	0.91	3.7044%	4.0862%	4.0862%
Total	*45,425*	*1,534*	*1,602.8*	*1,602.8*	*0.96*	*0.96*	*3.3770%*	*3.5284%*	*3.5284%*

NEW YORK CITY FIRE DEPARTMENT PENSION FUND

Table 1C

Mortality Experience of Service Retirees - Non-WTC **Women**

Year	Life Years Exposed	Number of Deaths			Ratio of Actual to		Mortality Rate		
		Actual	Expected	Recommended	Expected	Recommended	Actual	Expected	Recommended
2002	6	1	0.0	0.0	75.95	75.95	16.6667%	0.2195%	0.2195%
2003	6	0	0.0	0.0	0.00	0.00	0.0000%	0.2173%	0.2173%
2004	6	0	0.0	0.0	0.00	0.00	0.0000%	0.2439%	0.2439%
2005	6	1	0.0	0.0	61.18	61.18	16.6667%	0.2724%	0.2724%
2006	5	0	0.0	0.0	0.00	0.00	0.0000%	0.3282%	0.3282%
2007	5	0	0.0	0.0	0.00	0.00	0.0000%	0.3714%	0.3714%
2008	5	0	0.0	0.0	0.00	0.00	0.0000%	0.4213%	0.4213%
2009	5	0	0.0	0.0	0.00	0.00	0.0000%	0.4746%	0.4746%
Total	*44*	*2*	*0.1*	*0.1*	*14.60*	*14.60*	*4.5455%*	*0.3113%*	*0.3113%*

NEW YORK CITY FIRE DEPARTMENT PENSION FUND

Table 2C

Mortality Experience of Disability Retirees - Non-WTC **Men**

Year	Life Years Exposed	Number of Deaths			Ratio of Actual to		Mortality Rate		
		Actual	Expected	Recommended	Expected	Recommended	Actual	Expected	Recommended
2002	7,628	180	191.9	191.9	0.94	0.94	2.3597%	2.5156%	2.5156%
2003	7,586	224	200.1	200.1	1.12	1.12	2.9528%	2.6373%	2.6373%
2004	7,375	190	206.5	206.5	0.92	0.92	2.5763%	2.7997%	2.7997%
2005	7,193	160	214.1	214.1	0.75	0.75	2.2244%	2.9760%	2.9760%
2006	7,034	189	224.0	224.0	0.84	0.84	2.6869%	3.1851%	3.1851%
2007	6,847	203	231.8	231.8	0.88	0.88	2.9648%	3.3853%	3.3853%
2008	6,647	201	237.9	237.9	0.85	0.85	3.0239%	3.5785%	3.5785%
2009	6,457	220	244.2	244.2	0.90	0.90	3.4072%	3.7822%	3.7822%
Total	*56,767*	*1,567*	*1,750.4*	*1,750.4*	*0.90*	*0.90*	*2.7604%*	*3.0835%*	*3.0835%*

NEW YORK CITY FIRE DEPARTMENT PENSION FUND

Table 2C

Mortality Experience of Disability Retirees - Non-WTC **Women**

Year	Life Years Exposed	Number of Deaths			Ratio of Actual to		Mortality Rate		
		Actual	Expected	Recommended	Expected	Recommended	Actual	Expected	Recommended
2002	6	0	0.0	0.0	0.00	0.00	0.0000%	0.2440%	0.2440%
2003	6	0	0.0	0.0	0.00	0.00	0.0000%	0.2727%	0.2727%
2004	6	0	0.0	0.0	0.00	0.00	0.0000%	0.3095%	0.3095%
2005	6	0	0.0	0.0	0.00	0.00	0.0000%	0.3521%	0.3521%
2006	6	0	0.0	0.0	0.00	0.00	0.0000%	0.3978%	0.3978%
2007	6	0	0.0	0.0	0.00	0.00	0.0000%	0.4470%	0.4470%
2008	6	0	0.0	0.0	0.00	0.00	0.0000%	0.5017%	0.5017%
2009	6	0	0.0	0.0	0.00	0.00	0.0000%	0.5653%	0.5653%
Total	*48*	*0*	*0.2*	*0.2*	*0.00*	*0.00*	*0.0000%*	*0.3863%*	*0.3863%*

NEW YORK CITY FIRE DEPARTMENT PENSION FUND

Table 10C

Accidental Disability Experience of Active Members - Non-WTC **Men and Women**

Year	Life Years Exposed	Number of Disabilities			Ratio of Actual to		Disability Rate		
		Actual	Expected	Recommended	Expected	Recommended	Actual	Expected	Recommended
2002	643	144	18.1	18.1	7.94	7.94	22.3950%	2.8221%	2.8221%
2003	164	11	3.6	3.6	3.04	3.04	6.7073%	2.2097%	2.2097%
2004	875	7	3.1	3.1	2.26	2.26	0.8000%	0.3532%	0.3532%
2005	1693	1	3.7	3.7	0.27	0.27	0.0591%	0.2191%	0.2191%
2006	2380	1	4.7	4.7	0.21	0.21	0.0420%	0.1983%	0.1983%
2007	3037	3	5.4	5.4	0.55	0.55	0.0988%	0.1787%	0.1787%
2008	3447	10	7.1	7.1	1.41	1.41	0.2901%	0.2061%	0.2061%
2009	3936	3	9.4	9.4	0.32	0.32	0.0762%	0.2393%	0.2393%
Total	*16,175*	*180*	*55.2*	*55.2*	*3.26*	*3.26*	*1.1128%*	*0.3415%*	*0.3415%*
2003-2009	*15,532*	*36*	*37.1*	*37.1*	*0.97*	*0.97*	*0.2318%*	*0.2388%*	*0.2388%*

NEW YORK CITY POLICE PENSION FUND

Table 1C

Mortality Experience of Service Retirees - WTC **Men**

Year	Life Years Exposed	Number of Deaths			Ratio of Actual to		Mortality Rate		
		Actual	Expected	Recommended	Expected	Recommended	Actual	Expected	Recommended
2002	20	0	0.2	0.2	0.00	0.00	0.0000%	0.8278%	0.8278%
2003	1,002	1	2.6	2.6	0.38	0.38	0.0998%	0.2607%	0.2607%
2004	1,811	1	4.8	4.8	0.21	0.21	0.0552%	0.2673%	0.2673%
2005	2,617	5	7.1	7.1	0.71	0.71	0.1911%	0.2708%	0.2708%
2006	3,524	0	10.1	10.1	0.00	0.00	0.0000%	0.2860%	0.2860%
2007	4,279	6	12.8	12.8	0.47	0.47	0.1402%	0.2997%	0.2997%
2008	4,997	5	15.8	15.8	0.32	0.32	0.1001%	0.3158%	0.3158%
2009	5,513	7	18.9	18.9	0.37	0.37	0.1270%	0.3430%	0.3430%
Total	*23,763*	*25*	*72.3*	*72.3*	*0.35*	*0.35*	*0.1052%*	*0.3042%*	*0.3042%*

NEW YORK CITY POLICE PENSION FUND

Table 1C

Mortality Experience of Service Retirees - WTC **Women**

Year	Life Years Exposed	Number of Deaths			Ratio of Actual to		Mortality Rate		
		Actual	Expected	Recommended	Expected	Recommended	Actual	Expected	Recommended
2002	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
2003	139	0	0.2	0.2	0.00	0.00	0.0000%	0.1497%	0.1497%
2004	247	0	0.4	0.4	0.00	0.00	0.0000%	0.1541%	0.1541%
2005	344	0	0.6	0.6	0.00	0.00	0.0000%	0.1618%	0.1618%
2006	503	0	0.8	0.8	0.00	0.00	0.0000%	0.1657%	0.1657%
2007	629	1	1.1	1.1	0.91	0.91	0.1590%	0.1753%	0.1753%
2008	761	2	1.4	1.4	1.42	1.42	0.2628%	0.1847%	0.1847%
2009	861	0	1.7	1.7	0.00	0.00	0.0000%	0.2029%	0.2029%
Total	*3,484*	*3*	*6.2*	*6.2*	*0.48*	*0.48*	*0.0861%*	*0.1789%*	*0.1789%*

NEW YORK CITY POLICE PENSION FUND

Table 2C

Mortality Experience of Disability Retirees - WTC **Men**

Year	Life Years Exposed	Number of Deaths			Ratio of Actual to		Mortality Rate		
		Actual	Expected	Recommended	Expected	Recommended	Actual	Expected	Recommended
2002	21	0	0.2	0.2	0.00	0.00	0.0000%	0.8992%	0.8992%
2003	105	0	0.5	0.5	0.00	0.00	0.0000%	0.4835%	0.4835%
2004	243	0	0.9	0.9	0.00	0.00	0.0000%	0.3825%	0.3825%
2005	415	0	1.4	1.4	0.00	0.00	0.0000%	0.3300%	0.3300%
2006	603	1	1.9	1.9	0.52	0.52	0.1658%	0.3170%	0.3170%
2007	794	2	2.5	2.5	0.80	0.80	0.2519%	0.3158%	0.3158%
2008	991	1	3.2	3.2	0.32	0.32	0.1009%	0.3189%	0.3189%
2009	1,224	6	4.0	4.0	1.52	1.52	0.4902%	0.3228%	0.3228%
Total	*4,396*	*10*	*14.5*	*14.5*	*0.69*	*0.69*	*0.2275%*	*0.3304%*	*0.3304%*

NEW YORK CITY POLICE PENSION FUND

Table 2C

Mortality Experience of Disability Retirees - WTC **Women**

Year	Life Years Exposed	Number of Deaths			Ratio of Actual to		Mortality Rate		
		Actual	Expected	Recommended	Expected	Recommended	Actual	Expected	Recommended
2002	8	0	0.0	0.0	0.00	0.00	0.0000%	0.1274%	0.1274%
2003	18	0	0.0	0.0	0.00	0.00	0.0000%	0.1237%	0.1237%
2004	27	0	0.0	0.0	0.00	0.00	0.0000%	0.1322%	0.1322%
2005	53	0	0.1	0.1	0.00	0.00	0.0000%	0.1208%	0.1208%
2006	82	0	0.1	0.1	0.00	0.00	0.0000%	0.1293%	0.1293%
2007	112	0	0.2	0.2	0.00	0.00	0.0000%	0.1347%	0.1347%
2008	159	0	0.2	0.2	0.00	0.00	0.0000%	0.1454%	0.1454%
2009	183	0	0.3	0.3	0.00	0.00	0.0000%	0.1573%	0.1573%
Total	*642*	*0*	*0.9*	*0.9*	*0.00*	*0.00*	*0.0000%*	*0.1415%*	*0.1415%*

NEW YORK CITY POLICE PENSION FUND

Table 10A — **Fiscal Years 2002 - 2009**

Accidental Disability Experience of Active Members - WTC — **Men and Women**

Age	Life Years Exposed	Number of Disabilities			Ratio of Actual to		Disability Rate		
		Actual	Expected	Recommended	Expected	Recommended	Actual	Expected	Recommended
20	0	0	0.0	0.0	0.00	0.00	0.0000%	0.1000%	0.1000%
21	0	0	0.0	0.0	0.00	0.00	0.0000%	0.1400%	0.1400%
22	0	0	0.0	0.0	0.00	0.00	0.0000%	0.1800%	0.1800%
23	0	0	0.0	0.0	0.00	0.00	0.0000%	0.2200%	0.2200%
24	2	0	0.0	0.0	0.00	0.00	0.0000%	0.2600%	0.2600%
25	23	0	0.1	0.1	0.00	0.00	0.0000%	0.3000%	0.3000%
26	108	0	0.4	0.4	0.00	0.00	0.0000%	0.3600%	0.3600%
27	325	0	1.4	1.4	0.00	0.00	0.0000%	0.4200%	0.4200%
28	675	4	3.2	3.2	1.23	1.23	0.5926%	0.4800%	0.4800%
29	1091	2	5.9	5.9	0.34	0.34	0.1833%	0.5400%	0.5400%
30	1583	7	9.5	9.5	0.74	0.74	0.4422%	0.6000%	0.6000%
31	1998	5	13.2	13.2	0.38	0.38	0.2503%	0.6600%	0.6600%
32	2407	15	17.3	17.3	0.87	0.87	0.6232%	0.7200%	0.7200%
33	2843	14	22.2	23.3	0.63	0.60	0.4924%	0.7800%	0.8190%
34	3522	33	29.6	32.5	1.12	1.01	0.9370%	0.8400%	0.9240%
35	4264	37	38.4	44.1	0.96	0.84	0.8677%	0.9000%	1.0350%
36	4877	49	46.8	53.8	1.05	0.91	1.0047%	0.9600%	1.1040%
37	5312	46	54.2	62.3	0.85	0.74	0.8660%	1.0200%	1.1730%
38	5556	79	60.0	69.0	1.32	1.14	1.4219%	1.0800%	1.2420%
39	5657	82	64.5	74.2	1.27	1.11	1.4495%	1.1400%	1.3110%
40	5659	72	67.9	78.1	1.06	0.92	1.2723%	1.2000%	1.3800%
41	5293	74	66.7	76.7	1.11	0.96	1.3981%	1.2600%	1.4490%
42	4633	83	61.2	70.3	1.36	1.18	1.7915%	1.3200%	1.5180%
43	3926	46	54.2	62.3	0.85	0.74	1.1717%	1.3800%	1.5870%
44	3251	51	46.8	53.8	1.09	0.95	1.5687%	1.4400%	1.6560%
45	2623	46	39.3	43.7	1.17	1.05	1.7537%	1.5000%	1.6650%
46	2079	34	33.3	34.9	1.02	0.97	1.6354%	1.6000%	1.6800%
47	1620	31	27.5	27.5	1.13	1.13	1.9136%	1.7000%	1.7000%
48	1210	12	21.8	21.8	0.55	0.55	0.9917%	1.8000%	1.8000%
49	896	13	17.0	17.0	0.76	0.76	1.4509%	1.9000%	1.9000%
50	684	13	13.7	13.7	0.95	0.95	1.9006%	2.0000%	2.0000%
51	504	8	11.1	11.1	0.72	0.72	1.5873%	2.2000%	2.2000%
52	337	5	8.1	8.1	0.62	0.62	1.4837%	2.4000%	2.4000%
53	246	6	6.4	6.4	0.94	0.94	2.4390%	2.6000%	2.6000%
54	177	3	5.0	5.0	0.61	0.61	1.6949%	2.8000%	2.8000%
55	127	1	3.8	3.8	0.26	0.26	0.7874%	3.0000%	3.0000%
56	113	2	3.8	3.8	0.52	0.52	1.7699%	3.4000%	3.4000%
57	78	0	3.0	3.0	0.00	0.00	0.0000%	3.8000%	3.8000%
58	68	2	2.9	2.9	0.70	0.70	2.9412%	4.2000%	4.2000%
59	63	1	2.9	2.9	0.35	0.35	1.5873%	4.6000%	4.6000%
60	49	2	2.5	2.5	0.82	0.82	4.0816%	5.0000%	5.0000%
61	46	2	2.8	2.8	0.72	0.72	4.3478%	6.0000%	6.0000%
62	28	3	2.0	2.0	1.53	1.53	10.7143%	7.0000%	7.0000%
63	4	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
64	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
65	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
66	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
67	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
68	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
69	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
70	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
71	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
72	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
73	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
74	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
75	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
76	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
77	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
78	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
79	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
80	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
Total	*73,957*	*883*	*870.1*	*964.2*	*1.01*	*0.92*	*1.1939%*	*1.1764%*	*1.3037%*

NEW YORK CITY POLICE PENSION FUND

Table 10C

Accidental Disability Experience of Active Members - WTC **Men and Women**

Year	Life Years Exposed	Number of Disabilities			Ratio of Actual to		Disability Rate		
		Actual	Expected	Recommended	Expected	Recommended	Actual	Expected	Recommended
2002	24298	84	235.3	235.3	0.36	0.36	0.3457%	0.9685%	0.9685%
2003	23750	131	233.7	233.7	0.56	0.56	0.5516%	0.9839%	0.9839%
2004	22667	174	231.2	231.2	0.75	0.75	0.7676%	1.0198%	1.0198%
2005	21524	177	228.6	228.6	0.77	0.77	0.8223%	1.0619%	1.0619%
2006	20186	188	222.8	222.8	0.84	0.84	0.9313%	1.1037%	1.1037%
2007	19042	211	219.3	219.3	0.96	0.96	1.1081%	1.1518%	1.1518%
2008	17866	235	215.1	215.1	1.09	1.09	1.3153%	1.2042%	1.2042%
2009	16863	249	212.8	212.8	1.17	1.17	1.4766%	1.2620%	1.2620%
Total	*166,196*	*1,449*	*1,798.8*	*1,798.8*	*0.81*	*0.81*	*0.8719%*	*1.0823%*	*1.0823%*
2007-2009	*53,771*	*695*	*647*	*647*	*1.07*	*1.07*	*1.2925%*	*1.2038%*	*1.2038%*
2008-2009	*34,729*	*484*	*428*	*428*	*1.13*	*1.13*	*1.3936%*	*1.2323%*	*1.2323%*

NEW YORK CITY POLICE PENSION FUND

Table 1C

Mortality Experience of Service Retirees - Non-WTC **Men**

Year	Life Years Exposed	Number of Deaths			Ratio of Actual to		Mortality Rate		
		Actual	Expected	Recommended	Expected	Recommended	Actual	Expected	Recommended
2002	19,031	462	413.7	413.7	1.12	1.12	2.4276%	2.1736%	2.1736%
2003	19,512	451	425.7	425.7	1.06	1.06	2.3114%	2.1818%	2.1818%
2004	19,630	449	437.4	437.4	1.03	1.03	2.2873%	2.2281%	2.2281%
2005	19,884	507	449.1	449.1	1.13	1.13	2.5498%	2.2588%	2.2588%
2006	20,150	466	458.9	458.9	1.02	1.02	2.3127%	2.2775%	2.2775%
2007	20,342	487	467.9	467.9	1.04	1.04	2.3941%	2.3000%	2.3000%
2008	20,318	501	479.6	479.6	1.04	1.04	2.4658%	2.3605%	2.3605%
2009	19,973	496	489.9	489.9	1.01	1.01	2.4834%	2.4526%	2.4526%
Total	*158,840*	*3,819*	*3,622.2*	*3,622.2*	*1.05*	*1.05*	*2.4043%*	*2.2804%*	*2.2804%*

NEW YORK CITY POLICE PENSION FUND

Table 1C

Mortality Experience of Service Retirees - Non-WTC **Women**

Year	Life Years Exposed	Number of Deaths			Ratio of Actual to		Mortality Rate		
		Actual	Expected	Recommended	Expected	Recommended	Actual	Expected	Recommended
2002	557	3	5.3	5.3	0.56	0.56	0.5386%	0.9581%	0.9581%
2003	733	7	6.1	6.1	1.15	1.15	0.9550%	0.8317%	0.8317%
2004	857	9	6.6	6.6	1.37	1.37	1.0502%	0.7673%	0.7673%
2005	971	7	7.0	7.0	1.00	1.00	0.7209%	0.7173%	0.7173%
2006	1,120	7	7.6	7.6	0.93	0.93	0.6250%	0.6745%	0.6745%
2007	1,269	11	8.1	8.1	1.35	1.35	0.8668%	0.6419%	0.6419%
2008	1,385	9	8.4	8.4	1.08	1.08	0.6498%	0.6043%	0.6043%
2009	1,434	11	8.8	8.8	1.25	1.25	0.7671%	0.6139%	0.6139%
Total	*8,326*	*64*	*57.8*	*57.8*	*1.11*	*1.11*	*0.7687%*	*0.6948%*	*0.6948%*

NEW YORK CITY POLICE PENSION FUND

Table 2C

Mortality Experience of Disability Retirees - Non-WTC **Men**

Year	Life Years Exposed	Number of Deaths			Ratio of Actual to		Mortality Rate		
		Actual	Expected	Recommended	Expected	Recommended	Actual	Expected	Recommended
2002	12,958	243	242.4	242.4	1.00	1.00	1.8753%	1.8705%	1.8705%
2003	13,017	284	253.5	253.5	1.12	1.12	2.1818%	1.9477%	1.9477%
2004	12,997	232	261.1	261.1	0.89	0.89	1.7850%	2.0089%	2.0089%
2005	13,018	274	272.6	272.6	1.01	1.01	2.1048%	2.0937%	2.0937%
2006	12,938	254	281.3	281.3	0.90	0.90	1.9632%	2.1741%	2.1741%
2007	12,894	275	292.0	292.0	0.94	0.94	2.1328%	2.2649%	2.2649%
2008	12,753	281	300.6	300.6	0.93	0.93	2.2034%	2.3574%	2.3574%
2009	12,570	296	309.2	309.2	0.96	0.96	2.3548%	2.4599%	2.4599%
Total	*103,145*	*2,139*	*2,212.7*	*2,212.7*	*0.97*	*0.97*	*2.0738%*	*2.1453%*	*2.1453%*

NEW YORK CITY POLICE PENSION FUND

Table 2C

Mortality Experience of Disability Retirees - Non-WTC **Women**

Year	Life Years Exposed	Number of Deaths			Ratio of Actual to		Mortality Rate		
		Actual	Expected	Recommended	Expected	Recommended	Actual	Expected	Recommended
2002	742	4	3.9	3.9	1.04	1.04	0.5391%	0.5197%	0.5197%
2003	798	3	4.2	4.2	0.72	0.72	0.3759%	0.5256%	0.5256%
2004	848	6	4.6	4.6	1.29	1.29	0.7075%	0.5465%	0.5465%
2005	910	1	5.0	5.0	0.20	0.20	0.1099%	0.5518%	0.5518%
2006	954	6	5.6	5.6	1.07	1.07	0.6289%	0.5851%	0.5851%
2007	985	8	6.0	6.0	1.34	1.34	0.8122%	0.6044%	0.6044%
2008	1,000	5	6.1	6.1	0.82	0.82	0.5000%	0.6075%	0.6075%
2009	1,019	8	6.7	6.7	1.19	1.19	0.7851%	0.6583%	0.6583%
Total	*7,256*	*41*	*42.0*	*42.0*	*0.98*	*0.98*	*0.5650%*	*0.5792%*	*0.5792%*

NEW YORK CITY POLICE PENSION FUND

Table 10A — **Fiscal Years 2002 - 2009**

Accidental Disability Experience of Active Members - Non-WTC — **Men and Women**

Age	Life Years Exposed	Number of Disabilities			Ratio of Actual to		Disability Rate		
		Actual	Expected	Recommended	Expected	Recommended	Actual	Expected	Recommended
20	0	0	0.0	0.0	0.00	0.00	0.0000%	0.1000%	0.0400%
21	17	0	0.0	0.0	0.00	0.00	0.0000%	0.1400%	0.0560%
22	990	0	1.8	0.7	0.00	0.00	0.0000%	0.1800%	0.0720%
23	2345	0	5.2	2.1	0.00	0.00	0.0000%	0.2200%	0.0880%
24	3372	0	8.8	3.5	0.00	0.00	0.0000%	0.2600%	0.1040%
25	4000	1	12.0	4.8	0.08	0.21	0.0250%	0.3000%	0.1200%
26	4317	1	15.5	6.2	0.06	0.16	0.0232%	0.3600%	0.1440%
27	4300	3	18.1	7.2	0.17	0.42	0.0698%	0.4200%	0.1680%
28	4142	6	19.9	8.0	0.30	0.75	0.1449%	0.4800%	0.1920%
29	3751	5	20.3	8.1	0.25	0.62	0.1333%	0.5400%	0.2160%
30	3402	6	20.4	8.2	0.29	0.73	0.1764%	0.6000%	0.2400%
31	3095	13	20.4	8.2	0.64	1.59	0.4200%	0.6600%	0.2640%
32	2702	10	19.5	7.8	0.51	1.29	0.3701%	0.7200%	0.2880%
33	2560	13	20.0	12.0	0.65	1.09	0.5078%	0.7800%	0.4680%
34	2601	28	21.8	17.5	1.28	1.60	1.0765%	0.8400%	0.6720%
35	2708	39	24.4	24.4	1.60	1.60	1.4402%	0.9000%	0.9000%
36	2825	39	27.1	27.1	1.44	1.44	1.3805%	0.9600%	0.9600%
37	2720	28	27.7	27.7	1.01	1.01	1.0294%	1.0200%	1.0200%
38	2615	41	28.2	28.2	1.45	1.45	1.5679%	1.0800%	1.0800%
39	2371	41	27.0	27.0	1.52	1.52	1.7292%	1.1400%	1.1400%
40	2289	50	27.5	27.5	1.82	1.82	2.1844%	1.2000%	1.2000%
41	2052	44	25.9	25.9	1.70	1.70	2.1442%	1.2600%	1.2600%
42	1688	34	22.3	22.3	1.53	1.53	2.0142%	1.3200%	1.3200%
43	1464	31	20.2	20.2	1.53	1.53	2.1175%	1.3800%	1.3800%
44	1225	37	17.6	17.6	2.10	2.10	3.0204%	1.4400%	1.4400%
45	960	20	14.4	14.4	1.39	1.39	2.0833%	1.5000%	1.5000%
46	752	20	12.0	12.0	1.66	1.66	2.6596%	1.6000%	1.6000%
47	556	6	9.5	9.5	0.63	0.63	1.0791%	1.7000%	1.7000%
48	442	9	8.0	8.0	1.13	1.13	2.0362%	1.8000%	1.8000%
49	345	6	6.6	6.6	0.92	0.92	1.7391%	1.9000%	1.9000%
50	255	5	5.1	5.1	0.98	0.98	1.9608%	2.0000%	2.0000%
51	168	3	3.7	3.7	0.81	0.81	1.7857%	2.2000%	2.2000%
52	113	1	2.7	2.7	0.37	0.37	0.8850%	2.4000%	2.4000%
53	81	1	2.1	2.1	0.47	0.47	1.2346%	2.6000%	2.6000%
54	70	2	2.0	2.0	1.02	1.02	2.8571%	2.8000%	2.8000%
55	53	2	1.6	1.6	1.26	1.26	3.7736%	3.0000%	3.0000%
56	44	1	1.5	1.5	0.67	0.67	2.2727%	3.4000%	3.4000%
57	35	1	1.3	1.3	0.75	0.75	2.8571%	3.8000%	3.8000%
58	29	3	1.2	1.2	2.46	2.46	10.3448%	4.2000%	4.2000%
59	30	4	1.4	1.4	2.90	2.90	13.3333%	4.6000%	4.6000%
60	19	0	1.0	1.0	0.00	0.00	0.0000%	5.0000%	5.0000%
61	19	0	1.1	1.1	0.00	0.00	0.0000%	6.0000%	6.0000%
62	36	3	2.5	2.5	1.19	1.19	8.3333%	7.0000%	7.0000%
63	16	2	0.0	0.0	0.00	0.00	12.5000%	0.0000%	0.0000%
64	4	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
65	3	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
66	2	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
67	2	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
68	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
69	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
70	1	1	0.0	0.0	0.00	0.00	100.0000%	0.0000%	0.0000%
71	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
72	1	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
73	2	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
74	1	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
75	1	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
76	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
77	0	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
78	1	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
79	1	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
80	6	0	0.0	0.0	0.00	0.00	0.0000%	0.0000%	0.0000%
Total	*67,599*	*560*	*529.1*	*419.7*	*1.06*	*1.33*	*0.8284%*	*0.7827%*	*0.6209%*

NEW YORK CITY POLICE PENSION FUND

Table 10C

Accidental Disability Experience of Active Members - Non-WTC **Men and Women**

Year	Life Years Exposed	Number of Disabilities			Ratio of Actual to		Disability Rate		
		Actual	Expected	Recommended	Expected	Recommended	Actual	Expected	Recommended
2002	14668	300	149.3	149.3	2.01	2.01	2.0453%	1.0179%	1.0179%
2003	13062	248	132.3	132.3	1.88	1.88	1.8986%	1.0125%	1.0125%
2004	13604	251	130.8	130.8	1.92	1.92	1.8450%	0.9613%	0.9613%
2005	13622	188	125.5	125.5	1.50	1.50	1.3801%	0.9211%	0.9211%
2006	15294	209	127.8	127.8	1.64	1.64	1.3665%	0.8353%	0.8353%
2007	16273	142	126.8	126.8	1.12	1.12	0.8726%	0.7791%	0.7791%
2008	17471	105	132.1	132.1	0.80	0.80	0.6010%	0.7559%	0.7559%
2009	18561	104	142.5	142.5	0.73	0.73	0.5603%	0.7679%	0.7679%
Total	*122,555*	*1,547*	*1,066.9*	*1,066.9*	*1.45*	*1.45*	*1.2623%*	*0.8706%*	*0.8706%*
2007-2009	*52,305*	*351*	*401*	*401*	*0.87*	*0.87*	*0.6711%*	*0.7674%*	*0.7674%*
2008-2009	*36,032*	*209*	*275*	*275*	*0.76*	*0.76*	*0.5800%*	*0.7621%*	*0.7621%*

Summary of 2003 - 2010 Experience of Accidental Disability Retirements (ADRs) & WTC-ADRs (Both Direct & Via Reclassification)
Note: Counts Below Are All Male FIRE Disabled Retirees with WTC Codes

FY	New ADRs	Svc Rets Who Later Reclassified to WTC-ADR; ADR Code Was Mass Edited Back to FY Shown Below	Net New ADRs	# of Net New ADRs Coded WTC-ADR's Immed	% of Net New ADRs Coded WTC-ADR's Immed	ADR* Retirements Who Later Reclassified to WTC-ADR; Below in FY of Orig ADR Ret	% of Net New ADRs That Reclassified
2003	713	72	641	N/A**	N/A**	21	3.3%
2004	348	28	320	N/A**	N/A**	8	2.5%
2005	403	14	389	N/A**	N/A**	6	1.5%
2006	397	21	376	N/A**	N/A**	3	0.8%
2007	402	37	365	31	8.5%	2	0.6%
2008	358	23	335	116	34.6%	1	0.3%
2009	260	29	231	118	51.1%	1	0.4%
2010	294	N/A***	N/A***	129	N/A***	N/A***	N/A***
8-Yr Total: 2003-10	3175	N/A***	N/A***	394	N/A***	N/A***	N/A***
7-Yr Total: 2003-09	2881	224	2657	265	10.0%	42	1.6%
3-Yr Total: 2008-10	912	N/A***	N/A***	363	N/A***	N/A***	N/A***
2-Yr Total: 2008-09	618	52	566	234	41.3%	2	0.4%

* Note: 40 of the total 42 Disability Retirees included here were Accidental Disabilities; 2 were actually Ordinary Disabilities

**Before WTC-ADR processing began; seems fiscal 2007 was the first (partial) year of processing/approving WTC-ADR applications

***Not determinable until 2011 reclassification data for FIRE is available

Summary of 2003 - 2009 Experience of Service Retirements Reclassifying into WTC-ADRs
Note: Counts Below Are All Male FIRE Retirees with WTC Codes

FY	New Svc Rets	Service Retirements Who Later Reclassified to WTC-ADR; Below in FY of Original Service Retirement	% Reclassified
2003	500	72	14.40%
2004	150	28	18.67%
2005	124	14	11.29%
2006	122	21	17.21%
2007	105	37	35.24%
2008	50	23	46.00%
2009	106	29	27.36%
7-Yr Total:	1157	224	19.36%
2007-09:	261	89	34.10%

Summary of Experience of 2003-2009 Service Retirees Who Later Reclassified

Time Elapsed (Years) From Date of Service Retirement Until Date of Reclassification Into WTC-ADR:	<1	>=1 and <2	>=2 and <3	>=3 and <4	>=4 and <5	>=5 and <6	>=6 and <7	>=7 and <8	>=8 and <9	Total	Average Duration
Total:	48	29	24	26	40	29	11	13	4	224	3.44
Percent of Total:	21.4%	12.9%	10.7%	11.6%	17.9%	12.9%	4.9%	5.8%	1.8%	100%	

Summary of Experience of 2003-2009 Disability Retirees* Who Later Reclassified

Time Elapsed (Years) From Date of Disability Retirement Until Date of Reclassification Into WTC-ADR:	<1	>=1 and <2	>=2 and <3	>=3 and <4	>=4 and <5	>=5 and <6	>=6 and <7	>=7 and <8	>=8 and <9	Total	Average Duration
Total:	1	2	1	6	10	9	3	10	0	42	5.14
Percent of Total:	2.4%	4.8%	2.4%	14.3%	23.8%	21.4%	7.1%	23.8%	0.0%	100%	

* Note: 40 of the total 42 Disability Retirees were Accidental Disabilities; 2 were Ordinary Disabilities

HayGroup®

Example of Hay Group Development of Assumption Change Recommendation

To illustrate Hay Group's method for determining our assumption change recommendations, we have chosen the FIRE – Withdrawal from Active Service Study.

The following page shows the 10-year (fiscal 2000-2009) study result, upon which we based our recommendation to adopt revised (service-based) withdrawal assumptions. We developed our recommendation in the same general manner that we developed our recommended new assumptions throughout our Demographic Experience Studies. Here are the key steps involved in this process:

1. Scan the actual-to-expected ratio column, looking for highs and/or lows as the service level changes from 0 to 20.
2. Group together any service level ranges where there seem to be consistent actual-to-expected ratios.
3. Note that we have used heavy horizontal lines to subdivide the service range into sub-ranges that seem to have actual-to-expected ratios in the same approximate range.
4. Then, for each of the selected sub-range we calculate a "sub-group" actual-to-expected ratio (as shown at the right side of the table)
5. By applying the calculated "sub-group" actual-to-expected ratios to the current (expected) withdrawal rates for each of the service levels within the sub-group, we determine our recommended withdrawal rates for that sub-group of service levels, as shown in the Recommended column.
6. The final actual-to-recommended ratio of 1.00 at the bottom of the actual-to-recommended column confirms that the adjustment factors applied do create recommended withdrawal assumptions that are a good fit relative to the 10-year study experience.

Note: On the page following the table we have included the actual FIRE Withdrawal Study commentary included in the Results, Observations & Recommendations section of our report.

NEW YORK CITY FIRE DEPARTMENT PENSION FUND

Table 3B (10 Years) **Fiscal Years 2000 - 2009**

Withdrawal Experience of Active Members **Men and Women**

Service	Life Years Exposed	Number of Withdrawals			Ratio of Actual to		Withdrawal Rate			Subtotal Actual	Subtotal Expected	A/E = Adj Factor
		Actual	Expected	Recommended	Expected	Recommended	Actual	Expected	Recommended			
0	4,064	76	40.6	55.3	1.87	1.38	1.8701%	1.0000%	1.3600%			
1	6,048	53	42.3	57.6	1.25	0.92	0.8763%	0.7000%	0.9520%			
2	5,629	23	28.1	38.3	0.82	0.60	0.4086%	0.5000%	0.6800%			
3	5,361	21	16.1	21.9	1.31	0.96	0.3917%	0.3000%	0.4080%	173.0	127.2	1.36
4	5,245	22	10.5	19.9	2.10	1.10	0.4194%	0.2000%	0.3800%			
5	5,220	19	10.4	19.8	1.82	0.96	0.3640%	0.2000%	0.3800%			
6	4,706	12	9.4	17.9	1.27	0.67	0.2550%	0.2000%	0.3800%			
7	4,260	22	8.5	16.2	2.58	1.36	0.5164%	0.2000%	0.3800%			
8	4,027	14	8.1	15.3	1.74	0.91	0.3477%	0.2000%	0.3800%	89.0	46.9	1.90
9	4,328	9	8.7	7.4	1.04	1.22	0.2079%	0.2000%	0.1700%			
10	4,131	6	8.3	7.0	0.73	0.85	0.1452%	0.2000%	0.1700%			
11	3,906	6	7.8	6.6	0.77	0.90	0.1536%	0.2000%	0.1700%			
12	3,865	6	7.7	6.6	0.78	0.91	0.1552%	0.2000%	0.1700%			
13	3,812	7	7.6	6.5	0.92	1.08	0.1836%	0.2000%	0.1700%	34.0	40.1	0.85
14	3,836	4	7.7	4.1	0.52	0.97	0.1043%	0.2000%	0.1080%			
15	3,858	3	7.7	4.2	0.39	0.72	0.0778%	0.2000%	0.1080%			
16	4,063	5	8.1	4.4	0.62	1.14	0.1231%	0.2000%	0.1080%			
17	4,348	4	8.7	4.7	0.46	0.85	0.0920%	0.2000%	0.1080%			
18	4,723	4	9.4	5.1	0.42	0.78	0.0847%	0.2000%	0.1080%			
19	4,140	2	8.3	4.5	0.24	0.45	0.0483%	0.2000%	0.1080%			
20	5	5	0.0	0.0	0.00	0.00	100.0000%	0.0000%	0.0000%	27.0	49.9	0.54
Total	*89,575*	*323*	*264.1*	*323.2*	*1.22*	*1.00*	*0.3606%*	*0.2949%*	*0.3608%*			

Example of Hay Group Development of Assumption Change Recommendation (cont'd)

Hay Group Commentary on FIRE Study of Withdrawals from Active Service (Men and Women)

This study, of the service-related probabilities of members leaving (withdrawing from) active service prior to reaching 20 years of service, included a 21-year study (covering fiscal years 1989-2009), a 10-year study (covering fiscal years 2000-2009) and a 4-year study (covering fiscal years 2006-2009). There were significant differences in the actual-to-expected ratios for these three studies, which were 1.06 for the 21-year, 1.22 for the 10-year and 1.51 for the 4-year studies. These differences are indicative of the upward trend in actual withdrawals relative to expected levels over past years.

Recommendation - Given our belief that there is sufficient experience over the 10-year period for these results to be credible and our view that the experience over this 10-year period is representative of the withdrawal experience to be expected among active members of FIRE in the future, we recommend increasing the current withdrawal probabilities.

Closer examination of the service-specific results from the 10-year study clearly reveals relatively higher ratios among those members with shorter service (i.e., with less than 10 years) and relatively lower ratios among those with longer (i.e., with 10 or more years) service. By adjusting the current withdrawal assumptions upward at all service levels less than 9 years (with the greatest upward adjustment for service levels 4 through 8 years) and adjusting the current assumptions downward at service levels of 9 or more years (with the greatest downward adjustment for service levels greater than 13 years), to make them consistent with the FIRE experience over the past 10 years (and to produce a 10-year actual-to-expected ratio close to 1), we developed our recommended new FIRE withdrawal from active service assumptions, still applicable to both males and females. These recommended assumptions are shown in the Recommended columns of all the A and B Tables that appear in the Study 3 tables of the Appendix.