
Massachusetts Water Resource Authority Other Post-Employment Benefits



**Actuarial Valuation
January 1, 2010**



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SECTION I MANAGEMENT SUMMARY

Introduction

This report presents the results of the actuarial valuation of the Massachusetts Water Resource Authority (MWRA) Other Post-employment Benefits as of January 1, 2010. The valuation was performed for the purpose of measuring the actuarial accrued liabilities associated with these benefits and calculating a funding schedule. These results are used in satisfying the requirements under the Governmental Accounting Standards Board Statement No. 45.

The valuation was based on participant data as of January 1, 2010 supplied by the MWRA. The provisions reflected in the valuation are based on Chapter 32B of the General Laws of the Commonwealth of Massachusetts and related statutes and the benefits provided by the Authority.

We are pleased to present the results of this valuation. We are available to respond to any questions on the content of this report. Please note that this report is meant to be used in its entirety. Use of excerpts of this report may result in inaccurate or misleading understanding of the results.

Respectfully submitted,
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Summary of Actuarial Results

The actuarial values in this report were calculated consistent with the Governmental Accounting Standards Board (GASB) Statement No. 45, *Accounting and Financial Reporting by Employers for Postemployment Benefits Other Than Pensions*, issued June 2004. Values at two discount rates are presented. The 7.75% discount rate represents the expected rate of return for a funded plan with a longer-term investment horizon. For an unfunded plan, the GASB Statement No. 45 calls for the use of a discount rate approximating the rate of return of MWRA's general assets. The rate we recommend for MWRA is 4.25%. The OPEB liability is extremely sensitive to this assumption. Use of the unfunded rate instead of the funded rate causes the Annual Required Contribution (ARC), Accrued Actuarial Liability (AAL), and the Normal Cost to increase dramatically.

The summary results are as follows:

- Actuarial Accrued Liability (“AAL”) is the “price” attributable to benefits earned in past years. The total AAL as of January 1, 2010 (at 4.25% discount rate) is \$192,096,039. This is made up of approximately \$141.2 million for current active MWRA employees and approximately \$50.9 million for MWRA retirees, spouses and survivors.
- The Normal Cost is the “price” attributable to benefits earned in the current year. The Normal Cost as of January 1, 2010 (at the 4.25% discount rate) is approximately \$9.4 million.
- Based on a twenty-seven year funding schedule (at the 4.25% discount rate), the Fiscal 2011 contribution would be \$17,433,262 . This figure is referred to as the Annual Required Contribution (ARC). This figure should be contrasted with the ARC using the fully funded 7.75% rate and a 30-year funding schedule of \$10,808,574. These compare to the pay-as-you-go contribution of the existing costs for current retirees of \$3,293,314. For an illustration of how payment of the ARC impacts the funding of the plan over time, please refer to the “Illustrative Funding Schedule” discussion beginning on page 15 and the accompanying table on page 31. The following table shows the breakdown of the



Actuarial Accrued Liability between future retirees and current retirees, as well as the normal cost, at MWRA's different discount rates:

Actuarial Results as of January 1, 2010	7.75% Rate	4.25% Rate
Current Actives	\$73,390,728	\$141,209,599
Current Retirees, Beneficiaries, Vesteds and Survivors	<u>\$33,666,358</u>	<u>\$50,886,440</u>
Total AAL	\$107,057,086	\$192,096,039
Normal Cost	\$4,615,206	\$9,391,532
ARC (Uses 27 yrs for unfunded, 30 Yrs for Funded)	\$10,808,574	\$17,433,262



Valuation Methodology and Assumptions

VALUATION METHOD

The valuation of the other post-employment benefits is based upon the projected unit credit actuarial cost method. Under this method, future health care benefit cost is projected using assumed rates of annual health care cost increases (health care cost trend rates). The cost of future expected life insurance death benefits is added to the projected medical cost. The actuarial value of the future expected benefits is allocated proportionately over a health plan member's working lifetime.

A normal cost (or service cost) is determined for each year of the member's creditable service and is equal to the value of the future expected benefits divided by the total expected number of years of service. This is similar to a normal cost in a retirement actuarial valuation. The Actuarial Accrued Liability is the accumulated value of prior normal costs, similar to the actuarial accrued liability in a retirement actuarial valuation, and represents the liability associated with prior service.

GASB Statement No. 45

The actuarial cost method used in this valuation is consistent with the Governmental Accounting Standards Board (GASB) Statement No. 45, *Accounting and Financial Reporting by Employers for Postemployment Benefits Other Than Pensions*, issued June 2004. It is one of the allowable cost methods specified in that accounting standard, and is the cost method most similar to the prescribed method of accounting for these benefits in the private sector described in the Financial Accounting Standards Board Statement 106 (FAS 106).

Difference Between FAS 106 and GASB Statement No. 45

The GASB Statement No. 45 differs in one important regard from the actuarial cost method described in the private sector accounting standard. In the FAS 106 methodology, benefits are considered to be fully earned in the first 10 years of service, since members become vested in



the retirement benefits in 10 years. Compared to the FAS 106 method, the GASB Statement No. 45 attribution method produces a lower accrued liability for future retirees. The cost of the benefit is spread over the expected working lifetime of the employee. This makes the cost of the benefit associated with the years of service the employee is providing. This is more appropriate for the public sector due to the relative permanence of public entities compared to private entities. There are other significant differences between the GASB Statement No. 45 and FAS 106, most noticeably in the choice of discount rate. The GASB Statement No. 45 discount rate assumption is discussed below.

ACTUARIAL ASSUMPTIONS

Details of the assumptions used in this valuation are shown in Section II. Here we present a brief discussion of the assumptions selected.

Demographic and Financial Assumptions

These include discount rates of 7.75% and 4.25% as well as mortality, disability, withdrawal and retirement rates. These discount rates apply to the two scenarios of either a fully funded or unfunded program. A fully funded program is when the employer contributes 100% of the ARC each year. An unfunded program is where the only amount contributed is used to pay benefits during the year so no assets accumulate. GASB Statement No. 45 indicates that the discount rate for an unfunded post employment benefit plan should be based on the degree to which the plan is funded. For an unfunded plan, the rate of return on the employer's general assets should be used. The rate we are recommending for this scenario is 4.25%. For a fully funded plan, GASB statement No. 45 allows one to use a long-term investment rate such as what would be used for a defined benefit pension fund. The rate we are currently using for this is 7.75%. For a plan (not the case with MWRA) where the Authority has been setting aside some funds toward the liability above the pay-as-you-go amount, but less than the full ARC ("partially" funded), a rate in between these two levels should be used. It should be noted that the rate of return assumption could change significantly in the future due to changes in the economic environment.



We recommend that MWRA adopt a funding policy for its OPEB benefits. The funding policy would describe the amounts and timing of the contributions. The GASB statement does not have a requirement for a formal funding policy document but indicates that a formal funding policy should be adopted. We recommend that the Authority detail its intent with either a written document or in the minutes of a meeting.

The discount rate would change if the Authority implements any sort of funding above the pay-as-you-go amount. Such a change would lead to a higher discount rate and, hence, a lower AAL, possibly significantly so. Note that the discount rate that would be used would be affected by the asset allocation of the fund.

Health Care Plan Assumptions

Assumptions unique to post-retirement medical plans include initial annual health care costs and annual health care cost increase (trend) rates, Medicare eligibility, plan participation and coverage election rates.

- *Current health care costs by age*

Initial health care cost assumptions were derived from premium rates for the various health care plans in-force at January 1, 2010. Typically, we analyze the plans offered in terms of four different categories: whether the plan offered is Commercial (not integrated with Medicare) or Medicare Supplement and whether the plan is Indemnity (where reimbursements are a function of billed charges) or Managed Care (where reimbursements are a function of negotiated contracts). Grouping the plans in this manner allows us to maintain a reasonable degree of granularity in our analysis. At the same time, it avoids the problem of a lack of credibility that often arises if one attempts to analyze every plan separately.

In the case of MWRA there are plans in all four of these categories. The Authority offers several plans in each of these categories.



For all of these groups, weighted-average costs for each plan grouping were calculated based on the actual MWRA active and retiree population enrollments. For categories with more than one plan (all four for MWRA), costs were based on an average weighted by enrollment. However, in order to capture the effect of aging on health care costs, an assumption is required for the increase in health care costs as a person ages. We based our aging assumption on a study sponsored by the Society of Actuaries Health Section in August 2003. The effect of this aging assumption is illustrated in the table of “Initial Monthly Health Care Costs” in the Actuarial Methods and Assumptions section of this report. This method was applied only to the Commercial plans, since these plans incorporate both retirees and active employees. By age-grading the claim costs, we account for the subsidy of older employees by younger employees implicit in a flat premium rate (also referred to as the “Attributed Cost” of each employee). That is, the cost of an active 20-year old employee, for example, is much less than the cost of a retired 80-year old employee. But, the premiums charged the Authority are flat – the same for both of these people. Thus, the 20-year old in our example is overcharged and the 80-year old is undercharged by a flat rate premium. Age-grading makes this subsidy or mischarge explicit in the claim costs at each age. For the purposes of the GASB valuation, this subsidy needs to be taken into account in determining the retiree liability and normal cost.

No such age-grading was necessary for the Medicare plan because these plans cover retirees only. There is no overcharging of actives in the flat premium rate. Thus, there is no implicit subsidy to take into account.

- **Cost trends**

The claim rates developed using the methodology described above must be projected over the life of each retiree. For this purpose we use trend rates calculated to reflect the general rate of increase in Health Care costs. Since we did not have adequate data to develop trend rates unique to MWRA’s experience, we used trends based upon Stone Consulting’s understanding of current health care rate increases.



We developed different trends for each of the categories of plans for which we also developed claim costs. These factors were applied to the premium-based claim rates. In the case of MWRA, rate increases in the first year were known, so these figures became our first-year trend values. Subsequent year trends were based on our understanding of the trends.

It should be noted that premium rate increases typically include factors other than health care cost increases, such as aging of the covered population, that are reflected elsewhere in our valuation methodology. Therefore, premium rate increases are not themselves a proxy for health care trends. However, they do give some indication of the level of expected cost increases.

As is typical in post-retirement medical valuations, initially higher rates of health care cost trend are assumed to decrease over time to an ultimate rate consistent with long-term economic assumptions. Our general set of trend assumptions has Commercial Managed Care trends that begin at 10% and scale down to 5% and Commercial Indemnity trends that begin at 11% and scale down to 6%. For Medicare, the Indemnity trend rates begin at 10% and scale down to 6% while the Managed Care trend rates being at 9% and scale down to 5%. These different sets of trend rate reflect our belief that (1) Managed Care plans, with their negotiated pay levels and tighter controls, will exhibit lower trends than unmanaged Indemnity plans; and (2) Commercial plans will be subject to modestly higher trends than Medicare plans due to cost shifting induced by cutbacks in the federal government's payment of Medicare costs. As mentioned above, we did alter the first year trend rates to reflect the already known rates of change in the rates for the first year, 2010. These altered factors (which are shown in the appendix) were based on the weighted average change in rates in each category.

These trend rates should be thought of not as a forecast but as a reasonable progression of rates based on historic patterns. For many years, health care cost increases have been particularly volatile, and this actuarial assumption should be reviewed and, most likely, reset every year or two. Implicit in our health care cost trend assumptions is that the general rate of medical inflation will moderate due to economic pressure on insurers, employers, employees, retirees, government entities, and health care providers. As expectations of future health care



cost increases change, they will be reflected in future valuations, resulting in actuarial gains/losses. These will be incorporated in the future costs and funding schedules. In this manner, there is a systematic means of adjusting to changes in the health care environment.

- **Sensitivity analysis**

The effect of increasing health care costs is extremely significant in an actuarial valuation of post-employment health benefits. As experience emerges the trend assumptions we have used are unlikely to be realized exactly. To illustrate the effect of different trend rates on the actuarial valuation results, we have included a sensitivity analysis of the effect on the actuarial accrued liability, normal cost and annual required contribution of a 1% increase or decrease in the health care cost trend assumption to the base (4.25%) unfunded scenario. We have also included a sensitivity analysis of the effect on the actuarial accrued liability, normal cost and annual required contribution of a 0.50% increase or decrease in the base unfunded discount rate assumption.

- **Timing**

All values discussed in this report are based on a January 1, 2010 valuation. This means that the first year of the valuation is January 1, 2010 through December 31, 2010. It is permissible, under GASB Statement No. 45, to use these values, without adjustment for interest or any other timing factor for a limited future time period. For an entity such as MWRA, which will be doing a valuation every two years, the standard allows use of data “not more than twenty-four months before the beginning of the first of two years for which the valuation provides the ARC.” This means that it is acceptable for us to use the January 1, 2010 results without adjustment when discussing the 2011 fiscal year. Included are projected costs under the unfunded scenario for the fiscal year after the 2011 fiscal year. If you do not make any cash contributions or there are no significant plan changes you will be able to use the results for both fiscal years.



- Medicare

Medicare eligibility is an important assumption with regard to future costs. For those entities that have adopted Section of 18 of Chapter 32 B of the code, we will assume that active employees who were hired after March 31, 1986 will be Medicare eligible due to their mandated participation in the Medicare program. Active employees prior to that employment date are assumed to be 85% Medicare eligible.

Medicare Changes

The Medicare Prescription Drug, Improvement and Modernization Act of 2003 introduced significant changes to the Medicare program and its interaction with employer-sponsored post-retirement benefits. Medicare beneficiaries are able to participate in a voluntary, prescription drug coverage program. In order to encourage employers, including public-sector employers, to continue providing prescription drug coverage to retirees, the Act provides for a cash subsidy to employers whose prescription drug coverage is deemed to be actuarially equivalent to the new Medicare Part D drug coverage. This cash subsidy can be used to offset partially the cost of retiree medical benefits, including potentially reducing the accrued liability for a portion of the drug benefits provided by a retiree medical plan. The Act may have additional impact on retiree plan choices, as Medicare-eligible retirees may opt for the Part D coverage rather than an employer's plan options. Such changes, if they occur, may affect the selection of future actuarial assumptions.

GASB has indicated that the subsidy should not be included as part of the OPEB valuation. The reason being that the subsidy is considered general governmental revenue and as such is not earmarked towards the funding of OPEB benefits.

- Health plan coverage election

Assumptions must also be made regarding the participation in health plans when active members retire and when those already retired turn age 65. Using data supplied by MWRA, Stone Consulting modeled the behavior of employees as they moved from being active to being retired or moved from being an under age 65 retiree to being an age 65+ retiree. Such



modeling involved an analysis of the distribution of the plans chosen by current retirees, the possible plans available to those who will retire in the future, and our opinions about the likely future course of retiree medical care. Such models are applicable to actives and to retirees not yet age 65, since both of these groups will have the option to select plans at key ages. It should be kept in mind that these percentages are applicable even to actives not currently enrolled in a medical plan. The reason for this is that these people could change their behavior and enroll in a plan at retirement. The likelihood that they (or other actives) elect to do so is controlled by the participation assumption (see below). Some retiree groupings do not require any modeling. For example, retirees over age 65 are assumed to remain in the plans they have already selected. If they have opted out of MWRA coverage, we assume they will continue to do so. Similarly, those retirees under age 65 already in Medicare plans are assumed to remain in those plans for life. These are people who are disabled or have certain medical conditions that qualify them for Medicare early. Pre-age 65 retirees in Commercial plans are assumed to stay in their current plan until age 65. At that point, they may migrate to a different plan. We have modeled their possible choices at age 65 and reflected that in our assumptions. Active employees over age 65, once they retire, are assumed to make the same sorts of selections as retirees at age 65. The following table shows the way we modeled the choices at each of the key ages.

MWRA Participant Behavior at Key Ages			
Status	Age	Pre-65 Retirement	65+ Retirement
Active	Under 65	50% Commercial Managed Care 50% Commercial Indemnity	77% Medicare Indemnity 22% Medicare Managed Care 1% Commercial Managed Care
Active	65+	NA	77% Medicare Indemnity 22% Medicare Managed Care 1% Commercial Managed Care
Retired	Under 65	Current Plan	77% Medicare Indemnity 22% Medicare Managed Care 1% Commercial Managed Care or Actual Plan if already in Medicare
Retired	65+	NA	Current Plan



Participation

In addition to determining the choices that retirees will make among plans, there is also the issue of whether the retiree will elect coverage at all. The rate at which retirees elect coverage is called the “Participation” Rate. Stone Consulting conducted a study of MWRA retirees to determine the historical frequency at which retirees elect to take medical coverage. Based on this study, we assumed that 80.0% of future eligible retirees and spouses of retirees will elect health plan coverage. For Life Insurance, we assumed that 85.0% of future retirees will elect coverage.

Change From Prior Valuation

Overall results of the valuation are similar to the prior valuation (1/1/2008). However, the components of the results show some significant changes. The following chart summarizes a comparison of certain key numbers at the date of the last valuation versus this valuation:

Category	1/1/2008 Figure	1/1/2010 Figure	% Change
ARC	\$17.6 million	\$17.4 million	-1.1%
Pay-as-You-Go	\$1.8 million	\$3.3 million	+83.3%
AAL Actives	\$151.1 Million	\$141.2 Million	-6.6%
AAL Retirees	\$29.7 million	\$50.9 Million	+71.3%
Total AAL	\$180.8million	\$192.1 Million	+6.3%

The following addresses the reasons behind these changes:

- 1) The large increases in the retiree liability and the pay-as-you-go cost are primary the result of a growth in the number of retirees. MWRA is a relatively immature population in that it has few retirees relative to the actives. The number of retirees increased from 308 to 417 or more than 33%.
- 2) We used an updated mortality table. This resulted in a roughly 1.5% increase in most of the figures.



- 3) Changes in various factors involved in the costs from last time to this time resulted in a roughly 12.5% decrease in the amounts. These changes included a change in the assumed percentage of spouses at retirement from 85% to 80% and a change in the assumed percentage of families for pre-65 retirees (reduced to 40% from the old 60%). There were also changes in the trend rates and claim costs beyond these factors. Running the current data with the old claims and trend resulted in an AAL that was about 14% higher with the revised claims and trend rates.



Data

The participant census data for the valuation study was supplied by the MWRA. Participants include MWRA active employees, retirees, disability retirees, surviving spouses, and inactive former employees with 10 or more years of service who qualify for a vested retirement benefit.

The participant census data was not audited by Stone Consulting, Inc. However, it was checked for reasonableness.

Summaries of active participants and MWRA retiree census data are included in Section II.



Funding

There are alternative ways to plan for the payment of post-retirement health and life insurance benefits: continue to fund on a pay-as-you go method, contribute on an ad-hoc basis to a fund for this purpose, or develop a funding schedule in which the unfunded amount is amortized over some number of years. With the funding schedule, the normal cost must continue to be paid each year to keep current.

There is no legal requirement to prefund these post-employment benefit liabilities. Nor does GASB Statement No. 45 require actual prefunding; however, its accounting requirements will serve to highlight the substantial unfunded accrued liabilities associated with these benefits.

ILLUSTRATIVE FUNDING SCHEDULE

The GASB Statement No. 45 is designed to account for non-pension post-employment benefits using an approach similar to the accounting for retirement benefits. It develops an Annual Required Contribution (“ARC”) that is based on the Normal Cost plus an amortization of the Unfunded Actuarial Accrued Liability (“UAAL”). To the extent that actual contributions equal to the ARC (from GASB 45 adoption) are made by the employer to the post-employment health benefit plan, no additional liability will be required to be shown on MWRA’s balance sheet. Employer contributions may be in the form of benefit or premium payments or contributions to a fund set aside for future benefit payments. Such a fund must meet the requirements set out in the accounting standard.

We have calculated an illustrative funding schedule for the other post-employment benefits, consistent with the GASB Statement No. 45. This funding schedule assumes that MWRA funds 100% of the ARC and begins with MWRA’s Fiscal Year 2011. The full schedule is shown in Section II. We have used a 30-year schedule for this exhibit.





Development of Funding Schedule and Annual Required Contribution

The contribution amount under a fully funded scenario using the 7.75% discount rate for Fiscal 2011 is \$10,808,574. Part of this comes from the amortization of the January 1, 2010 Unfunded Actuarial Accrued Liability (UAAL) of \$107,057,086. Because there are no funds set aside, the UAAL is equal to the total actuarial accrued liability (AAL). The UAAL is amortized over thirty years using an increasing amortization payment at the rate of assumed payroll increase due to inflation (3.25%). We have elected to use the thirty-year schedule rather than twenty-seven years because no funding has yet taken place. The funding contribution is the amortization payment plus the projected normal cost. Under the GASB Statement No. 45, thirty years is the maximum amortization period allowed. Shorter periods of time and/or other amortization patterns could be considered. The thirty-year funding schedule shown produces the lowest possible initial fiscal year contribution under the GASB parameters. It should be noted that the contribution is assumed to be made at the beginning of the fiscal year, so the first contribution is assumed to be made July 1, 2010. The amount of the amortization payment in the first year is \$6,193,368. For the purposes of this schedule, we have not adjusted the January 1, 2010 liability for timing by applying interest to bring it to any future date.

Yearly contributions will increase, as both normal cost and amortization payments increase each year.

The remaining part of the ARC is the cost of the current year's benefit accrual, the normal cost, of \$4,615,206.

Cash Flow Consideration

We have analyzed the cash flow of a funded post-employment medical trust by comparing the expected payouts of claims over the thirty-year period to expected contribution levels. If the actuarial assumptions are met, the funded amounts will be sufficient to cover annual benefit

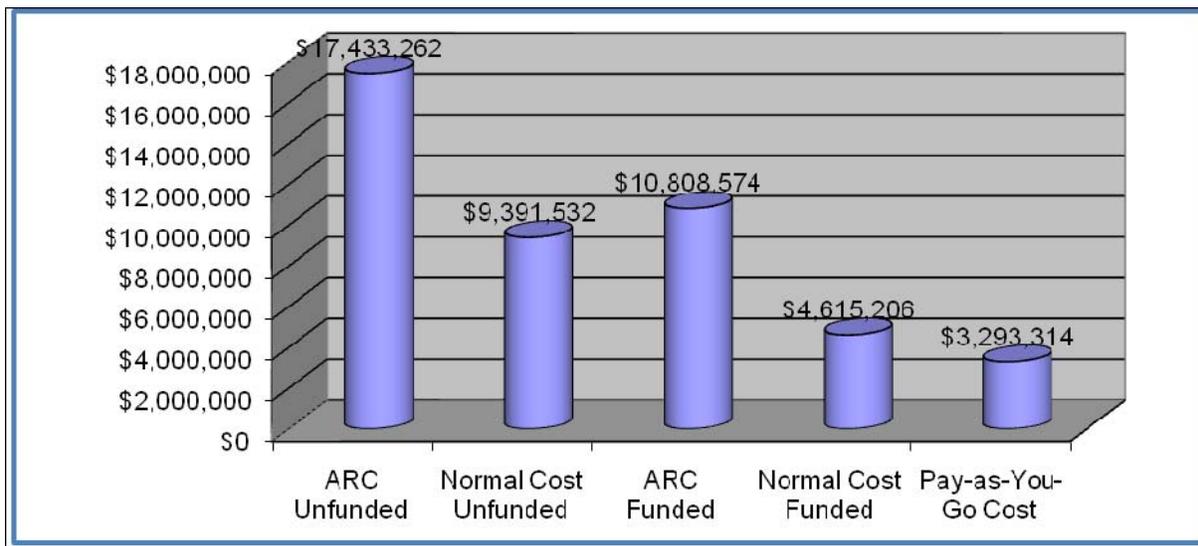


payments each year. Prior to adopting a funding schedule we recommend additional analysis be conducted to examine the effects of potential actuarial gains and losses on the cash flow.

FUNDING VERSUS PAY-AS-YOU-GO VERSUS PARTIAL FUNDING

Currently, most Massachusetts governmental entities are paying for their post-employment medical benefits on a pay-as-you-go basis. This means that no amount in excess of the actual cost for the year is paid. All such entities must report figures for GASB Statement No. 45 based on the unfunded discount rate. MWRA has elected, to date, to follow this course of action. It has not indicated that it has any intent to fund more than the pay-as-you-go cost.

In order to understand the impact of not funding versus funding completely, a comparison of the ARCs and normal costs (the contribution amount if the UAAL was \$0) under both scenarios, and the pay-as-you-go amount is illustrated in the following chart:



The chart depicts the advantage to the entity of even a partial funding policy, since the ARC and Normal Cost are significantly higher under the unfunded scenario.

As can be seen in the funding schedule, the retiree medical plan's normal cost will increase each year, so that by the time the initial unfunded liability is fully amortized, the required annual contribution will be substantially higher than is illustrated here for the first year. The



pay-as-you-go costs will also increase dramatically as more and more employees retire. A projection of annual expected retiree pay-as-you-go costs is included with the funding schedule.

It is very important to understand that, in order to utilize the higher discount rate that goes with the fully funded or partially funded scenarios, there must be a “Funding Policy.” That is, the Authority must intend to continue to make payments and, in the future, must actually make them. Should the policy not be followed in future years, an adjustment to the discount rate would need to be made. As the figures above illustrate clearly, there is an iterative relationship between the degree of funding and the amounts that must be shown as liabilities, amortization payments, and normal cost figures. Lower funding levels lead to higher amounts for these key figures.

The partial subsidy of prescription drug benefit costs that is available under the Medicare Prescription Drug, Improvement and Modernization Act of 2003 is a potential source of funds for a portion of the retiree medical costs. To the extent that this subsidy reimburses MWRA for drug benefits it would already be paying for, the additional cash from the subsidy could be used to help pre-fund future benefits. The magnitude of any future subsidy is only a small portion of the additional cost to fund. Other plan design changes, such as a carve-out of prescription drug coverage, may yield greater opportunities for savings.

DETERMINATION OF THE NET OPEB OBLIGATION (NOO)

The Statement does not require MWRA to put its entire Actuarial Accrued Liability on its books immediately as a liability. Rather, a cost is applied to its assets each year. Over time this cost, which is called the OPEB Cost, will add up to the total liability. The total liability at any point in time is called the Net OPEB Obligation (NOO).

For the first year of funding, the OPEB Cost and ARC are identical. Amounts contributed toward the cost of other post-employment benefits must then be deducted. These amounts include: 1) actual premiums paid; 2) the extra implied costs or “implicit subsidy” associated



with covering retirees; 3) any additional amounts paid during the year. Item three is not applicable to an entity such as MWRA that has chosen not to fund its obligation either in whole or in part. The Net OPEB Cost is the OPEB Cost less these amounts. For year one, where there is no prior NOO on the financial statement, the Net OPEB Cost is the same as the Net OPEB Obligation.

Starting year two, the OPEB Cost must recognize not only the Normal Cost and Amortization Cost for the year but also add interest on the prior year's NOO as well as subtract Annual Required Contribution (ARC) adjustment to prevent double counting of the prior year's NOO. The interest and the ARC adjustments somewhat offset each other so the net impact is not large. The total contributions are then subtracted from the OPEB Cost and the result is added to the prior year's NOO. In this manner, the difference between each year's ARC and the contributions are accumulated.

Please refer to the following table on page 20 in the following discussion.

If MWRA continues its current policy and contributes on a pay-as-you-go basis, without any prefunding, the unfunded actuarial accrued liability used in the calculation would be \$192,096,039. We have not illustrated this with a "funding" schedule. The following chart projects the ARC, Pay-As-You-Go, Annual OPEB Cost and the Net OPEB Obligation for 8 years under the unfunded scenario. This exhibit includes three years from prior valuation reports, 2008-2010. Starting with 2011, figures from the current valuation are used. The Annual OPEB cost is the ARC plus an adjustment for interest not included in the ARC calculation. The Net OPEB Obligation is the accumulation of the Annual OPEB Cost minus any contributions. This is the amount that is subtracted from the Net Assets on your balance sheet. In the unfunded case, the contributions are the attributed pay-as-you-go amounts. Note that the rate used for interest is the 4.25% unfunded rate.



CALCULATION OF NET OPEB OBLIGATION

"Funding" Schedule at 4.25%

Year	UAL	Normal Cost ¹	Amort. ¹	ARC	Interest on NOO ¹	ARC Adjust. ¹	OPEB Cost	Total Contribs. ¹	Change in NOO	NOO
2008	NA	NA	NA	\$15,120,000	\$0	\$0	\$15,120,000	\$1,694,000	\$13,426,000	\$13,426,000
2009	\$180,833,263	\$10,668,006	\$6,886,336	\$17,554,342	\$570,605	\$511,272	\$17,613,675	\$1,805,756	\$15,807,919	\$29,233,919
2010	\$197,796,344	\$11,121,396	\$7,774,169	\$18,895,565	\$1,242,442	\$1,149,132	\$18,988,875	\$2,150,963	\$16,837,912	\$46,071,830
2011	\$192,096,039	\$9,391,532	\$8,041,730	\$17,433,262	\$1,958,053	\$1,928,708	\$17,462,607	\$3,293,314	\$14,169,293	\$60,241,123
2012	\$206,688,224	\$10,206,776	\$8,944,030	\$19,150,806	\$2,560,248	\$2,606,817	\$19,104,236	\$3,985,758	\$15,118,478	\$75,359,601
2013	\$222,043,463	\$10,640,564	\$9,946,757	\$20,587,320	\$3,202,783	\$3,375,842	\$20,414,262	\$4,472,943	\$15,941,319	\$91,300,920
2014	\$238,006,094	\$11,092,788	\$11,054,768	\$22,147,556	\$3,880,289	\$4,240,692	\$21,787,153	\$5,019,856	\$16,767,297	\$108,068,217
2015	\$254,560,166	\$11,564,231	\$12,280,650	\$23,844,881	\$4,592,899	\$5,213,494	\$23,224,286	\$5,664,718	\$17,559,568	\$125,627,786

¹For all years, Total Contributions are equal to the implicit premiums paid.
Boxed area numbers from prior valuations



Implementation

According to the GASB Statement No. 45, its provisions would be effective for MWRA fiscal years beginning after December 15, 2006. The timing is due to MWRA being a “Tier 1 government under GASB 34”. In the first fiscal year of adoption, Fiscal 2008, MWRA recorded a liability on its balance sheet to the extent that its contributions (including benefit payments) for other post-employment benefits were less than the Annual Required Contribution (“ARC”) determined in accordance with the GASB standard and described above. Similar figures have been recorded for the second and third years of adoption, Fiscal 2009 and Fiscal 2010. For future years, a similar liability will need to be recorded. This liability would also reflect interest on any prior funding deficiencies. The total actuarial liability is determined by a valuation to be performed at least every two years. The total actuarial liability is reduced by any assets set aside to pre-fund the post-retirement benefits, with the resulting unfunded actuarial liability being amortized according to a funding schedule similar to that illustrated in this report.

To be considered a funded system, the retiree medical plan assets must be “segregated and restricted in a trust, or equivalent arrangement, in which (a) employer contributions to the plan are irrevocable, (b) assets are dedicated to providing benefits to retirees and their beneficiaries, and (c) assets are legally protected from creditors of the employers or plan administrator, for the payment of benefits in accordance with the terms of the plan.” (GASB 45, p. 47, “Plan Assets”). Therefore, for MWRA to receive “credit” under the GASB accounting standard for assets set aside to pre-fund post-retirement benefits, these assets must be segregated in a trust or other account that is not subject to use for any other purpose by MWRA.



Recommendations and Comments

Post-employment medical benefits are a significant long-term liability that is only now starting to be addressed by Massachusetts government employers. In managing this liability, any governmental entity needs to consider the parameters that can significantly influence the level of the liability. To facilitate such a review, we recommend that MWRA maintain a continuing group that is cognizant of the relevant financial and employee benefits issues raised by GASB Statement No. 45 that will provide leadership to the Authority. We would recommend that the group review the following:

- 1) Funding Policy: As previously discussed, the funding policy is critical to the valuation not only because it impacts the funds backing the liability but also because it impacts the discount rate that is used to calculate all of the relevant figures. MWRA needs to bear in mind that it is the formulation of a funding policy that is essential, not simply the contribution of funds. Of course, if a funding policy is developed, it needs to be implemented, not just formulated. Thus, we recommend that the Authority maintain a written funding policy that it reviews each year.
- 2) Plan Design: One of the major factors influencing costs is the design of the plans that MWRA offers to retirees. To the extent that any part of these plans changes materially, costs may either increase or decrease. In order to keep costs under control, the Authority should review the design of all its medical plans annually. Changes in plan characteristics such as deductibles, coinsurance levels, out-of-pocket maximums, and covered services can help mitigate the impacts of ever-increasing medical costs. In addition, the Authority should review the networks it is using to be sure that it is getting the most competitive reimbursement levels available.



3) Contribution Levels: The extent to which the Authority subsidizes the cost of retiree benefits is one of the most significant factors in the ultimate costs. Currently, retired MWRA employees and their spouses are covered by the GIC and pay either 15% (those retired prior to 10/1/2009) or 20% of the premium cost for their medical insurance. It is fairly common for Massachusetts public entities to require contributions in this range, with about 25% being the average. At the extremes, some municipal entities require as much as 50% for all participants (the most that retirees can be asked to contribute) while other require as little as 10% or 15% (we have seen one entity at 0%). Thus, MWRA, requires a lower level of contribution for most of its retirees than its average peer entity. Contribution levels have a double impact on costs. First off, there is a direct relationship between contributions and costs in that higher contribution levels mean that more of the cost of the plan is born by the Authority. Secondly, higher contribution levels lead to higher participation rates because the plan becomes less costly to the retiree. In the case of cities and towns where a substantial portion of the medical costs are paid by the employer, participation rates tend to be very high. MWRA's participation level of 80.0% for retirees is about what we would have expected for a plan with contributions of the sort the Authority requires from its retirees.

In general, a very-well subsidized plan will have many participants enrolled at a high cost. Also, to the extent that other employers are cutting back or eliminating their programs, there is increased likelihood that a favorably subsidized plan will be elected by retirees, since no coverage or only very expensive coverage may be available from other sources such as their spouse's employer. There has been a very definite move toward reducing the subsidies paid by Massachusetts public entities.

4) Eligibility: The extent to which retirees are eligible for benefits is another variable that very directly impacts costs. MWRA should review its eligibility criteria each year to be sure that they are in accord with Authority goals for controlling costs and for providing well-deserved benefits for those who have worked for the Authority. Retirement system policies can also affect the eligibility for benefits. In the case of



MWRA, the Authority pays for medical benefits for those who reach ten years of service, even if they do not retire from the Authority immediately upon separation from service. This will produce a higher liability and ARC for MWRA than if only those actually retiring from the Authority were covered.

In addition to reviewing the above items regularly, we recommend that the Authority continue working toward an organized method of keeping its data. This is an issue faced by virtually all public entities with respect to GASB Statement No. 45. Some of the typical issues are:

- 1) Be sure that it has a record of those eligible for coverage who do not take coverage. This should cover not only actives who are not enrolled but retired employees who opted out.
- 2) To the extent possible, make sure that all databases can be tied together by a single identifier, such as social security number or employee number. Some entities keep certain data by, for example, social security number, but organize other data on some other basis. This greatly increases the time and effort to tie all the relevant pieces of data together.



SECTION II

ACTUARIAL VALUATION DETAILS

Population Data

A. DISTRIBUTION BY AGE: RETIREES, BENEFICIARIES, SURVIVORS AND TERMINATED VESTED (Includes retirees with life only or no coverage)

Age	Number ⁽¹⁾
0-19	0
20-24	0
25-29	0
30-34	0
35-39	1
40-44	6
45-49	15
50-54	26
55-59	42
60-64	73
65-69	108
70-74	85
75-79	46
80-84	12
85-89	3
90-94	0
95-99	0
100+	0
TOTAL	417

⁽¹⁾ Includes retirees who are eligible for medical or with life coverage in addition to beneficiaries and survivors with medical coverage.



B. FUTURE RETIREES – ACTIVE PARTICIPANTS

OF PARTICIPANTS*

Current Plan	Medicare Eligible	Not Medicare Eligible	Total
No Medical/ Unknown	100	2	102
Indemnity	229	6	235
Managed Care	753	15	768
TOTAL	1082	23	1105

* “Pre-Medicare eligible” means hired March 31, 1986 or before and “Medicare eligible” means hired after March 31, 1986. Employees hired March 31, 1986 or before do not contribute to Medicare.



*Other Post-Employment Benefits Valuation
as of January 1, 2010*

PLAN DEFINITION TABLE

Plan Name	Plan Type	Ind Rate ⁽¹⁾	# Retirees	FAM Rate ⁽¹⁾	# Retirees	EE Contribution %
Fallon Direct Care	Commercial Managed Care	\$404.40	0	\$970.60	1	15.00%
Fallon Select care	Commercial Managed Care	\$490.36	0	\$1,176.90	0	15.00%
Harvard Pilgrim Independence	Commercial Managed Care	\$524.56	17	\$1,269.50	13	15.00%
Health new England	Commercial Managed Care	\$429.69	0	\$1,065.10	0	15.00%
Navigator by Tufts	Commercial Managed Care	\$517.36	23	\$1,246.60	9	15.00%
NHP Care	Commercial Managed Care	\$415.46	0	\$1,101.00	1	15.00%
Indemnity Basic w/CIC	Commercial Indemnity	\$765.03	41	\$1,785.95	19	18.93%
Indemnity Basic wo/CIC	Commercial Indemnity	\$729.62	0	\$1,703.80	0	15.00%
Comm Choice	Commercial Indemnity	\$409.93	2	\$983.80	1	15.00%
Indemnity Plus	Commercial Indemnity	\$530.69	4	\$1,266.50	5	15.00%
Fallon Senior Plan	Medicare Managed Care	\$199.50	1	NA	NA	15.00%
Harvard Pilgrim Med Enhance	Medicare Managed Care	\$348.80	7	NA	NA	15.00%
HNE Med Plus	Medicare Managed Care	\$362.20	0	NA	NA	15.00%
Tufts Medicare Compliment	Medicare Managed Care	\$320.60	36	NA	NA	15.00%
Tufts Medicare Preferred	Medicare Managed Care	\$177.50	0	NA	NA	15.00%
Indemnity OME w/CIC	Medicare Indemnity	\$351.78	152	NA	NA	17.56%
Indemnity OME wo/CIC	Medicare Indemnity	\$341.20	0	NA	NA	15.00%

⁽¹⁾ Rates at 1/1/2010



C. DISTRIBUTION BY AGE AND SERVICE: ACTIVE PARTICIPANTS

Age Group	0-4	5-9	10-15	15-19	20-24	25-29	30-34	35-39	40+	Total
0-19	0	0	0	0	0	0	0	0	0	0
20-24	3	2	0	0	0	0	0	0	0	5
25-29	11	1	0	0	0	0	0	0	0	12
30-34	15	13	3	0	0	0	0	0	0	31
35-39	18	14	20	15	0	0	0	0	0	67
40-44	18	16	37	47	35	0	0	0	0	153
45-49	21	23	43	55	108	0	0	0	0	250
50-54	12	27	34	64	86	0	0	0	0	223
55-59	9	28	27	56	71	0	0	0	0	191
60-64	7	9	14	36	58	0	0	0	0	124
65-69	3	4	4	15	12	0	0	0	1	39
70-74	0	3	2	2	0	0	0	0	0	7
75-79	0	0	0	0	1	0	0	0	0	1
80-84	0	0	0	2	0	0	0	0	0	2
85-89	0	0	0	0	0	0	0	0	0	0
90-94	0	0	0	0	0	0	0	0	0	0
95-99	0	0	0	0	0	0	0	0	0	0
100+	0	0	0	0	0	0	0	0	0	0
TOTAL	117	140	184	292	371	0	0	0	1	1105



SUMMARY OF RESULTS

Actives	
- Already in Medicare	0
- Pre-Medicare Coverage	23
- Post-Medicare Coverage	<u>1082</u>
Total	1105
Retired, Disabled, Survivors and Beneficiaries	368
Terminated Vesteds	49

	At 7.75% discount	At 4.25% discount
Active Employees	\$73,390,728	\$141,209,599
Current Retirees	\$33,666,358	\$50,886,440
TOTAL	\$107,057,086	\$192,096,039
Unfunded Accrued Liability		
January 1, 2010	\$107,057,086	\$192,096,039
Normal (Service) Cost as of		
January 1, 2010	\$4,615,206	\$9,391,532



SUMMARY OF RESULTS
(continued)

	At 7.75% discount	At 4.25% discount
30-yr/27-yr amortization of UAAL	\$6,193,368	\$8,041,730
Normal Cost	\$4,615,206	\$9,391,532
TOTAL	\$10,808,574	\$17,433,262

Expected Claims

- Fiscal 2011 \$3,293,314

Schedule of Funding Progress Other Post-Employment Benefits
(Dollars in Thousands)

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Liability (AAL) [Projected Unit Credit] (b)	Unfunded AAL (UAAL) (b-a)	Funded Ratio (a/b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll (b-a)/c
1/1/2006	\$0	\$154,449	\$154,449	0.00%	\$72,476	213%
1/1/2008	\$0	\$180,833	\$180,833	0.00%	\$79,298	228%
1/1/2010	\$0	\$192,096	\$192,096	0.00%	\$81,372	236%



Thirty-Year Funding Schedule at 7.75%					
Fiscal Year	Normal Cost ¹	Amortization ²	Contribution	Year-End AAL	Projected Annual Benefit Cost ³
2011	4,615,206	6,193,368	10,808,574	108,680,657	3,293,314
2012	4,972,884	6,394,652	11,367,536	110,213,170	3,985,758
2013	5,358,283	6,602,478	11,960,761	111,640,520	4,472,943
2014	5,773,550	6,817,059	12,590,609	112,947,280	5,019,856
2015	6,221,000	7,038,613	13,259,613	114,116,589	5,664,718
2016	6,703,128	7,267,368	13,970,496	115,130,035	6,340,576
2017	7,222,620	7,503,557	14,726,177	115,967,530	6,916,659
2018	7,782,373	7,747,423	15,529,796	116,607,165	7,576,657
2019	8,385,507	7,999,214	16,384,721	117,025,067	8,118,881
2020	9,035,384	8,259,189	17,294,573	117,195,233	8,522,756
2021	9,735,626	8,527,612	18,263,238	117,089,362	8,910,416
2022	10,490,137	8,804,760	19,294,897	116,676,658	9,391,153
2023	11,303,123	9,090,915	20,394,037	115,923,639	9,959,108
2024	12,179,115	9,386,369	21,565,484	114,793,908	10,443,176
2025	13,122,996	9,691,426	22,814,422	113,247,924	11,066,035
2026	14,140,028	10,006,398	24,146,426	111,242,745	11,553,965
2027	15,235,880	10,331,606	25,567,486	108,731,752	11,762,041
2028	16,416,661	10,667,383	27,084,044	105,664,358	12,118,276
2029	17,688,952	11,014,073	28,703,025	101,985,683	12,398,758
2030	19,059,846	11,372,030	30,431,876	97,636,211	12,479,779
2031	20,536,984	11,741,621	32,278,605	92,551,420	12,678,058
2032	22,128,600	12,123,224	34,251,824	86,661,382	12,808,633
2033	23,843,567	12,517,228	36,360,795	79,890,325	13,001,264
2034	25,691,443	12,924,038	38,615,482	72,156,174	12,989,081
2035	27,682,530	13,344,070	41,026,600	63,370,042	13,046,927
2036	29,827,926	13,777,752	43,605,678	53,435,693	13,108,583
2037	32,139,591	14,225,529	46,365,119	42,248,952	13,156,742
2038	34,630,409	14,687,859	49,318,267	29,697,078	13,189,194
2039	37,314,266	15,165,214	52,479,480	15,658,083	13,171,663
2040	40,206,121	15,658,083	55,864,205	0	13,115,321

¹Assumes 7.75% annual increase in normal cost and a static group of actives

²Assumes 3.25% annual increase in amortization payment

³The Pay-As-You-Go amount is for the current group of actives and retirees and is shown for the calendar year. It does not include any future hires. It is not directly comparable to the funding contribution but it included for illustrative purposes only. It does illustrate in the short-term, the estimated amount of claims costs for retirees. However, the retiree amount is expected to grow as new employees retire or become disabled.



Sensitivity Analysis

The results of any actuarial valuation are sensitive to the assumptions used. That is, a change in an actuarial assumption will produce a change in the actuarial accrued liability and/or normal cost each year of the valuation. To illustrate this sensitivity, we performed valuations in which we changed two different inputs: the trend rate and the discount rate.

A) Trend Rate Sensitivity

For postretirement medical plans in particular, the calculated actuarial values are highly sensitive to the assumed rate of health care cost trend. This is due to the compounding effect of the annual trend rates assumed for medical costs, as opposed to pension valuations where benefit levels typically remain fixed.

The following table illustrates the effect on our valuation results of a 1% increase or decrease in the assumed rates of health care cost trend in each year. The base scenario uses the unfunded discount rate of 4.25%.

As of January 1, 2010	Health Care Cost Trend Rates		
	As Reported (4.25%)	+1% Each Year	-1% Each Year
Liability for:			
• Future Retirees	\$141,209,599	\$174,776,527	\$115,438,837
• Current Retirees, Beneficiaries, and Survivors	<u>\$50,886,440</u>	<u>\$58,337,582</u>	<u>\$44,803,079</u>
Total AAL	\$192,096,039	\$233,114,109	\$160,241,916
Normal Cost	\$9,391,532	\$11,829,726	\$7,548,914
Annual Required Contribution for Fiscal Year 2011:	\$17,433,262	\$21,588,599	\$14,257,133

The cumulative effect of a 1% increase in health care cost trend increases the AAL by approximately 21%, the normal cost by 26%, and the ARC by 24%. A 1% decrease in trend



would decrease the AAL by 17%, the normal cost by 20% and the ARC by 18%.

There is the likelihood – based on historical experience – of significant deviations from the smooth rates of health care cost increase typically projected in any actuarial valuation. Therefore, emerging experience under the plan is likely to differ from the assumptions made as of any valuation date. This will produce actuarial gains and losses each year, even if the underlying assumptions remain reasonable for the future. Amortization of gains and losses will affect the updated funding schedule calculated at any point in the future.



B) Discount Rate Sensitivity

We also examined the sensitivity of the various key numbers to changes in the discount rate. For this testing, we varied the discount rate by 0.50%, or in other words, we used rates of 3.75% and 4.75%. The following table shows the results we obtained:

As of January 1, 2010	Discount Rates		
	As Reported (4.25%)	Plus 0.50% (4.75%)	Minus 0.50% (3.75%)
Liability for:			
• Future Retirees	\$141,209,599	\$127,229,552	\$157,352,731
• Current Retirees, Beneficiaries, and Survivors	<u>\$50,886,440</u>	<u>\$47,594,268</u>	<u>\$54,570,404</u>
Total AAL	\$192,096,039	\$174,823,820	\$211,923,135
Normal Cost	\$9,391,532	\$8,389,282	\$10,558,135
Annual Required Contribution for Fiscal Year 2011:	\$17,433,262	\$16,033,386	\$18,669,825

Thus, the cumulative effect of a 0.50% decrease in the discount rate is to increase the AAL by approximately 10%, the normal cost by 12%, and the ARC by 7%. A 0.50% increase in the discount rate would decrease the AAL by 9%, the normal cost by 11% and the ARC by 8%. It is prudent, and GASB Statement No. 45 requires, an updated actuarial valuation be performed periodically. For an entity of MWRA's size, a new valuation will be required at least every two years.



Actuarial Methods and Assumptions

- | | | |
|----|-----------------------------|---|
| 1. | Actuarial Cost Method | Costs are attributed between past and future service using the Projected Unit Credit cost method. For attribution purposes, benefits are assumed to accrue over all employee service until decrement. |
| 2. | Interest Rate/Discount Rate | 7.75% per year net of investment expenses for funded program.
4.25% per year net of investment expenses for an unfunded program (at client's direction) |
| 3. | Mortality | Actives: The RP-2000 Mortality Tables (Sex-distinct) for Employees projected 10 years.
Retirees: The RP-2000 Mortality Tables (Sex-distinct) for Healthy Annuitants projected 10 years.
Disabled: The RP-2000 Mortality Tables (Sex-distinct) for Healthy Annuitants projected 10 years and set forward 2 years |



4. Withdrawal Prior to Retirement Based on service. The rates shown at the following sample years of service illustrate the withdrawal assumption:

Duration from hire

Years of Service	Rate	Years of Service	Rate
1	15.00%	16	2.00%
2	12.00%	17	2.00%
3	10.00%	18	2.00%
4	9.00%	19	2.00%
5	8.00%	20	2.00%
6	7.60%	21	2.00%
7	7.50%	22	1.00%
8	6.70%	23	1.00%
9	6.30%	24	1.00%
10	5.90%	25	1.00%
11	5.40%	26	1.00%
12	5.00%	27	1.00%
13	4.60%	28	1.00%
14	4.10%	29	1.00%
15	3.70%	30	0.00%

5. Eligibility for Vested Post-Retirement Medical Benefits upon Withdrawal 10 years of Service; assumed that individuals who withdraw prior to age 40 will elect a return of pension contributions and therefore be ineligible for retiree medical coverage

6. Disability Prior to Retirement The rates shown at the following sample ages illustrate the assumption regarding the incidence of disability. Disability is assumed to be 45% ordinary and 55% accidental.

<i>Age</i>	Rate of Disability All Members
20	0.01%
25	0.02%
30	0.03%
35	0.06%
40	0.10%
45	0.15%
50	0.19%
55	0.24%
60	0.28%



7. Rates of Retirement

Rates of Retirement		
<i>Age</i>	<i>Male</i>	<i>Female</i>
50	1.00%	1.50%
51	1.00%	1.50%
52	1.00%	2.00%
53	1.00%	2.50%
54	2.00%	2.50%
55	2.00%	5.50%
56	2.50%	6.50%
57	2.50%	6.50%
58	5.00%	6.50%
59	6.50%	6.50%
60	12.00%	5.00%
61	20.00%	13.00%
62	30.00%	15.00%
63	25.00%	12.50%
64	22.00%	18.00%
65	40.00%	15.00%
66	25.00%	20.00%
67	25.00%	20.00%
68	30.00%	25.00%
69	30.00%	25.00%
70	100.00%	100.00%



Actuarial Methods and Assumptions

8. Initial Claim Costs: Medical

Age	Managed Care Commercial Individual	Managed Care Commercial Blended ⁽¹⁾	Indemnity Commercial Individual	Indemnity Commercial Blended ⁽¹⁾	Managed Care Medicare ⁽²⁾	Indemnity Medicare ⁽²⁾
55	\$6,728.16	\$10,682.05	\$8,146.90	\$12,285.66	\$3,868.01	\$4,221.36
60	\$8,029.62	\$12,748.34	\$9,722.79	\$14,662.14	\$3,868.01	\$4,221.36
65	\$9,863.55	\$15,660.01	\$11,943.44	\$18,010.92	\$3,868.01	\$4,221.36
70	\$11,434.56	\$18,154.25	\$13,845.72	\$20,879.59	\$3,868.01	\$4,221.36
75	\$12,937.16	\$20,539.87	\$15,665.16	\$23,623.34	\$3,868.01	\$4,221.36
80	\$14,283.67	\$22,677.67	\$17,295.61	\$26,082.08	\$3,868.01	\$4,221.36
85	\$15,012.28	\$23,834.46	\$18,177.86	\$27,412.53	\$3,868.01	\$4,221.36

⁽¹⁾ Rates above age 64 shown for illustrative purposes only.

⁽²⁾ Medicare rates are not age-graded

9. Trend Rates By Plan

Year	Commercial Managed Care	Commercial Indemnity	Medicare Managed Care	Medicare Indemnity
2010	13.61%	5.01%	10.32%	10.59%
2011	9.00%	10.00%	8.00%	9.00%
2012	8.50%	9.50%	7.50%	8.50%
2013	8.00%	9.00%	7.00%	8.00%
2014	7.50%	8.50%	6.50%	7.50%
2015	7.00%	8.00%	6.00%	7.00%
2016	6.50%	7.50%	5.50%	6.50%
2017	6.00%	7.00%	5.00%	6.00%
2018	5.50%	6.50%	5.00%	6.00%
2019+	5.00%	6.00%	5.00%	6.00%



Actuarial Methods and Assumptions (Continued)

11. Medicare Eligibility	Employees: 100% if hired March 31, 1986 or after; 85% if hired pre-March 31, 1986 Spouses:100%
12. Participation Rates	<p>Current retirees and spouses are assumed to continue the same coverage they have as of the valuation date. No future election of coverage is assumed for those retirees and spouses who currently have not elected coverage.</p> <p>All Retirees: 80.0% of the active employees eligible for post-employment medical benefits are assumed to elect Medical Coverage immediately upon. 85% of the active employees eligible for post-employment medical benefits are assumed to elect Life Insurance coverage immediately upon.</p> <p>For all Retirees: Of those electing coverage, 80% are assumed to have a covered spouse at retirement. Participants with no or unknown current coverage (e.g. active employees and/or vested inactives who do not currently participate in MWRA's medical plans) are assumed to elect retiree coverage at the same rates as currently covered active employees. Medicare-eligible retirees currently under age 65 are assumed to elect a Medicare plan option at age 65.</p>
13. Expenses	Administrative expenses are included in the per capita medical cost assumption.



Actuarial Methods and Assumptions

(Continued)

14. Plan Enrollment Rates

These are the rates are which retirees select medical plans, given that they enroll in a medical plan. The selection patterns follow the table below

Status	Age	Pre-65 Retirement	65+ Retirement
Active	Under 65	50% Commercial Managed Care 50% Commercial Indemnity	77% Medicare Indemnity 22% Medicare Managed Care 1% Commercial Managed Care
Active	65+	NA	77% Medicare Indemnity 22% Medicare Managed Care 1% Commercial Managed Care
Retired	Under 65	Current Plan	77% Medicare Indemnity 22% Medicare Managed Care 1% Commercial Managed Care or Actual Plan if already in Medicare
Retired	65+	NA	Current Plan

15. Projections

The January 1, 2010 valuation was not adjusted for timing when determining the funding schedule. This means that the Pay-as-you-go amount as well as the Actuarial Valuation results have not been modified for interest or any other timing factor in our presentation.



Principal Plan Provisions Recognized in Valuation

- | | | |
|----|--------------------------|---|
| 1. | Eligibility for Benefits | <p>Current retirees, beneficiaries and spouses of MWRA are eligible for medical benefits.</p> <p>Current employees or spouses who retiree with a benefit from the MWRA.</p> <p>Survivors of MWRA employees and retirees are also eligible for medical benefits.</p> |
| 2. | Medical Benefits | Various medical plans offered by MWRA to its own employees. |
| 3. | Life Insurance | MWRA retirees are eligible for a \$5,000 life insurance benefit offered by MWRA. Retirees pay 15% of the \$6.85 per month rate. |
| 4. | Retiree Contributions | Based on data provided by MWRA. |



Glossary

Actuarial Accrued Liability	The portion, as determined by a particular Actuarial Cost Method, of the present value of benefits which is not provided for by future Normal Costs.
Actuarial Assumptions	Assumptions as to the occurrence of future events affecting Other Post-employment Benefits such as: mortality rates, disability rates, withdrawal rates, and retirement rates, the discount assumption, and the trend rates.
Actuarial Cost Method	A procedure for determining the Actuarial Present Value of Total Projected benefits and for developing an actuarially equivalent allocation of such value to time periods, usually in the form of a Normal and an Actuarial Accrued Liability.
Amortization Payment	The portion of the OPEB contribution designed to pay interest and to amortize the Unfunded Actuarial Accrued Liability.
Annual OPEB Cost	The accrual-basis measure of the periodic cost of an employer's participation in a defined-benefit OPEB plan.
Annual Required Contribution (ARC)	The employer's periodic contributions to a defined benefit OPEB plan, calculated in accordance with the parameters defined in GASB 45. This is defined as the sum of the Normal Cost and the Amortization payment.
Commercial Plans	Plans designed to cover the medical expenses of those not otherwise covered by Medicare.
GASB	The Governmental Accounting Standards Board is the organization that establishes financial reporting standards for state and local governments.



Glossary
(continued)

Investment return Assumptions (Discount Rate)	The rate used to adjust a series of future benefit payments to reflect the time value of money. Under GASB 45, this rate is related to the degree to which the OPEB program is funded.
Healthcare Cost Trend Rate	The rate of change in per capita health claims costs over time as a result of factors such as medical inflation, utilization of healthcare services, the intensity of the delivery of services, technological developments, and cost-shifting.
Medicare Plans	Medical plans sold to those over 65 who are also covered by Medicare. These plans are supplemental to the Medicare plan, which is considered primary.
Net OPEB Obligation	The cumulative difference, since the effective date of GASB 45, between the annual OPEB cost and the employer's contributions to the plan.
Normal Cost	The portion of the Actuarial Present value of plan benefits that is allocated to a valuation year by the Actuarial Cost Method.
OPEB	Other Postemployment benefits other than pensions. This does not include plans such as severance plans or sick-time buyouts.
Pay-as-You-Go	The amount of benefits paid out to plan participants during the year.
Per Capita Claims Cost	The current average annual cost of providing postretirement health care benefits per individual.
Unfunded Actuarial Accrued Liability	The portion of the Actuarial Accrued Liability that is not covered by plan assets. For a plan that is completely unfunded, this amount is equivalent to the Actuarial Accrued Liability.
Valuation Date	The point from which all future plan experience is projected and as of which all present values are calculated.



Acknowledgement of Qualifications

We, Lawrence Stone and Kevin Gabriel, are consultants for Stone Consulting, Inc. and are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

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