

# **Sultanate of Oman**

## **Report to the Government**

### **Peer review of the actuarial valuation of the Public Authority for Social Insurance as at 31 December 2005**

**International Financial and Actuarial Service  
Social Security Department  
Geneva 2008**

---

Copyright © International Labour Organization 2008  
First published 2008

Publications of the International Labour Office enjoy copyright under Protocol 2 of the Universal Copyright Convention. Nevertheless, short excerpts from them may be reproduced without authorization, on condition that the source is indicated. For rights of reproduction or translation, application should be made to ILO Publications (Rights and Permissions), International Labour Office, CH-1211 Geneva 22, Switzerland, or by email: [pubdroit@ilo.org](mailto:pubdroit@ilo.org). The International Labour Office welcomes such applications.

Libraries, institutions and other users registered with reproduction rights organizations may make copies in accordance with the licences issued to them for this purpose. Visit [www.ifro.org](http://www.ifro.org) to find the reproduction rights organization in your country.

---

#### ILO Cataloguing in Publication Data

Sultanate of Oman: report to the Government : peer review of the actuarial valuation of the Public Authority for Social Insurance as at 31 December 2005  
Social Security Department, International Labour Office. - Geneva: ILO, 2008  
xviii, 39 p.

ISBN: 9789221212355;9789221212362 (pdf)

International Labour Office; Social Security Dept

social security / social security financing / actuarial valuation / projection / Oman

02.03.1

---

The designations employed in ILO publications, which are in conformity with United Nations practice, and the presentation of material therein do not imply the expression of any opinion whatsoever on the part of the International Labour Office concerning the legal status of any country, area or territory or of its authorities, or concerning the delimitation of its frontiers.

The responsibility for opinions expressed in signed articles, studies and other contributions rests solely with their authors, and publication does not constitute an endorsement by the International Labour Office of the opinions expressed in them.

Reference to names of firms and commercial products and processes does not imply their endorsement by the International Labour Office, and any failure to mention a particular firm, commercial product or process is not a sign of disapproval.

ILO publications and electronic products can be obtained through major booksellers or ILO local offices in many countries, or direct from ILO Publications, International Labour Office, CH-1211 Geneva 22, Switzerland. Catalogues or lists of new publications are available free of charge from the above address, or by email:

[pubvente@ilo.org](mailto:pubvente@ilo.org)

Visit our website: [www.ilo.org/publns](http://www.ilo.org/publns)

---

Printed in Switzerland

---

## Contents

	<i>Page</i>
Abbreviations and acronyms .....	v
Acknowledgements .....	vii
Executive summary .....	ix
1. Introduction .....	1
2. Statutory requirements and professional experience.....	3
3. Data .....	5
3.1. Insured population .....	5
3.2. Financial statements.....	6
4. Methodology .....	9
5. Financial system for employment injury (EI) benefits (work injuries and occupational diseases benefits).....	11
5.1. Short-term EI benefits.....	11
5.2. Long-term EI benefits .....	11
5.3. Contingency reserve .....	12
5.4. Reserve accounts.....	13
6. Assumptions.....	15
6.1. Demographic assumptions .....	16
6.1.1. Mortality .....	16
6.1.2. Fertility/Migration .....	17
6.1.3. Population of Oman/Growth of insured population .....	17
6.1.4. Morbidity (incidence of disability).....	18
6.1.5. Retirement rates.....	18
6.2. Economic assumptions .....	19
6.2.1. Real GDP growth .....	19
6.2.2. Salary scale.....	20
6.2.3. Interest rate .....	20
6.2.4. Inflation .....	21
6.2.5. Density of contributions/Accrual of benefit rights .....	21
6.2.6. Administration expenses .....	22
7. Analysis of results.....	23
7.1. Demographic projections .....	23
7.2. Financial system .....	24
7.3. Financial projections.....	25
7.3.1. Pay-as-you-go (PAYG) contribution rate (cost rate).....	25

7.3.2. Reserve (funding) ratio.....	26
7.3.3. Scaled premium financial system.....	26
7.3.4. General average premium (GAP) financial system.....	26
7.4. Replacement rates .....	28
7.5. Unfunded liabilities/International Accounting Standards.....	28
7.6. Sensitivity tests .....	29
7.7. 2005 AR Conclusions, recommendations and future considerations.....	30
8. Other actuarial issues .....	31
8.1. Contribution rate increase – Scenario 8.....	31
8.2. Adjustment to reduction factors – Scenario 9 .....	31
8.3. Years to average pensionable salary – Scenario 10.....	32
8.4. Pension increases – Scenarios 12, 13, 14.....	33
8.5. Minimum pension amount – Scenario 15 .....	33
8.6. Early retirement age increase – Scenario 16.....	33
8.7. Sufficiency of the 1 per cent contribution rate to cover work injuries and occupational diseases – Scenario 17.....	34
9. Communication of results .....	35
10. Conclusions of the peer review .....	37
Annex Benefits for which amounts should be recorded in the Notes to Financial Statements describing benefit payments .....	39

---

## Abbreviations and acronyms

AI	Actuarial Report
CPI	Consumer price inflation
EI	Employment injury benefit branch
GAP	Global average premium
GCC	Gulf Cooperation Council
GDP	Gross domestic product
IAA	International Actuarial Association
IAS	International accounting standard
ILO	International Labour Organization
PASI	Public Authority for Social Insurance
PAYG	Pay-as-you-go



---

## Acknowledgements

This report presents the results of a Peer Review of the Fourth “Actuarial Review as at 31 December 2005” of the Public Authority for Social Insurance, the Sultanate of Oman, which was undertaken by the International Financial and Actuarial Service of the Social Security Department of the International Labour Office, at the request of the Executive Management of the Public Authority for Social Insurance (PASI).

The Director General of the ILO entrusted the International Financial and Actuarial Service (ILO/FACTS) of the Social Security Department (SEC/SOC) with this mandate and Mr Warren R. McGillivray, FSA, was appointed to prepare the peer review, to conduct the mission to Muscat in January 2008 and to draft the document that served as the main background to the present report. He worked in close consultation with Ms Anne Drouin, Coordinator of ILO/FACTS and Mr Florian Léger, Actuary of ILO/FACTS. Mr Michael Cichon, Director of the Social Security Department, assumed the overall responsibility for the project.





---

## Executive summary

This Peer Review of the Fourth “Actuarial Review as at 31 December 2005” of the Public Authority for Social Insurance, the Sultanate of Oman, was undertaken by the International Financial and Actuarial Service of the Social Security Department, International Labour Office, at the request of the executive management of the Public Authority for Social Insurance (PASI). Mr W.R. McGillivray, FSA, undertook a mission to Oman in connection with the peer review from 12-20 January 2008.

The 2005 Actuarial Review was undertaken by I.E. Muhanna & Co. Actuarial Services under the direction of Mr George Psaras, Managing Actuary.

The Peer Review contains observations on the following matters:

- Has the work been completed in compliance with the relevant statutory requirements and professional standards of practice?
- Did the actuary have access to the information required to perform the valuation, and were relevant tests and analysis on the data completed as might be expected?
- Were the actuarial methods and assumptions used in completing the report reasonable?
- Does the 2005 Actuarial Report fairly communicate the results of the work performed by the actuary?

The Peer Review report does not comment on the current PASI plan design, administration or investment arrangements, except in so far as these aspects have an impact on the actuarial review.

The 2005 Actuarial Report financial and demographic projections cover the period 2006 to 2100. The results of an actuarial valuation are estimates, not predictions. They present the outcomes if all of the assumptions were to come true in the future. The parameters involved cannot be estimated with confidence over a long projection period. The estimates provide guidance for financing the PASI scheme and for planning and management tasks.

The 2005 Actuarial Report concludes that: “The results of the 4th Actuarial Review demonstrate that as at 31 December 2005 the Fund of the Public Authority for Social Insurance is in a very good financial position.”

The principal recommendations arising from the Peer Review appear in the Executive Summary in bold italics.

### 1. Statutory requirements and professional experience

The Social Insurance Law requires actuarial valuations to be undertaken triennially. The legislation does not set out the system which is to be applied to finance benefits and administration expenses.

The peer review was undertaken taking into account the International Actuarial Association *Guidelines of Actuarial Practice for Social Security Programs*, and the Social Security Department of the ILO *Internal guidelines for the actuarial analysis of a national social security pension scheme*.

---

The actuary responsible for the valuation, Mr George Psaras is a member (President 2007-2009) of the Cyprus Association of Actuaries, and a Committee Member of the Pensions, Benefits and Social Security Section of the International Actuarial Association.

## **2. Data**

The actuarial valuation had access to PASI data, and it is noted in the 2005 Actuarial Report that the data were checked for correctness and reasonableness. The number of insured persons and the average earnings are consistent with PASI Financial Statements.

The PASI Financial Statements provide very limited information on benefits paid by type of benefit. This is reflected in the 2005 Actuarial Report which does not provide detailed information for the period 2003-2005. Some additional financial data was obtained during the peer review.

*The Notes to PASI Financial Statements should provide additional financial data to facilitate actuarial reviews (see the Annex to the Peer Review for details). Data on the number of lump-sum benefits paid, new pensions and pensions in payment is also required*

## **3. Methodology**

The 2005 Actuarial Report applied a projection model of the PASI scheme which projects the annual number of insured persons and beneficiaries, the annual contribution and investment income and benefit and administration outgo, and the reserve fund at the end of each year.

The model projects expected experience for 95 years (2006 to 2100) based on demographic and economic assumptions. Long projection periods are common in mature partially funded social insurance pension schemes. For a relatively new scheme such as the PASI, it is particularly important to bear in mind that financial and demographic projections beyond two generations are inevitably very uncertain, and the possible changes in the principal parameters which can affect the projections. What is important to note is the change in the projection results since the preceding actuarial review.

## **4. Financial system for employment injury (EI) benefits (work injuries and occupational diseases benefits)**

As well as the pension scheme, the PASI operates an employment injury (EI) social insurance scheme covering occupational accidents and diseases. As elsewhere, PASI EI benefits are financed only by employers.

The EI scheme has both short-and long-term benefits.

*Short-term benefits* are normally payable for less than one year – temporary work-injury allowance, medical care, permanent partial disability lump sums (where the degree of disability is less than 30 percent), death grants, funeral grants.

*Long-term benefits* which may be payable for the lifetime of beneficiaries and thereafter to their survivors – permanent total disability pensions, permanent partial disability pensions.

The financial system of an EI scheme is normally set up so that all current and future benefits payable in respect of work accidents and occupational diseases which occur in a year are paid from contributions made by employers in the year. Since contributions

---

collected on an annual basis cover all current and future costs related to claims occurring in the year, “today’s employers pay the full cost of today’s claims”.

EI benefits are usually treated as a separate branch of social security, and valued separately from pension benefits. Short-term EI benefits are normally financed on a pay-as-you-go (PAYG) system where the contribution rate is set at a level which will produce sufficient funds to pay the temporary disability benefits, medical care, funeral grants and lump sum permanent disability payments arising from work injuries in the year.

EI disability and survivors’ pensions are financed under a terminal funding system. Under this system the amount of each new pension is capitalized and the present value of the pension is paid from contributions in the year the injury or death gave rise to the pension, into a separate Employment Injury Pensions Reserve Account. Investment income is credited to and pensions are paid from this Account. At each triennial actuarial valuation, pensions in payment are revalued taking into account appropriate mortality and interest rate assumptions, and the required amount in the account is adjusted.

Unless such a terminal funding financial system is applied to EI pensions, the annual EI contribution rate will gradually increase for many years. A terminal funding system whereby pensions are capitalized ensures that the cost of all EI pensions arising from employment injuries in a year are financed from contributions made in that year.

While the average incidence of work injuries or deaths normally varies little from year to year, deviations from the average do occur. In a relatively small scheme such as the PASI these deviations can have significant financial implications. In order to avoid the financial impact of unusual and unexpected incidence of injuries and/or deaths, a Contingency Reserve should be set up.

Separate accounts would then be maintained for the PASI pension and EI branches. This would be consistent with Article 10 of the Social Insurance Law which states that “An independent account shall be opened for each of the Authority’s branches”. The operation of the EI Reserve Account is set out in the Peer Review.

Scenario 17 of the 2005 Actuarial Report verifies the adequacy of the 1 per cent contribution rate by calculating the PAYG contribution rate for projected employment injury expenditures. The 2006 rate of 0.2 per cent of insured earnings is projected to increase to 0.4 per cent at the end of the projection period. The subsidy of the pensions branch by the EI branch would be evident if the two branches were valued separately.

*It would be desirable to treat the employment Injury benefits branch separately from the pensions branch, and for actuarial reviews to value the Employment Injury branch separately.*

## **5. Assumptions**

The model requires the input of assumptions about future economic and demographic experience and future costs of operation of the PASI. Observations on selected assumptions are noted below.

### **5.1. Demographic assumptions**

**Mortality:** English Life Table No. 13 has been modified to reflect the assumed mortality of Oman covered by the PASI. This is an accepted procedure since the PASI (like other small social insurance schemes covering nationals in Gulf Cooperation Council (GCC) countries) has insufficient mortality experience to construct a mortality table.

---

*It would be useful to investigate whether the social security schemes in the small GCC countries could pool their mortality experience and construct a regional mortality table for GCC nationals. This project could be undertaken with the cooperation of the ILO and/or the ISSA.*

**Growth of insured population:** This depends on the mortality, fertility, migration and labour force participation rates of Omanis. The 2005 Actuarial Report is silent on the fertility, migration and labour force participation rates assumed.

**Morbidity (incidence of disability):** The incidence of disability claims depends on the definition of disability and the application of the definition. Given the low incidence of disability and the limited disability experience of the PASI, it is not possible to produce a reliable table of rates of entry into disability for the PASI. Projections of numbers and average amounts of new disability claims could be made by developing formulas to estimate them as proportions of new retirement pensioners and pension amounts.

## **5.2. Economic assumptions**

**Interest rate:** After deducting investment expenses, a nominal net rate of return on investments of 6 per cent is assumed throughout the projection period.

There seems to be little point in assuming an interest rate to be paid on a deficit which is projected to occur in 85 years, and which in any event is not likely to be allowed to occur (paragraph 3.46).

**Salary scale:** The salary scale shows the assumed evolution by age of the salary of an individual over their career. The salary scale reflects productivity increases – increasing work experience, promotions, merit increments, etc. by age. The assumed salary scale is relatively flat which it is understood reflects the current situation in the private sector in Oman.

**Inflation:** Salaries also increase due to overall increases in productivity and consumer prices. In the long term, the annual real rate of productivity growth (which determines the real rate of wage inflation) can be derived from real gross domestic product (GDP) and employment growth. The annual nominal rate of **wage inflation** is assumed to be 2 per cent in 2006, increasing to 4 per cent after 20 years, and constant at 4 per cent thereafter.

A rate of **consumer price inflation** (CPI) is not assumed explicitly (recent rates have been very low or negative and there is no provision for increases in PASI pensions in payment to take into account inflation). The assumed increases in the minimum pension, the maximum salary, etc (0 in 2006, increasing to 2 per cent after 20 years, and constant at 2 per cent thereafter) constitute a consumer price inflation assumption.

The relationships between the assumed interest rate, wage inflation and the CPI are shown in the following table.

---

## Relations among selected economic assumptions

	2006	2007-2026	2027+
Consumer price inflation (CPI)	0	increasing to 2 %	2 %
Wage inflation	2 %	increasing to 4 %	4 %
Net* rate of return	6 %	6 %	6 %
<b>Real rates of:</b>			
Wage inflation	2 % throughout		
Net* return	6 %, decreasing to 4 % in 2026 and thereafter		
* Net refers to "net of investment expenses".			

**Density of contributions/Accrual of benefit rights:** The 2005 Actuarial Report is silent on the density of contributions (the proportion of a year during which, on average, contributions are made by and on behalf of a contributor).

**Administration expenses:** Administration expenses are assumed to be 6.5 per cent of contribution income. Presumably, as the number of contributors increases, economies of scale will permit the PASI to operate efficiently at lower expense ratios.

## 6. Analysis of results

The principal outputs from the model are:

- projected demographic and financial results, including cash flows and the accumulated reserve fund,
- projections of the
  - pay-as-you-go contribution (cost) rates, and
  - reserve ratios.

### 6.1. Demographic projections

Over the 50 years after 2006, the interaction of the demographic assumptions results in the projected population insured by the PASI increasing by nearly six times. While sufficiently reliable mortality and fertility assumptions can be made, assumptions about the pace of expansion of the private sector, and of entry of females into private sector employment and indigenization of private sector employment, are less reliable.

Over the same period, the number of retirement and survivor pensioners increase much more rapidly (over 90 times for retirement pensioners and over 37 times for all types of survivor pensioners), as is expected as the PASI scheme matures.

The total dependency ratio for all pensioners (active insured persons/all pensioners) decreases from 29.2 in 2006 to 3.5 in 2050 and 1.8 in 2100. Since the survivors' pension is the full retirement pension and there are provisions for multiple reversions, the total pensioners' dependency ratio is an indication of the projected extent of support required from active insured persons.

---

The 2005 Actuarial Report provides no demographic projections of the number of end of service and other lump sum benefits (family affairs benefit, funeral grant, death grant, marriage grant). Supplementary material provided by the PASI show projected amounts of these benefits, but not the numbers of them.

*The actuarial report should contain full demographic projections for each year of the projection period for the numbers of contributors and of beneficiaries for each type of benefit.*

## **6.2. Financial system**

The financial system refers to the arrangement whereby funds are made available by a social security scheme to pay benefits as they fall due. It does not affect the amounts of benefit payments. Benefits are determined by the legislation and regulations of the scheme and the interaction of demographic and economic factors.

The PASI is a partially funded scheme; however, the partially funded financial system which the PASI follows is not precisely set out. A prescribed financial system would, for example, set the desired level(s) of reserves to be maintained and the period(s) over which the level(s) would apply. If an actuarial review (or two successive actuarial reviews) revealed that these conditions were not being met, this would require the scheme to take remedial action so that the conditions of the financial system would be met.

Any partially funded pension scheme will show liabilities (present value of expected benefit and administration payments) exceeding assets (the initial reserve plus the present value of expected future contributions and investment income) until the scheme is fully mature (at which time it will no longer be in a partially funded state). In the absence of a prescribed financial system, deciding whether adjustments to a scheme are necessary becomes subjective, and the approach can be that the larger the reserve fund, the better – which is not necessarily true.

*It would be desirable for the PASI to set out the partially-funded financial system it will follow for the pensions branch. An actuarial review would then determine whether the benchmarks of the financial system are being met. In the event they are not, the PASI would be obliged to take remedial measures to meet the requirements of the financial system applied.*

## **6.3. Financial projections**

The extract of the financial projections in Table 5.3.2 of the 2005 Actuarial Report is insufficient for a thorough review of the actuarial valuation. It is necessary to have details of the projections for each year of the projection period. Table 13 (Financial Projections) in the Peer Review is based on supplementary annual projection data made available by the PASI. The small differences between the Actuarial Review and Peer Review tables are explained in footnotes to Peer Review Table 13.

*The actuarial report should contain full financial projections for each year of the projection period for contributors and for each type of benefit.*

The **pay-as-you-go (PAYG) contribution rate (cost rate)** is the contribution rate which would be required each year under the PAYG financial system, whereby each year benefit and administration expenditures are paid from the contribution income of the scheme in the year. The PAYG rate increases to almost the current 19 per cent contribution rate in 2040, and thereafter it continues to rise.

---

Under a partially funded financial system, for a scheme which is not mature, the current contribution rate will always be lower than the PAYG contribution rate at some time in the future. Rather than indicating that “benefit levels are too high for the current contribution rate to be sustained indefinitely” (paragraph 5.9 of the 2005 Actuarial Report), the development of the PAYG contribution rate simply indicates that the current contribution rate will have to be increased (or benefits reduced) in the future as is expected under a partially funded financial system.

The **reserve (funding) ratio** is the reserve fund at the end of a year divided by the benefit and administration expenditures in the year. It indicates the number of years of outgo at the current annual level of benefit payments and administration expenses which could be paid by the reserve fund alone. The reserve ratios are around 40 until 2020 and fall to 29.4 in 2030, 19.4 in 2040, 13.3 in 2050, and to less than 1 in 2090.

If a partial funding benchmark(s) is established, it could be related to the reserve ratio which must be maintained at a certain point in the future.

The **scaled premium financial system** provides benchmarks for partially funded schemes. Under this system a fixed contribution rate is established for a period of equilibrium (usually 15 or 20 years) so that in every year throughout this period contributions and investment income will be sufficient to pay benefits and administration expenses. The excess of contribution and investment income over the funds needed to pay benefit and administration expenses is held in the reserve fund. At no time during the period of equilibrium are reserve funds used to pay benefits. Before the end of a period of equilibrium, a new higher contribution rate is calculated for a subsequent period of equilibrium. From the Financial Projections, under the scaled premium financial system, the period of equilibrium would extend from 2006 to 2076.

Under the **general average premium (GAP) financial system** a theoretical constant contribution rate which could be applied indefinitely is calculated by equating the present value of contributions for existing and future insured persons plus the amount of the current reserve to the present value of future benefits for existing and future insured persons and administration expenses. The GAP financial system indicates the long-term level contribution rate cost of a scheme. It is rarely applied in practice, and is used to compare the costs of different benefit packages or the effect of alternative assumptions. Over the projection period, under the main valuation assumptions, the general average premium is 25 per cent of insured earnings.

## **6.4 Replacement rate**

The purpose of a pension scheme is to replace members' lost income. A measure of this is the replacement rate, the ratio of the amount of the pension benefit to the amount of insured earnings.

A crude indication of projected replacement rates shows that until 2050 they are around 80 per cent of average earnings, and thereafter decrease to around 60 per cent of average earnings. The estimated replacement rates are overestimated since lump sum benefits are included in total benefits. The principal reason for this decrease is that the PASI has no provision for adjusting pensions in payment to take into account inflation.

## **6.5. Unfunded liabilities/International Accounting Standards**

The 2005 Actuarial Report presents an estimate of the unfunded liabilities of the PASI scheme. This conforms to International Accounting Standard (IAS) 26 *Accounting and*

---

*Reporting by Retirement Benefit Plans.* Unlike occupational pension plans, a public social security scheme is established by statute, it is not subject to early termination and it will have continuous new entrants. Social security schemes such as the PASI do not fall within the definition of retirement benefit plans in IAS 26. As it is stated in the 2005 Actuarial Report, the actuarial methodology prescribed in IAS 26 is not appropriate for public social security pension schemes. Nor is such a valuation required by the International Actuarial Association *Guidelines of Actuarial Practice for Social Security Programs* (2003).

Including this valuation, which is not required, can create confusion among readers of the 2005 Actuarial Report. Even more likely to create confusion and uncertainty are the remarks in Notes 1 and 2 and especially Note 4 to the 31 December 2005 PASI Financial Statements which refer to the unfunded liability calculated by the actuary, and treat the PASI as a (funded) occupational pension scheme. It is not clear why several actuarial matters appear in the Notes to the PASI accounts. Nor, are the brief one or two sentence summaries of selected results in the actuarial report particularly informative; rather they can only create uncertainty about the financing of the PASI.

*The Notes to the PASI Financial Statements should take into account that the PASI is a partially funded public social security scheme, not an occupational scheme.*

## **6.6. Sensitivity tests**

The 2005 Actuarial Report is based on the projection of PASI revenues and expenditures over a long period of time. The results presented in the 2005 Actuarial Report have been derived using best-estimate assumptions regarding future demographic and economic trends. Both the length of the projection period and the number of assumptions required mean that actual future experience will not develop precisely in accordance with the assumptions.

Individual sensitivity tests are performed that consist of projections of the PASI financial results using alternative assumptions. The 2005 Actuarial Report includes seven sensitivity tests which illustrate the results of plausible alternative combinations of key assumptions and the relative importance of the assumptions.

Under the main assumptions where the interest rate is 6 per cent, the reserve fund is exhausted in 2091. Scenarios 1 to 4 illustrate the critical importance of the rate of return on investments. Under Scenario 3 where the interest rate is 5 per cent, the reserve fund is exhausted in 2078.

## **6.7. 2005 Actuarial Report conclusions, recommendations and future considerations**

Paragraph 7.1 of the 2005 Actuarial Report states: “The results of the 4th Actuarial Review demonstrate that as at 31/12/2005 the Fund of the Public Authority for Social Insurance is in a very good financial position. This is mainly due to the very successful reform that took place in 2005.”

Indeed, the financial position of the PASI as revealed by the actuarial valuation is very sound. This gives the PASI an opportunity to set out the financial system it will follow, in particular the benchmarks to meet in order to maintain the sound financing of the scheme.



---

## 7. Other actuarial issues

Scenarios 8 to 17 of Section 6 of the 2005 Actuarial Report deal with various actuarial issues. The following paragraphs contain comments on selected issues.

At some point (usually several points) a **contribution rate increase** (Scenario 8) is inevitable in a partially funded pension scheme. If the financial system which the PASI is obliged to follow were set out, the need for and the timing and amount of a contribution rate increase would be triggered by the results of an actuarial valuation.

**Early retirement reduction factors** (Scenario 9) are applied to ensure that an early retirement pension is “cost neutral” (i.e. the cost to the scheme is the same as if the pension were payable from the normal retirement age). Unless cost neutral reduction factors are applied, early retirement has cost implications for the PASI scheme. What this means is that active members of the scheme are subsidizing those who retire early.

In a public pension scheme which allows members to retire before normal retirement age the early retirement pension is normally based on the acquired pension rights of the retiring member based on the member’s period of contributions at the time of retirement and the member’s pensionable earnings at that time,

From paragraph 8.7 of the 2005 Actuarial Report, it appears that a member’s pensionable earnings at early retirement age are adjusted to take into account the salary scale increases and wage inflation between the member’s early and normal retirement ages. The early retirement pension is thus based on assumed salary increases during the period after early retirement until the member’s normal retirement age, a period during which the member pays no contributions and receives the early retirement pension. This is unusual.

*As well as a review of the early retirement pension reduction factors, the method of calculating the early retirement pension before application of a reduction factor should be investigated.*

**Pension increases** (Scenarios 12, 13, 14) in order to maintain their purchasing power has not been an issue for the PASI since consumer price inflation has been negligible from the inception of the scheme until 2005.

A change in the consumer price inflation environment in Oman will oblige the PASI to adjust pensions in payment (and the minimum pension) to maintain their purchasing power. The PASI can take the initiative to introduce inflation adjustments to pensions, or eventually do so in response to pressure from pensioners.

*The PASI should take the lead to introduce adjustments to pensions in payment to take into account inflation.*

## 8. Communication of results

The 2005 Actuarial Report is a very thorough and informative document. It includes much detail, and useful tables and charts. It is understood that an Executive Summary is available.

The 2005 Actuarial Report shows a very favourable picture regarding the financing of the PASI, and it would be useful if members were aware of this. A pamphlet could be produced summarizing the main results of the Report for distribution to all members of the PASI. This would also provide a more satisfactory explanation of the financial situation of the PASI than is found in Note 4 to the Financial Statements.

---

## **9. Conclusions of the peer review**

The findings of the Peer Review indicate that the 2005 Actuarial Report was competently prepared, and as a result the conclusion that the PASI is in a sound financial position is well supported. The 2005 Actuarial Report meets the PASI statutory requirement and current professional standards of actuarial practice, and applies data, assumptions and methodologies that are appropriate and reasonable. The Board of the PASI and PASI scheme members can have confidence in the results of the 2005 Actuarial Report and the conclusions about the long-term financial status of the PASI.

---

## 1. Introduction

This report presents the results of a Peer Review of the Fourth “Actuarial Review as at 31 December 2005”<sup>1</sup> of the Public Authority for Social Insurance, the Sultanate of Oman, and was undertaken by the International Financial and Actuarial Service of the Social Security Department, International Labour Office, at the request of the Executive Management of the Public Authority for Social Insurance (PASI).

The 2005 Actuarial Review (2005 AR) was undertaken by I.E. Muhanna & Co. Actuarial Services under the direction of Mr George Psaras, Managing Actuary. Previous actuarial reviews of the PASI scheme (also undertaken by I.E. Muhanna & Co.) were undertaken as of 31 December 2002 and 31 December 1999.

The Peer Review contains observations on the following matters:

- Has the work been completed in compliance with the relevant statutory requirements and professional standards of practice?
- Did the actuary have access to the information required to perform the valuation, and were relevant tests and analysis on the data completed as might be expected?
- Were the actuarial methods and assumptions used in completing the report reasonable?
- Does the 2005 AR fairly communicate the results of the work performed by the actuary?

The report does not comment on the current PASI plan design, administration or investment arrangements, except in so far as these aspects have an impact on the actuarial review.

The PASI operates a social insurance programme set out in the *Social Insurance Law* (Royal Decree No. 72/91 and subsequent amendments) which provides pensions and lump sum benefits principally upon retirement, death or disability of participants, and employment injury benefits for participants suffering work injuries or occupational diseases. Appendix A of the 2005 AR provides a description of the PASI programme.

Given the national importance of actuarial valuations of public social security schemes, peer reviews are becoming an increasingly accepted procedure. For example, the triennial Actuarial Reports on the Canada Pension Plan, which are prepared by the Chief Actuary of the Office of the Superintendent of Financial Institutions Canada, are peer reviewed by an independent review panel. Peer reviews of the United Kingdom Government Actuary’s Department’s reports on the National Insurance Fund are undertaken.

The actuarial capacity of national social security schemes is increasing, and many institutions now undertake in-house actuarial valuations of their schemes. They can use the demographic and financial projection programme developed by the International Financial and Actuarial Service of the International Labour Office Social Security Department. In response to institutions’ requests that their in-house actuarial reviews be validated, the Department arranges for peer reviews of the actuarial reports.

<sup>1</sup> Final Report – 14 August 2006.

---

This peer review of the 2005 AR of the PASI by the International Financial and Actuarial Service of the International Labour Office Social Security Department focuses on the most important issues, notably, the data, methodology and key actuarial assumptions as set out in the 2005 AR. Mr W.R. McGillivray, FSA, undertook a mission to Oman in connection with this Peer Review from 12-20 January 2008.

The 2005 AR includes the following principal results:

- Projected cash flow at the current contribution rate annually to 2010 and every tenth year thereafter to 2100 (Table 5.3.2).<sup>2</sup>
- Projected total (benefits plus administration) PAYG contribution rates (Cost Rates in Table 5.3.3).
- Sensitivity tests illustrating the results which would be obtained under various changes in actuarial assumptions and scheme parameters.

The 2005 AR concludes in Section 7: “The results of the 4th Actuarial Review demonstrate that as at 31 December 2005 the Fund of the Public Authority for Social Insurance is in a very good financial position.”

It must be emphasized that these results are not predictions. They present the outcomes if all the assumptions were to come true in the future. The parameters involved (e.g., fertility rates, net migration rates, mortality rates, disability incidence rates, rates of labour force participation, retirement rates, rates of price increase, real rates of wage increase, real rates of return on investments) cannot be predicted accurately over the entire projection period.

The estimates provide guidance to financing the PASI scheme and to planning and management tasks. The sensitivity tests give indications of a range of possible actual outcomes. With respect to financing a scheme, what is of particular interest is changes in the results of the current valuation compared to the previous valuation, and the reason(s) for the changes.

Sections 2 and 3 of this report deal with statutory requirements and professional standards of practice and data for the review. The actuarial methodology is considered in Section 4. Section 5 deals with the financing and valuation of work injury and occupational diseases benefits. Sections 6 and 7 include comments on the assumptions and analysis of the results of the actuarial projections. Section 8 deals with other actuarial issues. Section 9 deals with communication of the results of the actuarial review, and the conclusions of the Peer Review are in Section 10.

<sup>2</sup> Annual projections (PASI MAIN RESULTS) were provided by the PASI.

---

## 2. Statutory and professional requirements

Article 10 of Chapter Two (The Authority's Financial System) in the Social Insurance Law states: "The Authority's financial status shall be audited [*i.e. evaluated*] by one or more actuary experts at least once every three years". There is no definition of "actuary expert". Article 7(10) of the Law empowers the Board of the PASI to "Appoint[ing] actuaries to review and prepare the Authority's financial status". Presumably, actuarial reports are to be submitted to the Board of the PASI.

The International Actuarial Association has promulgated *Guidelines of Actuarial Practice for Social Security Programs*.<sup>3</sup> They cover scientific rigour, objectivity and the transparency, explicitness, simplicity and consistency of information provided in an actuarial report. The IAA Guidelines provide guidance specific to social security programmes, and they have been taken into account in the Peer Review of the 2005 AR.

The 2005 AR has also been reviewed taking into account the *Internal guidelines for the actuarial analysis of a national social security pension scheme* published by the Social Security Department of the ILO (ISBN: 92-2-111314-0).<sup>4</sup> The Guidelines summarize what the Department regards as standard practice for actuarial analysis of social security pension schemes. They are meant to serve as checklists for staff members of the Department, as guidance for external collaborators and as information for client institutions and governments.

The actuarial review was directed by Mr George M. Psaras, Managing Actuary, I.E. Muhanna & Co. Mr Psaras is a member (President 2007-09) of the Cyprus Association of Actuaries. He is the Delegate of the Cyprus Association of Actuaries to the Council of the International Actuarial Association (IAA), and is a Committee Member of the Pensions, Benefits and Social Security Section of the IAA.

<sup>3</sup> IAA *Guidelines of Actuarial Practice for Social Security Programs*. Adopted by Council of the IAA 21 October 2002 – Effective 1 January 2003.

<sup>4</sup> See

<http://www.ilo.org/gimi/gess/ResShowSecsocRessource.do?ressourceId=7958&longTitle=Internal+guidelines+for+the+actuarial+analysis+of+a+national+social+security+pension+scheme&author=ILO,+Financial,+Actuarial+and+Statistical+Branch&ressYear=1998>.



---

### 3. Data

For an actuarial review of a social security scheme, the data required normally include:

Data on current and past status

- Covered population (by age/sex)
- Contributory earnings of contributors (by age/sex)
- Contributions paid
- Benefit expenditures (by type/number/amount paid)
- Administration expenses
- Assets (reserve fund)
- Investment returns

Data for assumptions

Demographic data

- Mortality rates/future mortality improvement
- Fertility rates
- Migration rates
- Family composition (structure of dependants)
- Retirement rates
- Disability rates/recovery rates

Economic data

- Labour force participation rates
- Earnings statistics
- Wage/price inflation
- Investment policy and performance
- National economic data

Historical data and various projections of possible future experience are used to develop assumptions for the projections.

From the 2003 AR (paragraph 1.3), the principal external data sources for the actuarial review were the 1993 and 2003 Oman Census Reports, the 2005 Oman Statistical Year Book and the 2005 Central Bank of Oman Annual Report.

The review had access to PASI Annual Financial Statements for the years 2000 to 2005, and data from PASI on active members, pensioners and beneficiaries of the scheme. The 2005 AR notes that the data were checked for correctness and reasonableness (paragraph 1.4).

Presumably, the PASI data on active members, pensioners and beneficiaries of the scheme was considered to be sufficient and reliable for the purpose of the actuarial review. It would, however, be useful if there were a brief description of tests which were undertaken to ensure the internal consistency and reasonableness of the data, and the consistency of PASI data with past data and data from other sources.

#### 3.1. Insured population

According to the 2000 Labour Force Survey in the ILO labour statistics database (<http://laborsta.ilo.org/cgi-bin/brokerv8>), the Omani labour force (excluding the military) consisted of 247,400 employees of whom 136,900 are in public administration. This leaves 110,500 persons employed in the private sector in 2000.

According to the (December) 2003 Census, there were 74,816 Omani citizens employed in the private sector. The total number of contributors at 31 December 2005 is 98,535 (Table 4.5.1). The explanation for this increase of about 15 per cent per year is in paragraph 2.4 (expansion of private sector employment opportunities).

### 3.2. Financial statements

The number of contributors in 2005 is consistent with the contribution income received. In the table below, total contributors and average annual salary are taken from Table 2.3.1. Estimated contributions are based on a 16 per cent contribution rate for years 2002 to 2004, and a 17.5 per cent rate for 2005. (The contribution rate was increased to 19 per cent on 1 July 2005.) The contribution income is from the PASI Financial Statements reproduced in Appendix D of the 2005 AR. Contributions are in Omani rial (RO) 1000.

Table 1.

	2002	2003	2004	2005
Total contributors	65,799	74,794	87,060	98,535
Average annual salary	2,062	2,032	2,039	2,085
Estimated contributions	21,708	24,317	28,402	35,953
Contribution income	20,109	22,781	26,797	33,115

The PASI 31 December Financial Statements, while thorough in most respects, provide limited information on Pensions and Benefits (e.g. 2004 Financial Statement Note 5; 2005 Financial Statement Note 7). Further details of some Pensions and Benefits were obtained and are reproduced below.

Table 2. Elaboration of Financial Statements (RO)

	2004	2005
<b>Pensions branch (1)</b>		
Old-age pension	2,533,690	3,059,631
Disability 1 pension	375,375	539,362
Survivors 1 pension	1,071,030	1,473,295
Death gratuity	75,825	67,740
Funeral gratuity	62,472	62,650
Marriage grant	12,245	19,559
Lump sums (data are incomplete)		
<b>Work injuries branch (2)</b>		
Disability 2 pension		
Total	14,184	13,827
Partial	22,833	25,099
Survivors 2 pension	154,189	193,420
Disability lump sum	4,035	9,804



The following table shows data from tables in the 2005 AR, the input for the actuarial valuation and data from the elaboration of the 2005 Financial Statement. It can be seen that the first two sets of data correspond closely. Amounts are in RO 1000.

**Table 3.**

Benefit	From 2005 AR tables		2005 AR input		Financial statement**
	Number	Amount*	Number	Amount*	Amount
<b>Pensions branch</b>					
Old-age Pensions - Table 4.9.1	1,468	3,254	1,472	3,258	3,060
Disability Pensions (1) - Table 4.14.1	551	659	572	689	539
Survivor Pensions (1) - Table 4.18.1	1,148	1,455	1,148	1,455	1,473
<b>Work injuries branch</b>					
Disability Pensions (2) - Table 4.14.1	49	37	49	37	39
Survivor Pensions (2) - Table 4.18.1	150	220	150	220	193

\* Amount assumes pension were payable for 12 months.  
\*\* From elaborated PASI Financial Statements.

The 2005 AR does not record lump sum payments made in 2005 (in respect of end of service, family affairs benefit, marriage grant, death grant, funeral grant, work-related disability of less than 30 percent).

It would be desirable to record benefit payments for the period since the previous actuarial review in an appendix to the actuarial report. In order to do this the Notes to the Financial Statements must show more detail. An illustration is provided in the Annex to this Peer Review.

The PASI has an excellent IT information system. Any improvements which could be made in PASI's data collection and management which would facilitate future actuarial reviews could be noted in the actuarial review.



---

## 4. Methodology

The results presented in the 2005 AR are based on a deterministic model of the PASI's operations, which projects the annual number of members and beneficiaries, the annual contribution and investment income and benefit and administration outgo and the accumulation of the reserve fund at the end of each year. Table 5.3.1 shows the demographic projections and Table 5.3.2 the financial projections annually until 2010 and every ten years thereafter until 2100.

The model starts with statistics by age and sex as of 31 December 2005 on (a) insured persons (i.e. contributors to the PASI) and their earnings, and (b) pensioners and the amounts of their pensions. Throughout the projection period, the model projects:

- the number and characteristics (e.g. age, sex) of insured persons, pensioners and other beneficiaries;
- the amount of contributions paid and benefits received, and
- projections of contribution income and benefit outgo are combined with projections of investment income and administration expenses to produce the amounts in the reserve fund.

The model projects anticipated experience in future years based on demographic and economic assumptions. These assumptions include demographic parameters such as fertility, mortality and migration, and economic parameters such as labour force participation rates, price inflation, wage escalation and investment returns.

The principal outputs from the model are:

- projected demographic and financial results, including cash flows and the accumulated reserve fund;
- projections of the
  - PAYG contribution rates (cost rates) and
  - reserve ratios.

The 95 year projection period is consistent with that used for partially funded public pension schemes elsewhere (e.g. 75 years for the Canada Pension Plan and the OASDI system in the USA, 95 years in Japan).

Since the length of the projection period and the number of assumptions required mean that actual future experience will not develop precisely in accordance with the assumptions, sensitivity tests are performed using alternative assumptions.

Back-testing, whereby a model is validated by comparing output for years prior to the valuation date against historic values so that any necessary adjustments to the model can be made and discrepancies investigated and resolved, is a useful procedure. Reconciliations are conducted of the results of the current actuarial review with those of the previous review, and the principal causes of changes in the results and their impact are identified. Detailed reconciliations serve as a check on the results of the actuarial review. In "Comparison with the 31 December 2002 Actuarial Report" on page 36 of the 2006 AR, the 31 December 2005 valuation results are compared and reconciled with the 2002 AR.



---

## 5. Financial system for employment injury (EI) benefits (work injuries and occupational diseases benefits)

As well as the pension scheme, the PASI operates an employment injury (EI) social insurance scheme covering occupational accidents and diseases. As elsewhere, PASI EI benefits are financed only by employers. For the PASI, a 1 per cent contribution on insured wages is set out in the Social Insurance Law (Article 31[1]). The EI scheme has both short- and long-term benefits (see Type B contributions and benefits in Appendix A of the 2005 AR):

- *Short-term benefits* are normally payable for less than one year – temporary work-injury allowance, medical care, permanent partial disability lump sums (where the degree of disability is less than 30 percent), death grants, funeral grants.
- *Long-term benefits* which may be payable for the lifetime of beneficiaries and thereafter to their survivors – permanent total disability pensions, permanent partial disability pensions (where the degree of disability is 30 percent or more), survivors' pensions.

The financial system of an EI scheme should be set up so that all current and future benefits payable in respect of work accidents and occupational diseases which occur in a period (usually a year) are paid from contributions made by employers in the year. Since contributions collected on an annual basis cover all current and future costs related to claims occurring in the year “today’s employers pay the full cost of today’s claims”.

EI benefits are usually treated as a separate branch of social security, and valued separately from pension benefits. Different financial systems are appropriate for short- and long-term EI benefits.

### 5.1. Short-term EI benefits

The average incidence (frequency) and the average severity (duration) of temporary disability claims normally varies little from year to year. Most temporary disability benefit payments terminate within one year, either due to recovery or assessment of permanent disability. The benefit is directly related to the injured worker’s earnings, and the PAYG financial system is appropriate for financing temporary disability benefits. Under the PAYG system, the contribution rate is set at a level which will produce sufficient funds to pay the temporary disability benefits arising from work injuries in the year. The annual PAYG financial system is also used to finance estimated costs of medical care, funeral grants and lump sum permanent disability payments arising from injuries in a year. (It is understood that medical care is free of charge in government medical facilities. In countries with similar medical care systems, the EI scheme is sometimes charged the cost of medical care provided to injured workers.)

### 5.2. Long-term EI benefits

From AR 2005 Tables 4.14.1 and 4.18.1, employment injury disability and survivors’ pensions comprise around 10 per cent of the total disability and survivors’ pensions in payment at 31 December 2005.

**Table 4. Employment injury pensions in payment  
(at 31 December 2005; based on year pension started)**

Year	Partial disability	Total disability	Survivors
1995	-	-	1
1996	-	-	1
1997	2	-	9
1998	1	2	23
1999	5	3	26
2000	7	2	17
2001	4	2	13
2002	6	-	18
2003	7	-	20
2004	3	2	18
2005	3	-	4
Total	38	11	150

Source: PASI 2005 input data.

In order to finance EI disability and survivors' pensions, rather than project pension expenditures, a terminal funding system can be applied. Under a terminal funding system, the amount of each new pension is capitalized and the present value of the pension is paid from contributions in the year the injury or death gave rise to the pension, into a separate Employment Injury Pensions Reserve Account. Investment income is credited to and pensions are paid from this Account. At each triennial actuarial valuation, pensions in payment are revalued taking into account appropriate mortality and interest rate assumptions, and the required amount in the account is adjusted. Funds in the account can be pooled with funds in the pensions branch and invested for long terms.

Unless such a terminal funding financial system is applied to EI pensions, the annual EI contribution rate will gradually increase, since each year a new group of insured persons or their survivors qualifies for EI pensions, resulting in annual increases in the number of pensions in payment for many years after the inception of the scheme, and since EI pensions are based on an insured person's earnings at the time the pension becomes payable, the average annual pension in payment will normally increase each year. A terminal funding system whereby pensions are capitalized ensures that the cost of all EI pension benefits arising from employment injuries in a year are financed from contributions made in that year.

### 5.3. Contingency reserve

While the average incidence of work injuries or deaths normally varies little from year to year, deviations from the average occur. In a relatively small scheme such as the EI scheme in Oman these deviations can have significant financial implications. In order to avoid the financial impact of unusual and unexpected experience (excessive incidence of injuries and/or deaths), a Contingency Reserve is set up. The purpose of the Contingency Reserve is to pay benefits in the event of adverse experience and thereby maintain the stability of the contribution rate to the scheme. A Contingency Reserve of at least two years' expected annual benefit payments arising from claims in a year should be built up. Investment of funds in the Contingency Reserve should be made for short terms.

---

## 5.4. Reserve accounts

In the Social Insurance Law, Article 10 of Chapter Two (The Authority's Financial System) states: "An independent account shall be opened for each of the Authority's branches."

Article 31 of Section Five (Insurance against Work Related Injuries and Occupational Illness), Chapter One states:

The branch of Insurance against work related injuries and occupational illness will be financed by the following:

1. Monthly contributions the employers have to pay to the Authority in the amount of 1 per cent of the employees' monthly wages.
2. Contribution investment returns mentioned in the previous item. In case there is a surplus, it shall be transferred to the account stipulated in Article 11 of this Law.

Article 11 provides:

In case there is a surplus fund, it shall be carried over to a private account to be opened in accordance with the financial systems of the state. This account shall be under the Board of Directors' control, in coordination with the Ministry of Finance in the following cases:

- a. To settle all or some liabilities paid by the general treasury;
- b. To form a public or private reserve to be utilized for various purposes.

Separate accounts should be maintained for the PASI pension and EI branches. The Employment Injury Pensions Reserve Account and Contingency Reserve would be sub-accounts of the reserve established under Article 11.

Setting up a separate Employment Injury Pensions Reserve Account would require capitalized (i.e. present) values of disability and survivors' pensions to be calculated. Employment injury disability and survivors' pensions in payment would be identified and the capitalized value of these pensions moved from the general reserve fund to the Account. The capitalized values would be used to determine the allocation from contributions to the Account for new disability and survivors' pensions. The capitalized values would be recalculated as part of the 2008 actuarial valuation and used to determine any adjustments to the Account (any deficit would be paid from contributions to the EI scheme), and to determine the allocation from contributions to the Account for disability and survivors' pensions awarded in the next triennial period (2009-2011).

It is not possible from the data available in the 2005 AR or PASI Financial Statements to determine the cost experience with respect to EI benefits. In the 2005 AR, there is no information on the share of death and funeral grants attributable to work-related deaths, nor on benefit payments in respect of the temporary work-injury allowance or permanent partial disability lump sums (where the degree of disability is less than 30 percent). Items which should appear in the accounts are shown in the Annex.

Scenario 7 of the 2005 AR verifies the adequacy of the 1 per cent contribution rate by calculating the cost rate (PAYG contribution rate) for projected employment injury expenditures. The 2006 rate of 0.2 per cent of insured earnings is projected to increase to 0.4 per cent at the end of the projection period.

Treating Employment Injury as a separate social insurance branch, and financing EI benefits in the manner outlined above, makes it possible to ensure that the contribution rate

---

to the EI scheme is adequate to finance all EI benefits arising from claims in a year, and to reveal subsidies between the pensions and EI branches.



---

## 6. Assumptions

The following text concerning actuarial assumptions is adapted from the *Review of the Twenty-First Actuarial Report on the Canada Pension Plan* conducted by the CPP Actuarial Review Panel.

The triennial actuarial review requires the actuary look to back in time, to review the operations of the programme and also look forward, to make an estimate of its future operations. For the forward-looking part of the process, the actuary builds a model that incorporates the details of the benefit, contribution and investment elements of the scheme and reflects the expected behaviour of the factors that determine the year-by-year development of the benefit costs and the contribution and investment income. The assumptions incorporated into the model for a particular actuarial review reflect the actuary's judgment, based on his/her interpretation of past experience and the available evidence about the likely course of future experience.

The nature of the actuarial process is to make projections (not predictions) about the future based on the evidence available and then to review them periodically. Where appropriate, the actuary makes "mid-course corrections" in the assumptions as the emerging experience of the plan deviates from the previous assumptions and the expectations for likely future experience change. In assessing whether to change an assumption and if so, by how much, the actuary must weigh

- long- and short-term historical data and recent experience data;
- recent amendments to the scheme;
- government policies (e.g. on inflation and migration), investment policy, administration policies;
- academic research, and
- other external sources of relevant information.

The assumptions are intended to apply over the long-term future, so the actuary will normally give substantial weight to long-term historical data. However, where the actuary judges that more recent data for a particular assumption indicate a shift or a trend that is likely to continue for the long-term future, the actuary will recognize that shift or trend in the assumption.

For some assumptions used in the model, the actuary may adopt an approach that actuaries describe as "select and ultimate". Under this approach, the particular assumption gradually changes over a period of years (the "select period") from one that initially is very close to actual recent experience to one that reflects the actuary's best estimate of the long-term future (the "ultimate" assumption). The length of the select period can be different for different assumptions. The choice is based on the actuary's judgment and depends partly on the nature of the parameter involved and partly on how significantly the ultimate assumption differs from recent experience.

The results of the actuarial process at any given time do not yield a "right" answer but should lie somewhere within a range that can be regarded as "reasonable". Actuarial reviews focus on several key assumptions where the assumptions are "best-estimates", i.e. in the judgment of the actuary, the assumptions were such that adverse or favourable deviations of actual future experience from each of the assumptions are about equally likely.

The major actuarial assumptions can be divided into two groups:

- demographic assumptions that deal with changes in the covered population (fertility, migration and mortality rates) and events (death, disability, retirement) that result in the starting or stopping of benefit payments or contributions, and
- economic assumptions that deal with employment, wages, prices and returns on investment.

The data on experience since the 2002 AR in Section 2 of the 2005 AR (Analysis of Experience) provides guidance for selecting appropriate assumptions for the 2005 AR. The comparison of actual data to expected results based on the 2002 AR in Section 2 should not give the impression that an actuarial review predicts short-term results. Actuarial reviews deal with the long-term financial status of a scheme, and it would be unusual for the actual and expected experience to coincide over a short period.

## 6.1. Demographic assumptions

### 6.1.1. Mortality

As in the previous actuarial report, for the projections, English Life Table No. 13 (ELT 13) has been modified to reflect the assumed mortality of Omanis covered by the PASI. The table below shows expectations of life for the mortality table used in the 2005 AR, the 2003 Census results and United Nations statistics. The UN data refers to all persons resident in Oman.

Table 5.

Age	Expectation of life		Expectation of life	
	Males	Females	Males	Females
<b>2005 Actuarial Review</b>				
	Initial table (2006)		Ultimate table (2055)	
0	73.4	78.6	79.0	84.4
60	18.4	22.4	22.7	27.0
<b>2003 Census (Omanis)</b>				
0	73.1	75.4	-	-
<b>United Nations – medium variant in Oman</b>				
UN	2005-2010		2045-2050	
0	74.2	77.5	79.4	83.1
60	17.1	18.9	19.8	23.4

When there are insufficient deaths or persons exposed to the risk of death, it is a common accepted practice to modify an existing mortality table to estimate the mortality which it is expected that a scheme will experience.

The assumed initial mortality table is adjusted to take into account expected future decreases in mortality over 50 years. At age 60 the increase in the expectation of life is one month per year for males and 1.1 months per year for females. The following chart shows the assumed male and female mortality rates in 2005 and 2055.



Other small State members of the GCC with public social security schemes no doubt have insufficient mortality experience to construct mortality tables for their schemes. The mortality experience of their nationals who are covered by their schemes is similar. It may be possible for the social security schemes in these countries to pool their mortality experience and construct a regional mortality table. This project could be undertaken with the cooperation of the ILO and/or the ISSA.

### 6.1.2. Fertility/Migration

According to the 2003 Census, the total fertility rate for Omani women was 3.2. An indication of the expected development of fertility in Oman can be had from the 2006 Revision of World Population Prospects (Population Division, ECOSOC, United Nations) where total fertility (children per woman) is expected to fall from 3.7 in 2000-2005 to 2.1 in 2035-40. This statistic is affected by female expatriate workers who are included in the United Nations data.

The 2005 AR does not refer to a specific fertility assumption.

Presumably, the 2005 AR assumption is that migration of Omanis is negligible.

### 6.1.3. Population of Oman/Growth of insured population

According to the 2003 Census, the total population of Oman was 2,340,915 of whom 1,781,558 (76 per cent) were Omani nationals. Of the Omani nationals, 40.6 per cent of them were under age 15, and 56.2 per cent were aged 15-64. The census records 99,076 Omani employees in the government sector and 74,816 in the private sector. On the basis of these records, 17 per cent of Omanis aged 15-64 are employed persons.

United Nations population projections are not particularly useful for the purpose of the actuarial review since they include non-Omanis.

The expected decline in fertility and increased labour force participation of females must be taken into account in estimating the rate of growth of the Omani insured population. In

addition, a programme to indigenize various occupations is leading to significant increases in the number of Omanis employed in the private sector.

Taking these factors into account (see paragraphs 3.22 to 3.24) the assumed rates of increase in the insured population (taken from 2005 AR PASI MAIN RESULTS) are the following.<sup>5</sup> The assumptions from the 31 December 2002 Actuarial Report (2002 AR) main scenario are also shown. The intervals are chosen for the purpose of comparison.

**Table 6. Assumed rates of increase in the insured population (contributors)  
(Compound annual rates over the intervals)**

	Valuation date						
	to 2008 (%)	2009 to 2018 (%)	2019 to 2028 (%)	2029 to 2038 (%)	2040 to 2048 (%)	2050 to 2058 (%)	2059 onwards (%)
2002 AR	7.3	6.2	4.6	2.7	2.7	2.2	decreasing to 1.1
2005 AR	10.0	5.9	4.0	2.6	2.2	1.7	decreasing to 0.8

The 2005 AR takes into account the effect of indigenization in the near term and declines in fertility in the long term.

#### **6.1.4. Morbidity (incidence of disability)**

The incidence of disability claims depends on the definition of disability and the application of the definition. In the 2005 AR, future disability claims are projected using a table of rates of entry into disability. Given the low incidence of disability and the limited disability experience of the PASI (at 31 December 2005 there were a total of 572 natural disability pensions), it is not possible to produce a reliable table of rates of entry into disability for the PASI.

Projections of numbers and average amounts of new disability claims could be made by developing formulas to estimate them as proportions of new retirement pensioners and pension amounts.

#### **6.1.5. Retirement rates**

Retirement rates by age and sex are assumed for 2006 with gradual increases until 2025 after which they remain constant. All persons are assumed to have retired by age 65.

<sup>5</sup> It would be desirable if the 2005 AR PASI MAIN RESULTS were in an appendix to the 2005 AR.

**Table 7. Retirement rates  
(per cent of contributors retiring at age)**

Age	Males 2006	Males 2025	Females 2006	Females 2025
45	0.5	0.5	1	1
46	0.5	0.8	1	1
47	0.5	1.0	1	1
48	0.5	1.3	1	2
49	0.5	1.5	1	3
50	0.5	1.8	2	5
51	0.5	2.0	2	6
52	0.5	2.3	2	7
53	0.5	2.5	2	8
54	0.5	2.8	2	9
55	1.0	3.0	9	20
56	1.0	3.3	-	-
57	1.0	3.5	-	-
58	1.0	3.8	-	-
59	1.0	4.0	-	-
60	20.0	35.0	-	-

The increase in the probability of retirement over the period 2005 to 2025 will result in increasing numbers of early retirement pensions (retirements of males before age 60 and females before age 55).

End of service lump sum benefits are paid in the event of retirement without the right to a pension. Females can receive the Family Affairs Benefit.

## 6.2. Economic assumptions

### 6.2.1. Real GDP growth

From the International Monetary Fund, World Economic Outlook Database, October 2007, GDP growth in Oman has been the following:

**Table 8. GDP at constant prices (annual percentage change)**

2000	2001	2002	2003	2004	2005 est
5.5	7.5	2.6	2.0	5.4	5.8

In the long run, the annual real rate of productivity growth (which determines the real rate of wage inflation) can be derived from real gross domestic product (GDP) and employment growth, where:

$$\text{real productivity growth} = [(1 + \text{real GDP growth}) / (1 + \text{employment growth})] - 1.$$

Statistics on employment growth of Omanis and the share of GDP growth attributable to the output of Omanis are either unavailable or not measured, hence the real productivity growth of persons covered by the PASI cannot be measured in this manner.

### 6.2.2. Salary scale

The salary scale shows the assumed evolution by age of the salary of an individual over their career. The salary scale reflects productivity increases – increasing work experience, promotions, merit increments, etc. by age. The assumed salary scale set out in Table 3.40.1 is relatively flat which it is understood reflects the current situation in the private sector in Oman.



### 6.2.3. Interest rate

From the 2005 AR (Table 2.22.1 and Appendix D), rates of return on investments are shown below. The calculated rates of return are  $2I/(A+B-I)$  where I is investment income and A and B are PASI invested assets at the beginning and end of the year respectively.

Table 9. Rates of return on investments

	2002 (%)	2003 (%)	2004 (%)	2005 (%)
Excluding unrealized gains/losses	3.4	3.3	3.5	4.4
Including unrealized gains/losses	5.0	14.5	9.9	18.2

From paragraph 3.43, after deducting investment expenses, a nominal net rate of return on investments of 6 per cent is assumed throughout the projection period.

The assumed real net rate of return (nominal net rate less CPI – see below) is then 6 per cent in 2006, decreasing to 4 per cent after 20 years, and constant at 4 per cent thereafter.

There seems to be little point in assuming an interest rate to be paid on a deficit which is projected to occur in 85 years, and which in any event is not likely to be allowed to occur (paragraph 3.46).

#### 6.2.4. Inflation

According to the International Monetary Fund (World Economic Outlook Database, October 2007), the rates of increase in consumer prices in Oman have been as follows:

Table 10. Consumer price increases (average, annual percentages)

2000 (%)	2001 (%)	2002 (%)	2003 (%)	2004 (%)	2005 est (%)
-1.2	-0.8	-0.3	0.2	0.7	1.9

A rate of consumer price inflation is not assumed explicitly (recent past rates have been very low or negative) and there is no automatic increase in pensions in payment. The assumed increases in the minimum pension, the maximum salary, etc in paragraph 3.42 constitute a consumer price inflation assumption (0 in 2006, increasing to 2 per cent after 20 years, and constant at 2 per cent thereafter).

Salaries increase due to overall increases in productivity and consumer prices. From paragraph 3.39, the annual nominal rate of wage inflation is assumed to be 2 per cent in 2006, increasing to 4 per cent after 20 years, and constant at 4 per cent thereafter.

The assumed real rate of annual wage inflation (nominal rate less CPI) is then 2 per cent throughout the projection period.

The relationships between the assumed interest rate, wage inflation and the CPI shown below are consistent with the application of a (partially) funded financial system.

Table 11.

	2006	2007-2026	2027+
Consumer price inflation (CPI)	0	increasing to 2 %	2 % (Para. 3.42)
Wage inflation	2 %	increasing to 4 %	4 % (Para. 3.38)
Net* rate of return	6 %	6 %	6 % (Para. 3.43)
<b>Real rates of:</b>			
Wage inflation	2 % throughout		
Net* return	6 %, decreasing to 4 % in 2026 and thereafter		

\* Net refers to "net of investment expenses".  
See also Appendix B of the 2005 AR.

#### 6.2.5. Density of contributions/Accrual of benefit rights

The 2005 AR is silent on the density of contributions – the proportion of a year during which, on average, contributions are made by and on behalf of a contributor. The density of contributions is less than unity due to periods of unemployment of a contributor and contribution evasion. It is understood that contribution evasion is not a problem.

Periods of non-contribution are implicitly taken into account in the data input file which shows accrued benefit rights. The file contains a record of the number of contributions paid since a contributor joined the scheme (including credit for service before 1 July 1992 when the scheme began).

---

### **6.2.6. Administration expenses**

As a percentage of contribution income, administration expenses were 7.4, 6.5 and 6.1 per cent in 2003, 2004 and 2005 respectively. It may be observed that for a relatively small public social security scheme, these are satisfactory expense levels.

Administration expenses are assumed to be 6.5 per cent of contribution income. Presumably, as the number of contributors (and thus the amount of contributions) increases, economies of scale will permit the PASI to operate efficiently at lower expense ratios.



## 7. Analysis of results

The principal outputs from the model are:

- projected demographic and financial results, including cash flows and the accumulated reserve fund;
- projections of the
  - PAYG contribution (cost) rates, and
  - reserve ratios.

### 7.1. Demographic projections

Table 5.3.1 of the 2005 AR shows an extract of the demographic projections of retirement, disability and survivor pensioners.

Over the 50 years after 2006, the interaction of the demographic assumptions results in the projected population insured by the PASI increasing by nearly six times. While sufficiently reliable mortality and fertility assumptions can be made, assumptions about the pace of expansion of the private sector, and of entry of females into private sector employment and indigenization of private sector employment are less reliable.

Over the same period, the number of retirement and survivor pensioners increase much more rapidly (over 90 times for retirement pensioners and over 37 times for all types of survivor pensioners), as is expected as the PASI scheme matures.

Table 5.3.3 of the 2005 AR shows the total dependency ratio for all pensioners (active insured persons/all pensioners). The results of Tables 5.3.1 and 5.3.3 are shown in Table 12 below. The old-age dependency ratio (active insured persons/old-age pensioners) is also shown in Table 12.

**Table 12: Projected numbers of contributors and pensioners**

Year	Contributors	Pensioners		Dependency Ratio	
		Old-age	Total	Old-age	Total pensioners
2006	109,888	1,658	3,762	66.3	29.2
2010	155,513	2,975	6,126	52.3	25.4
2020	258,873	9,939	17,541	26.0	14.8
2030	372,445	25,711	41,437	14.5	9.0
2040	471,982	61,264	90,817	7.7	5.2
2050	580,422	117,958	167,735	4.9	3.5
2060	680,213	172,037	249,289	4.0	2.7
2070	755,834	222,866	325,393	3.4	2.3
2080	823,492	275,029	391,176	3.0	2.1
2090	892,551	327,565	466,168	2.7	1.9
2100	972,536	369,911	528,708	2.6	1.8

---

Given the normal retirement ages of 60 for males and 55 for females, the old-age dependency ratio indicates the pace of ageing of the insured population. Since the survivors' pension is the full retirement pension and there are provisions for multiple reversions, the total pensioners dependency ratio is an indication of the projected extent of support required from active insured persons.

The 2005 AR provides no demographic projections of the number of end of service and other lump sum benefits (family affairs benefit, funeral grant, death grant, marriage grant). Supplementary material provided by the PASI show projected amounts of these benefits, but not the numbers of them.

## 7.2. Financial system

The financial system refers to the arrangement whereby funds are made available by a social security scheme to pay benefits as they fall due. It does not affect the amounts of benefit payments. Benefits are determined by the legislation and regulations of the scheme and the interaction of demographic and economic factors.

Article 11 of Section Two Chapter Two (The Authority's Financial System) in of the Social Insurance Law states in part:

“Auditing the financial status shall include assessing existing liabilities. If the funds are insufficient, then the Treasury shall settle. This settlement is considered a loan which the Authority shall pay back from any surplus in subsequent years. The expert [*i.e. actuary*] shall explain the reasons behind this insufficiency and approaches to avoid a recurrence.

In case there is a surplus fund, it shall be carried over to a private account to be opened in accordance with the financial systems of the state. This account shall be under the Board of Directors' control, in coordination with the Ministry of Finance in the following cases:

- a. To settle all or some liabilities paid by the general treasury
- b. To form a public or private reserve to be utilized for various purposes.”

The PASI is a partially funded scheme; however, the partially funded financial system which the PASI follows is not precisely set out. A prescribed financial system would, for example, set the desired level(s) of reserves to be maintained and the period(s) over which the level(s) would apply. If an actuarial review (or two successive actuarial reviews) revealed that these conditions were not being met, this would require the scheme to take remedial action so that the conditions of the financial system would be met. This action would normally involve an increase in the contribution rate or a decrease in benefits or a combination of both measures.

The financial projections in the 2002 AR were deemed to have produced unsatisfactory results (depletion of the reserve fund in 2061), and as a result in 2005 the contribution rate was raised to 19 per cent. This desirable measure was based on a subjective analysis of the financial projections, not because the results of the financial projections failed to meet a predetermined financial system benchmark. It can be useful to have such a benchmark(s) which requires action to maintain the sustainability of the scheme.

To illustrate, the Canada Pension Plan financing benchmark is that it must be financed to maintain a steady-state contribution rate. The steady-state contribution rate is defined to be the lowest level contribution rate that results in the projected asset/expenditure ratio (*i.e.* the funding ratio) of the plan being the same in the tenth and sixtieth year following the end of the actuarial review period. The USA Social Security Administration applies another funding rule.

---

Since both the Canadian and USA public pension schemes are relatively mature, funding rules which they apply would be inappropriate for the PASI. However, it would be desirable for the PASI to set out the partially funded financial system it will follow for the pensions branch (the financial system for the employment injury branch has been discussed in Section 5 of the Peer Review). Each actuarial review would then determine whether the benchmarks are being met. In the event they are not, the PASI would be obliged to take remedial measures to meet the requirements of the financial system applied.

It should be emphasized that any partially funded pension scheme will show liabilities (present value of expected benefit and administration payments) exceeding assets (the initial reserve plus the present value of expected future contributions and investment income) until the scheme is fully mature (at which time it will no longer be in a partially funded state). With reference to Article 11, this “insufficiency” does not have to be “settled” by the PASI taking a loan from the Treasury. The guarantee (i.e. a loan) of the Treasury would only be applicable if the PASI were unable to pay current benefit and administration expenditures from its current income and reserves.

### **7.3. Financial projections**

Table 5.3.2 of the 2005 AR contains an extract of cash flow projections on the basis of the current 19 per cent contribution rate which shows that benefit expenditures will exceed contribution income in 2042, benefit and administration expenditures will exceed contribution and investment income in 2077 and that the reserve fund will be exhausted in 2091 (paragraphs 5.5 to 5.7)..

An extract of the financial projections is insufficient for a thorough review of an actuarial valuation. It is necessary that the details of the demographic and financial projections for each year of the projection period be annexed to an actuarial report. The extract in Table 5.3.2 shows a global total for benefits. The projected amount of each benefit should be shown.

Table 13 (Financial Projections) is based on supplementary annual projection data made available by the PASI, The small differences between Table 13 and Table 5.3.2 in the 2005 AR are explained in footnotes to Table 13.

#### **7.3.1. PAYG contribution rate (cost rate)**

Table 5.3.3 of the 2005 AR presents the cost rate, the contribution rate which would be required each year under the PAYG financial system. Under the PAYG system, each year, benefit and administration expenditures are paid from the contribution income of the scheme in the year. The PAYG (cost) rate rises from 4.5 per cent of insured earnings in 2006 to 18.8 per cent in 2040 and to 32.9 per cent in 2100.

Application of a partially funded financial system means that the contribution rate must be increased in the future. Under a partially funded financial system, for a scheme which is not mature, the current contribution rate will always be lower than the PAYG contribution rate at some time in the future. Rather than indicating that “benefit levels are too high for the current contribution rate to be sustained indefinitely” (paragraph 5.9), the development of the PAYG contribution rate indicates that the current contribution rate will have to be increased (or benefits reduced) in the future as is expected under a partially funded financial system.

---

### **7.3.2. Reserve (funding) ratio**

The reserve ratio is the reserve fund at the end of a year divided by the benefit and administration expenditures in the year. It indicates the number of years of outgo at the current annual level of benefit payments and administration expenses which could be paid by the reserve fund alone. The reserve ratios are around 40 until 2020. The ratio falls to 10.2 in 2060, 4.5 in 2080 and 0.6 in 2090.

If a partial funding benchmark(s) is established, it could be related to the reserve ratio which must be maintained at a certain point in the future.

### **7.3.3. Scaled premium financial system**

The scaled premium financial system provides benchmarks for partially funded schemes. Under this system a fixed contribution rate is established for a period of equilibrium (usually 15 or 20 years) so that every year throughout this period contributions and investment income will be sufficient to pay benefits and administration expenses. The excess of contribution and investment income over the funds needed to pay benefit and administration expenses is held in the reserve fund. At no time during the period of equilibrium are reserve funds used to pay benefits. Before the end of a period of equilibrium, a new higher contribution rate is calculated for a subsequent period of equilibrium. From the Financial Projections, under the scaled premium financial system, the period of equilibrium would extend from 2006 to 2076.

### **7.3.4. General average premium (GAP) financial system**

Under the GAP financial system a theoretical constant contribution rate which could be applied indefinitely is calculated by equating the present value of contributions for existing and future insured persons plus the amount of the current reserve, to the present value of future benefits for existing and future insured persons and administration expenses. The GAP financial system indicates the long-term level contribution rate cost of a scheme. It is rarely applied in practice, and is used to compare the costs of different benefit packages or the effect of alternative assumptions. Over the projection period, under the main valuation assumptions, the General Average Premium is 25 per cent of insured earnings.<sup>6</sup>

<sup>6</sup> It may be noted that the 25 per cent GAP contribution rate is lower than the Standard Contribution Rate of 31.2 per cent under the Projected Unit Credit valuation (see Section 7.4). This is principally because the GAP valuation takes into account that there will be a continuous flow of new entrants into the PASI.

Table 13: Financial projections									
Year ending in	Insured earnings (estimated)	Contribution income	Investment income	Total income	Benefits	Administration expenses	Total expenses	Reserve fund	PAYG (cost) contribution rate
2005								343,934	
2006	219,732	41,749	20,636	62,385	7,258	2,714	9,972	396,347	4.5%
2007	249,142	47,337	23,828	71,165	8,238	3,077	11,315	456,197	4.5%
2008	280,574	53,309	27,472	80,781	9,375	3,465	12,840	524,138	4.6%
2009	313,868	59,635	31,610	91,245	10,671	3,876	14,548	600,835	4.6%
2010	348,847	66,281	36,280	102,561	12,332	4,308	16,640	686,756	4.8%
2020	840,111	159,621	121,223	280,844	47,719	10,375	58,094	2,220,801	6.9%
2030	1,781,626	338,509	316,728	655,237	173,489	22,003	195,492	5,684,605	11.0%
2040	3,195,321	607,111	657,529	1,264,640	561,022	39,462	600,484	11,545,788	18.8%
2050	5,562,153	1,056,809	1,070,957	2,127,766	1,331,654	68,693	1,400,347	18,556,406	25.2%
2060	9,803,163	1,862,601	1,518,249	3,380,850	2,449,536	121,069	2,570,605	26,268,497	26.2%
2070	16,493,258	3,133,719	1,974,791	5,108,510	4,240,911	203,692	4,444,602	34,048,378	26.9%
2080	26,684,700	5,070,093	2,068,875	7,138,968	7,505,773	329,556	7,835,329	34,868,032	29.4%
2090	42,351,874	8,046,856	609,310	8,656,166	13,080,212	523,046	13,603,258	7,545,398	32.1%
2100	67,801,363	12,882,259		12,882,259	21,500,126	837,347	22,337,473		32.9%

Insured earnings = estimated contribution income/0.19.

Marriage grants included in benefits; administration expenses at 6.5% of contribution income; investment income recalculated. (Ref. 2005 AR

## 7.4. Replacement rates

The purpose of a pension scheme is to replace members' lost income, and it is of interest to show the extent to which under the legislation a scheme is currently replacing lost income and is projected to do so in the future. A measure of this is the replacement rate, the ratio of the amount of the pension benefit to the amount of insured earnings.

Table 14 draws on Tables 12 and 13 to give a crude indication of projected replacement rates. The replacement rates refer to average earnings of the insured population, not the final five years average earnings on which pensions are based (and to which a maximum pension of 80 per cent of these earnings applies). The estimated replacement rates are overestimated since lump sum benefits are included in total benefits.

			<b>Average</b>	<b>Total</b>			<b>Estimated</b>
<b>Year</b>	<b>Number of contributors</b>	<b>Insured earnings (RO 1000)</b>	<b>annual earnings (RO)</b>	<b>number of pensioners</b>	<b>Total benefits (RO 1000)</b>	<b>Average pension* (RO)</b>	<b>replacement rate</b>
<b>2006</b>	109,888	219,732	2,000	3,762	7,236	1,923	96.2%
<b>2010</b>	155,513	348,847	2,243	6,126	12,306	2,009	89.6%
<b>2020</b>	258,873	840,111	3,245	17,541	47,682	2,718	83.8%
<b>2030</b>	372,445	1,781,626	4,784	41,437	173,434	4,185	87.5%
<b>2040</b>	471,982	3,195,321	6,770	90,817	560,939	6,177	91.2%
<b>2050</b>	580,422	5,562,153	9,583	167,735	1,331,538	7,938	82.8%
<b>2060</b>	680,213	9,803,163	14,412	249,289	2,449,395	9,826	68.2%
<b>2070</b>	755,834	16,493,258	21,821	325,393	4,240,745	13,033	59.7%
<b>2080</b>	823,492	26,684,700	32,404	391,176	7,505,522	19,187	59.2%
<b>2090</b>	892,551	42,351,874	47,450	466,168	13,079,844	28,058	59.1%
<b>2100</b>	972,536	67,801,363	69,716	528,708	21,499,592	40,664	58.3%

\* Average pensions are overestimated since lump sum benefits are included in total benefits.

It is important to note that the replacement rate of over 80 per cent of average earnings gradually decreases to around 60 per cent. The principal reason for this is that annual wage inflation is assumed to increase from 2 per cent in 2006 to 4 per cent in 2027 and thereafter, while the PASI has no provision for adjusting pensions in payment to take into account inflation. (See Pension Increases in Section 8.)

## 7.5. Unfunded liabilities/International Accounting Standards

Paragraph 5.12 refers to Appendix F in the 2005 AR which includes a valuation that meets the International Accounting Standard (IAS) 26 *Accounting and Reporting by Retirement Benefit Plans*.<sup>7</sup> IAS 26 applies to the financial statements of retirement benefit plans which are defined to be arrangements whereby an entity provides benefits for employees on or after termination of service (i.e. employer sponsored occupational pension schemes). Under IAS 26, an accrued benefit actuarial cost method (set out in IAS 19) is to be applied.

<sup>7</sup> See IASB Technical Summary at <http://www.iasb.org/NR/rdonlyres/EBFAD1C0-13A6-43B7-A109-83BA2D4B6380/0/IAS26.pdf>

---

Unlike occupational pension schemes, a public scheme is (1) not subject to termination by its sponsor (the government), and (2) it can anticipate continuous new entrants. Hence, as it is noted in paragraph 5.12 of the 2005 AR, social security schemes such as the PASI do not fall within the definition of retirement benefit plans in IAS 26. In addition, as it is stated in Appendix F, the actuarial methodology prescribed in IAS 26 “is inappropriate for a social insurance plan [such] as the one administered by PASI”. Such a valuation is not required by the International Actuarial Association *Guidelines of Actuarial Practice for Social Security Programs* (2003). Including this valuation (with sensitivity studies of alternative assumptions) which is not required can create confusion among readers of the 2005 AR.

The PASI Notes to the Financial Statements include a number of references to actuarial matters. In 2005, Note 1 (English version) states that the PASI is a funded defined benefit plan. The PASI is not funded in the way employer sponsored occupational defined benefit pension plans are. Like many public social security schemes, the PASI is partially funded.

Under Note 2 (Summary of significant accounting policies), Note 2.1 (Basis of preparation) it is stated “The financial statements are prepared in accordance with International Financial Reporting Standards ... including in particular Accounting Standard 26 ...” This would apply to an employer sponsored occupational scheme, but, as noted above, it is inapplicable to a public social security scheme such as the PASI.

Note 2.5 (Funding policy) states that: “[the] Present value of promised retirement benefits is assessed by an actuarial expert at least one every three years, and if it is found that the Authority’s funds are not sufficient, the Ministry of Finance is obliged to fund the shortage.” This government guarantee highlights the difference between the PASI and an employer sponsored occupational scheme. However, the statement leaves the impression that arrangements to fund the “shortage” must be made at the time it is identified by the actuary (as would happen for an employer sponsored occupational scheme). This is not the case with a public social security scheme. The government guarantees the benefits, but it does not fund any deficit in advance. (The preceding comments also relate to the interpretation of Article 11 of the Social Insurance Law (see paragraph 7.2 in the Peer Review).)

Note 4 to the 2005 Financial Statements deals with the Actuarial Deficit. Using the Projected Unit Credit valuation method, the deficit is RO122,945,000 at 31 December 2002 (the Note incorrectly refers to 2004). The Projected Unit Credit valuation method is to be applied to employer sponsored occupational schemes under IAS 19 to which IAS 26 refers. The Note then summarizes actuarial issues which the PASI Board has dealt with. It is not clear why these actuarial matters appear in the Notes to the PASI accounts. Nor, are the brief one or two sentence summaries of selected results in the actuarial report particularly informative; rather they can only create uncertainty about the financing of the PASI.

## **7.6. Sensitivity tests**

A deterministic model produces a single set of projected results for each year. A stochastic (probability) approach produces a distribution of possible results based on projections which take into account the volatility of model parameters by assigning probability distributions to them. When a deterministic model is applied, sensitivity tests are used to illustrate the effects of alternative assumptions of the parameters.

The 2005 AR is based on the projection of PASI revenues and expenditures over a long period of time. The results presented in the 2005 AR have been derived using best-estimate assumptions regarding future demographic and economic trends. As it is stated in paragraph 5.2, both the length of the projection period and the number of assumptions

---

required mean that actual future experience will not develop precisely in accordance with the best-estimate assumptions.

Individual sensitivity tests are performed that consist of projections of the PASI financial results using alternative assumptions. The 2005 AR includes seven sensitivity tests which illustrate the results of plausible alternative combinations of key assumptions and the relative importance of the assumptions.

Under the main assumptions where the interest rate is 6 per cent, the reserve fund is exhausted in 2091. Scenarios 1 to 4 illustrate the critical importance of the rate of return on investments. Under Scenarios 1 and 2 where the interest rates are 7 and 8 per cent respectively, the reserve fund continues to accumulate throughout the entire projection period (until 2100). Under the 5 per cent assumption in Scenario 3, the reserve fund is exhausted in 2078.

Scenarios 6 and 7 show the important effect of salary scales and rates of wage inflation on scheme cash flows.

It is most unlikely that the PASI will fail to implement reforms necessary to avoid the deficit which is projected to arise in 2091. Consequently, consideration of the effect of this deficit and the rate of interest which would be paid on funds borrowed from the Treasury to cover the deficit is not particularly relevant.

## **7.7. 2005 AR Conclusions, recommendations and future considerations**

Paragraph 7.1 of the 2005 AR states: “The results of the 4th Actuarial Review demonstrate that as at 31/12/2005 the Fund of the Public Authority for Social Insurance is in a very good financial position. This is mainly due to the very successful reform that took place in 2005.”

Indeed, the financial position of the PASI as revealed by the actuarial valuation is very good. This gives the PASI an opportunity to set out the financial system it will follow, in particular the benchmarks which will indicate that measures to maintain the sound financing of the scheme must be taken. (See Section 7.2 of the Peer Review.)



---

## 8. Other actuarial issues

According to the terms of reference of the 2005 AR, the actuary was to "... present different scenarios of different contribution and benefit levels and, in the light of the results, propose specific reforms to modify the scheme and make recommendations". These scenarios deal with the actuarial implications of issues that are among those typically raised from time to time (often outside the actuarial review) by the management and board of a social security scheme.

The following issues are dealt with in Section 6 of the 2005 AR under ten alternative scenarios. Details are in Appendix G of the 2005 AR.

- Contribution rate increase – Scenario 8
- Adjustment to reduction factors – Scenario 9
- Years to average pensionable salary – Scenario 10
- Reduction of the accrual factor – Scenario 11
- Pension increases – Scenarios 12, 13, 14
- Minimum pension amount – Scenario 15
- Early retirement age Increase – Scenario 16
- Assess the sufficiency of the 1 per cent contribution rate to cover work injuries and occupational diseases – Scenario 17.

The following paragraphs contain brief comments on the issues.

### 8.1. Contribution rate increase – Scenario 8

At some point (usually several points) a contribution rate increase is required in a partially funded pension scheme. If the financial system which the PASI was obliged to follow were set out, the need for and the timing and amount of a contribution rate increase would be triggered by the results of an actuarial valuation (see Section 7.2 of Peer Review).

### 8.2. Adjustment to reduction factors – Scenario 9

This important issue is also dealt with in Section 8 of the 2005 AR.

In a public pension scheme which allows members to retire before normal retirement age (subject to certain contribution conditions), the early retirement pension is normally:

- (1) based on the acquired pension rights of the retiring member based on the member's period of contributions at the time of retirement and the member's pensionable earnings at that time, and
- (2) the pension is reduced so that it is "cost neutral" (i.e. the cost to the scheme is the same as if the pension were payable from the normal retirement age).

(1) In the formula in paragraph 8.7, the member's pensionable earnings at the early retirement age are adjusted to take into account the salary scale and wage inflation between the member's early and normal retirement ages. The early retirement pension is thus based on assumed salary increases during the period after early retirement until the member's normal retirement age, a period during which the member pays no contributions and

---

receives the early retirement pension.<sup>8</sup> From an analysis of the male reduction factors which are proposed in the 2005 AR (paragraph 8.8 and Tables 6.6.1 and 8.7.1), this seems to have been the approach to calculating early retirement pension reductions.

Article 27 of the Social Insurance Law which defines pensionable earnings as the insured's average monthly pay based on the insured's insurance contribution over the last five years of the contribution period presumably applies to early retirement. Article 21 which includes provision for reduction factors in the event of early retirement does not mention any alternative definition of pensionable earnings in the event of early retirement.

Unlike a private occupational pension scheme, in a social insurance scheme covering all persons in a sector and which has benefit transfer arrangements with other sectors, no provision for attributing increases to the acquired pension on early withdrawal is necessary.

Applying reduction factors only to the pension rights acquired at early retirement age would produce higher reduction factors than those recommended in Table 6.6.1 of the 2005 AR.

(2) The 2005 AR points out that if the reduction factors are “actuarially neutral”, there are no cost implications for the PASI scheme. Actuarially neutral means that the amount of the early retirement pension payable from the age of early retirement is the actuarial equivalent (present) value of the pension which would be payable at normal retirement age based on the pension rights acquired at the time of early retirement.

Aside from the social and economic implications of early retirement (assuming those who retire early actually withdraw from the labour force), unless cost neutral reduction factors are applied, early retirement has cost implications for the PASI scheme. What this means is that active members of the scheme are subsidizing those who retire early. Application of the current reduction factors is an incentive for members to retire early: the earlier a member retires, the greater the subsidy the member receives from contributors to the PASI (see paragraph 8.6 of the 2005 AR).

In order to encourage retirement after normal retirement age, pension increments could be introduced.

Contrary to the generosity of the early retirement reduction factors, the present commutation factor (RO10 per RO1 of pension) is very disadvantageous for retiring members. Retiring members (at least those who are aware of this situation) are thereby discouraged from commuting (up to one-quarter of) their pensions, thus resulting in adequate periodic pension payments (see Section 9 of the 2005 AR).

### 8.3. Years to average pensionable salary – Scenario 10

In the last sentence of paragraph 6.8 of the 2005 AR it is noted that “... the risk [of *ad hoc* salary increases during the averaging period] can only be eliminated if the calculation of the members' pensions is based on the average of the salary during the members working lifetime, indexed to the time of retirement”.

<sup>8</sup> From the formula  $(1 - f_x) a_x s_x = l_{60}/l_x v^{(60-x)} a_{60} s_{60}$ , the portion of the early retirement pension received is  $(1 - f_x) = (l_{60-x}/l_x)(s_{60}/s_x) / a_x$ , i.e. the present value of an annuity at early retirement age  $x$  with payments deferred to age 60 times the ratio of pensionable earnings at age 60 to pensionable earnings at age  $x$  divided by the present value of a life annuity payable from age  $x$ . If pensionable salary increases after the early retirement age are not taken into account, then  $s_{60} = s_x$ .

---

This “career average indexed earnings” system is also a fairer system of determining pensionable salary. The annual index applied to earnings on which PASI contributions were made could be the average earnings of contributors in the current year divided by average earnings of contributors in the previous year.

#### **8.4. Pension increases – Scenarios 12, 13, 14**

Section 7.4 of this Peer Review illustrates the declining replacement rate of the PASI. Increases in pensions in payment in order to maintain their purchasing power has not been an issue for the PASI since consumer price inflation has been negligible from the inception of the scheme to 2005.

A change in the consumer price inflation environment in Oman will oblige the PASI to adjust pensions in payment to maintain their purchasing power. The PASI can take the initiative to introduce inflation adjustments to pensions, or eventually do so in response to pressure from pensioners.

The inflation adjustments could be ad hoc on the occasion of each triennial actuarial review, or automatic each year based on the consumer price index calculated by the Ministry of National Economy. Relatively high rates of inflation require automatic adjustments.

In some schemes, inflation adjustments to pensions in payment take into account productivity increases (i.e. wage inflation), and not just consumer price inflation.

Consumer price inflation is normally accompanied by wage inflation thereby resulting in higher contributions, albeit possibly with a lag. Whether introducing inflation adjustment for pensions in payment would require an increase in the contribution rate should be ascertained with reference to the financial system applied by the PASI (see Section 7.2 of the Peer Review).

#### **8.5. Minimum pension amount – Scenario 15**

The minimum pension amount could be adjusted in the same manner as pensions in payment, thereby reducing pressure for it to be increased.

#### **8.6. Early retirement age increase – Scenario 16**

Clearly, increases in early retirement ages are desirable. This measure would also reduce the inequity resulting from the generous reduction factors.

It may also be borne in mind that in the future, for national economic and social reasons, and to ensure the financing of the PASI, it is likely that the current normal retirement ages will be increased. This has been the experience elsewhere in countries where labour forces are not expected to increase and the public pension schemes are mature (see paragraph 7.6 in the 2005 AR).

---

**8.7. Sufficiency of the 1 per cent contribution rate to cover work injuries and occupational diseases – Scenario 17**

The financing of employment injury benefits is discussed in Section 5 of this Peer Review.

---

## 9. Communication of results

The 2005 AR is a very thorough and informative document. It includes much detail, and useful tables and charts. It is understood that an Executive Summary is available.

The 2005 AR includes the following Sections:

1. Introduction
  2. Analysis of experience
  3. Model assumptions and other specifications
  4. Model methodology
  5. Main results and sensitivity testing (with sensitivity test details in Appendix G)
  6. Alternative scenarios (with details in Appendix G)
  7. Conclusions, recommendations and future considerations
  8. Early retirement pensions and reduction factors
  9. Commutation factors
- Appendices A to G

It is not known whether the 2005 AR is available to members of the PASI. In any event, it is a complicated document which would not be accessible to many of the members. The 2005 AR shows a very favourable picture regarding the financing of the PASI, and it would be useful if members were aware of this. A pamphlet could be produced summarizing the main results of the 2005 AR for distribution to all members of the PASI. This would also provide a better explanation of the financial situation of the PASI than is found in Note 4 to the Financial Statements (see Section 7.4 of the Peer Review).

It is important to emphasize that the results of the actuarial review's projections are not predictions. They present the outcomes if all of the assumptions were to come true in the future. The uncertainty inevitably involved in the estimates must be understood.



---

## 10. Conclusions of the peer review

The findings of the Peer Review indicate that the 2005 AR was competently prepared, the assumptions used in the Report are reasonable, and as a result the conclusion that the PASI is in a sound financial position is well supported. The 2005 AR meets current professional standards of actuarial practice and uses data and methodologies that are appropriate and reasonable. The Board of the PASI and PASI scheme members can have confidence in the results of the 2005 AR and the conclusions about the long-term financial status of the PASI.

This Peer Review contains a number of recommendations and observations which may be taken into account in the preparation of future actuarial reports, in particular:

- Establishing and operating a financial system which takes into account the characteristics of work injuries and occupational diseases benefits (Section 5).
- Setting out a financial system for PASI retirement, disability and survivors' benefits with appropriate benchmarks (Section 7.2).
- For each year of the entire projection period, the demographic and financial projections for each benefit should be annexed to the actuarial report. (Sections 7.2 and 7.3).

Suggestions for additional information in the Financial Statements (Section 3 and the Annex), and references to remarks in the Financial Statements on unfunded liabilities and the application International Accounting Standards (Section 7.4) are made.

In Section 8 of the Peer Review, supplementary remarks are provided on several alternative scenarios in Section 6 of the 2005 AR, notably adjustments to reduction factors, (cost of living) pension increases and an increase in the early retirement age.

The Peer Review suggests that the possibility of constructing a mortality table for social security schemes in GCC countries be explored (Section 6.1).





---

**Annex            Benefits for which amounts should be  
                     recorded in the Notes to Financial  
                     Statements describing benefit payments**

**Pensions branch (1)**

**Pensions**

Old-age pension  
Disability 1 pension  
Survivors 1 pension

**Lump sums**

End of service  
Family affairs benefit  
Marriage grant  
Death grant  
Funeral grant

**Work injuries and occupational diseases branch (2)**

**Daily allowance**

**Pensions**

Disability 2 pension: Total disability  
  Partial disability  
Survivors 2 pension

**Lump sums**

Disability lump sum (for disability less than 30 per cent)  
Daily allowance  
Death grant  
Funeral grant

Although they are not benefit payments, transfers to other pension funds should also be noted.

If disability and survivors pensions can give rise to lump sum payments, these should be noted for each benefit branch.