Actuarial Audit Report

The Police and Firemen's Disability and Pension Fund of Ohio

August 1999

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August 20, 1999

Mr. Aristotle Hutras
Director
The Ohio Retirement Study Council
88 East Broad Street, Suite 1175
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Mr. Allen J. Proctor
Executive Director
The Police and Firemen's Disability and Pension Fund
140 East Town Street
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Subject: Actuarial Audit Report

Dear Mr. Hutras and Mr. Proctor:

The enclosed report presents our findings and comments resulting from a detailed review of the following reports performed by Watson Wyatt Worldwide.

- Actuarial Evaluation as of January 1, 1998
- Quinquennial Evaluation – January 1, 1992 to December 31, 1996
- 1998 Forecast Study
- 1998 Report on the Solvency of the Health Care Stabilization Fund.

We are pleased to report that we found Watson Wyatt's work to be reasonable and performed according to generally accepted actuarial standards and principles. We found no financially significant actuarial issues to report.

This report includes a detailed discussion of all of the elements of our review. The major issues are categorized in one of three levels of significance.

Level 1: Areas where changes will result in a financial impact on the actuarial findings,
Level 2: Areas where we recommend changes based on our professional opinions or preferences,
Level 3: Areas which are not material, but where improvements could be made in the actuarial processes or reporting of the findings.

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These issues are summarized in the Executive Summary. More detailed commentary on our review process and suggested considerations for refinements in actuarial procedures or presentations are included in subsequent sections of this report.

We wish to express our appreciation for the cooperation provided to us by the Watson Wyatt consultants as well as both of you and your staffs.

Sincerely,

Stephen T. McElhaney, FSA

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Executive Summary

Purpose and Scope of the Actuarial Audit Review

William M. Mercer, Inc. was engaged by the Ohio Retirement Study Council (ORSC) to conduct an actuarial audit of the following reports which were prepared by Watson Wyatt, consulting actuary to the Police and Firemen's Disability and Pension Fund (PFDPF):

- Actuarial Evaluation as of January 1, 1998
- Quinquennial Evaluation – January 1, 1992 to December 31, 1996
- 1998 Forecast Study
- 1998 Report on the Solvency of the Health Care Stabilization Fund

The primary purpose of the audit was to perform an independent verification and analysis of the assumptions, procedures, and methods used by Watson Wyatt in preparing these reports.

Statement of Key Findings

Based upon a thorough review of each of the above reports we are pleased to report that we found the work to be reasonable and performed in accordance with generally accepted actuarial principles and practices. We found that the actuarial methods and assumptions are reasonable and appropriate and that the work was performed by fully qualified actuaries.

It is important to understand that in selecting and recommending actuarial methods and assumptions, there is a great deal of professional judgment involved. In making the above statement, we have not attempted to substitute our judgment for that of the consulting actuary to the Fund. However, as a part of our review, we have identified a number of areas where PFDPF and its consulting actuary should undertake further investigation or study. The major issues are categorized in one of three levels of significance to the overall funding status of PFDPF.

Level 1: Areas where changes will result in a financial impact on the actuarial findings.

Level 2: Areas where we recommend changes based on our professional opinions or preferences.

Level 3: Areas which are not material but where improvements could be made in the actuarial processes or reporting of the findings.

Level 1 – Areas of Potential Financial Impact:

Economic Assumptions: We do not believe that a consistent inflation model was used in constructing the actuarial assumptions for interest rate and salary increase scale. Also, we believe that Watson Wyatt should reexamine the inflation assumptions of 3.5% for interest rate and 4.0% for salary increase rate to determine whether current conditions would dictate that the inflation assumption be lowered. In the event that a change in the assumed rate of inflation changes either of these two assumptions, there could be a significant financial change in the actuarial results.

PFDPF should be aware that over the last couple of years, a number of large public retirement systems have either lowered or are considering lowering the actuarial interest rate in response to expectations of continued low inflation.

Mortality Improvements: The projected mortality improvements used in the 1998 Forecast Study for retirees may be overstated. In addition, the assumption that mortality improvements will be recognized for valuation purposes at the end of each five-year period is causing discontinuities in the results as well as the appearance of overfunding in the early years. We recommend that PFDPF consider adopting a fully generational mortality table for valuation purpose to minimize these discontinuities.

Health Plan Participation: We believe that the continued assumption of 100% participation in the retiree health plan is unrealistic based upon the projected significant increases in retiree premium rates.

Level of Contributions to Health Care Stabilization Fund: PFDPF should determine whether the level of contributions to the HCSF needs to be tested to assure compliance with the limitations of Section 401(h) of the Internal Revenue Code.

Level 2 – Areas of Professional Opinion or Preference

Actuarial Cost Method: The Funding to Decrement modification of the Entry Age Normal Actuarial Cost Method is used by Watson Wyatt for the valuation of the PFDPF. This method has certain advantages and seems to meet professional standards, although the method is new and not widely used. However, Mercer feels that PFDPF should examine whether the Funding to Decrement method provides advantages over the traditional application of this method, i.e., Funding to Maximum Retirement Age, with regard to meeting the long-term funding objectives of PFDPF.

Valuation Asset Method: The current valuation asset method has a bias toward an understatement of asset value relative to actual market. Our preference is for a method where there is an equal probability of producing results that are above or below actual market.

Termination Experience: The current termination rates do not consider that termination is related to length of service, particularly during the early years, known as the "select period."

Mortality Experience: With the increasing number of female members within the Police group, consideration should be made for a separate female mortality table.

Level 3 – Areas of Potential Improvement in Actuarial Reporting

Summary of Actuarial Assumptions: A number of actuarial assumptions used in the valuation were not included in the summary. These include the assumed benefit percentage for partial disabilities, the percentage of members assumed to be married, the assumed age difference for spouses, and the number of dependent children. In the interest of completeness, we recommend that these assumptions be included in the summary.

Salary assumptions for new entrants: The forecast assumes new entrants to have salary increases at the rate of 10% per year for the first five years after hire. However, no substantiating information is provided in support of this assumption.

Scenario selected: For Watson Wyatt's recommendation of the 1% Growth/Baseline Health Care Trend, it would have been helpful to include the data supporting the recommendation.

Review of the January 1, 1998 Actuarial Evaluation

Our review of the January 1, 1998 actuarial evaluation included the following areas, with our overall conclusions noted:

- Verification of data used for the valuation
  - *The membership data used was reasonable and appropriate*

- Review of funding methodology
  - *The funding methodology meets professional standards*
  - *The funding methodology is conservative compared to other methods*

- Review of actuarial assumptions
  - *The actuarial assumptions are reasonable individually and in the aggregate*
  - *Recommendations are offered for further review of certain assumptions*

- Checking the computation of valuation asset value
  - *The value in the report was verified to be correct*

- Checking test cases to determine whether plan provisions and assumptions were programmed properly
  - *Only minor differences were found without having a material effect on the results*

- Recreate the actual results of the actuarial valuation
  - *The differences between our calculations and Watson Wyatt's calculations are within normal standards of tolerance.*

- Review of report for conformance with actuarial standards of practice
  - *The report is complete and conforms with all applicable actuarial standards of practice*

Verification of data used for the valuation

Mercer requested and received the data file that PFDPF provided to Watson Wyatt for the 1998 Evaluation, as well as Watson Wyatt's actual valuation database. The following comments are based upon our comparison of these two files.

There were a number of member records with one or more missing data fields. These included dates of birth, date of plan entry, and sex. In each instance Watson Wyatt filled these fields using specified assumptions in order to include the members in the valuation. We examined each such assumption and determined these to be reasonable.

One inactive person was not valued since the individual was not coded as either Police or Fire. Since there were more than 47,000 members in the valuation this omission is not material.

One inactive person was not valued since the individual was not coded as either Police or Fire. Since there were more than 47,000 members in the valuation this omission is not material.

The number of total members is overstated slightly since rehired retirees are counted within both the active and retiree groups. However, this does not affect the plan liabilities.

We have concluded that the membership data as used by Watson Wyatt for the Actuarial Evaluation was reasonable and appropriate.

Review of funding methodology

The valuation defines an actuarial cost method and a valuation asset method.

Actuarial Cost Method: The Entry Age Normal Actuarial Cost Method is used. Watson Wyatt has used a particular variation of the method which has been referred to as funding to decrement (FTD). The more common application of this cost method is known as funding to maximum retirement age (FMRA). There are advantages of each of these variations and both variations meet professional standards. In general, FTD will cause higher actuarial accrued liabilities in the early years of a member's career than FMRA, which results in a more conservative funding pattern.

The true test of which variation is more appropriate for a plan normally centers around which method produces more stable costs and/or a more equitable allocation of costs among the membership categories. The long-term goal of stable costs is especially important since PFDPF is using the 1998 forecast as a primary decision tool for future decisions on the management of the fund. For example, the Board might want to examine whether FTD or FMRA would result in a more stable pattern of future amortization periods for the unfunded actuarial accrued liability. This is not to suggest that FTD variation is not appropriate, but only that the funding method selected should be the one that best meets all objectives. A forecast study comparing each of the methods would be the best way to make this determination.

The description of the cost method in the report does not clearly indicate that the FTD variation is being used. We recommend that the description be revised to be more precise.

Valuation asset method: There are separate valuation asset methods for common and preferred stocks and for all other fund assets.

For assets other than common and preferred stocks, valuation assets equal the net cost (book) value. In general, most actuaries do not prefer book value for a valuation asset method since it can be influenced by decisions to sell or hold particular securities. However, if there is regular turnover of the assets being measured at book value, then this criticism becomes less of an issue.

For common and preferred stocks, valuation assets are computed using the 4-Year Market Adjustment Method. Under the 4-Year Market Adjustment Method, realized and unrealized gains on stocks are recognized over four years. This method has a bias toward understating the valuation asset value over the long term because a large proportion of the earnings of the System will fall into this category, thus requiring smoothing . The purpose of an actuarial asset valuation method is to smooth out year to year results while capturing the intrinsic value of the investments, thus avoiding systematic understatement or overstatement. However, the current method, since it is conservative, does have the advantage of providing extra protection against a possible downward adjustment of asset values.

We would normally recommend a valuation asset method that has the same probability of producing results that are above or below market value in order the maintain generational equity in the actuarial evaluation results. One such method in use is known as the Smoothed Market Value Method. Under this method an expected return on assets is calculated each year by multiplying the actuarial interest rate times the average market value of the fund. This result is compared to the actual return on plan assets, with the difference recognized over a specified period, usually four or five years.

These comments notwithstanding, the current asset valuation methods are in use elsewhere and meet applicable professional standards.

Review of actuarial assumptions

Our comments on the following specific actuarial assumptions are addressed in the section on the Review of the Quinquennial Evaluation:

- Interest rate
- Salary increase scale
- Inflation
- Termination rates
- Mortality rates
- Retirement rates
- Dependent children

As noted in the Review of the Quinquennial Evaluation, Mercer has certain reservations concerning the interrelationship between the interest rate, salary scale and inflation rate. Also, the assumed inflation rate inherent within the interest rate and salary scale assumptions may be too high based upon current inflation expectations. Notwithstanding these reservations, all of the actuarial assumptions appear reasonable individually and in the aggregate.

Several of the actuarial assumptions used by Watson Wyatt are not listed in the summary of actuarial assumptions in the report:

- Assumed benefit percentage for partial disabilities
- Percentage of members assumed to be married
- Assumed age difference for spouses
- Number of dependent children assumed

We recommend that these assumptions be included within the summary for future actuarial evaluations.

Checking the computation of valuation asset value

We were provided by PFDPF with the source information that was used in the computation of valuation asset value as well as worksheets used by Watson Wyatt. We were able to reproduce the value as used within the 1998 actuarial evaluation. We have concluded that the value was computed accurately based upon the description of the method as it appears within the actuarial evaluation report.

Checking test cases to determine whether plan provisions and assumptions were programmed properly

We requested from PFDPF copies of 15 actual benefit calculations which occurred during the first three months following the date of the actuarial evaluation. We then requested test cases from Watson Wyatt for these same 15 members. We would normally expect to see the benefit in the test case for the first year nearly identical to the actual benefit calculation. We found this to be true in our comparison of the test cases to the actual benefit calculations.

We requested from Watson Wyatt 15 test cases of inactive plan members with a wide range of benefit types and 12 test cases of active plan members selected from among various age and service combinations. It is important to realize that test cases are carefully selected to check all of the plan provisions rather than being selected randomly. Many of the test cases involve situations that occur very infrequently. The total number of lives potentially affected by the errors on the inactive test cases represent only one percent of the total number of inactives. Similarly, the one exception we found on the active lives affects only a small portion of the total calculation.

Overall, there would have been no material effect on the valuation results if these situations had been processed correctly. Our review of the test cases supports our overall opinion concerning the reasonableness of the valuation results. In fact, it would be unusual to conduct an actuarial audit of this magnitude and not find a few exceptions of this type.

For the inactive life test cases, we reviewed benefit amounts as well as the calculations of actuarial liabilities. We found the calculations accurate with three exceptions:

- One of the test cases was for a dependent parent. The benefit to dependent parents is $158 per month. However, the test case was valued with a monthly benefit of $410, which is the surviving spouse benefit. Even if this error affected all of the dependent parents in the valuation it would have minor effect upon the overall valuation results since there are only two of these in the valuation.

- Another test case involved a male child over age 22. The liability was valued using a one-year set back in the Projected Annuity Mortality Table, rather than the six-year setback as intended (affects 46 in the valuation).

- The third problem was a retiree who was female. The $410 surviving spouse liability to the male spouse was valued using a one-year setback in the Projected Annuity Mortality Table rather than a six-year setback as specified for all surviving spouses (affects 187 retirees in the valuation).

For the test cases of active plan members, our review included checking closely the projected benefits for each member (known as "benefit arrays") as well as a review of the actuarial present values computed from such benefit arrays. From this review we found only one issue to report:

- The vested termination benefit for members who terminate employment between 15 years and 25 years of service is calculated as a deferred benefit equal to 1.5% of average annual salary multiplied by the number of years of service. After 25 years of service the benefit is calculated the same as the service retirement benefit. One test case we reviewed did not change the calculation of this benefit after the individual reached 25 years of service. This issue would only affect persons hired before age 23 and even then have a relatively minor effect on the overall calculation of liability.

Recreate the actual results of the actuarial valuation

We have independently calculated the actual results of the January 1, 1998 actuarial evaluation using the same actuarial methods and assumptions as used by Watson Wyatt in their report. The results are shown below, with a comparison to the original results obtained by Watson Wyatt:

For our calculation of the actuarial accrued liability, we obtained a value 2.1% greater than Watson Wyatt as shown in the table below:

(all figures in millions)

	Watson Wyatt			Mercer			Ratio
	Police	Fire	Total	Police	Fire	Total	
Actuarial Accrued Liability							
Active	2,159.9	1,639.5	3,799.4	2,274.4	1,722.4	3,996.8	105.2%
Inactive	11.4	5.1	16.5	11.3	5.1	16.4	99.4%
Rehired retirees	1.3	0.7	2.0	1.2	0.5	1.7	85.0%
Retirees	2,046.0	1,561.5	3,607.5	2,031.4	1,552.2	3,583.6	99.3%
Beneficiaries & Survivors	156.2	116.1	272.3	149.4	110.5	259.9	95.4%
Total	4,374.8	3,322.9	7,697.7	4,467.7	3,390.7	7,858.4	102.1%

For our calculation of normal cost we obtained a value 4.6% greater than Watson Wyatt:

(all figures in millions)

	Watson Wyatt			Mercer			Ratio
	Police	Fire	Total	Police	Fire	Total	
Normal Cost	125.0	96.1	221.1	130.2	101.0	231.2	104.6%
Payroll	679.8	511.1	1,190.9	679.8	511.1	1,190.9	100.0%
Normal Cost Rate	19.15%	19.58%	19.33%	19.94%	20.58%	20.21%	104.6%

Since all of the major actuarial firms have developed their actuarial valuation systems independently of each other, there are certain inherent differences in calculation procedures. The standard usually used is based upon a 5% corridor. Since our results for normal cost and actuarial accrued liability are within 5% of the results obtained by Watson Wyatt, we conclude that the valuation calculation results of Watson Wyatt are reasonable and we have no reason to question their accuracy. This conclusion is supported by our favorable review of test cases.

It must also be noted that the Mercer valuation system required special adjustments to obtain results under the Fund to Decrement Entry Age Funding Method. We have determined that the manner in which these adjustments were made accounts for approximately one-third of the differences shown for active members.

Review of report for conformance with actuarial standards of practice

The actuarial evaluation report is complete and conforms with all applicable standards of actuarial practice. The text of the report was especially thorough and helpful in understanding the basis underlying the valuation results.

Review of the Quinquennial Evaluation

The most recent quinquennial evaluation covered the period from January 1, 1992 to December 31, 1996. The report prepared by Watson Wyatt analyzes the experience of the Fund during this period and makes recommendations with regard to modifications in actuarial assumptions. An actuarial experience study is an extremely important part of an actuary's professional responsibility to a pension system.

Our review of this study asked the following questions:

- Was the study conducted in accordance with generally accepted actuarial principles and practices?
  - *The answer to this question is yes*

- Did the report cover all material actuarial assumptions and fully measure the experience under such assumptions?
  - *All material assumptions were covered by the study*
  - *Mercer has made recommendations for future studies*

- Are the conclusions supported by the results?
  - *Generally, the conclusions were well supported*
  - *Mercer has suggested areas where alternative conclusions could have been reached*

Was the study conducted in accordance with generally accepted actuarial principles and practices?

In response to this first question, we can answer yes. The report is very thorough and well documented and shows compliance with generally accepted actuarial principles and practices.

Did the report cover all material actuarial assumptions and fully measure the experience under such assumptions?

All material actuarial assumptions were covered by the study. We have identified several areas where it might have been helpful to analyze the experience in more detail:

Termination experience: There are separate assumed rates of termination for police and firemen and the rates vary by the age of the member. Generally rates are highest for younger members and they decrease with age. Usually, however, service is also a determining factor in termination rates in that members are most likely to terminate during the first few years of service. This period is known as the "select period". We would recommend that the next experience study determine whether a select period for termination rates exists for this fund and if so modify the actuarial assumptions accordingly.

Mortality experience: Historically, pension funds for police and firemen have covered predominately male groups. Therefore, the mortality table for members has been based upon a male mortality table and the mortality table for spouses has been based upon a female mortality table. However, the number of female members has been increasing, particularly among the police. As of January 1, 1998, females represented 9.1% of active police members. The percentage for police is 10.4% for active members under the age of 45. Females represent only 2.2% of police retirees, but this percentage will obviously increase as the currently active members start to reach retirement age. Some of the improvements in mortality may be due to a change in the mix of male and female members. We recommend that the next experience study measure this effect in more detail to determine whether separate male and female tables are appropriate.

Inflation experience: Inflation is a factor in the selection of the interest rate, salary increase rate and the assumed rate for COLA increases (see more detailed discussion in the next question). However, the only mention of inflation in the report is a passing reference under the salary increase experience section. We would recommend a more structured investigation of inflation experience and its effect upon each of the related assumptions.

Dependent Children: The valuation assumes that 1/3 of dependent children over 18 will be students and thus eligible for payments to age 22. It would be helpful to review actual data to determine whether this is a reasonable assumption. However, Mercer acknowledges that this has relatively little effect on the overall valuation results.

Are the conclusions supported by the results?

Generally, the conclusions and recommendations provided by Watson Wyatt were well supported by the results of the experience study. The following are areas where we view the results differently and might have reached different conclusions:

Economic assumptions: The economic assumptions are the interest rate, the salary increase rate and CPI increase for the COLA. Each of these assumptions has expected inflation as a common component.

> Interest rate – The assumed interest rate is the sum of expected inflation plus the expected real rate of return.
>
> Salary increase – The assumed salary increase rate is the sum of expected inflation plus the expected real rate of salary growth. The real rate of salary growth includes increases due to productivity, promotions and merit increases.
>
> COLA – The assumed COLA increase is based upon expected inflation.

We will examine each of these assumptions with regard to the results of the experience study and the recommended actuarial assumptions.

The COLA assumption states that the increase in CPI (i.e., inflation) is assumed to be at 3% or greater. The plan limits inflation adjustments to 3% per year on a cumulative basis.

For the salary increase assumption, the rate is stated as the sum of an inflation increase of 4% plus a promotional increase that varies by age. However, Watson Wyatt implicitly seems to recognize that the correct assumption may actually be a 3% inflation assumption, with higher promotional increases, leading to the same total rates (see comments at the bottom of page 14 of the Quinquennial Evaluation).

Watson Wyatt's interest rate recommendation was based upon using their 1997 Asset Model assumptions. This model produced a mean expected return of 8.7%. Details of these assumptions were not included within the report but were provided to Mercer as a part of our review. These assumptions included an inflation assumption of 3.5%, which is not consistent with the inflation assumption used for the salary increase assumption.

However, the larger question is whether 3.5% is still an appropriate inflation assumption to use for the interest assumption since inflation has been well under 3.5% for most of the 1990's. We urge PFDPF and Watson Wyatt to re-examine this issue in the context of the most recent Watson Wyatt asset model. The purpose of this exercise should be to determine whether an investment return assumption of 8.50% (pre-expenses) can still be supported in the long run. For example, if the inflation assumption were lowered by 0.5% to 1.0%, the mean expected return under the asset model would be in the range of 7.7% to 8.2%, unless changes have also occurred in the real rates of return.

None of these issues cause us to question the validity of the 8.25% interest assumption used in the actuarial evaluation. The after-expenses valuation assumption of 8.25% is used in conjunction with a valuation asset value that is considerably below the actual market value. This difference between valuation assets and actual market value will ultimately be reflected as an increased rate of return on valuation asset value. In fact, under the building block method of constructing the valuation interest rate, it would be acceptable and proper to include a specific allowance for recovering the difference between market value and valuation value. Therefore, even if a revised asset model resulted in a mean rate of return as low as 7.7%, an assumed rate of return of 8.25% would still be very reasonable after reflecting the difference between valuation assets and market value.

We are more concerned with the 8.5% assumption used for purposes of projecting assets over the next 30 years in the Forecast Study. Our understanding is that this is an investment target set by the fund and its investment consultant. Nevertheless, this assumption should be reviewed prior to the next Forecast Study to determine whether it is reasonable in the context of the other economic actuarial assumptions.

Retirement rates: For police, the rates of retirement by age decrease after age 53 from 25% to 20% and then increase to 25% again at age 61. However, the study showed a much more stable pattern from age 49 through age 64, which may indicate that the "dip" in rates should be eliminated.

For firemen, the rates after age 48 are the same until age 60 when they increase. The experience study showed that this increase in rates might be occurring at age 58.

If these patterns continue to be observed in the next quinquennial study, an adjustment to these rates would be recommended.

Review of the 1998 Forecast Study and the 1998 Report on the Solvency of the Health Care Stabilization Fund

The 1998 Forecast Study was issued in April 1998, based upon the January 1, 1997 actuarial valuation. The purpose of the forecast was determine the maximum affordable level of net health care cost for the Fund and the corresponding portion of gross health care cost that must be covered by member premiums. The forecast incorporated the requirements of Senate Bill 82 by requiring that beginning in 2007 the statutory contribution rates be adequate to amortize the unfunded actuarial accrued liability over no more than a 30-year period.

The Forecast Study included three different forecasts of future active member growth – (i) no growth, (ii) 0.5% growth per year for each of the next 15 years, and (iii) 1.0% growth for each of the next 15 years. The forecast also included three different projections of medical trends – (i) baseline (or expected) increases (ii) baseline plus 1.0% and (iii) baseline minus 1.0%.

The 1998 Report on the Solvency of the Health Care Stabilization Fund was based upon the projections from the 1998 Forecast Study, but only used the projections which assumed active member growth of 1.0% per year for each of the next 15 years.

Our review of these reports included the following:

- Review of the actuarial assumptions used in the forecast.
  - *Generally, the assumptions are reasonable*
  - *Mortality improvements may be overstated, generational mortality is recommended*
  - *Health plan participation may be affected by premium increases*
  - *Medical trend rates should be reviewed*

- Review of the report exhibits for consistency and conformance with generally accepted actuarial principles and practices.
  - *The report is consistent and complies with all applicable actuarial principles and practices*

- Review of conclusions and recommendations.
  - *Generally, the conclusions and recommendations are appropriate*

Review of the actuarial assumptions used in the forecast

Many of the actuarial assumptions for the forecast are the same as those in the actuarial evaluation. Our comments on these appear elsewhere in this report. The following are our comments on certain of the assumptions used specifically for the forecast:

Mortality Improvements: The forecast assumes that every five years, beginning in 2003, that retiree liabilities will be increased by 2% and active liabilities and normal cost increased by 1%. In other words, over 30 years, the increase would be 6% for actives and 12% for retirees.

The 1994 Group Annuity Reserving Table was published with Projection Scale AA for the purpose of projecting mortality improvements. Using Scale AA, the adjustment for the actives would appear reasonable. However, for retirees, the adjustment appears to be overstated with respect to Scale AA, although an increase in the number of female retirees would also affect this expected improvement. More investigation should be done regarding this assumption.

The improvement in mortality once every five years causes discontinuity in the amortization of the unfunded actuarial accrued liability. For example, using the base line health care trend assumptions and 1% growth over the next 15 years, the resulting amortization periods are as follows:

2002	4.58 years
2003	7.61 years
2007	7.36 years
2008	12.98 years
2012	8.62 years
2013	13.60 years
2017	7.90 years
2018	14.36 years
2022	10.42 years
2023	21.39 years

This pattern gives the appearance of overfunding the plan in the early years in order to achieve the goal of meeting the 30-year amortization requirement at the end of the period. This may be difficult to explain at a time when retirees are being asked to increase their share of the health insurance costs.

One possible solution would be to smooth this funding by adoption of fully generational mortality tables. A fully generational table creates a separate set of mortality rates for each year of birth and explicitly recognizes all future mortality improvements. Adoption of female tables for police might also be required if this strategy were adopted. Fully generational tables would increase the liability by a greater amount now such that future improvements would not have as much impact.

Most actuarial valuation systems do not currently accommodate fully generational mortality rates, so this comment should not be viewed as a criticism of the 1998 Forecast Study but rather a recommendation to be incorporated in a future study. The valuation systems of most of the major actuarial firms will probably be modified to use these tables by next year.

Salary assumptions for new entrants: For new entrants it is assumed that salary increases will be 10% per year for the first five years after hire. This may or may not be a reasonable assumption, but no data is provided in either this study or the Quinquennial Evaluation to support such an assumption.

Health plan participation: The report assumes 100% retiree participation in the plan forever. This is not realistic when the retiree contributions are expected to increase substantially. Also, many employees will retire at an age where they may take another job or have coverage available from their spouse. We recommend that this issue be examined more closely. A sensitivity analysis of retiree medical participation rates would add insight to the analysis.

The assumption that excess costs will be picked up by retiree contributions combined with it having no impact on retiree participation forces the Health Care Stabilization Fund to balance to solvency. However, these projections show much more stability in retiree contributions and total retiree claims than is likely to occur.

Medical trend assumption: The medical trends when compared to national expectations appear reasonable for a long term projection but may be a little low in the near term. Looking at actual fund experience for 1994 to 1997, the medical trend appears flat to slightly negative. However, this could be caused by retirees shifting to HMO's, various plan changes, or simply the demographics of the group changing. The level of claim detail provided for our review was not sufficient to do any sort of rigorous analysis.

The prescription drug trend, however, is probably below what we would consider reasonable. In 1999, for example, Wyatt assumes 8% drug trend. Most industry projections would expect a retiree drug trend to be in the 12 - 25% range. The drug claim experience for the PFDPF shows the following drug trends:

1995/1994 = 12%
1996/1995 = 19%
1997/1996 = 12%

The long term projection could still be reasonable (a greater near term trend may imply a lower ultimate), but there will likely be deviations in near term actual to expected fund balances.

The plus 1%/minus 1% analysis shows how sensitive the retiree contributions are to medical trend. Additional sensitivity analysis such as plus 5% for the next 3 years grading to the same ultimate might paint a better picture of a pessimistic scenario.

Review of the report exhibits for consistency and conformance with generally accepted actuarial principles and practices

Our review of report exhibits identified only one item for comment:

Accrued liability projections: Comparing the Exhibits A.1, B.1 and C.1, we would normally expect that the actuarial accrued liability for pay status from actives and entrants would increase with the increase in the assumed growth of new entrants. However, many of the figures for the early years in Exhibit B.1 are less than the corresponding figures for Exhibit A.1. Watson Wyatt has indicated that even though these columns are inconsistent, this did not affect the accuracy of the overall results.

Otherwise we found the forecast study exhibits to be consistent and in conformance with generally accepted actuarial principles and practices.

Review of conclusions and recommendations

We found the conclusions and recommendations to be reasonable and appropriate. The following comments are provided:

Scenario selected: Watson Wyatt states the following under the heading "Application of Forecast":

> "We recommend that the Board use the results presented in this study to establish a policy with respect to future member premiums. That policy should be based upon the scenario which the Board believes is most likely to occur. *From our perspective*, that scenario is the 1% Growth/Baseline Health Care Cost Trend scenario." (italics added)

No supporting data is provided in order to justify the recommendation that this scenario be used. In discussions with the Executive Director during the course of our review, it appears as though this was the most reasonable scenario. Nevertheless, we believe that supporting data should be been included.

Level of contributions to Health Care Stabilization Fund: In order to provide tax-free health benefits from a tax-qualified retirement plan, the fund must accumulate assets in compliance with the provisions of Section 401(h) of the Internal Revenue Code. Section 401(h) generally requires that the employer contributions to a separate health care account not exceed 25% of the total employer contributions to the plan, excluding amortization of the unfunded actuarial accrued liability. PFDPF should review this issue to determine whether Section 401(h) applies. If it is determined that Section 401(h) does apply to the HCSF, then the limit should be incorporated into the forecast model.