

ACTUARIAL REPORT

as at

31 March 1997

Pension Plan

for the

Canadian Forces

1 April 1998

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Office of the Superintendent
of Financial Institutions Canada

Bureau du surintendant
des institutions financières Canada

255 Albert Street
Ottawa, Canada
K1A 0H2

255, rue Albert
Ottawa, Canada
K1A 0H2

23 January 1998

The Honourable Marcel Massé, P.C., M.P.
President of the Treasury Board
Ottawa, Canada
K1A 0R5

Dear Minister:

Pursuant to section 6 of the *Public Pensions Reporting Act*, I am pleased to submit my report on the actuarial review as at 31 March 1997 of the pension plan established under the *Canadian Forces Superannuation Act*.

Yours sincerely,

Bernard Dussault, B.Sc., F.S.A., F.C.I.A.
Chief Actuary
Public Insurance and Pension Programs

Canada

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I- Overview

The financial soundness of the pension plan established under the *Canadian Forces Superannuation Act* (CFSA) rests on the balance in the CFS Account which forms part of the public debt of Canada. The plan is not funded through investments in marketable securities. Instead, the plan's assets are borrowed by the government.

A- Raison d'être of this Actuarial Report

This actuarial review of the pension plan established under the CFSA was made as at 31 March 1997 pursuant to the *Public Pensions Reporting Act* (PPRA). The previous review was made as at 31 December 1993. This report is thus the first to be based on fiscal years rather than calendar years. The date of the next periodic review contemplated by the PPRA is 31 March 2000.

In accordance with accepted actuarial practice, the main purpose of this actuarial report is to show realistic estimates of:

- the balance sheet of the pension plan as at the valuation date, i.e. its assets, liabilities and surplus or deficit as at that date;
- the annual amount required to amortize over a period of years any surplus or deficit revealed as at the valuation date; and
- the projected cost of the plan for each of the next three plan years¹ following the valuation date.

B- Main Findings

The main findings of this actuarial review are the following:

1. As at 31 March 1997, the plan had a surplus of \$11.6 billion resulting from the difference between the assets of \$39.9 billion and the liabilities of \$28.3 billion.
2. The statutes governing the operation of the plan do not address the disposition of a surplus. However, if the \$11.6 billion surplus were amortized as a deficit would be, then the contributions to the plan would be reduced by \$1,363.6 million in each of the next 15 years. This annual reduction corresponds to 52% of pensionable payroll for the 1998 plan year.
3. The normal cost of the plan for the 1998 plan year is 21.28% of pensionable payroll, that is \$554.4 million, and is estimated to increase to 22.12% and 22.95% of pensionable payroll for the following two plan years, respectively. This gradual increase in costs mainly reflects a partial transition from current to ultimate economic assumptions. The rate of 21.28% for plan year 1998 closely corresponds to the projection of the previous report.

¹ Any reference to a given *plan year* in this report should be taken as the 12-month period ending 31 March of the given year.

C- Developments Since the Previous Report's Date

Although demographic and short-term economic assumptions on which this report is based have changed from those of the previous report, the key long-term economic assumptions have not changed, i.e. a new money interest rate of 6%, and annual rates of increases in the Consumer Price Index (CPI) and in average employment earnings of 3% and 4%, respectively.

The developments described below have in aggregate a non-material effect on the valuation results.

During the interim actuarial valuation period the Government has reduced the size of the regular force from about 76,500 as of 31 December 1993 to about 63,900 as of 31 March 1997, which is less than the objective of 66,700 set at the inception of the Force Reduction Program (FRP). The effect of this surpassed objective on the valuation results is not material. It is included in the item "Project population to 31 March 1997" below the title "As at 31 March 1996" in the reconciliation table in section V-D, page 25.

Since the last actuarial review date, certain plan provisions were changed by Bill C-55, which received Royal Assent on 29 September 1992. Bill C-55 amended, as described below, certain Acts relating to pensions, including the CFSA, and also enacted the *Special Retirement Arrangements Act* (SRAA) and the *Pension Benefits Division Act* (PBDA), all of which came into force by the valuation date.

1. *Special Retirement Arrangements Act*

Under this Act a supplementary pension plan known as a Retirement Compensation Arrangement (RCA) was established in respect of the portion of employment earnings that is no longer pensionable under the CFSA (see also item C-3 below). The first actuarial report on the RCA is contemplated as at 31 March 2000, i.e. the same as that contemplated for the next report on the CFSA.

2. *Pension Benefits Division Act*

This Act provides for a division, upon spousal union breakdown, of pension benefits accrued during the cohabitation period. The member's spouse's portion of the accrued benefits is accordingly paid out as a lump sum determined using current market values.

This change, which has no material effect on the valuation results, became effective 30 September 1994.

3. Amendments to the CFSA

This report is based on the plan provisions described in Appendix 1, which are deemed to incorporate the three following changes arising from Bill C-55.

(a) Optional Survivor Benefit

The amending legislation allows pensioners to provide survivor benefits in respect of marriages at age 60 or over. The full cost of the survivor benefit is borne by the pensioner in the form of a reduction in his/her retirement pension as long as the relationship exists. The full amount of retirement pension is restored to the pensioner if and when the spousal union terminates for any reason.

This change, which has no material effect on the valuation results, became effective on 24 March 1994.

(b) Leave Without Pay

Members may now choose not to contribute in respect of leave without pay periods in excess of three months. Moreover, they may elect later on to purchase the pension benefits relating to such periods in the form of elective service.

This change, which has no material effect on the valuation results, became effective 1 December 1995.

(c) Maximum Pensionable Earnings

Under the amended tax-related legislation, the CFSA regulations prescribe the yearly maximum pensionable earnings in respect of service from May 1995 onward. The maximum was \$98,700 in 1997, with scheduled increases for each calendar year thereafter. The effect of this limit on contributions and benefits (survivor benefits are not affected by the limit) is taken into account in this valuation; however, its effect is not material because only a handful of members are actually affected.

II- Data

A- Account

1. Reconciliation of Balances in the CFS Account

(in millions of dollars)				
Account balance as at 31 December 1993				31,412.4
Net cash flow from 1 January 1994 to 1 April 1994				606.7
Plan year	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1995-1997</u>
Public Accounts opening balance	32,019.1	34,553.9	37,122.1	32,019.1
INCOME				
Employee contributions	167.8	152.1	137.9	457.8
Employer contributions	437.2	409.8	389.6	1,236.6
Transfers from other pension	4.8	5.4	5.5	15.7
Investment earnings	<u>3,321.5</u>	<u>3,541.8</u>	<u>3,734.0</u>	<u>10,597.3</u>
Subtotal	3,931.3	4,109.1	4,267.0	12,307.4
EXPENDITURES				
Annuities	1,358.4	1,459.4	1,570.6	4,388.4
Pension division	5.0	43.4	36.5	84.9
Returns of contributions	32.0	37.0	34.4	103.4
Transfers to other pension funds	<u>1.1</u>	<u>1.1</u>	<u>0.8</u>	<u>3.0</u>
Subtotal	1,396.5	1,540.9	1,642.3	4,579.7
Public Accounts closing balance	34,553.9	37,122.1	39,746.8	39,746.8
Balance as at 31 March 1997				39,746.8

The above table shows the reconciliation of the CFS Account between the last valuation date and the current valuation date. Since the last valuation, the Account balance has grown by \$8,334.4 million (i.e. a 26.5% increase) to reach \$39,746.8 million as at 31 March 1997. The net growth in the Account balance is largely the result of investment earnings.

2. Rates of Return

The following rates of return on the Account by plan year in the last three plan years were calculated using the foregoing entries. These results differ somewhat from those shown in the actuarial reports as at 31 March 1996 on the Royal Canadian Mounted Police and Public Service pension plans even though the quarterly yields used to compute actual investment earnings are identical for all three plans. The main reasons for this discrepancy are that:

- (a) the uniform quarterly yields are applied only to the opening quarterly balance of the Accounts but not whatsoever to the cash flows during the quarter, and
- (b) the results below were computed assuming a uniform distribution of cash flows during the plan year by imputing to them one half year of interest.

	<u>%</u>
1995	10.50
1996	10.39
1997	10.21

3. Sources of Asset Data

The Account entries shown in item 1 above were taken from the Public Accounts of Canada. In accordance with section 8 of the PPRA, the Office of the Comptroller General of Canada provided a certification of the assets of the plan as at 31 March 1997.

B- Membership

1. Highlights

The individual data in respect of contributors, pensioners and survivors were provided as at 31 March 1996, and are shown in the summaries of membership data in Appendix 3. The methodology used to project these membership data one year to the valuation date of 31 March 1997 is described in section III-E page 9. Following are the highlights of membership data as at 31 March 1996.

(a) Contributors

The main characteristics of the 66,358 contributors as at 31 March 1996 are summarized in the following table:

Type of Contributor	Number	Average		
		Age	Service	Salary
Male Officers	12,938	35.1	14.4	\$51,026
Male Other ranks	46,256	33.3	13.0	\$36,806
Female Officers	1,594	30.9	9.6	\$42,277
Female Other ranks	5,570	32.7	11.8	\$36,025
Grand Total	66,358	33.5	13.1	\$39,644

Tables 3D, 3E, 3F and 3G, pages 61 to 64, show detailed information for each group.

(b) Pensioners and Survivors

As at 31 March 1996, the plan was paying benefits to pensioners and survivors at the following annual rates:

Type of Beneficiary	Number	Average		Annual Benefit (millions)
		Age	Males	
Retirement pensioners ¹	71,803	60.1	97.8%	\$1,321.5
Disability pensioners	4,253	64.5	99.0%	\$41.0
Surviving spouses	16,768	68.1	0.2%	\$132.6
Grand Total	92,824	61.8	80.2%	\$1,495.1

In addition there were 825 surviving child beneficiaries.

Tables 3H, 3I, 3J, 3K and 3L, pages 65 to 69, show more detailed information on the benefits to pensioners and survivors.

¹ Includes 108 former contributors whose pension benefits are deferred to age 60.

2. Validation of Membership Data

The principal validation tests applied to the valuation input data were as follows:

- reconciling the membership data with the data used in the previous valuation report (see tables 3A, 3B and 3C of Appendix 3, pages 58 to 60);
- comparing the membership with that published in the Report on the Administration of the CFS Account for the year ending 31 March 1996;
- checking that the salary of a contributor is within a certain range reasonably consistent with the salary of that contributor in the previous valuation report;
- verifying that the pensionable service of a contributor is reasonably consistent with the attained age; and
- comparing the initial pension of each contributor retiring during the January 1994 to March 1996 period with the expected pension based on the 31 December 1993 valuation data, taking into account any changes arising from service after 31 December 1993.

Based on the omissions and discrepancies identified by these and other tests, appropriate adjustments were made to the basic data after consulting with the Department of National Defence who provided them.

3. Sources of Membership Data

The Department of National Defence provided relevant valuation input data on contributors, pensioners and survivors. The co-operation and able assistance received from various sections of the Department of National Defence in this respect deserve to be acknowledged.

III- Methodology

A- Assets

The assets of the plan consist essentially of the recorded balance in the CFS Account, which forms part of the Public Accounts of Canada. These assets are shown at the book value of the underlying notional bond portfolio described in Appendix 1. For consistency, the normal costs and liabilities are determined using the projected yields on the Account, described in section D below, that fully reflect the earning power of the Account. If a market value approach had been taken, the resulting higher asset value would be largely offset by the higher liabilities attributable to discounting at the appropriate market new money interest rates, which were lower than the yields projected for this valuation.

The only other plan asset consists of the present value, discounted in accordance with the projected yields, of all future member contributions and government credits (see section IV-G-8) in respect of prior service elections.

B- Normal Costs

The projected accrued benefit actuarial cost method (also known as the projected unit credit method) was used to compute normal costs. Under this method, the normal cost computed in respect of a given year corresponds to the value, discounted in accordance with the projected yields described in section D below, of all future benefits accruing in respect of that year's service. Consistent with this cost method, pensionable earnings are projected up to retirement using the assumed annual increases in average pensionable earnings (including seniority and promotional increases).

C- Liabilities

1. Contributors

Consistent with the projected accrued benefit actuarial cost method employed to estimate normal costs, the plan's liabilities in respect of contributors as at the valuation date correspond to the value, discounted in accordance with the projected yields described in section D below, of all future benefits having accrued as at that date in respect of all previous years' service.

2. Pensioners and Survivors

Consistent with accepted actuarial practice and standards, the plan's liabilities as at the valuation date in respect of pensioners (including deferred annuitants) and survivors correspond to the value, discounted in accordance with the projected yields, described in section D below, of all outstanding future benefits to which these individuals are entitled.

D- Projected Yields

The projected yields (shown in section IV-C page 12) used in computing the present value of benefits involved in estimating the normal costs and liabilities mentioned in sections B and C above are the projected annual yields on the book value of the combined Superannuation Accounts of the pension plans established under the *Public Service, Canadian Forces, and Royal Canadian Mounted Police Superannuation Acts*. The yields were determined using the open-group approach, meaning that all expected future contributions to the plan were taken into account in projecting the annual yields on the Account.

The open-group approach was adopted in accordance with the plan provision, common to the three above-mentioned plans, stipulating that the average yield on the combined accounts is to be used in allocating aggregate investment earnings to each of the three accounts.

The projected yields were determined by an iterative process involving the actual investment earnings on the combined existing assets of the three accounts as at the valuation date, the assumed future new money interest rates (also shown in section IV-C page 12), and all future contributions as well as all future expected benefits payable in respect of all pension entitlements accruing both before and after the valuation date.

E- Membership Data

Contrary to previous valuations, the individual valuation data were not grouped by age and sex for purposes of this valuation. This newly adopted seriatim approach has no material effect on this valuation.

The data on members referred to in section II-B page 6 were provided as at 31 March 1996, which is one year earlier than the valuation date of this report. Normally, these data would be projected to the 31 March 1997 valuation date using the demographic assumptions of this valuation and the actual economic experience (1.6% indexation increase for pensioners and general earnings increases of 2.2% for Other Ranks and no increase for Officers) for the relevant one-year projection period.

However, additional data information was received from the Department of National Defence on the membership changes during the 31 March 1996 to 31 March 1997 period showing, among other changes, a reduction of approximately 1,600 Officers. From the submitted information, new termination rates were developed in order to obtain a projected in force membership as at 31 March 1997 as closely in line as possible with the membership distribution reported in the upcoming 1997 administrative report.

IV- Assumptions

A- Key Economic Assumptions

The following key economic assumptions are required for valuation purposes in respect of each year following the valuation date:

- average new money interest rate applicable to long-term (at least 20 years to maturity) Government of Canada bonds purchased during the year;
- increase in the CPI;
- increase in the Industrial Aggregate of Average Weekly Earnings; and
- increase in contributors' average annual employment earnings (exclusive of seniority and promotional increases).

These assumptions were made by analysing past experience (i.e. over the last 10, 25, and 50 years), current experience and expectations for the future. Three main conclusions were reached as a result of these analyses:

1. High current real rates of return (i.e. the excess of new money interest rates over annual increases in the CPI) on long-term Government of Canada bonds are expected to return eventually to 3% per annum.
2. Low current increases in the CPI will rise gradually to eventually reach an ultimate level of 3% per annum.
3. Low current real increases in average earnings (i.e. the excess of increases in average annual employment earnings over CPI increases) will rise gradually to eventually reach an ultimate level of 1% per annum. The assumed increase in contributors' average annual employment earnings would normally, for any year, be the same as the assumed increase in the Industrial Aggregate of Average Weekly Earnings.

These conclusions are the same as those underlying the ultimate values assumed for the previous valuation. The rationale is as follows:

1. The assumed ultimate real rate of return on long-term Government of Canada bonds at 3% per annum appears reasonable considering the average experience of the last 25 years and the expected impact on the Canadian economy of free trade, international competition and the size of the public debt.
2. The assumed ultimate level of inflation at 3% per annum, with the prospects of stable moderate inflation from now on, seems appropriate. Considering the normal fluctuations in the financial and labour markets, inflation is not expected to remain at the historically low rates experienced over the last five years (average of 1.6% per annum was the lowest in three decades). However, a return to the high inflation rates of the 1970s and 1980s (average of 6.9% per annum over 20 years) is judged to be unlikely.
3. The assumed ultimate productivity rate (i.e. real increase in average employment earnings) was kept at 1% per annum, which lies about midway between the average Canadian experience of the past 25 years (0.59% per annum) and 50 years (1.50% per annum).

B- Derived Economic Assumptions

The following assumptions were derived from the key economic assumptions:

1. Projected Yields on the Account

These yields are required for the computation of present values of benefits to determine the plan's liabilities and normal costs. The methodology used to determine the projected yields on the Account is described in section III-D page 9.

2. Year's Increase in the Canada Pension Plan (CPP) Year's Maximum Pensionable Earnings (YMPE)

The YMPE is involved in the valuation process because the plan is integrated with the CPP. The assumed increase in the YMPE for a given year was derived, in accordance with the *Canada Pension Plan Act*, to correspond to the increase in the assumed Industrial Aggregate of Average Weekly Earnings over successive 12-month periods ending 30 June.

3. Year's Increase in the Pension Indexing Factor

The year's pension indexing factor is involved in the valuation process by virtue of its role in the pension inflation adjustments. It was derived by applying the indexation formula described in Appendix 1, which relates to assumed CPI increases over successive 12-month periods ending on 30 September.

C- Summary of Key and Derived Economic Assumptions

Plan Year	Interest		Inflation		Employment Earnings		
	New Money Interest (%)	Projected Yield on Account (%)	CPI Increase (%)	Pension Indexing ¹ (%)	Industrial Aggregate Increase ¹ (%)	YMPE Increase ¹ (%)	Average Pensionable Earnings Increase ² (%)
1998	7.2	9.97	2.0	2.0	3.2	2.9	2.4 / 1.5 ³
1999	6.8	9.73	2.2	2.2	3.4	3.1	3.2
2000	6.5	9.47	2.4	2.4	3.6	3.3	3.4
2001	6.2	9.16	2.6	2.6	3.8	3.5	3.6
2002	6.0	8.81	2.8	2.8	4.0	3.7	3.8
2003	6.0	8.41	3.0	3.0	4.0	3.9	4.0
2004	6.0	8.14	3.0	3.0	4.0	4.0	4.0
2005	6.0	7.89	3.0	3.0	4.0	4.0	4.0
2006	6.0	7.65	3.0	3.0	4.0	4.0	4.0
2007	6.0	7.46	3.0	3.0	4.0	4.0	4.0
2008	6.0	7.30	3.0	3.0	4.0	4.0	4.0
2009	6.0	7.13	3.0	3.0	4.0	4.0	4.0
2010	6.0	6.97	3.0	3.0	4.0	4.0	4.0
2011	6.0	6.81	3.0	3.0	4.0	4.0	4.0
2012	6.0	6.57	3.0	3.0	4.0	4.0	4.0
2013	6.0	6.45	3.0	3.0	4.0	4.0	4.0
2014	6.0	6.36	3.0	3.0	4.0	4.0	4.0
2015	6.0	6.28	3.0	3.0	4.0	4.0	4.0
2016	6.0	6.18	3.0	3.0	4.0	4.0	4.0
2017	6.0	6.11	3.0	3.0	4.0	4.0	4.0
2018	6.0	6.07	3.0	3.0	4.0	4.0	4.0
2019	6.0	6.04	3.0	3.0	4.0	4.0	4.0
2020	6.0	6.02	3.0	3.0	4.0	4.0	4.0
2021+	6.0	6.00	3.0	3.0	4.0	4.0	4.0

1 Assumed to be effective as at 1 January.

2 Assumed to be effective as at 1 April and exclusive of the seniority and promotional increases.

3 Salary increases of 2.4% and 1.5% were actually granted to Officers and Other Ranks, respectively.

D- Margin Against Adverse Fluctuations

Actuarial valuations prepared for private employers' pension plans normally include safety margins. This is mainly done to ensure that on plan wind-up there would be, taking into account possible future fluctuations in economic and demographic factors, sufficient funds for the payment of all future benefits accrued as at the wind-up date. Such rationale does not appear to apply to this plan because it is sponsored by the Government of Canada.

However, a secondary objective of a margin consists of ensuring as much as possible that any eventual difference between assets and liabilities will be positive rather than negative, and therefore that any required financing adjustments will be in respect of a surplus rather than a deficit. This objective is deemed to be met implicitly in this valuation through the assumed ultimate real rate of return on investments which, at 3% per annum, most likely errs on the safe side. Consequently no explicit margin is held for valuation purposes.

E- Seniority and Promotional Salary Increases

Promotion means changing to a higher rank, and *seniority* means length of service within a rank level. Both these factors are combined in the development of this assumption.

Pursuant to the federal budget of February 1994, salary increases on account of seniority in respect of government employees were suspended for two years. To account properly for the effect of that suspension on the valuation results and to take into account the actual maximum six-year average pensionable earnings as of the valuation date, the salary scale previously derived only by number of service years is now also by plan year. Pre-1997 plan years' salary increases shown in tables 2A1 and 2A2 of Appendix 2 correspond to the plan's actual experience.

Separate rates were used for Officers and Other Ranks. For plan year 2000 and above, the graduated increases were derived from the 1983-93 experience. These salary increases are lower, on an overall basis, than in the previous report for both Officers and Other Ranks. Increases assumed for 1997, 1998 and 1999 plan years are slightly higher than the ultimate (i.e. 2000 and later) increases thereby providing a transition period between the two years of seniority increases suspension and the lower ultimate increases (tables 2A1 and 2A2, on pages 45 and 46).

F- Demographic Assumptions

Except where otherwise noted, all demographic assumptions were determined from the plan's own experience as was done in the past. Therefore, assumptions of the previous valuation were appropriately updated to reflect the experience of January 1994 to March 1996. As for the previous valuation, demographic assumptions were grouped on a *last* basis, i.e. age and years of service were rounded to the next lower integer.

1. Contributors

(a) New Contributors

To estimate the normal costs shown in the cost certificate (section V-B), assumptions are required regarding the number, age, sex and initial salary rate of future new contributors. For each future year and each group of members, the number of new contributors was assumed equal to the assumed number of all terminations so as to obtain a constant regular force from 31 March 1997 onward.

For Officers and Other Ranks, the assumed age distribution of new contributors was derived separately by sex consistent with that of actual new contributors during the 1996 plan year.

(b) Terminations (withdrawals or retirements), Other than for Disability, with Less than 20 Years of Service

Contributors terminating with less than 10 years of service (withdrawals) are entitled to receive either a return of contributions or a cash termination allowance. Contributors terminating with 10 or more years of service but less than 20 (retirement) are entitled to receive either:

- a return of employee contributions (withdrawals), or
- an immediate reduced annuity offered under *compulsory retirement to promote economy or efficiency* (note 12, page 40).

i) Termination Rates

For the previous valuation, termination rates had been derived separately for Officers, Other Ranks, male and female, with a three-year select period for Other Ranks to take account of the FRP. With the FRP no longer applying, only ultimate rates of termination are used for this valuation.

Furthermore, on the basis of the analysis of the benefits granted under the CFSA, the rates of termination were changed from an age last basis to a service last basis.

Since the FRP has sporadically targeted specific groups of contributors over the last five years and that the experience is now expected to correspond to that prior to the FRP period, the rates of termination for this valuation were developed on the basis of the experience of the 1984 to 1990 period. For each of the male Officers, male Other Ranks, female Officer and Female Other Ranks groups, the crude experience rates were graduated by applying the Whittaker-Henderson method (table 2B, page 47).

ii) Proportions Electing an Immediate Reduced Annuity

The proportions assumed for the previous report were based on the 1984-90 experience for all types of annuity election (e.g. deferred annuity and immediate reduced annuity) which were grouped under the immediate reduced annuity option. For this valuation, the same experience period was retained and the assumed proportions (table 2C, page 48) were derived applying the Whittaker-Henderson graduation method.

Such proportions were derived separately for Officers and Other Ranks. For the reason mentioned in paragraph i) above, this assumption was changed from an age last basis to a service last basis.

(c) Assumed Proportions of Contributors With 10 to 19 Years of Service, Electing an Immediate Reduced Annuity

Contributors terminating with 20 or more years of service are entitled to receive either

- an immediate unreduced annuity, or
- an immediate reduced annuity offered under *retirement for reasons other than compulsory retirement to promote economy or efficiency* (note 12, page 40).

i) Termination Rates

Termination rates were derived separately for Officers and Other Ranks. The three-year calendar select period for Other Ranks set up for the FRP was disregarded for this valuation.

On the basis of the analysis of the benefits granted under the CFSA, the rates of termination were changed from an age last basis to a service last basis. Since the FRP has sporadically targeted specific groups of contributors over the last five years and that the experience is expected to correspond to that prior to FRP period, the rates of termination for this valuation were developed on the basis of the experience of the 1984 to 1990 period.

For both Officers and Other Ranks, the crude experience rates were graduated by applying the Whittaker-Henderson method. Assumed termination rates are shown in table 2D, page 49.

ii) Rate of Reduction in Immediate Annuity

The rates of reduction assumed for the previous report were based on the 1984-90 experience. For this valuation, the same experience period applies but the rates were derived on a service last basis separately for Officers and Other Ranks (table 2E, page 50).

(d) Terminations Due to Disability

Termination rates were derived separately for male Officers, male Other Ranks and females. Even though the 1991-93 experience was approximately 50% higher than the 1990 valuation assumption, the previous valuation assumptions had not been changed because it was deemed to be related to the effect of the downsizing of the Forces' membership, a temporary measure.

However, it is now deemed that following the downsizing of the Forces that occurred over the last five years, the Canadian Forces are no longer in a position to retain personnel unfit for duty. Consequently, rates of termination due to disability are assumed for this report to be higher than those used for the previous report as members becoming unfit for duty would normally be immediately terminated.

Termination rates assumed for the previous valuation were based on the 1984-87 graduated experience but with only 50% statistical credibility being given to that experience in the case of male Officers and all female contributors and 50% credibility to the rates assumed for the previous valuation.

For this valuation, all three groups' rates were graduated using the Whittaker-Henderson method giving 50% credibility to the previous assumption and 50% to the 1991-96 experience (table 2F, page 51).

(e) Mortality Rates and Longevity Improvement Factors

The mortality rates deemed to apply in 1998 were set equal to mortality rates assumed for 1997 in the actuarial report as at 31 March 1996 on the pension plan established under the *Public Service Superannuation Act* (PSSA), reduced to account for one year of improvement in longevity assumed as per that valuation. Distinct rates apply for males and females (table 2G, page 51).

Mortality rates after 1998 were derived from the 1998 rates by assuming for each age constant annual percentage decreases in such rates. Sample longevity improvement factors are shown in table 2K, page 55.

2. Pensioners**(a) Mortality Rates**

In respect of retirement pensioners (i.e. former contributors terminated for reasons other than disability), assumed mortality rates were derived separately for male Officers, male Other Ranks and females. Terminations for reasons other than disability include individuals who are medically unfit to perform their duties and not otherwise advantageously employable in the Canadian Forces (i.e. medically discharged under Q.R. & O. 15.01 Article 3B).

On the basis of the plan's experience, the rates assumed for males in the previous valuation for 1995 were maintained but projected three years to account for longevity improvements from 1995 to 1998. For females, the GAM 1994 Basic Table had been assumed for 1994 in the previous valuation. On the basis of the plan's experience regarding female mortality, the GAM 1994 Static Table is assumed for 1998 in this report as it includes a 7% margin over the Basic Table. See table 2H, page 52, for sample values of the assumed mortality rates.

In respect of disability pensioners (i.e. former contributors terminated by reason of disability under Q.R. & O. 15.01 Article 3A), mortality rates were derived separately by sex, Officers and Other Ranks. The previous valuation assumptions for 1995 were based on the Canada Life Tables for 1985-87 projected five years for longevity improvement. On the basis of the plan's experience, 1998 rates for both female groups are the same as those used for 1995 in the previous valuation, but projected three additional years for longevity improvements.

Rates for male Other Ranks were adjusted by giving 50% credibility to the previous valuation assumption and 50% credibility to the 1994-96 experience. Rates for male Officers were adjusted by giving 65% credibility to the previous valuation assumption and 35% credibility to the 1994-96 experience (table 2I, page 53).

Mortality rates for 1999 and later years were adjusted using the same projection factors as for current contributors.

(b) Miscellaneous

In respect of pensioners, the following assumptions used for current contributors also apply:

- longevity improvement factors;
- proportions married at death;
- average age of spouse at death of contributor;
- number of children at death of contributor; and
- average age of children at death of contributor.

3. Survivors

(a) Mortality Rates

Mortality rates are assumed separately for males and females. For both males and females, the rates used for 1995 in the previous valuation were retained. However, they were projected three years for longevity improvements to 1998 (table 2J, page 54).

Mortality rates after 1998 were projected as described in paragraph 1(e) above for current contributors.

(b) Proportions of Members Married at Death

The proportions assumed separately for males and females in the previous valuation were retained for this valuation. For males, the assumed proportions correspond to the graduated 1984-90 experience of members and pensioners. For females, the assumed proportions are those of the valuation of the pension plan established under the *Royal Canadian Mounted Police Superannuation Act* as at 31 March 1996 (table 2L, page 56).

(c) Average Age of Spouse at Death of Member

The corresponding assumptions are those of the valuation of the pension plan established under the *Royal Canadian Mounted Police Superannuation Act* as at 31 March 1996 (table 2L, page 56).

(d) Number of Children at Death of Member

The corresponding assumptions are those of the valuation of the pension plan established under the PSSA as at 31 December 1989. See table 2M, page 57, for sample assumptions of the number of children at death of the member.

(e) Average Age of Children at Death of Member

The corresponding assumptions are those of the valuation of the pension plan established under the PSSA as at 31 December 1989. See table 2M, page 57, for sample values of the assumed average age of children at death of the member.

(f) Proportions of Students Still Eligible for Allowances

The previous valuation's assumed proportions, which were taken from the actuarial report as at 31 December 1989 on the pension plan established under the PSSA, were replaced by those used in the actuarial report as at 31 March 1996 on the PSSA (table 2N, page 57).

G- Other Assumptions**1. Pension Benefits Division / Optional Survivor Benefit / Leave Without Pay**

Pension benefits divisions have no material effect on the valuation results because the liabilities of the plan are reduced by roughly the amount paid to the credit of the former spouse. Consequently, no future pension benefits divisions were assumed in estimating normal costs and liabilities. However, past pension benefits divisions were fully reflected in liabilities.

Two other provisions, i.e. optional survivor benefit and suspension of membership while on leave without pay, were treated like pension benefits divisions for the same reason.

2. Maximum Age of Contributors

It was assumed that all contributors would leave service before their 60th birthday. With respect to those contributors already at least age 60, it was assumed that retirement would occur immediately after 31 March 1996.

3. Minimum Death Benefit

This valuation does not take into account the minimum death benefit, described on page 43 of Appendix 1, in respect of deaths occurring after retirement. The resulting understatement of accrued liability and normal cost is not material because almost all of the relatively few pensioners who die in the early years of retirement do leave an eligible survivor.

4. CPP Contribution Rates

In accordance with the CPP amending Bill tabled in the House of Commons 25 September 1997, the schedule of CPP contribution rates for employees is assumed herein to rise from 2.8% in 1996 to its ultimate level of 4.95% by the calendar year 2003. The previous schedule of CPP employee contribution rates increased more slowly, taking 12 more years to reach the same level of 4.95%.

5. CPP Offset for Retirement Pensioners

Although the CPP amending Bill of 25 September 1997 incorporates a change to base the CPP benefit on a contributor's last five years of service instead of the current three years, no corresponding change was assumed for the calculation of the CPP offset at age 65 to the CFSA retirement pension. Such a change would require an amendment to the CFSA.

6. CPP Offset for Disability Pensioners

It was assumed that all future disability pensioners would receive an immediate CPP disability pension. The CPP offset status of current disability pensioners under age 65 was in accordance with the valuation data.

7. Maximum Pensionable Earnings

The tax-related limit of \$98,700 prescribed for the 1997 calendar year was assumed to rise very slowly until 1 January 2005, and to rise thereafter in accordance with the assumed increase in the Industrial Aggregate of Average Weekly Earnings, as prescribed under the current legislation. The effect of implementing this limit is reported in section D-14, page 28.

8. Funding of Elected Prior Service

The government credits to the Account in each future year in respect of prior service elections are assumed to be 373% of the corresponding future contributions by the contributors making the elections. This multiple corresponds to that shown for year 2000 at item V-B-2 page 23.

9. Administrative Expenses

To compute the liabilities and normal costs, no provision was made regarding the expenses incurred for the administration of the plan. These expenses, which are not charged against the CFS Account, are borne entirely by the government and are commingled with all other government expenses.

10. Nature of Terminations

It was assumed that terminations without right to a pension, pensionable disabilities and retirements were permanent and that therefore no subsequent re-entry would occur.

V- Results**A- Balance Sheet as at 31 March 1997**

The following balance sheet was prepared using the data described in section II, the methodology described in section III, and the assumptions described in section IV.

<u>Assets</u>	(\$ millions)
Balance in CFS Account	39,746.8
Present value of future contributions and government credits in respect of elected prior service	103.5
Total Assets	39,850.3
<u>Liabilities</u>	
For benefits accrued to, and in respect of, contributors	8,400.5
For benefits payable to, and in respect of:	
• Retirement pensioners	17,830.7
• Disability pensioners	473.7
• Surviving spouses	1,569.8
• Surviving children	6.2
	19,880.4
Total Liabilities	28,280.9
<u>Surplus</u>	11,569.4

B- Cost Certificate

The normal costs, assets and liabilities were computed using the data described in section II, the methodology described in section III, and the assumptions described in section IV. Emerging experience, differing from the corresponding assumptions, will result in gains or losses to be revealed in subsequent reports.

1. Normal Costs

The following normal costs are expressed as a dollar amount, as well as a percentage of the projected pensionable payroll (see F-1 on page 36 in Appendix 1) in each given plan year.

Plan Year	% of Pensionable Payroll	Millions of Dollars
1998	21.28	554.4
1999	22.12	595.2
2000	22.95	637.9
2001	23.74	682.7
2002	24.44	728.7
2003	24.99	774.7
2004	25.47	822.1
2005	25.89	869.8
2006	26.23	917.7
2007	26.51	965.8
2008	26.75	1,014.1
2009	26.96	1,063.2
2015	27.51	1,377.4
2020	27.80	1,727.0
2037	28.80	3,597.9

The annual increase in the normal cost (expressed as a % of pensionable payroll) from 1998 to 2002 reflects mainly the partial transition of all economic assumptions from their current to their ultimate values. The annual increase in the normal cost (expressed as a % of pensionable payroll) from 2003 to 2020 reflects mainly the balance of the transition from the high yields projected for the immediate future (e.g. 9.97% for the 1998 plan year) to the lower ultimate rate of 6% per annum assumed for 2021 and later plan years. The projected normal cost continues to increase beyond 2021 due to the age distribution of contributors, which stabilizes only in 2037, and the assumed declines in mortality.

2. Allocation of Normal Costs

The foregoing normal costs are borne jointly by contributors and the government. Contributors make required contributions in accordance with a prescribed formula (see page 31 of Appendix 1), with the government covering the balance of the normal cost. The following table shows the allocation of the normal cost expressed as a percentage of pensionable payroll, between the government and the contributors, as well as the ratio of the cost borne by the government to that borne by the contributors.

Plan Year	Allocation of Normal Costs		Ratio
	Government	Contributors	
1998	16.06%	5.22%	3.08
1999	17.05%	5.07%	3.36
2000	18.10%	4.85%	3.73
2001	19.18%	4.56%	4.21
2002	20.17%	4.27%	4.72
2003	20.97%	4.02%	5.22
2004	21.58%	3.89%	5.55
2005	22.00%	3.89%	5.66
2006	22.34%	3.89%	5.74
2007	22.62%	3.89%	5.81
2008	22.86%	3.89%	5.88
2009	23.07%	3.89%	5.93
2015	23.64%	3.87%	6.11
2020	23.92%	3.88%	6.16
2037	24.93%	3.87%	6.44

The initial ratio of 3.08 more than doubles before reaching the level of 6.44 in 2037. Most of the increase occurs in the first seven years, mainly because the rate at which contributors make required contributions to the plan decreases as the CPP contribution rate rises rapidly until 2003 to its ultimate level of 4.95% (see item IV-G-4 on page 20). The ratio of 6.44 reached in the 2037 plan year remains essentially stable afterwards.

3. Summary Balance Sheet

The assets of the plan were \$39.9 billion as at 31 March 1997. The total liabilities as at the same date are estimated at \$28.3 billion, leaving a surplus of \$11.6 billion. Amortizing this surplus over 15 years would correspond to an annual amount of \$1,363.6 million (payable monthly and corresponding to 52% of pensionable payroll for the 1998 plan year) which was estimated using the yields described in section III-D and shown in section IV-C.

C- Sensitivity of Normal Costs to Variations in Key Assumptions

The supplementary estimates shown below indicate the degree to which the valuation results shown in the Cost Certificate depend on some of the key assumptions. The differences between the results below and those shown in the Cost Certificate above can also serve as a basis for approximating the effect of other numerical variations in a key assumption, to the extent that such effects are linear.

1. Productivity (real rate of annual increase in average employment earnings)

If the assumed productivity gains were reduced by one percentage point from 1999 onward (e.g. from 1% to 0% ultimately), then the 1998 normal cost would decrease by 1.92% of pensionable payroll (i.e. from 21.28% to 19.36%).

2. Investment Yields

The valuation reflects a deemed investment policy of buying and holding long-term Government of Canada bonds. If the investment portfolio also included a significant equity component, it would be appropriate to project higher rates of return. As a measure of sensitivity, an increment of one percentage point in each of the projected annual yields (e.g. from 6% to 7% ultimately) would decrease the 1998 normal cost by 4.55% of pensionable payroll (i.e. from 21.28% to 16.73%) and the 2037 normal cost by 6.37% of pensionable payroll.

3. Pension Indexing

If the pension indexing assumption were reduced by one percentage point for all years (e.g. from 3% to 2% ultimately), then the 1998 normal cost would decrease by 2.43% of pensionable payroll (i.e. from 21.28% to 18.85%).

4. Mortality

If the mortality rates assumed in each future year were reduced by one-tenth, then the 1998 normal cost would increase by 0.22% of pensionable payroll (from 21.28% to 21.50%).

If the assumed improvements in longevity after the 1998 plan year (see table 2C of Appendix 2) were disregarded, then the 1998 normal cost would decrease by 1.01% of pensionable payroll (from 21.28% to 20.27%).

D- Reconciliation of Results with Previous Report

This section describes the various factors reconciling the surplus and normal cost in this valuation with the corresponding items in the previous valuation. Figures in brackets indicate negative amounts. The main items in this table are explained in the following pages.

	Surplus (\$ millions)	Normal Cost as a % of Pensionable Payroll
As at 31 December 1993	8,151.4	17.79 (for calendar year 1994)
Data corrections	16.1	0.01
Interest on revised surplus	2,020.1	-
Expected normal cost change		2.93
Experience Gains and Losses		
Earnings / YMPE increases	198.8	-
Pension indexation	(37.3)	-
Employee contribution differences	(8.1)	-
Cost / contributions differences	96.3	-
Investment earnings	88.1	-
Annuity payment differences	(72.1)	-
Return of contribution differences	18.1	-
Net transfers to the CFS Account	10.4	-
Prior service payments	25.4	-
PBDA payments	(50.5)	-
Demographic	(64.5)	-
Miscellaneous	(18.4)	0.01
PBDA offset liabilities	80.3	-
Revision of Assumptions		
Demographic	(33.8)	(0.12)
Earnings / YMPE increase	(180.2)	0.28
Pension indexation	174.0	(0.02)
Projected yields	135.2	(0.12)
Promotional salary increases	144.7	(0.50)
Methodology refinements	(45.4)	0.06
As at 31 March 1996	10,648.6	20.32
Project population to 31 March 1997	(104.8)	0.07
Interest on revised surplus	1,066.4	-
Expected normal cost change	-	0.96
PBDA payments	(38.0)	-
Experience gains and losses	(3.3)	-
Miscellaneous	(3.3)	-
Tax-related maximum (RCA)	3.8	(0.07)
As at 31 March 1997	11,569.4	21.28 (for plan year 1998)

Explanations of the Preceding Reconciliation Table**1. Interest on Initial Surplus**

The surplus was increased by \$2,020.1 million as a result of accrued interest payments on the initial surplus as at 31 December 1993. The amount of expected interest for the two years and three months period from 31 December 1993 to 31 March 1996 was computed using the yields projected for the 1993 valuation report. The surplus was further increased by \$1,066.4 million during the projection period from 31 March 1996 to 31 March 1997 using the actual yield on the Account for the corresponding period.

2. Expected Normal Cost Change

The gradual increase in the normal cost of 2.93% of pensionable payroll from 31 December 1993 to 31 March 1996 as under the previous report and of 0.96% from 31 March 1996 to 31 March 1997 as under this report mainly reflects a partial transition from the current to the ultimate economic assumptions.

3. Earnings/YMPE Increases

An increase in surplus of \$198.8 million was mainly the result of the promotional salary increases having been less than anticipated. No gains or losses were experienced pursuant to the salary freeze having applied from 31 December 1993 to 31 March 1996.

4. Pension Indexation

The pension indexation was largely as expected except for the actual 1 January 1996 increase being 1.6% instead of 1.4%. Consequently, the surplus has fallen by \$37.3 million.

5. Cost/Contributions Differences

An increase in the surplus of \$96.3 million resulted from the actual government contributions in the 1994-1996 period having been greater than those corresponding to the government portion of the normal cost shown in the previous report cost certificate. The amount of \$96.3 million includes accumulated interest on that difference.

6. Investment Earnings

During the intervaluation period, interest credited to the CFS Account was in excess of that projected in the previous report. This excess accounted for an increase in surplus of \$88.1 million.

7. Annuity Payment Differences

A decrease of \$72.1 million in the surplus resulted from actual annuity payments in the 1994-1996 period having been greater than those projected for the same period in the previous report.

8. Effect of Introducing the PBDA

Since the PBDA effective date of 30 September 1994, \$50.5 million of related benefits were paid until 31 March 1996 to the members' spouses upon spousal union breakdown and an additional \$38.8 million of related benefits were paid during the 1997 plan year. These payments were offset by a corresponding reduction of \$80.3 million in the plan's liabilities. The net effect is a decrease in surplus of \$8.2 million.

9. Demographic Experience

A decrease of \$64.5 million in surplus resulted from the actual demographic experience being different from that assumed in the previous report. More details on these demographic assumptions having led to a surplus gain or loss are shown in table 1A on page 29.

10. Revision of Economic Assumptions

The assumed annual increases in average employment earnings for some years after 1997 are slightly higher than for the previous valuation. It causes the surplus to decrease by \$180.2 million and the normal cost to increase by 0.28% of pensionable payroll.

The revised assumption for pension indexing is lower than the previous assumption for the first five years of the projection period, which causes the surplus to increase by \$174 million and the normal cost to decrease by 0.02% of pensionable payroll.

The revised projected yields on the Account are slightly greater than those of the previous valuation. The overall effect is an increase of \$135.2 million in surplus and a decrease in the normal cost of 0.12% of pensionable payroll.

11. Methodology Refinements

An overall decrease in surplus of \$45.4 million results from refinements in valuation methodology. Of this \$45.4 million, \$20.6 million results firstly from using, for a specific age-service cell, the exact average pensionable service instead of the completed pensionable years of service plus one half, and secondly from the change in the approach for calculating the CPP average maximum pensionable earnings as the result of moving to a fiscal year basis. A change in methodology in the calculation of the actuarial present value of future contributions and government credits in respect of elected prior service accounts for an additional \$3.3 million. The remainder of \$21.4 million is due to other various other refinements in methodology, of which the seriatim approach accounts for only \$0.1 million.

12. Revision of Demographic Valuation Assumptions

An overall decrease in surplus of \$33.8 million and a decrease in normal cost of 0.12% of pensionable payroll are the result of the changes in demographic assumptions. Table 1B on page 29 shows in more detail those demographic assumptions changes having led to a gain/loss in surplus as well as an increase/decrease in the normal cost expressed as a percentage of pensionable payroll.

13. Population Projection from 31 March 1996 to 31 March 1997

A decrease in surplus of \$104.8 million and a corresponding increase in normal cost of 0.07% of pensionable payroll are the results of the projection of the 31 March 1996 population data to 31 March 1997 using the revised assumed termination rates. The total annual attrition rate assumed for the Officers group for 1997 is about 3%. The average actual annual attrition rate from 31 March 1996 to 31 March 1997 was about 11%. The modified assumed termination rates were accordingly derived with a greater emphasis on retirements than on withdrawals, which led to an increased number of retirement pensioners.

14. Tax-Related Limit on Pensions

Limiting the benefit to the tax-related maximum pensionable earnings of \$98,700 for the calendar year 1997 increased the surplus by \$3.8 million and decreased the normal cost by 0.07% of pensionable payroll.

Details on items 9 and 12 above.**Table 1A**

	Surplus (\$ millions)
Demographic (Experience Gains / Losses)	
Healthy pensioner mortality rates	(6.2)
Disabled pensioner mortality rates	3.0
Spouse mortality rates	15.0
Proportion married at death	2.7
Age difference between spouse	(6.4)
Active mortality	(5.4)
Termination (with less than 20 years of service) rates	118.3
Termination (due to disability) rates	(11.2)
Termination (with 20 or more years of service) rates	(78.4)
Proportion electing a reduced annuity	(94.6)
Percentage reduction in annuity upon retirement	(1.3)
Total	(64.5)

Table 1B

	Surplus (\$ millions)	Normal Cost as a % of Pensionable Payroll
Revision of Demographic Assumptions		
Active mortality	(1.2)	-
Pensioner mortality	(21.3)	-
Disabled mortality	8.4	-
Widow(er) mortality	(1.5)	-
Improvements in longevity	(145.4)	0.14
Termination (with less than 20 years of service) rates	(35.0)	0.02
Termination (with 20 or more years of service) rates	75.4	(0.22)
Termination (due to disability) rates	(21.2)	0.05
Proportion of member married at death	(0.4)	0.01
Age difference of spouse	90.7	(0.05)
Proportion electing reduced annuity	(1.9)	0.01
Percentage reduction in annuity upon retirement	19.4	(0.08)
Percentage in population projection	0.2	-
Child assumptions	-	-
Total	(33.8)	(0.12)

VI- Conclusions

A- Surplus

Considering that the surplus as at 31 March 1997 is very large, whether expressed absolutely (\$11.6 billion) or relatively (41% of liabilities or alternatively 20.87 times the estimated normal cost for the 1998 plan year), and that

- the liabilities computed in respect of all benefits accrued by 31 March 1997 were estimated on an adequate and realistic basis, and
- the normal costs computed for the 1998, 1999 and 2000 plan years make adequate provision for the full funding of benefits projected to accrue during those years,

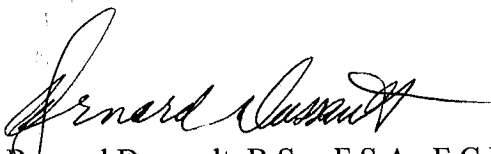
it would be appropriate to address the plan's surplus as soon as possible. However, the statutes governing the operation of the plan are silent on this matter.

B- Actuarial Standards

In my opinion, considering that this report was prepared pursuant to the *Public Pensions Reporting Act*,

- the valuation data on which it is based are sufficient and reliable;
- the assumptions that have been used are, in aggregate, appropriate;
- the methodology employed is appropriate; and
- the value of the plan assets would be greater than the liabilities if the plan were to be wound up at the valuation date.

This report has been prepared, and my opinion given, in accordance with accepted actuarial practice, and particularly with the Canadian Institute of Actuaries' Standard of Practice for Valuation of Pension Plans.



Bernard Dussault, B.Sc., F.S.A., F.C.I.A.
Chief Actuary
Public Insurance and Pension Programs

Ottawa, Canada
30 January 1998

APPENDIX 1

Summary of Plan Provisions

Pensions for members of the Canadian Forces (the *regular force*) were provided under the *Defence Services Pension Act* until the *Defence Services Pension Continuation Act* and the *Canadian Forces Superannuation Act* (CFSA) were enacted in 1959. The current provisions of the pension plan established under the CFSA are summarized in this Appendix. However, the Act shall prevail if there is a discrepancy between it and the summary.

A- Membership

Membership in the plan is compulsory for all active members of the Canadian Forces. It includes the forces known before 1 February 1968 as the regular forces of the Canadian Forces and the forces known before 1 February 1968 as the Royal Canadian Navy, the Canadian Army Active Force, the Permanent Active Militia, the Permanent Militia Corps, the permanent staff of the Militia, the Royal Canadian Air Force (Regular) and the permanent Active Air Force.

B- Assets

The plan is financed through the CFS Account, which forms part of the Public Accounts of Canada. The Account is credited with all contributions made by the members and the government, and charged with all benefit payments when they become due. The Account is also credited with investment earnings as though net cash flows were invested quarterly in 20-year Government of Canada bonds issued at prescribed interest rates and held to maturity. No formal debt instrument is issued to the Account by the government in recognition of the amounts therein.

C- Contributions

1. Contributors

During the first 35 years of pensionable service, contributors make required contributions to the Account equal to 7.5% of pensionable earnings (see note 1 on page 36) minus their contributions to the CPP. Thereafter they contribute 1% of pensionable earnings. Contributors may elect to contribute in respect of a period of prior service, as described in note 3 on page 37.

2. Government

(a) Current Service

The government contributes monthly such amount, which when combined with the required contributions by contributors in respect of current service, is sufficient to cover the cost, as estimated by the President of the Treasury Board, of all future benefits that have accrued in respect of pensionable

service during that month. The government credits averaged 270% of required contributions by contributors from January 1994 to March 1997.

(b) Elected Prior Service

The government credits to the Account in respect of elected prior service are analogous to those already described in respect of current service.

(c) Unfunded Liability

If an unfunded actuarial liability is identified through a triennial statutory actuarial report, the Account is to be credited with such annual amounts that in the opinion of the President of the Treasury Board will fully amortize this deficit over a period not exceeding 15 years.

D- Investment Earnings

1. Interest Rate on New Money

The interest rate on the newly issued notional bonds is the same as that applying to the CPP, i.e. the average rate on outstanding Government of Canada bonds with 20 or more years to maturity.

2. Allocation of Investment Earnings

Investment earnings are credited every three months to the Account on the basis of the actual average yield for the same period on the combined Superannuation Accounts of the Public Service, Canadian Forces, and Royal Canadian Mounted Police pension plans.

E- Summary Description of Benefits

The pension plan established under the CFSA mainly aims at providing an employment earnings-related lifetime retirement pension to the eligible members of the Canadian Forces. The plan also provides benefits to members in case of disability and to their spouses and children in case of death.

Subject to its integration with the pensions paid by the CPP, the initial rate of retirement pension is equal to 2% of the highest average of annual pensionable earnings over any period of six consecutive years multiplied by the number of years of pensionable service not exceeding 35. Once in pay, the pension is indexed annually with the CPI. Such indexation also applies to deferred pensions during the deferral period.

Entitlement to benefits depends on either service in the Force or pensionable service, as defined in notes 2 and 3 on pages 36 and 37. The explanatory notes referred to in this summary description are given in section F of this Appendix.

1. Contributors¹

Type of Termination	Service in the Regular Force <i>(note 2)</i>	Benefit
Retirement because of age <i>(note 6)</i>	3 years or less	Return of contributions <i>(note 7)</i>
	More than 3 but less than 10 years	Return of contributions or cash termination allowance <i>(note 8)</i> , whichever is the greater
	10 years or more	Immediate annuity <i>(note 9)</i>
Retirement on completion of short engagement (an officer contributor other than a subordinate officer who has not reached retirement age and is not serving on an intermediate engagement or for an indefinite period of service) <i>(note 4)</i>	Less than 10 years	Return of contributions <i>(note 7)</i>
	At least 10 but less than 20 years	At option of contributor (1) return of contributions or (2) deferred annuity <i>(note 10)</i>
	20 years or more	See “Retirement for reasons other than those previously mentioned”
Retirement during an indefinite period of service after having completed an intermediate engagement and prior to reaching retirement age, for reasons other than disability or misconduct, or to promote economy or efficiency	Any length	Immediate annuity to which contributor was entitled upon completion of intermediate engagement increased to such extent as prescribed by regulation ² <i>(note 11)</i>
Retirement on completion of intermediate engagement (a contributor who has not reached retirement age and is not serving for an indefinite period of service) <i>(note 5)</i>	20 years or more (by definition in CFS Regulations)	Immediate annuity <i>(note 9)</i>

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- 1 Pursuant to the CFSA, contributors include persons no longer required to contribute to the CFS Account.
 - 2 The CFSA limits the annuity to the immediate annuity to which the contributor would be entitled if retiring because of age or disability, and the formula in the CFS Regulations *(note 11)* always produces less than the maximum.

Type of Termination	Service in the Regular Force <i>(note 2)</i>	Benefit
Compulsory retirement because of disability ¹	Less than 10 years	Return of contributions or cash termination allowance, whichever is greater
	10 years or more	Immediate annuity
Compulsory retirement to promote economy or efficiency	3 years or less	Return of contributions
	More than 3 but less than 10 years	Return of contributions or cash termination allowance, whichever is greater
	At least 10 but less than 20 years	At option of contributor (1) return of contributions; or (2) deferred annuity; or (3) with consent of the Minister of National Defence, an immediate reduced annuity <i>(note 12)</i>
Compulsory retirement because of misconduct, as defined in the CFSA	Less than 10 years	Return of contributions
	10 years or more	Return of contributions or, with consent of Treasury Board, the whole or any part specified by Treasury Board of the annuity to which the contributor would have been entitled at the time of his or her retirement if <i>retired for other reasons</i> <i>(note 13)</i>
Retirement for reasons other than those previously mentioned	Less than 10 years	Return of contributions
	At least 10 but less than 20 years	At option of contributor: return of contributions or deferred annuity
	At least 20 but less than 25 years	Immediate reduced annuity
	25 years or more	Officer contributor - immediate reduced annuity <i>(note 12)</i> ; Other than officer contributor: - immediate annuity <i>(note 9)</i>

2. Benefits in Case of Death of a Contributor

¹ Any condition rendering a member of the regular force mentally or physically unfit to perform his or her duties.

Status at Death	Service in the Regular Force <i>(note 2)</i>	Benefit
Leaving no eligible spouse or children under 25 <i>(notes 14 and 15)</i>	Less than 10 years	Return of contributions or cash termination allowance, whichever is greater
	10 years or more	Five times the annual amount of retirement pension to which the contributor would have been entitled at the date of death
Leaving eligible spouse and/or children under 25	Less than 5 years	Return of contributions or an amount equal to one month's earnings of the deceased contributor for each year of credited pensionable service, whichever is the greater
	5 years or more	Annual allowances <i>(note 16)</i>

3. Benefits in Case of Death of a Pensioner

Status at Death	Benefit
Leaving no eligible spouse or children under 25	Minimum death benefit <i>(note 17)</i>
Leaving eligible spouse and/or children under 25	Annual allowances <i>(note 16)</i>

4. Division of Pension in Case of Spousal Union Breakdown

In accordance with the PBDA, upon the breakdown of a spousal union (including common-law), a lump sum can be transferred by court order from the Superannuation Account to the credit of the former spouse of a contributor or pensioner. The maximum transferable amount (MTA) is half the value, calculated as at the transfer date, of the retirement pension accrued by the contributor or pensioner during the period of cohabitation. If the member's benefits are not vested, the MTA corresponds to half the member's contributions, made during the period subject to division, accumulated with interest at the rate applicable on a refund of contributions. The benefits of the contributor or pensioner are then reduced accordingly.

5. Indexation

(a) Level of Indexation Adjustments

All immediate and deferred annuities (pensions and allowances) are adjusted every January to the extent warranted by, as at 30 September of the previous year, in the 12-month average CPI. If the indicated adjustment is negative, annuities are not decreased for that year; however, the next following adjustment is diminished accordingly.

(b) First Indexation Adjustment

Indexation adjustments accrue from the end of the month in which employment terminates. The first annual adjustment following termination is prorated accordingly.

(c) Commencement of Indexation Payments

The indexed portion of a retirement, disability or survivor pension starts being paid only once the pension is put into pay. However, regarding a retirement pension, the pensioner must be at least 55 years old provided also the sum of age and pensionable service is at least 85; otherwise the retirement pensioner must be at least 60 years old.

F- Explanatory Notes

1. Pensionable Earnings

Pensionable earnings means the salary at the annual rate prescribed by the regulations made pursuant to the *National Defence Act* together with the *allowances* representing medical-dental care costs prescribed by the Canadian Forces Superannuation Regulations to a contributor. Pensionable earnings are subject for tax purposes to a prescribed yearly maximum after April 1995. The maximum was \$98,400 for the 1995 calendar year, \$98,600 for 1996 and \$98,700 for 1997.

Pensionable payroll means the aggregate pensionable earnings of contributors with less than 35 years of pensionable service.

2. Service in the Regular Force

For most purposes of the CFSA, *service in the regular force* means service in the regular force of the Canadian Forces or its predecessors excluding any service for which a contributor was paid a return of contributions or lump sum payment under the CFSA which he or she did not elect to repay on subsequent enrolment.

3. Pensionable Service

Pensionable service includes any period of service in the regular force in respect of which a contributor either made contributions that remain in the Account or elected to contribute. It also includes any period of prior service for which a contributor was paid a return of contributions or lump sum payment under the CFSA which he or she did elect to repay on subsequent enrolment.

4. Short Engagement

Short engagement means a period of service of a member of the regular force as an officer, other than as a subordinate officer, of such duration shorter than an intermediate engagement as is prescribed by regulation. The regulations prescribe a period of at least nine years for a short engagement in respect of commissioned officers.

5. Intermediate Engagement

Intermediate engagement means a period of service of a member of the regular force of such duration as is prescribed by regulation. A period of service of at least 20 years of total continuous service plus any additional time necessary to reach age 40 has been prescribed as an intermediate engagement for all members.

6. Retirement Because of Age

Retirement because of age means ceasing to be a member of the regular force at or after the prescribed retirement age for any reason other than disability, misconduct or death. A retirement age of 55 applies for all members serving under the career programs adopted in 1975.

For those members enrolled prior to the introduction of the 1975 programs and not subject to their provisions, the previous rules for retirement age continue to apply. These rules, effective 1 February 1968, applicable to contributors who enrolled on or after that date, or to those serving on that date who elected to be subject to such rules, are shown below.

	Pre-1975 Retirement Age		
	General Service	Specialist Service	Commissioned from Ranks
Brigadier-General and above	55	60	55
Colonel	55	58	55
Lieutenant-Colonel	51	55	50
Major	47	55	50
Captain and Lieutenant	45	50	50
Others Ranks above Corporal	50		
Corporal and below	44		

For those contributors serving on 1 February 1968 who did not elect to have these rules apply to them, the retirement age is as in the table above but varies slightly by rank and by branch of the Forces.

For those contributors to whom the above rules would normally apply, the regulations also prescribe, for purposes of compulsory retirement under certain conditions or voluntary retirement, that the retirement age will be deemed to have been reached only upon completion of the following periods of full-time paid service in any of Her Majesty's Forces, if the resulting date of retirement is earlier.

	Years of Service
Colonel and above	30
Officers below Colonel	28
Other Ranks above Corporal	30
Corporal and below	25

7. Return of Contributions

Return of contributions means the payment of an amount equal to the accumulated current and prior service contributions paid or transferred by the contributor into the Account. Interest is credited at the rate of 4% per annum each 31 December on the accumulated contributions with interest as at the prior 31 December.

8. Cash Termination Allowance

Cash termination allowance means the payment of an amount equal to one month's employment earnings at the rate authorized to be paid to the contributor at date of termination multiplied by the number of years of pensionable service to the credit of the contributor minus the total reduction in employee contributions to the CFS Account by virtue of the integration of the plan with the CPP.

9. Immediate Annuity

Immediate annuity means an unreduced pension that becomes payable immediately upon a pensionable retirement or a pensionable disability. The annual amount of *basic annuity* is equal to 2% of the highest average of annual pensionable earnings (calculated without reference to the yearly maximum described in note 1) of the contributor over any six¹ consecutive years, multiplied by the number of years of pensionable service not exceeding 35. If such highest six-year earnings average exceeds the yearly maximum prescribed for the calendar year in which service is terminated, then the annual amount is reduced by 2% of the related excess, multiplied by the number of years of pensionable service after April 1995.

¹ If the number of years of pensionable service is less than six, then the average is over the entire period of pensionable service.

When a pensioner attains age 65 or becomes entitled to a disability pension from the CPP, the annual amount of pension is reduced by 0.7% of the indexed CPP annual pensionable earnings¹ (or, if lesser, the indexed six-year average earnings on which the immediate annuity is based), multiplied by the number of years of CPP pensionable service².

Annuities are payable in equal monthly instalments in arrears until the end of the month in which the pensioner dies or when the disability pensioner recovers from disability. Upon the death of the pensioner, either a survivor allowance (note 16) or a minimum death benefit (note 17) may be payable.

10. Deferred Annuity

Deferred annuity means an annuity that normally becomes payable to a retirement pensioner when he/she reaches age 60. The annual payment is determined like that of an immediate annuity (see note 9 above) but is adjusted to reflect the indexation (see paragraph E-5 above) from date of termination to the commencement of annuity payments.

When a contributor entitled to a deferred annuity becomes disabled before reaching age 60, the contributor ceases to be entitled to that deferred annuity and becomes entitled to an immediate annuity.

When a contributor, being entitled while still under age 60 to an immediate annuity in respect of a disability, recovers from that disability, the disability annuity payments are terminated and the contributor becomes entitled to a deferred annuity.

11. Annuity Payable upon Retirement During an Indefinite Period of Service

For a contributor who has not reached retirement age and ceases to be a member of the regular force while on an indefinite period of service after completing an intermediate engagement for any reason other than disability, misconduct, or to promote economy or efficiency, CFS Regulations prescribe an annuity that is equal to the greater of:

-
- 1 *Indexed CPP annual pensionable earnings* means the average of the YMPE, as defined in the CPP, over the last three years of pensionable service, increased by indexation proportionate to that accrued in respect of the immediate annuity.
 - 2 *Years of CPP pensionable service*, means the number of years of pensionable service after 1965 or after attaining age 18, whichever is later, but not exceeding 35.

- (a) an immediate annuity based on the pensionable service to the date of completion of the intermediate engagement only and the highest six-year earnings average at date of retirement, and
- (b) an immediate annuity based upon the total pensionable service to the date of retirement and the highest six-year employment earnings average at that date reduced by 5% of such amount of annuity for each full year by which:
 - in the case of an officer, the age at the date of retirement is less than the retirement age applicable to the contributor's rank; or
 - in the case of a contributor other than an officer, the age at the date of retirement is less than the retirement age applicable to the contributor's rank or the period of service in the regular force is less than 25 years, whichever is the lesser.

12. Immediate Reduced Annuity

Immediate reduced annuity means an immediate annuity for which the annual amount of the annuity as determined in note 9 is reduced as stated below.

With the consent of the Minister of National Defence, a contributor who is required to terminate to promote economy or efficiency and has between 10 and 20 years of service in the regular force may choose an immediate annuity reduced, until attainment of age 65 but not thereafter, by 5% for each full year not exceeding six by which:

- the period of service in the regular force is less than 20 years; or
- the age of the contributor at the time of retirement is less than the retirement age applicable to the contributor's rank,

whichever is the lesser.

A contributor who, not having reached retirement age, ceases to be a member of the regular force for any reason other than disability, misconduct, or to promote economy or efficiency, or while on an indefinite period of service is entitled

- (a) as an officer having served in the regular force for 20 years or more, to an immediate annuity reduced by 5% for each full year by which his or her age at the time of retirement is less than the retirement age applicable to his or her rank, or
- (b) as other than an officer having served in the regular force for 20 years or more but less than 25 years, to an immediate annuity reduced by 5% for each full year by which:

- the period of service in the regular force is less than 25 years, or
- the age at the time of retirement is less than the retirement age applicable to the contributor's rank,

whichever is the lesser.

When a pensioner in receipt of an immediate reduced annuity becomes disabled before reaching age 60, the pensioner ceases to be entitled to that immediate reduced annuity and becomes entitled to an immediate annuity adjusted in accordance with regulations to take into account the amount of any immediate reduced annuity which the pensioner may have received prior to becoming disabled.

13. Compulsory Retirement Because of Misconduct

In the case of *compulsory retirement because of misconduct*, the contributor is entitled to:

- (a) a return of contributions, or
- (b) having served in the regular force for 10 or more years, with the consent of the Treasury Board, the whole or any part specified by the Treasury Board of any annuity to which the contributor would have been entitled if the contributor had *retired for other reasons* (excluding disability, completion of short or intermediate engagement, misconduct and to promote economy or efficiency) at the same date. However, in no case shall the actuarial present value of any reduced benefit (based by Regulation on the Canadian Life Table (1941) and an interest rate of 4%) be less than the return of contributions.

14. Eligible Surviving Spouse

Eligible surviving spouse means the surviving spouse of a contributor or pensioner except if:

- (a) the contributor or pensioner died within one year of marriage unless the Minister of National Defence is satisfied that the contributor's health at the time of the marriage justified an expectation of surviving for at least one year; or
- (b) the pensioner married at age 60 or over, unless after such marriage the pensioner either:

- became a contributor again (in such cases, common-law unions are accepted), or
 - made an optional survivor benefit election within 12 months following marriage to accept a reduced pension so that the new spouse would be eligible for a survivor benefit. This reduction is reversed if and when the new spouse predeceases the pensioner or the spousal union is terminated for reason other than death; or
- (c) the pensioner is a female who retired before 20 December 1975 and did not make an optional survivor benefit election within the one-year period ending 6 May 1995.

15. Eligible Surviving Children

Eligible surviving children includes all children of the contributor or pensioner who are under age 18, and any child of the contributor or pensioner who is age 18 or over but under 25, in full-time attendance at a school or university, having been in such attendance substantially without interruption since he or she reached age 18 or the contributor or pensioner died, whichever occurred later.

16. Annual Allowance for Eligible Survivors

The *basic allowance* is an annuity payable to the eligible surviving spouse of a contributor or a pensioner upon the death of that individual. The amount of the basic allowance is one-half of the annual amount of basic annuity computed as described in note 9 but without regard to the tax-related yearly maximum.

Annual allowance to each eligible child of a deceased contributor or a deceased pensioner means one-fifth of the basic allowance, subject to a reduction if there are more than four eligible children in the same family. The annuity otherwise payable to an eligible child is doubled if the child is an orphan. Allowances are not payable to children of a spouse who is not entitled to an allowance in case of death of a contributor within one year of marriage under circumstances stated previously.

Except as provided by regulation, allowances are not payable to a child who was born, adopted or became a stepchild of a member of the regular force when the member was over 60 years of age, unless he or she became or continued to be a current contributor after attaining 60 years of age.

Annual allowances are not integrated with those of the CPP and are payable in equal monthly instalments in arrears until the end of the month in which the survivor dies or otherwise loses eligibility. If applicable, a minimum benefit (note 17) is payable to the estate upon the death of the last survivor.

17. Minimum Death Benefit

If upon the death of a contributor there is no person to whom an allowance provided under the terms of the CFSA may be paid, or if the persons to whom such allowances may be paid die or cease to be entitled thereto and no other amount may be paid to them, there is paid to the estate of the contributor:

- (a) if the contributor was not a member of the regular force upon or after 20 December 1975, any amount by which the amount of *return of contributions* exceeds the aggregate of all amounts paid to those persons and to the contributor;
- (b) if the contributor was a member of the regular force upon or after 20 December 1975, an amount similar to the above except that the return of contributions is taken as at least equal to five times the basic annuity to which the contributor was or would have been entitled at the time of his or her death;
or
- (c) if the contributor was retired and entitled to an immediate annuity from which a deduction had been made as a result of integration with the CPP, the amount payable in (a) or (b) above cannot be less than the amount by which the cash termination allowance (see note 8 above) exceeds the aggregate of all amounts already paid to those persons and to the contributor.

APPENDIX 2

Sample Demographic Assumptions

Table 2A1

**Assumed Annual Seniority and Promotional Salary Increases
For Officers**

Pensionable Service ¹	Plan Year				Pensionable Service ¹	Plan Year			
	Experienced		Assumed			Experienced		Assumed	
	1991-94 (%)	1995-96 (%)	1997-99 (%)	2000+ (%)		1991-94 (%)	1995-96 (%)	1997-99 (%)	2000+ (%)
0	11.2	4.1	13.4	13.4	20	1.5	0.4	1.5	1.4
1	16.2	4.3	16.7	16.6	21	1.4	0.4	1.4	1.3
2	18.4	8.8	18.2	18.0	22	1.4	0.5	1.3	1.2
3	19.9	14.1	19.9	19.7	23	1.2	0.4	1.2	1.1
4	16.7	15.2	16.7	16.5	24	1.1	0.4	1.2	1.0
5	12.0	12.3	12.5	12.3	25	1.0	0.3	1.0	0.9
6	8.6	7.9	8.8	8.6	26	1.0	0.3	1.0	0.9
7	6.2	4.2	6.3	6.2	27	0.9	0.3	0.9	0.8
8	5.2	2.9	5.2	5.1	28	0.8	0.3	0.8	0.7
9	4.2	2.2	4.2	4.1	29	0.8	0.3	0.8	0.7
10	3.5	1.5	3.7	3.6	30	0.7	0.3	0.7	0.7
11	3.2	1.3	3.5	3.4	31	0.7	0.3	0.8	0.7
12	3.0	1.2	3.2	3.1	32	0.6	0.3	0.8	0.7
13	2.7	1.1	2.8	2.7	33	0.6	0.3	0.6	0.6
14	2.3	1.1	2.4	2.3	34	0.6	0.3	0.6	0.6
15	2.0	1.0	2.1	2.0	35	0.5	0.2	0.6	0.6
16	1.7	0.8	1.7	1.7	36	0.5	0.2	0.6	0.6
17	1.6	0.7	1.7	1.6	37	0.4	0.1	0.5	0.5
18	1.6	0.6	1.6	1.5	38	0.3	0.0	0.4	0.4
19	1.5	0.5	1.6	1.5	39	0.4	0.0	0.3	0.3
					40 and over	0.0	0.0	0.0	0.0

Table 2A2

¹ Expressed in completed years.

**Assumed Annual Seniority and Promotional Salary Increases
For Other Ranks**

Pensionable Service ¹	Plan Year				Pensionable Service ¹	Plan Year			
	Experienced		Assumed			Experienced		Assumed	
	1991-94 (%)	1995-96 (%)	1997-99 (%)	2000+ (%)		1991-94 (%)	1995-96 (%)	1997-99 (%)	2000+ (%)
0	18.7	12.3	19.2	19.2	20	1.0	0.4	1.2	1.2
1	18.0	13.9	19.4	15.8	21	1.0	0.4	1.2	1.2
2	16.9	13.9	18.6	12.7	22	1.0	0.5	1.2	1.2
3	13.9	11.6	13.8	10.0	23	1.0	0.5	1.1	1.1
4	8.5	7.6	10.2	7.8	24	0.9	0.4	1.1	1.1
5	4.0	4.2	7.4	5.9	25	0.9	0.4	1.1	1.1
6	2.0	1.7	5.4	4.4	26	0.8	0.4	1.0	1.0
7	1.4	0.7	3.8	3.2	27	0.8	0.3	1.0	1.0
8	1.0	0.6	2.7	2.3	28	0.8	0.3	1.0	1.0
9	0.7	0.5	1.9	1.7	29	0.7	0.3	1.0	1.0
10	0.6	0.4	1.4	1.3	30	0.7	0.3	1.0	1.0
11	0.6	0.4	1.2	1.0	31	0.7	0.2	0.9	0.9
12	0.6	0.3	1.0	1.0	32	0.6	0.2	0.9	0.9
13	0.7	0.3	1.0	0.9	33	0.6	0.2	0.9	0.9
14	0.8	0.3	1.0	1.0	34	0.7	0.2	0.9	0.9
15	0.8	0.4	1.1	1.1	35	0.6	0.2	0.8	0.8
16	0.8	0.4	1.1	1.1	36	0.6	0.3	0.8	0.8
17	0.9	0.4	1.2	1.2	37	0.5	0.3	0.7	0.7
18	1.0	0.4	1.2	1.2	38	0.0	0.0	0.6	0.6
19	1.0	0.4	1.2	1.2	39	0.0	0.0	0.6	0.5
					40 and over	0.0	0.0	0.0	0.0

Table 2B

¹ Expressed in completed years.

**Assumed Annual Rates of Termination for Contributors
With Less Than 20 Years of Service**

Pensionable Service ¹	Officers		Other Ranks	
	Male	Female	Male	Female
0	0.082	0.094	0.021	0.038
1	0.065	0.074	0.052	0.069
2	0.048	0.060	0.119	0.090
3	0.033	0.049	0.090	0.086
4	0.024	0.049	0.061	0.076
5	0.027	0.060	0.056	0.072
6	0.042	0.076	0.051	0.068
7	0.054	0.086	0.045	0.063
8	0.055	0.086	0.036	0.059
9	0.045	0.076	0.030	0.055
10	0.034	0.061	0.028	0.051
11	0.027	0.049	0.024	0.046
12	0.023	0.039	0.020	0.039
13	0.019	0.033	0.016	0.032
14	0.015	0.027	0.013	0.024
15	0.013	0.023	0.011	0.018
16	0.014	0.020	0.008	0.014
17	0.017	0.018	0.006	0.012
18	0.024	0.017	0.002	0.012
19 and over	n/a	n/a	n/a	n/a

¹ Expressed in completed years.

Table 2C

**Assumed Proportions of Contributors
With 10 to 19 Years of Service,
Electing an Immediate Reduced Annuity**

Pensionable Service ¹	Officers	Other Ranks
8 and under	0.000	0.000
9	0.008	0.014
10	0.026	0.021
11	0.039	0.021
12	0.044	0.021
13	0.049	0.026
14	0.068	0.045
15	0.122	0.087
16	0.224	0.162
17	0.385	0.281
18	0.624	0.490
19	1.000	1.000
20 and over	n/a	n/a

¹ Expressed in completed years.

Table 2D**Assumed Rates of Termination for Contributors
With 20 or More Years of Service**

Pensionable Service ¹	Officers	Other Ranks
18 and under	n/a	n/a
19	0.043	0.057
20	0.056	0.057
21	0.062	0.053
22	0.061	0.058
23	0.058	0.097
24	0.059	0.137
25	0.064	0.132
26	0.076	0.116
27	0.091	0.120
28	0.103	0.138
29	0.111	0.175
30	0.115	0.207
31	0.121	0.226
32	0.146	0.240
33	0.202	0.274
34	0.278	0.342
35	0.338	0.420
36	0.381	0.507
37	0.407	0.604
38 and over	0.417	0.604

1 Expressed in completed years.

Table 2E

**Assumed Reduction Factors Applying to
Immediate Annuities for Retiring Contributors
(With 20 or More Years of Service)**

Pensionable Service ¹	Officers	Other Ranks
18 and under	n/a	n/a
19	0.94	0.88
20	0.94	0.89
21	0.94	0.93
22	0.93	0.94
23	0.93	0.99
24	0.94	1.00
25	0.94	1.00
26	0.98	1.00
27 and over	1.00	1.00

¹ Expressed in completed years.

Table 2F**Sample of Assumed Rates of Termination due to Disability ¹**

Age Last Birthday	Male		Female
	Officers	Other Ranks	Officers / Other Ranks
15	0.0004	0.0117	0.0021
20	0.0032	0.0063	0.0045
25	0.0020	0.0038	0.0045
30	0.0009	0.0027	0.0037
35	0.0006	0.0032	0.0039
40	0.0009	0.0054	0.0053
45	0.0014	0.0086	0.0075
50	0.0035	0.0142	0.0108
55	0.0051	0.0227	0.0156
59	0.0051	0.0313	0.0206

Table 2G**Sample of Assumed Mortality Rates Deemed Applicable in Plan Year 1998
in Respect of Contributors**

Age Last Birthday	Male	Female
15	0.0004	0.0002
20	0.0004	0.0002
25	0.0005	0.0003
30	0.0007	0.0004
35	0.0009	0.0004
40	0.0012	0.0006
45	0.0017	0.0012
50	0.0024	0.0018
55	0.0041	0.0027
59	0.0074	0.0045

¹ Disability is assumed to be permanent with no recovery possible.

Table 2H

**Sample of Assumed Mortality Rates Deemed Applicable in Plan Year 1998
in Respect of Retirement Pensioners**

Age Last Birthday	Male		Female
	Officers	Other Ranks	Officers / Other Ranks
20	0.0004	0.0004	0.0003
25	0.0004	0.0006	0.0003
30	0.0005	0.0009	0.0004
35	0.0007	0.0012	0.0005
40	0.0011	0.0020	0.0007
45	0.0017	0.0025	0.0010
50	0.0030	0.0042	0.0014
55	0.0048	0.0074	0.0024
60	0.0085	0.0120	0.0047
65	0.0142	0.0197	0.0091
70	0.0210	0.0325	0.0144
75	0.0379	0.0504	0.0236
80	0.0644	0.0739	0.0411
85	0.1018	0.1083	0.0708
90	0.1535	0.1615	0.1228
95	0.2260	0.2338	0.1973
100	0.3198	0.3264	0.2939
105	0.4957	0.4957	0.4152
110	1.0000	1.0000	0.4924

Table 2I

**Sample of Assumed Mortality Rates Deemed Applicable in Plan Year 1998
in Respect of Disability Pensioners**

Age Last Birthday	Male		Female	
	Officers	Other Ranks	Officers	Other Ranks
15	0.0008	0.0004	0.0004	0.0005
20	0.0008	0.0004	0.0004	0.0005
25	0.0008	0.0008	0.0004	0.0006
30	0.0008	0.0027	0.0005	0.0007
35	0.0010	0.0047	0.0007	0.0009
40	0.0013	0.0066	0.0010	0.0013
45	0.0034	0.0082	0.0018	0.0023
50	0.0090	0.0098	0.0030	0.0038
55	0.0153	0.0139	0.0048	0.0062
60	0.0212	0.0212	0.0076	0.0097
65	0.0280	0.0316	0.0119	0.0151
70	0.0379	0.0511	0.0189	0.0241
75	0.0554	0.0751	0.0311	0.0395
80	0.0877	0.0981	0.0524	0.0667
85	0.1413	0.1311	0.0910	0.1159
90	0.2210	0.1888	0.1561	0.1986
95	0.3281	0.2749	0.2557	0.3255
100	0.4622	0.3896	0.3686	0.4691
105	0.6280	0.5000	0.9321	1.0000
110	1.0000	0.5000	1.0000	1.0000

Table 2J**Sample of Assumed Mortality Rates Deemed Applicable in Plan Year 1998
in Respect of Survivors**

Age Last Birthday	Male	Female
15	0.0006	0.0001
20	0.0012	0.0002
25	0.0013	0.0003
30	0.0012	0.0004
35	0.0013	0.0005
40	0.0017	0.0006
45	0.0026	0.0010
50	0.0043	0.0017
55	0.0074	0.0035
60	0.0122	0.0057
65	0.0196	0.0094
70	0.0308	0.0140
75	0.0478	0.0232
80	0.0744	0.0403
85	0.1153	0.0658
90	0.1754	0.1088
95	0.2620	0.1829
100	0.3479	0.3067
105	0.7283	0.5169
110	1.0000	1.0000

Table 2K**Sample of Assumed Improvements in Longevity After Plan Year 1998**

Age Last Birthday	Annual Reduction in Plan Year 1998 Assumed Mortality Rates	
	Male	Female
15	0.0215	0.0185
20	0.0215	0.0185
25	0.0125	0.0165
30	0.0075	0.0125
35	0.0075	0.0135
40	0.0105	0.0175
45	0.0155	0.0185
50	0.0205	0.0195
55	0.0215	0.0105
60	0.0185	0.0075
65	0.0165	0.0075
70	0.0175	0.0075
75	0.0165	0.0105
80	0.0125	0.0095
85	0.0095	0.0085
90	0.0065	0.0055
95	0.0045	0.0045
100	0.0035	0.0035
105 and over	0.0000	0.0000

Table 2L

**Sample of Assumed Proportions
of
Members Married at Death
and
Assumed Average Age Difference Between Spouses**

Age ¹ of Deceased Member	Sex of Deceased Member			
	Male		Female	
	Proportion Married at Death	Age Difference Between Spouses ²	Proportion Married at Death	Age Difference Between Spouses ²
20	0.306	0	0.140	1
25	0.610	(1)	0.350	1
30	0.786	(1)	0.480	2
35	0.887	(1)	0.520	2
40	0.923	(1)	0.520	2
45	0.893	(1)	0.520	2
50	0.866	(2)	0.510	3
55	0.846	(2)	0.500	3
60	0.843	(3)	0.470	3
65	0.817	(3)	0.420	2
70	0.775	(3)	0.360	2
75	0.715	(3)	0.290	1
80	0.614	(4)	0.210	1
85	0.406	(4)	0.130	0
90	0.328	(5)	0.070	(2)
95	0.186	(6)	0.030	(4)
100	0.072	(8)	0.010	(6)
105	0.000	(11)	0.000	(4)

1 Expressed in completed years calculated at the beginning of the plan year.

2 Age of widow(er) less age of member, both at the beginning of the plan year.

Table 2M

**Sample of Assumed Average Number and Average Age
of Children at Death of Member or Pensioner**

Age ¹ of Member at Death	Average Number of Children (according to sex of member)		Average Age ¹ of Children (according to sex of member)	
	Male	Female	Male	Female
20	0.072	0.002	0	1
25	0.271	0.438	2	1
30	0.670	0.702	5	5
35	0.925	0.794	8	10
40	1.020	0.726	11	13
45	0.927	0.538	14	16
50	0.665	0.311	16	17
55	0.358	0.129	17	18
60	0.136	0.028	18	19
65	0.036	0.000	19	21
70	0.011	0.000	21	23
75	0.006	0.000	23	n/a
80	0.000	0.000	n/a	n/a

Table 2N

**Assumed Proportions of Children
Remaining Eligible (on account of school attendance) for
Allowances Throughout the Following Year**

Age ¹	Proportion
under 18	1.00
18 to 23	0.80
24 and over	0.00

¹ Expressed in completed years calculated at the beginning of the plan year.

APPENDIX 3

Reconciliation and Summaries of Membership Data

The data for this valuation were supplied by the Department of National Defence. The following tables derived from those data show pertinent statistics concerning contributors, pensioners and survivors during the period from 1 January 1994 to 31 March 1996.

Table 3A

Reconciliation of Contributors

	Male			Female			Total
	Officers	Other Ranks	Total	Officers	Other Ranks	Total	
Contributors as at 31 December 1993	15,475	52,627	68,102	1,828	6,591	8,419	76,521
Data corrections ¹	243	15	258	28	(16)	12	270
New entrants 1994 to 1996 ²	552	3,107	3,659	139	141	280	3,939
Terminations from 1994 to 1996							
Annuity benefits							
Death	(12)	(61)	(73)	-	(1)	(1)	(74)
Disabled	(42)	(390)	(432)	(5)	(59)	(64)	(496)
Other ³	(2,199)	(5,740)	(7,939)	(133)	(568)	(701)	(8,640)
Subtotal	(2,253)	(6,191)	(8,444)	(138)	(628)	(766)	(9,210)
Lump sum benefit							
Death	(5)	(33)	(38)	(2)	(1)	(3)	(41)
Disabled	(28)	(141)	(169)	(10)	(23)	(33)	(202)
Other ³	(1,046)	(3,128)	(4,174)	(251)	(494)	(745)	(4,919)
Subtotal	(1,079)	(3,302)	(4,381)	(263)	(518)	(781)	(5,162)
Total terminations	(3,332)	(9,493)	(12,825)	(401)	(1,146)	(1,547)	(14,372)
Contributors as at 31 March 1996	12,938	46,256	59,194	1,594	5,570	7,164	66,358

- 1 On this line, contributors who had other rank status on 31 December 1993 and who attained officer status at some time during the 1993-96 period are shown as officers rather than other ranks.
- 2 Excludes 755 contributors, entitled to a lump sum, who were released from the Forces during their year of entry.
- 3 Compulsory retirements because of age, promotion of economy or efficiency, misconduct, and all retirements for other reasons.

Table 3B**Reconciliation of Pensioners**

	Male			Female			Total
	Officers	Other Ranks	Total	Officers	Other Ranks	Total	
Retirement Pensioners							
Entitled as at 31 December 1993	14,505	48,965	63,470	313	452	765	64,235
Data corrections	(68)	(196)	(264)	(1)	(1)	(2)	(266)
New entitlements 1994 to 1996	2,199	5,739	7,938	133	568	701	8,640
Terminations 1994 to 1996							
Deaths	(764)	(2,420)	(3,184)	(13)	(5)	(18)	(3,202)
Other ¹	(15)	(37)	(52)	-	-	-	(52)
Subtotal	(779)	(2,457)	(3,236)	(13)	(5)	(18)	(3,254)
Entitled as at 31 March 1996	15,857	52,051	67,908	432	1,014	1,446	69,354
Disability Pensioners							
Entitled as at 31 December 1993	404	6,140	6,544	23	119	142	6,686
Data corrections	2	4	6	2	-	2	8
New entitlements 1994 to 1996	42	390	432	5	59	64	496
Terminations 1994 to 1996							
Deaths	(35)	(446)	(481)	(1)	(3)	(4)	(485)
Other ¹	-	(3)	(3)	-	-	-	(3)
Subtotal	(35)	(449)	(484)	(1)	(3)	(4)	(488)
Entitled as at 31 March 1996	413	6,085	6,498	29	175	204	6,702

¹ Re-enrolments in the regular force and transfers to other superannuation plans.

Table 3C**Reconciliation of Survivors**

	Widows	Widowers	Total	Children under 18	Students (18 to 24)	Total
Entitled as at 31 December 1993	15,272	19	15,291	602	444	1,046
Data corrections	16	-	16	14	(133)	(119)
New entitlements 1994 to 1996	2,487	8	2,495	144	194	338
Terminations 1994 to 1996	(1,034)	-	(1,034)	(246)	(194)	(440)
Entitled as at 31 March 1996	16,741	27	16,768	514	311	825

Table 3D

**Male Officers as at 31 March 1996
Number of Contributors
and
Average Annual Pensionable Earnings**

Age Last Birthday	Completed Years of Service								All Years of Service
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35+	
15-19	278	-	-	-	-	-	-	-	278
	\$11,014	-	-	-	-	-	-	-	\$11,014
20-24	905	372	-	-	-	-	-	-	1,277
	\$15,145	\$32,161	-	-	-	-	-	-	\$20,102
25-29	219	1,412	314	-	-	-	-	-	1,945
	\$32,335	\$43,295	\$45,885	-	-	-	-	-	\$42,479
30-34	71	893	1,597	436	-	-	-	-	2,997
	\$35,318	\$47,651	\$50,715	\$54,512	-	-	-	-	\$49,989
35-39	25	165	682	1,338	335	-	-	-	2,545
	\$43,109	\$51,034	\$55,506	\$57,585	\$60,702	-	-	-	\$56,871
40-44	9	36	102	333	1,006	276	-	-	1,762
	\$45,368	\$53,726	\$60,424	\$63,298	\$62,154	\$64,075	-	-	\$62,313
45-49	4	18	14	47	300	721	269	-	1,373
	\$53,250	\$60,811	\$61,729	\$74,575	\$65,457	\$65,893	\$67,232	-	\$66,211
50-54	4	11	9	24	33	101	444	98	724
	\$63,060	\$65,359	\$61,625	\$76,476	\$74,723	\$70,643	\$69,132	\$71,836	\$70,023
55-59	-	1	-	-	2	2	5	24	34
	-	\$66,324	-	-	\$45,216	\$95,700	\$85,212	\$79,354	\$78,786
60-70	-	-	-	2	1	-	-	-	3
	-	-	-	\$64,176	\$64,176	-	-	-	\$64,176
All Ages	1,515	2,908	2,718	2,180	1,677	1,100	718	122	12,938
	\$18,685	\$43,977	\$51,816	\$58,423	\$62,683	\$65,927	\$68,532	\$73,314	\$51,026

Average age last birthday: 35.1 years

Average completed years of pensionable service: 14.4 years

PBDA Information

Number	Average		Annual Reduction		CPP Reduction	
	Age	Service	Without Indexation	With Indexation	Without Indexation	With Indexation
90	43.4	23.0	\$722,809	\$783,949	\$138,636	\$150,263

Table 3E

Male Other Ranks as at 31 March 1996
Number of Contributors
and
Average Annual Pensionable Earnings

Age Last Birthday	Completed Years of Pensionable Service								All Years of Service
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35+	
15-19	333	-	-	-	-	-	-	-	333
	\$19,955	-	-	-	-	-	-	-	\$19,955
20-24	2,742	1,341	-	-	-	-	-	-	4,083
	\$23,544	\$33,593	-	-	-	-	-	-	\$26,844
25-29	1,215	7,510	1,006	-	-	-	-	-	9,731
	\$27,863	\$34,588	\$36,309	-	-	-	-	-	\$33,926
30-34	297	2,878	8,132	2,592	-	-	-	-	13,899
	\$29,524	\$35,305	\$37,056	\$38,250	-	-	-	-	\$36,755
35-39	53	204	1,786	6,720	1,422	-	-	-	10,185
	\$29,637	\$35,383	\$37,194	\$39,204	\$41,015	-	-	-	\$38,978
40-44	18	24	67	1,069	2,834	600	-	-	4,612
	\$33,089	\$35,389	\$37,303	\$39,253	\$42,247	\$44,771	-	-	\$41,738
45-49	8	6	8	29	253	1,820	523	-	2,647
	\$43,262	\$41,368	\$39,162	\$40,681	\$42,562	\$45,131	\$46,771	-	\$45,128
50-54	-	3	2	3	2	92	565	90	757
	-	\$40,952	\$37,194	\$42,228	\$37,278	\$44,771	\$47,819	\$48,458	\$47,419
55-59	-	-	-	-	-	-	5	4	9
	-	-	-	-	-	-	\$39,773	\$48,972	\$43,861
All Ages	4,666	11,966	11,001	10,413	4,511	2,512	1,093	94	46,256
	\$24,933	\$34,669	\$37,013	\$38,977	\$41,874	\$45,032	\$47,281	\$48,480	\$36,806

Average age last birthday: 33.3 years

Average completed years of pensionable service: 13.0 years

PBDA Information

Number	Average		Annual Reduction		CPP Reduction	
	Age	Service	Without Indexation	With Indexation	Without Indexation	With Indexation
331	38.2	18.3	\$1,314,786	\$1,399,179	\$399,348	\$424,590

Table 3F

**Female Officers as at 31 March 1996
Number of Contributors
and
Average Annual Pensionable Earnings**

Age Last Birthday	Completed Years of Pensionable Service								All Years of Service
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35+	
15-19	88	-	-	-	-	-	-	-	88
	\$10,992	-	-	-	-	-	-	-	\$10,992
20-24	237	78	-	-	-	-	-	-	315
	\$15,224	\$31,938	-	-	-	-	-	-	\$19,363
25-29	44	234	58	-	-	-	-	-	336
	\$30,844	\$43,472	\$45,450	-	-	-	-	-	\$42,160
30-34	10	153	179	24	-	-	-	-	366
	\$35,292	\$49,302	\$50,025	\$50,560	-	-	-	-	\$49,356
35-39	3	24	87	97	19	-	-	-	230
	\$39,484	\$51,068	\$55,861	\$53,966	\$54,234	-	-	-	\$54,213
40-44	-	9	24	49	57	2	-	-	141
	-	\$51,059	\$55,593	\$59,103	\$61,723	\$57,780	-	-	\$59,032
45-49	-	5	6	23	44	20	-	-	98
	-	\$59,280	\$60,606	\$58,567	\$60,329	\$63,609	-	-	\$60,548
50-54	-	-	1	8	3	5	2	1	20
	-	-	\$58,284	\$60,732	\$58,720	\$66,886	\$128,076	\$55,992	\$68,344
All Ages	382	503	355	201	123	27	2	1	1,594
	\$16,764	\$44,112	\$51,286	\$55,607	\$59,994	\$63,784	\$128,076	\$55,992	\$42,277

Average age last birthday: 30.9 years

Average completed years of pensionable service: 9.6 years

Table 3G

**Female Other Ranks as at 31 March 1996
Number of Contributors
and
Average Annual Pensionable Earnings**

Age Last Birthday	Completed Years of Pensionable Service								All Years of Service
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35+	
15-19	14	-	-	-	-	-	-	-	14
	\$19,549	-	-	-	-	-	-	-	\$19,549
20-24	180	209	-	-	-	-	-	-	389
	\$25,725	\$33,396	-	-	-	-	-	-	\$29,846
25-29	82	1,049	138	-	-	-	-	-	1,269
	\$29,834	\$34,249	\$36,016	-	-	-	-	-	\$34,156
30-34	37	466	1,032	308	-	-	-	-	1,843
	\$30,213	\$34,521	\$36,577	\$37,519	-	-	-	-	\$36,087
35-39	12	82	264	935	147	-	-	-	1,440
	\$31,831	\$34,206	\$36,639	\$38,156	\$39,706	-	-	-	\$37,758
40-44	4	14	26	170	261	8	-	-	483
	\$31,941	\$34,100	\$36,717	\$38,165	\$40,775	\$41,513	-	-	\$39,384
45-49	2	2	3	10	38	64	1	-	120
	\$34,074	\$33,132	\$37,724	\$38,364	\$41,778	\$42,785	\$53,916	-	\$41,758
50-54	-	-	-	1	-	4	7	-	12
	-	-	-	\$35,016	-	\$40,620	\$45,941	-	\$43,257
All Ages	331	1,822	1,463	1,424	446	76	8	-	5,570
	\$27,330	\$34,217	\$36,540	\$38,018	\$40,508	\$42,537	\$46,938	-	\$36,025

Average age last birthday: 32.7 years

Average completed years of pensionable service: 11.8 years

PBDA Information

Number	Average		Annual Reduction		CPP Reduction	
	Age	Service	Without Indexation	With Indexation	Without Indexation	With Indexation
3	38.3	25.7	\$10,582	\$11,972	\$3,396	\$3,813

Table 3H**Retirement Pensioners¹ as at 31 March 1996**

Age Last Birthday	Number			Annual Pension ²	
	Male	Female	Total	Without Indexation	With Indexation
25-29	35	13	48	\$303,024	-
30-34	782	204	986	\$7,432,888	-
35-39	1,969	318	2,287	\$27,219,751	-
40-44	3,135	302	3,437	\$54,130,788	-
45-49	6,109	254	6,363	\$115,961,816	-
50-54	8,833	112	8,945	\$177,482,510	-
55-59	11,527	115	11,642	\$44,797,057	\$179,167,205
60-64	12,398	82	12,480	-	\$255,861,344
65-69	9,575	74	9,649	-	\$172,866,995
70-74	8,159	41	8,200	-	\$154,642,845
75-79	5,370	51	5,421	-	\$98,098,314
80-84	1,937	34	1,971	-	\$32,863,832
85-89	323	6	329	-	\$4,735,372
90-94	42	1	43	-	\$499,932
95-99	2	-	2	-	\$17,676
Total	70,196	1,607	71,803	\$427,327,834	\$898,753,516

Average age last birthday: 60.1 years

- 1 2,288 males and 161 females who were medically discharged under Q.R. & O. 15.01 Article 3B, which are cases of former members medically unfit to perform their duties in present trade or employment and not otherwise advantageously employable in the Forces, were included among Retirement Pensioners.
- 2 Amounts of pension take into account the integration of the CFSA with the CPP.

Table 3I

**Retirement Pensioners as at 31 March 1996
Reduction in Annual Pension due to PBDA**

Age Last Birthday	Number			Annual Pension ¹	
	Male	Female	Total	Without Indexation	With Indexation
30-34	8	0	8	\$16,602	-
35-39	33	0	33	\$143,552	-
40-44	65	0	65	\$336,283	-
45-49	154	1	155	\$983,392	-
50-54	124	0	124	\$925,663	-
55-59	126	1	127	\$252,961	\$819,300
60-64	83	0	83	-	\$757,259
65-69	31	0	31	-	\$301,805
70-74	10	0	10	-	\$77,328
75-79	1	0	1	-	\$3,372
Total	635	2	637	\$2,658,452	\$1,959,064

Average age last birthday: 52.0 years

¹ Amounts of pension take into account the integration of the CFSA with the CPP.

Table 3J**Disability Pensioners as at 31 March 1996**

Age Last Birthday	Number			Annual Pension ¹
	Male	Female	Total	With Indexation
30-34	17	3	20	\$122,460
35-39	27	5	32	\$239,652
40-44	33	8	41	\$343,068
45-49	97	8	105	\$776,712
50-54	281	3	284	\$2,217,804
55-59	556	1	557	\$4,725,516
60-64	990	3	993	\$9,040,020
65-69	1,017	7	1,024	\$10,065,168
70-74	757	3	760	\$8,304,540
75-79	358	1	359	\$4,244,316
80-84	70	1	71	\$855,768
85-89	7	-	7	\$62,628
Total	4,210	43	4,253	\$40,997,652

Average age last birthday: 64.5 years

¹ Amounts of pension take into account the integration of the CFSA with the CPP.

Table 3K

**Disability Pensioners as at 31 March 1996
Reduction in Annual Pension due to PBDA**

Age Last Birthday	Number			Annual Pension ¹
	Male	Female	Total	With Indexation
55-59	2	0	2	\$4,032
60-64	3	0	3	\$13,092
65-69	4	0	4	\$19,044
Total	9	0	9	\$36,168

Average age last birthday: 62.6 years

¹ Amounts of pension take into account the integration of the CFSA with the CPP.

Table 3L**Surviving Spouses¹ as at 31 March 1996**

Age Last Birthday	Number	Annual Allowances
		With Indexation
20-24	3	\$23,628
25-29	23	\$72,396
30-34	84	\$318,036
35-39	127	\$688,716
40-44	213	\$1,409,808
45-49	413	\$3,282,624
50-54	724	\$5,943,360
55-59	1,402	\$11,425,320
60-64	2,284	\$17,868,312
65-69	3,065	\$24,979,644
70-74	3,975	\$32,261,304
75-79	2,774	\$22,230,936
80-84	1,261	\$9,331,032
85-89	344	\$2,290,488
90-94	64	\$359,172
95-99	12	\$67,356
Total	16,768	\$132,552,132

Average age last birthday: 68.1 years

¹ 27 of the surviving spouses are widowers.