

Office of the Superintendent  
of Financial Institutions

Bureau du surintendant  
des institutions financières

# **Pension Plan for the Canadian Forces**

## **Actuarial Report** (including cost certificate)

as at 31 December 1990

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Canada

PENSION PLAN  
FOR THE  
CANADIAN FORCES

ACTUARIAL REPORT  
(including Cost Certificate)

AS AT 31 DECEMBER 1990

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29 June 1992

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

Sir:

Pursuant to section 6 of the Public Pensions Reporting Act, I am pleased to provide my valuation report on an actuarial review as at 31 December 1990 of the pension plan established under the Canadian Forces Superannuation Act. The report includes a cost certificate required in accordance with section 5 of the Public Pensions Reporting Act.

Subsection 9(1) of the Public Pensions Reporting Act requires a report, filed with the Minister while Parliament is sitting, to be laid before Parliament within thirty sitting days of its being filed. If Parliament is not then sitting, the Act requires the report to be laid before Parliament on any of the first thirty days thereafter that Parliament is sitting.

Yours sincerely,

Bernard Dussault  
Acting Chief Actuary

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# **PUBLIC PENSIONS REPORTING ACT**

## **Report on the Actuarial Review as at 31 December 1990 of the Pension Plan Established under the Canadian Forces Superannuation Act**

### **I. Introduction**

Pursuant to paragraphs 3(1)(a) and 3(3)(a) of the Public Pensions Reporting Act (PPRA), we have made an actuarial review as at 31 December 1990 of the pension plan established under the Canadian Forces Superannuation Act (CFSA).

The previous review was made as at 31 December 1987. Since that date, the only change to the terms of the plan occurred when Bill C-24 received Royal Assent on 29 June 1989. Bill C-24 repealed the provisions for suspending annuity entitlements of surviving spouses upon remarriage and, upon marriage, of surviving children between the ages of 18 and 25 while in full-time attendance at a school or university. It also provided for the reinstatement of previously suspended annuities on and with effect from 29 June 1989 with the proviso that the surviving spouse repay with interest any lump sum received previously upon suspension of annuity entitlement. In addition, Bill C-24 eliminated the annuity reduction formerly applicable to a surviving spouse more than 20 years younger than the deceased member; moreover, it provided that any previously reduced annuities be restored to their full amounts on and with effect from 29 June 1989. Section X of this report provides a full discussion of the financial impact of Bill C-24.

The Government has announced that the Regular Force size of the Canadian Forces is to be reduced from about 87,000 to about 75,000 over the next few years. The reduction is to be accomplished by attrition (retirements and voluntary releases), selective intake (recruiting), and the Force Reduction Program (FRP). The FRP is designed to produce selective attrition in certain overstrength occupational groups. It is being offered to Other Ranks but not Officers. FRP superannuation benefits are being offered under the current CFSA provisions for retirement to promote economy and efficiency. Section IX of this report briefly describes the assumptions used to measure the impact of the FRP on the plan liabilities and normal cost.

For purposes of this report, as required by subsection 3(2) of the PPRA, we have deemed the plan to include the related benefits (inflation protection) payable under the Supplementary Retirement Benefits Act and the related assets of the Supplementary Retirement Benefits Account.

Section II is the cost certificate required by section 5 of the PPRA.

## II. Cost Certificate

We calculated the estimated normal cost of the plan by applying the actuarial methods and assumptions described in Sections III, IV and Appendix 3 to the data summarized in Appendix 17. (The normal cost for a year is the annual contribution required in that year to provide all future benefits considered to be accruing in respect of that year of service.)

We express the normal cost as a percentage of the pensionable payroll which is the sum of all salaries paid in the year to contributors with less than 35 years of pensionable service. We estimate the normal costs (and the allocation of these costs to the contributors and the government) to be the following percentages of pensionable payroll for the three years following the review date:

<u>Year</u>	<u>Payable by Contributors*</u> (%)	<u>Effective Cost to Government</u> (%)	<u>Normal Cost</u> (%)
1991	5.90	14.02	19.92
1992	5.81	14.85	20.66
1993	5.75	15.81	21.56

We estimate the actuarial liability of the plan to be \$22.3 billion as at 31 December 1990. The assets of this pension plan of \$25.1 billion as of the same date exceed the actuarial liability, so that the plan has an actuarial surplus of \$2.8 billion as at 31 December 1990.

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\*Active members make required contributions of 6.5% of salary (less a credit equal to their Canada Pension Plan contributions) to the Canadian Forces Superannuation Account, and 1% of salary to the Supplementary Retirement Benefits (SRB) Account until completion of 35 years of pensionable service. Thereafter, they make only the 1% contributions to the SRB Account.

### **Current and Ultimate Costs**

We consider the normal cost and the actuarial liabilities (see Section VII) to be realistic because they are based on dynamic economic assumptions that anticipate that the high real rates of interest (the excess of nominal interest rates over rates of increase in the Consumer Price Index) available at the date of valuation will prevail for some time before real rates return to more traditional levels. (The term "dynamic economic assumptions" refers to the fact that each economic assumption can vary in each future calendar year. In practice, each economic assumption varies for a period of time and then becomes static.)

Since the 1991 normal cost of 19.92% of pensionable payroll reflects the current high real rates of interest, it is not an indicator of the long-term cost of the plan. In fact, if we had assumed the ultimate economic assumptions (6.0% interest rates, 4.0% salary increases, and 3.0% price increases) to apply from the date of the valuation onward, the 1991 normal cost would have been 29.01% of pensionable payroll. The table on page 2 shows gradually increasing normal costs in 1992 and 1993, mainly reflecting a partial transition to the ultimate economic assumptions.

### **Variation of the Interest Assumption**

The early recurrence of more traditional real rates of interest would raise both the normal cost and actuarial liabilities. The margin (described in Section IV under Economic Assumptions) in the assumed interest rates provides some protection against this contingency (as well as against any adverse deviation in other assumptions). If we removed the margin, the 1991 normal cost would decline in relative terms by about 15% and the actuarial liabilities by about 11%.

The ultimate normal cost of 29.01% of pensionable payroll assumes a long-term real interest rate of approximately 3.0% which we expect the real return on long-term government bonds to be. If the funds were invested in assets other than notional government bonds, it would be appropriate to use rates of return more in line with the return of private sector pension funds. As a measure of sensitivity, an increment of one percentage point in the real interest rate decreases the ultimate normal cost in 1991 by 6.58% of pensionable payroll (22.43% rather than 29.01%).

### **Actual Financing of the Plan**

The government contributions shown in this cost certificate represent the difference between the normal costs and the estimated employee contributions. In any given year, the government's actual contributions to the plan usually differ from the contributions indicated by the cost certificate.

**In general, the government determines its own actual contributions to the Canadian Forces Superannuation (CFS) Account and the Supplementary Retirement Benefits (SRB) Account by taking a multiple (1.8 and 1.0, respectively) of the member contributions to these accounts. For example, in 1991 the members will contribute 4.89% of pensionable payroll to the CFS Account and 1% of total payroll to the SRB Account, for a total of 5.90% of pensionable payroll. Applying the above multiples, the government will contribute approximately 9.81% of pensionable payroll. The total actual contributions for 1991 by the government and the contributors are therefore estimated as 15.71% of pensionable payroll. In addition to these "formula" contributions, the government may make special contributions to the CFS Account whenever unanticipated general salary increases occur (see Appendix 1 for more details).**

In addition to the funding contributions already described, the pension plan also benefits from the fact that supplementary retirement benefits (the indexing component) payable in excess of accumulated contributions (with interest) by and in respect of members made to the SRB Account are charged directly to the Consolidated Revenue Fund (see "Payment of Benefits" on page 29 for more details). We estimate that the payments out of the Consolidated Revenue Fund in 1990 were equivalent to 12.7% of the estimated pensionable payroll.



### **III. Actuarial Methods**

#### **Valuation of Assets**

The assets, as reported by the Office of the Comptroller General, represent contributions to the plan, net of benefit payments, all accumulated with interest. They are shown at their "book value"; i.e., they are not adjusted to reflect changes in market interest rates. However, by using dynamic interest assumptions to value liabilities, we effectively reflect the earning power of these assets.

#### **Valuation of Liabilities and Determination of Normal Cost**

We used the projected accrued benefit cost method (or projected unit credit) to value liabilities in respect of plan benefits for contributors. This is the usual actuarial method employed in valuing pension plans, such as the plan established pursuant to the CFSA. Under this method, the contributions made in any year (the normal cost) are sufficient to fund projected benefits in respect of service in that year; the corresponding actuarial liability is the actuarial present value of projected benefits accrued to the valuation date.

The projected unit credit cost method was applied in this valuation in accordance with the recommendations of the Canadian Institute of Chartered Accountants for accounting for pension obligations in government financial statements, contained in "Public Sector Accounting Statement 5", dated November 1988.

#### **IV. Economic Assumptions**

This section is divided into two main components: basic economic assumptions and derived economic assumptions. Demographic assumptions required to perform this valuation are described in Appendix 3.

##### **Basic Economic Assumptions**

For each future calendar year, we needed to make a numerical assumption for each of the following basic economic factors:

- average yields available on purchase of a 20-year federal bond ("new money rates");
- increases in the Consumer Price Index (CPI); and
- general salary increases.

In selecting these inter-related assumptions, we consulted economic forecasters and researchers and reviewed the projections in the 25 February 1992 federal budget as well as long-term historical averages. We reached three principal conclusions as a result of our review of long-term economic forecasts:

- real rates on new long-term investments are likely to remain higher than they were 25 or more years ago for a relatively long time into the future;
- inflation will gradually rise and then remain fairly stable at a level of roughly 3% per annum; and
- current real general salary increases (productivity increases) will trend towards an eventual level of about 1% per annum.

The economic assumptions to be derived from this broad outlook of the economy are somewhat different from those adopted for 1999 and later in the previous valuation done as at 31 December 1987.

The main changes from the previous valuation were introduced for these reasons:

- The ultimate level of inflation is now at 3% as compared with 3.5%: inflation has been fairly stable at levels between 4% and 5% over the last 10 years. With recent trends pointing downward, it appears appropriate to reduce the long-term expectations by half a percentage point at this time.
- The ultimate productivity gains are now at 1% as compared with 1.5%; in the last few actuarial reports consideration was given to using 1% for productivity. We believe that it is time to recognize fully this lower level. This view is supported by recent experience and by long-term historical figures.
- The ultimate real interest rate now at 3% as compared with 2.5%; again, medium-term experience (25 years) in conjunction with the current outlook of the Canadian economy (globalization of markets, size of the public debt, etc.) indicate that higher real interest rates may well be sustainable longer than once thought. The chosen level of 3% reflects the last 15 years' experience better than the last 25 years historical average, in that it gives more weight to the more recent experience.

These assumptions are similar to the assumptions selected by the government last year as "management's best estimate" for accounting purposes for including of pension obligations in the 1990-91 Public Accounts. The main difference relates to the productivity gains, which were only 0.5% for accounting purposes. To illustrate this difference, we have estimated that the ultimate normal cost in 1991 would decrease by 1.4% of pensionable payroll (from 29.01% to 27.61%) if the general salary increases were reduced by half a percentage point.

## **Derived Economic Assumptions**

Having adopted the basic economic assumptions, we were able to develop these derived assumptions:

- projected fund yields;
- valuation interest rates;
- pension indexing factors compatible with the actual January 1 indexing dates;  
and
- Year's Maximum Pensionable Earnings (YMPE) annual increases.

For purposes of developing the first two derived assumptions, we considered that the three major public sector pension plans (the Public Service, Canadian Forces, and Royal Canadian Mounted Police plans, including indexation as provided by the SRBA) had, through a buy-and-hold strategy, accumulated an asset portfolio consisting entirely of 20-year federal bonds. We then assumed that sufficient new money would be injected on 31 December 1990 so that the book value of the notional investments would be equal to the corresponding plan liabilities projected for that date; moreover, we assumed no further contributions thereafter. We then projected the yields on the closed fund beyond 1990 by assuming a continuation of the buy-and-hold strategy and the reinvestment of the net cash flow in each year (borrowing if net cash flow is negative) at the assumed new money rates. Finally, the valuation interest rates were determined by reducing the relevant projected fund yields by one percentage point, but not below 6%.

We derived the pension indexing factors by applying the Benefit Index formula, which is based on CPI increases in successive 12-month periods ending in September.

For YMPE projection purposes, we assumed that the annual Industrial Aggregate increases were equal to general salary increases (except for 1991). The annual increase in the YMPE is based on successive increases in the Industrial Aggregate over 12-month periods ending in June.

For this valuation, we adopted the four economic assumptions shown with capitalized headings in the following table. (For completeness, we also show the three other economic assumptions needed to develop the valuation assumptions.)

Year	Interest Assumptions			Inflation		General Salary	
	New Money	Projected	VALUATION	CPI	JANUARY 1	CFSA	JANUARY 1
	<u>Interest</u>	<u>Fund Yield*</u>	<u>INTEREST</u>	<u>Increases</u>	<u>PENSION</u>	<u>GENERAL SALARY</u>	<u>YMPE</u>
	(%)	(%)	(%)	(%)	<u>INDEXING</u>	<u>INCREASES**</u>	<u>INCREASES</u>
					(%)	(%)	(%)
1991	9.8***	10.9***	9.9***	5.6***	4.8***	0.0***	5.5***
1992	9.0	10.9	9.9	1.8	5.8***	3.0***	5.6***
1993	8.5	10.8	9.8	1.9	2.8	3.0	3.0
1994	8.0	10.6	9.6	2.0	1.9	3.0	3.0
1995	7.5	10.5	9.5	2.2	2.0	3.2	3.0
1996	7.0	10.3	9.3	2.4	2.2	3.4	3.1
1997	6.5	10.0	9.0	2.6	2.4	3.6	3.3
1998	6.0	9.8	8.8	2.8	2.6	3.8	3.5
1999	6.0	9.5	8.5	3.0	2.8	4.0	3.7
2000	6.0	9.2	8.2	3.0	3.0	4.0	3.9
2001	6.0	8.9	7.9	3.0	3.0	4.0	4.0
2002	6.0	8.5	7.5	3.0	3.0	4.0	4.0
2003	6.0	8.2	7.2	3.0	3.0	4.0	4.0
2004	6.0	8.0	7.0	3.0	3.0	4.0	4.0
2005	6.0	7.7	6.7	3.0	3.0	4.0	4.0
2006	6.0	7.5	6.5	3.0	3.0	4.0	4.0
2007	6.0	7.4	6.4	3.0	3.0	4.0	4.0
2008	6.0	7.2	6.2	3.0	3.0	4.0	4.0
2009	6.0	7.0	6.0	3.0	3.0	4.0	4.0
Ultimate	6.0	6.0****	6.0	3.0	3.0	4.0	4.0

\*Projected fund yields for the combined Public Service, Canadian Forces and RCMP Superannuation Accounts, and the corresponding portions of the SRB Account.

\*\*These general salary increases are assumed to apply as well to the Industrial Aggregate, (except for 1991) and therefore to the Year's Maximum Pensionable Earnings (YMPE) under the Canada Pension Plan, in accordance with the prescribed formula.

\*\*\*These figures reflect actual experience.

\*\*\*\*The projected fund yield declines from 7.0% in 2009 to 6.0% by 2016.

## V. Reconciliation of Membership

The data for this valuation were supplied by the Department of National Defence on computer magnetic tapes. The following tables derived from those tapes show pertinent statistics concerning contributors to the Account (members and former members of the Regular Force\*) and survivors eligible for allowances during the intervaluation period from 1 January 1988 to 31 December 1990.

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\*Regular Force means the Regular Force of the Canadian Forces and 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.

## Current Contributors

Group	Contributors 88-01-01	Data Corrections**	New entrants* 1988-90	Terminations from 1988 to 1990*					Contributors 90-12-31
				Type of Benefit	Type of Termination			Total	
				Death	Disabled	Other***			
<b>Males</b>									
Officers	16,309	510	3,042	Annuity	(41)	(25)	(1,733)	(1,799)	16,311
				Lump Sum	(18)	(42)	(1,691)	(1,751)	
Other Ranks	62,709	(608)	13,803	Annuity	(95)	(348)	(4,900)	(5,343)	61,696
				Lump Sum	(77)	(323)	(8,465)	(8,865)	
Total	79,018	(98)	16,845	Annuity	(136)	(373)	(6,633)	(7,142)	78,007
				Lump Sum	(95)	(365)	(10,156)	(10,616)	
<b>Females</b>									
Officers	1,569	37	606	Annuity	0	(5)	(32)	(37)	1,793
				Lump Sum	(5)	(12)	(365)	(382)	
Other Ranks	6,646	(19)	2,531	Annuity	(3)	(33)	(84)	(120)	7,519
				Lump Sum	(2)	(56)	(1,461)	(1,519)	
Total	8,215	18	3,137	Annuity	(3)	(38)	(116)	(157)	9,312
				Lump Sum	(7)	(68)	(1,826)	(1,901)	
<b>Grand Total</b>	87,233	(80)	19,982	Annuity	(139)	(411)	(6,749)	(7,299)	87,319
				Lump Sum	(102)	(433)	(11,982)	(12,517)	
					(241)	(844)	(18,731)	(19,816)	

\*Excludes 3,765 contributors entitled to a lump sum who were released from the Forces during their year of entry.

\*\*In this column, contributors who had Other Rank status on 1 January 1988 and who attained Officer status at some time during the 1988-90 period are shown as Officers rather than Other Ranks.

\*\*\*Compulsory retirements because of age, promotion of economy or efficiency, misconduct, and all retirements for other reasons.

**Former Contributors**

<u>Group</u>	<u>Entitled 88-01-01</u>	<u>Data Corrections</u>	<u>New Entitlements 1988 to 1990</u>	<u>Terminations 1988 to 1990</u>			<u>Entitled 90-12-31</u>
				<u>Deaths</u>	<u>Other*</u>	<u>Total</u>	
<u>Males</u>							
<u>Officers</u>							
Non-disabled	13,470	(457)	1,727	(691)	(90)	(781)	(13,959)
Disabled	<u>417</u>	<u>(15)</u>	<u>25</u>	<u>(27)</u>	<u>(2)</u>	<u>(29)</u>	<u>(398)</u>
	13,887	(472)	1,752	(718)	(92)	(810)	(14,357)
<u>Other Ranks</u>							
Non-disabled	44,669	(844)	4,896	(2,173)	(270)	(2,443)	(46,278)
Disabled	<u>6,097</u>	<u>(128)</u>	<u>347</u>	<u>(377)</u>	<u>(14)</u>	<u>(391)</u>	<u>(5,925)</u>
	50,766	(972)	5,243	(2,550)	(284)	(2,834)	(52,203)
<u>Total</u>							
Non-disabled	58,139	(1,301)	6,623	(2,864)	(360)	(3,224)	(60,237)
Disabled	<u>6,514</u>	<u>(143)</u>	<u>372</u>	<u>(404)</u>	<u>(16)</u>	<u>(420)</u>	<u>(6,323)</u>
	64,653	(1,444)	6,995	(3,268)	(376)	(3,644)	(66,560)
<u>Females</u>							
<u>Officers</u>							
Non-disabled	258	(12)	32	(12)	0	(12)	266
Disabled	<u>17</u>	<u>0</u>	<u>5</u>	<u>0</u>	<u>(1)</u>	<u>(1)</u>	<u>21</u>
	275	(12)	37	(12)	(1)	(13)	287
<u>Other Ranks</u>							
Non-disabled	182	(3)	83	(3)	(3)	(6)	256
Disabled	<u>27</u>	<u>(1)</u>	<u>33</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>59</u>
	209	(4)	116	(3)	(3)	(6)	315
<u>Total</u>							
Non-disabled	440	(15)	115	(15)	(3)	(18)	522
Disabled	<u>44</u>	<u>(1)</u>	<u>38</u>	<u>0</u>	<u>(1)</u>	<u>(1)</u>	<u>80</u>
	484	(16)	153	(15)	(4)	(19)	602
<u>Males and Females</u>							
Non-disabled	58,579	(1,316)	6,738	(2,879)	(363)	(3,242)	60,759
Disabled	<u>6,558</u>	<u>(144)</u>	<u>410</u>	<u>(404)</u>	<u>(17)</u>	<u>(421)</u>	<u>6,403</u>
<u>Grand Total</u>	65,137	(1,460)	7,148	(3,283)	(380)	(3,663)	67,162

\*Re-enrolments in the Regular Force and transfers to other superannuation plans excluding, however, 113 re-enrolments that were treated as being entitled to annuities because they were not included among the active records.



**Survivors****Spouses**

	<u>Entitled 88-01-01</u>	<u>Data Corrections</u>	<u>New entitlements 1988 to 1990</u>	<u>Reinstatement* 1988 to 1990</u>	<u>Terminations 1988 to 1990</u>		<u>Entitled 90-12-31</u>
					<u>Deaths</u>	<u>Remarriages</u>	
Widows	10,630	(76)	2,622	648	(464)	(62)	13,298
Widowers	<u>7</u>	<u>(1)</u>	<u>4</u>	<u>4</u>	<u>(1)</u>	<u>0</u>	<u>13</u>
Total	10,637	(77)	2,626	652	(465)	(62)	13,311

**Children and Students**

	<u>Entitled 88-01-01</u>	<u>Data Corrections</u>	<u>New Entitlements 1988 to 1990</u>	<u>Terminations 1988 to 1990</u>	<u>Entitled 90-12-31</u>
Children under 18	930	22	237	(480)	709
Students (18 to 25)	<u>575</u>	<u>(28)</u>	<u>261</u>	<u>(404)</u>	<u>404</u>
Total	1,505	(6)	498	(884)	1,113

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\*Includes 649 reinstatements as a result of Bill C-24.

## **VI. Membership Data and Analysis**

### **Current Contributors**

There were 87,319 current contributors at the end of 1990 of whom 89.3% were males. The average age of a current contributor was 31.6 years, and the average length of pensionable service was 11.4 years. The average annual salary was \$35,940, and the aggregate annual payroll was \$3,138 million. Appendices 17A and 17B show detailed information on the age, pensionable service and average salary of male Officers and Other Ranks, respectively; Appendices 17C and 17D show information on female Officers and Other Ranks.

Officers comprise 20.7% of all the current contributors; Other Ranks comprise the remaining 79.3%.

### **Former Contributors and Survivors**

There were 81,586 claimants entitled to periodic payments from the plan at the end of 1990. The two types of claimants were former contributors (67,162 in number) and survivors (14,424 in number).

Appendices 18, 19 and 20 show detailed information on the benefits to former contributors and survivors. In determining the yearly amounts of pension shown in these appendices, we took into account the 1 January 1991 indexation increase pursuant to the SRBA. As well, the figures in those appendices reflect all deferred\* benefits (even though these benefits were not yet in course of payment) and recognize the benefit reductions resulting from CPP offsets applied to those at least age 65 and to some of those in receipt of disability pensions.

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\*The most common type of deferred benefit is indexation pursuant to the SRBA; for former contributors (other than disabled on medical grounds being unfit to perform duties as a member of the service), actual indexation payments begin only when the sum of the age (minimum 55 years) and the service is at least 85 years, but no later than age 60 in any event. In addition, there are 93 former contributors whose pension benefits under the CFSA are deferred to age 60.

## VII. Actuarial Balance Sheet

The results of the valuation as at 31 December 1990, based on the actuarial methods and assumptions described in Sections III, IV and Appendix 3, respectively, are summarized here.

<u>Assets</u>	(\$ millions)
Balance of Accounts	
CFSA*	23,936.7
SRBA	<u>1,155.0</u>
	25,091.7
Actuarial present value of future contributions and government credits in respect of elected prior service	42.2
Total assets	<u>25,133.9</u>
 <u>Liabilities and Surplus</u>	
Actuarial present value of prospective benefits to and in respect of members of the Regular Force	8,398.5
Actuarial present value of benefits to persons entitled to a periodic income	
Retirement pensioners	12,303.0
Disability pensioners	506.0
Surviving spouses	1,065.4
Surviving children and students	<u>6.0</u>
	13,880.4
Outstanding terminations	<u>8.1</u>
Total actuarial liabilities	22,287.0
Surplus	<u>2,846.9</u>
Total liabilities and surplus	25,133.9

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\*Includes items that accrued in the last quarter of 1990 but were not credited until 1991. These were chiefly interest credits and adjustments (\$614.5 million) and government contributions (\$87.2 million).

### VIII. Reconciliation of Actuarial Balance and Normal Cost

This section describes the various factors reconciling the overall change in the actuarial balance (excess of assets over actuarial liabilities) and normal cost between the last valuation (as at 31 December 1987) and this one. Figures in brackets indicate negative amounts. The items in the following table are fully explained on the next two pages or in other sections as noted.

	<u>Actuarial Balance</u> (\$ millions)	<u>Normal Cost</u> (% of Pensionable Payroll)
At 31 December 1987	(613.0)	19.51*
Data and assumption corrections	196.7	1.17
Interest on revised starting actuarial balance	(138.8)	--
Increase in normal cost due to dynamic economic assumptions	--	2.87
Portion of normal cost payments not made	(518.4)	--
Change in demographic characteristics of current contributors	2.5	(0.08)
Annuity payments made from Consolidated Revenue Fund	1,201.2	--
Change in benefits, Bill C-24 (see Section X)	(85.5)	0.04
Experience gains and losses (see Section IX)	244.7	--
Changes in actuarial assumptions (see Section IX)	<u>2,557.5</u>	<u>(3.59)</u>
At 31 December 1990	2,846.9	19.92

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\*The definition of pensionable payroll has been changed from the previous valuation. It is now limited to current contributors with less than 35 years of pensionable service. This resulted in the normal cost at 31 December 1987 changing from 19.30% to 19.51%.

**Data and Assumption Corrections**

Correcting errors (such as coding of status, etc.) in the data used in the previous valuation resulted in an increase in the actuarial balance of \$483.7 million. Refining the application of assumptions (e.g., effective date of salary increases) to the data resulted in a decrease in actuarial balance of \$287.0 million. These two changes produced a net increase in the starting actuarial balance of \$196.7 million.

The refinement in the application of assumptions to the data increased the normal cost by 1.17% of Pensionable Payroll.

**Interest on Revised Starting Actuarial Balance**

The starting actuarial balance was revised to \$(416.3) million after making the data and assumption corrections. A decrease in the actuarial balance of \$138.8 million is the result of interest on the revised actuarial balance as at 31 December 1987 not being paid. We calculated this interest for the three years to 31 December 1990 based on the interest rate assumptions used in the 1987 valuation report.

**Increase in Normal Cost due to Dynamic Economic Assumptions**

We expected the normal cost calculated on the basis of the dynamic economic assumptions adopted for the valuation as at 31 December 1987 to increase during each of the three succeeding years almost entirely as a result of the gradual transition from dynamic to ultimate assumptions. The normal cost rose by 2.87% of pensionable payroll from 31 December 1987 to 31 December 1990.

**Portion of Normal Cost Payments not Made**

A decrease in the actuarial balance of \$518.4 million is the result of a portion of the normal cost payments not being made. This occurred because the government did not contribute as much as the rates shown in the 1987 Cost Certificate for the three succeeding years. The amount of \$518.4 million included interest accumulation on the portion of the normal cost payments not made.

**Change in Demographic Characteristics of Current Contributors**

An decrease in the normal cost of 0.08% of pensionable payroll results from the active membership at 31 December 1990 having a different distribution of ages, a different proportion of female members and a different distribution of service as compared to the membership in the 1987 valuation. The cost of benefits being earned in respect of a member depends on the member's age, sex, and service.

The previous valuation assumed that certain changes in the demographic characteristics of active members would require an increase in normal cost. The actual changes that took place required a smaller increase. Consequently there was a gain of \$2.5 million, and the actuarial balance was increased by a like amount.

**Annuity Payments Made from the Consolidated Revenue Fund**

Supplementary retirement benefits payable in excess of accumulated contributions (including interest) by and in respect of members made to the SRB Account are charged directly to the Consolidated Revenue Fund. Since these benefits are not paid from the SRB Account, the pension plan gained \$1,201.2 million, and the actuarial balance increased by the same amount.

### IX. Experience Gains and Losses and Changes in Actuarial Assumptions

The following is an analysis of the effect on the actuarial balance and the normal cost of the experience gains and losses (actual experience during the three-year intervaluation period being different from the actuarial assumptions used in the valuation report as at 31 December 1987) and of the changes in actuarial assumptions. Figures in brackets indicate decreases in the actuarial balance or normal cost, as the case may be. All items in this table are explained on the next three pages.

	<u>Actuarial Balance</u> (\$ millions)	<u>Normal Cost</u> (% of Pensionable Payroll)
Experience gains and losses		
- Economic experience		
Interest earnings	638.8	--
Pension indexing	(79.4)	--
General salary increases	(447.7)	--
- Demographic experience		
Promotional salary increases	8.6	--
Retirement (other than disability)	4.6	--
Retirement because of disability	19.8	--
Mortality*	47.6	--
Miscellaneous	<u>52.4</u>	--
Total experience gains and losses	244.7	--
Changes in actuarial assumptions		
- Economic assumptions	2,440.2	(3.76)
- Demographic assumptions		
Retirement** (other than disability)	(12.0)	0.20
Mortality (for base year 1991)	(7.4)	0.01
Mortality projection factors	(151.9)	0.18
Surviving spouses assumptions***	261.0	(0.18)
Children (including students)	<u>27.6</u>	<u>(0.04)</u>
Total changes in actuarial assumptions	2,557.5	(3.59)

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\*Including proportion of contributors married at death and average age of spouse at death of contributor.

\*\*Including the effect of the Force Reduction Plan.

\*\*\*Proportion of contributors married at death and average age of spouse at death of contributor.

### **Economic Experience and Assumptions**

During the intervaluation period, interest credited to the CFS Account was in excess of that assumed. This excess accounted for an increase in the actuarial balance of \$638.8 million. A decrease in the actuarial balance of \$79.4 million resulted from pension indexing increases greater than assumed. A decrease in the actuarial balance of \$447.7 million resulted from general salary increases that were greater than expected.

The changes in economic assumptions resulted in an increase in the actuarial balance of \$2,440.2 million and a decrease in the normal cost of 3.76% of pensionable payroll.

### **Demographic Experience and Assumptions**

- **Promotional salary increases**

The experience with respect to promotional salary increases during the three-year intervaluation period resulted in an experience gain of \$8.6 million, due to salary increases being lower than expected.

- **Benefits and rates of retirement (for reasons other than disability)**

The experience during the three-year intervaluation period resulted in an experience gain of \$4.6 million. The following table shows the further analysis of the cause of the net experience gain:

<u>Assumption</u>	<u>Actuarial Balance</u> (\$ millions)
Retirement with less than 20 years of service	\$85.1
Retirement with 20 or more years of service	(80.5)
Total	\$ 4.6

The assumptions were changed from the previous valuation to better reflect the historical experience of the plan and the current economic conditions, as well as the Force Reduction Plan. The following table shows the effect of the change in assumptions, split between the effect of the Force Reduction Plan and other than the Force Reduction Plan:



Change in Retirement Assumptions because of:	<u>Actuarial Balance</u> (\$ millions)	<u>Normal Cost</u> (%)
Force Reduction Plan	25.4	(0.07)
Other than Force Reduction Plan	(37.4)	<u>0.27</u>
Total	(12.0)	0.20

The Force Reduction Plan results from the decision to reduce the size of the Regular Force of the Canadian Forces from just over 87,000 at 31 December 1990 to approximately 75,000 in the next few years. This will be achieved by increasing the attrition rate for Other Ranks and by minimizing recruitment. For Officers, the required attrition is expected to be achieved without any need for incentive or involuntary programs.

The Force Reduction Plan (FRP) is being offered only to those occupational groups that are in oversupply within the Other Ranks. The FRP benefits are actually the standard CFSA benefits available under "retirement to promote economy and efficiency":

- under 10 years of service, it is a cash benefit;
- for 10 to 19 years of service, the contributor may choose a cash benefit, a deferred annuity, or a subsidized, reduced immediate annuity (5% reduction until age 65 for each year of service less than 19, subject to a maximum reduction of 30%); and
- for 20 or more years of service, it is an unreduced immediate annuity.

We have assumed a three-year calendar select period for Other Ranks' retirement rates for reasons other than disability, during which 5,000 Other Ranks would retire under the FRP. However, the expected number of Other Ranks retirements for reasons other than disability during the three-year calendar select period was the same as it would have been expected using the ultimate rates; the only real changes were that the retirements would come at different ages and be subsidized.

Ultimate retirement rates for reasons other than disability were developed so that they would reflect the historical average rate of retirement and the historical age distribution.

For the three-year calendar select period, the benefit assumption for Other Ranks who retire with service between 10 to 19 years (for reasons other than disability) was revised to reflect the different incidence of retirees electing a subsidized reduced annuity under the FRP. The benefit assumption for retirements with 20 or more years of service (for reasons other than disability) was revised in the same way.

These assumptions are further described in Appendix 3.

- **Retirement because of disability**

The experience during the three-year intervaluation period was more favourable than expected and resulted in a gain of \$19.8 million.

- **Mortality**

This includes the experience for the proportion of contributors married at death and the average age of spouse at the death of the contributor. The following table shows the breakdown of the experience:

<u>Group</u>	<u>Actuarial Balance</u> (\$ millions)
Current contributors	(2.0)
Former contributors (other than disabled)	47.2
Former contributors (because of disability)	(2.5)
Surviving spouses	<u>4.9</u>
<b>TOTAL</b>	<b>47.6</b>

This assumption covers mortality for current contributors, former contributors and surviving spouses for base year 1991. The assumption was changed to reflect the improvement in mortality for the period 1988-90 compared with the 1984-87 experience for current contributors and disabled former contributors.

The following table shows the breakdown of the change in the actuarial balance and normal cost as a result of changes in mortality assumptions for base year 1991.

<u>Group</u>	<u>Actuarial Balance</u> (\$ millions)	<u>Normal Cost</u> (%)
Current contributors	0.1	0.00
Former contributors (because of disability)	(7.9)	0.01
Surviving spouses	<u>0.4</u>	<u>0.00</u>
Total	(7.4)	0.01

- **Mortality projection factors**

In the previous valuation no mortality improvement factors were used for active contributors. We have introduced these factors in this valuation for this group and changed the mortality improvement assumptions from the previous valuation for former contributors and surviving spouses. Compared to the projection factors used in the previous valuation, the current factors are somewhat higher for males aged 55 to 91 and for females aged 56 to 85.

These changes in assumptions caused a decrease in the actuarial balance of \$151.9 million and an increase in the normal cost of 0.18% of pensionable payroll.

- **Proportion of contributors married at death and average age of spouse**

This change in assumptions, implemented on the basis of our experience studies, turned out to be the most important change in the demographic assumptions of this valuation. The following table shows the breakdown of the changes in the actuarial balance and normal cost as a result of assumption changes to the proportion of contributors married at death and average age of surviving spouse at death of contributor.

<u>Assumption</u>	<u>Actuarial Balance</u> (\$ millions)	<u>Normal Cost</u> (%)
Proportion married at death	199.3	(0.14)
Average age of spouse	<u>61.7</u>	<u>(0.04)</u>
Total	261.0	(0.18)

- **Children and students**

The following assumptions with respect to children and students were changed from the previous valuation:

<u>Assumption</u>	<u>Actuarial Balance</u> (\$ millions)	<u>Normal Cost</u> (%)
Number of children at death of contributor	25.9	(0.04)
Average age of children at death of contributor	4.5	(0.01)
Proportion of students remaining eligible for allowance	<u>(2.8)</u>	<u>0.01</u>
Total	27.6	(0.04)

The changes in assumptions caused an increase in the actuarial balance of \$27.2 million and a decrease in the normal cost of 0.04% of pensionable payroll.

- **Miscellaneous**

This experience item includes all other demographic factors of lesser importance. The effect on the actuarial balance was \$52.4 million.

### **X. Effect of Bill C-24**

Bill C-24, which received Royal Assent on 29 June 1989, repealed the provisions for suspending annual allowance entitlements of surviving spouses upon remarriage and of children between the ages of 18 and 25 in full-time attendance at a school or university upon marriage. Previously suspended allowances became eligible for reinstatement effective 29 June 1989.

The annual allowances of 649 surviving spouses, with total annual rates of benefit of \$3.9 million as at 1 January 1991, have been reinstated as a result of Bill C-24. We took these into account in this valuation. The resulting cost as at 31 December 1990 is \$56.0 million. Payments made since 29 June 1989 were \$5.5 million (this is included in the cost as at 31 December 1990).

To reflect the effects of Bill C-24 on benefits payable following its enactment, we eliminated remarriage rates from our calculations because remarriage is no longer a cause for suspending the allowances of surviving spouses. This increased liabilities as at 31 December 1990 by \$29.5 million in respect of existing and prospective annual allowances to surviving spouses. It also increased the normal cost by 0.04% of pensionable payroll.

As a result of enacting Bill C-24, the total increase in actuarial liability as at 31 December 1990 in respect of surviving spouses was \$85.5 million.

No children's allowances were reinstated as a result of Bill C-24. No marriage assumption with respect to children was taken into account in previous valuations. We believe that any effect this Bill may have on the actuarial liability in respect of children's allowances would be negligible and we have not quantified it.

All costs quoted in this section were calculated as at 31 December 1990 and are of the same order of magnitude as the costs that would have been calculated as at 29 June 1989, the effective date of Bill C-24.


## XI. Acknowledgements and Actuarial Opinion

We wish to acknowledge the co-operation of the various sections of the Department of National Defence that supplied us with the data on contributors and annuitants. We examined the records for consistency, interrelationships, and general reasonableness and made adjustments that we considered appropriate.

In my opinion, for the purposes of this actuarial report

- the data on which this report is based are sufficient and reliable;
- the assumptions that have been used are adequate and appropriate; and
- the methods that have been employed are consistent with sound actuarial principles.

This report has been prepared and this opinion given in accordance with generally accepted actuarial principles and the Recommendations for the Valuation of Pension Plans of the Canadian Institute of Actuaries.



Bernard Dussault, F.S.A., F.C.I.A.  
Acting Chief Actuary

Ottawa, Canada  
29 June 1992

**APPENDIX 1****Estimates Relating to the Existing Financing Provisions  
of the Canadian Forces Superannuation Act (CFSA)**

The existing financing provisions of the CFSA contemplate the recognition of actuarial liabilities relating to basic CFSA benefits, but not of those relating to indexing pursuant to the Supplementary Retirement Benefits Act (SRBA). The Public Pensions Reporting Act (PPRA) requires the determination of actuarial liabilities including both the basic CFSA benefits and those relating to indexing pursuant to the SRBA. The information in the main body of this report conforms to the requirements of the PPRA.

The CFSA provides for the liquidation of any unfunded actuarial liability and for special credits to the Canadian Forces Superannuation Account relating to pay increases in excess of the rates assumed in the preceding actuarial report.

On the basis of the assumptions described in Section IV of this report, it was estimated that as at 31 December 1990 the assets relating to the CFSA (amounting to \$23,972.4 million) exceeded the corresponding actuarial liabilities by some \$11,966.5 million.

With regard to pay increases, we estimated on the basis of the same assumptions that general pay increases for Officers in excess of the assumed rate for a given year would generate additional liabilities requiring a special credit to the CFS Account equal to 1.92 times the increase in the effective payroll resulting from such excess increase, to the extent that there is insufficient surplus to absorb such additional liabilities. In respect of the Other Ranks, the corresponding multiple is 1.44 times.

**APPENDIX 2****Summary of the Pension Plan Established under the  
Canadian Forces Superannuation Act  
and of the relevant Provisions of the  
Supplementary Retirement Benefits Act**

In case of discrepancy between the provisions of the Act and this summary, the Act prevails.

**A- Coverage**

These persons are covered by the CFSA:

- current contributors; that is every member of the Regular Force;
- former contributors; that is retired members of the Regular Force who are entitled to annuities payable out of the Canadian Forces Superannuation Account; and
- surviving spouses and children of deceased contributors who are entitled to annual allowances payable out of the CFS Account.

**B- Credits and Charges to the CFS Account and the SRB Account****1. Contributions from Contributors**

The rate of contribution to the CFS Account is 6.5% of pay (Note 1) reduced by the amount that the contributor is required to contribute under the Canada Pension Plan in respect of pay received as a member of the Regular Force. Contributions for current service cease when a contributor has credit for 35 years of pensionable service (Note 2). In addition, all contributors, regardless of length of service, are required to contribute 1% of pay to the SRB Account. A contributor may elect to contribute for prior pensionable service.

**2. Contributions from Employer**

The government, as employer, credits the CFS and SRB Accounts with amounts related to the contributions from members or retired members of the Regular Force in respect of current and prior pensionable service. With respect to the SRB Account, the amount matches the contributions from members or retired members. For the CFS Account, the actual amount is specified by the Minister of Finance. Since 1 April 1969 it has been equal to 1.8 times the amount received from contributors in the preceding quarter.



In addition, the government credits the CFS Account with such amounts as are required, in the opinion of the Minister of Finance, to provide for the increase in cost of the benefits payable under the CFSA as a result of any pay increase applicable to at least 1% of the contributors or are required to meet the cost of benefits payable under the CFSA as shown by the most recent actuarial report. The technique for financing the special employer contributions has been to credit to the CFS Account the full amount estimated to be required in the fiscal year that the pay increase is authorized or the actuarial report is laid before Parliament and to charge such amounts to the Consolidated Revenue Fund in five equal annual instalments beginning in such fiscal year.

### **3. Interest**

In its role as custodian of the account, the government from time to time credits the CFS Account with amounts representing interest on the balance in the CFS Account calculated at the interest rate assumed in the preceding actuarial valuation and at supplementary rates that may be provided by regulation. However, the Minister may apply such supplementary interest to reduce the instalments being charged to the Consolidated Revenue Fund in respect of increases in costs resulting from pay increases and in respect of unfunded actuarial liabilities indicated in actuarial reports.

The composite rate at which interest is credited to the CFS Account changes every three months and is calculated as if the amounts not required for payment of benefits in each quarter pursuant to the Canadian Forces, Public Service and RCMP Superannuation Acts had been invested on a basis similar to the one used for the Canada Pension Plan; i.e., in 20-year bonds having a yield equivalent to the average yield on Government of Canada bonds with 20 or more years to maturity outstanding at that time.

Interest is credited to the SRB Account at the end of each quarter. The amount of the interest is calculated monthly on the minimum balance at a rate of interest representative of the yield on outstanding Government of Canada bonds that have a term to maturity of five years, less 0.125%.

### **4. Payment of Benefits**

All payments pursuant to the CFSA (excluding indexing) are charged to the CFS Account. Benefits resulting from indexing pursuant to the SRBA are charged to the SRB Account only until the accumulated total paid in respect of a former contributor equals the aggregate of all amounts credited to the SRB Account in respect of that person, including interest. SRBA benefits paid in excess of that aggregate are then charged directly to the Consolidated Revenue Fund.

**C- Summary of Benefits**

(Notes referred to in this Summary are at the end of this Appendix.)

**1. Contributors\* who are members of the Regular Force**

<u>Type of termination</u>	<u>Service in the Regular Force (Note 3)</u>	<u>Benefit</u>
Retirement because of age (Note 6)	3 years or less	Return of contributions (Note 7)
	More than 3 but less than 10 years	Return of contributions or cash termination allowance (Note 8), whichever is the greater
	10 years or more	Immediate annuity (Note 9)
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) (Note 4)	Less than 10 years	Return of contributions
	At least 10 but less than 20 years	At option of contributor (1) return of contributions or (2) deferred annuity (Note 11)
	20 years or more	See "Retirement for other reasons".
Retirement on completion of intermediate engagement (a contributor who has not reached retirement age and is not serving for an indefinite period of service) (Note 5)	20 years or more (by definition in CFS Regulations)	Immediate annuity

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\* Pursuant to the CFS Act, contributors include persons no longer required to contribute to the CFS Account.

<u>Type of termination</u>	<u>Service in the Regular Force</u>	<u>Benefit</u>
Retirement during an indefinite period of service after having completed an intermediate engagement and prior to reaching retirement age, for reasons other than disability, economy or efficiency, or misconduct	Any length	Immediate annuity to which contributor was entitled upon completion of intermediate engagement increased to such extent as prescribed by regulation*
Compulsory retirement because of disability**	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 (2) deferred annuity, or (3) with consent of the Minister of National Defence an immediate reduced annuity (Note 12)
	20 years or more	Immediate annuity

\* 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 10) always produces less than this maximum.

\*\* Any condition rendering a member of the Regular Force mentally or physically unfit to perform his or her duties.

<u>Type of termination</u>	<u>Service in the Regular Force</u>	<u>Benefit</u>
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 "retired for other reasons" (Note 13)
Retirement for other reasons	Less than 10 years	Return of contributions
	At least 10 but less than 20 years	At option of contributor (1) return of contributions or (2) deferred annuity
	At least 20 but less than 25 years	Immediate reduced annuity
	25 years or more	Officer contributor - immediate reduced annuity; Other than Officer contributor - immediate annuity
Death leaving no spouse or eligible children under 25 (Note 14)	Less than 10 years	Return of contributions or cash termination allowance, whichever is greater
	10 years or more	Five times the annuity to which the contributor would have been entitled at the date of death

<u>Type of termination</u>	<u>Service in the Regular Force</u>	<u>Benefit</u>
Death leaving spouse and/or eligible children under age 25	Less than 5 years	Return of contributions or an amount equal to one month's pay of the deceased contributor for each year of credited pensionable service, whichever is the greater
	5 years or more	Annual allowances (Notes 14, 15 and 16)

## 2. Former contributors receiving annuities or entitled to deferred annuities (Note 11)

<u>Type of termination</u>	<u>Benefit</u>
Death leaving no spouse or eligible children under age 25	Minimum benefit (Note 16)
Death leaving spouse and/or eligible children under age 25	Annual allowances

## 3. Indexing

Pursuant to the Supplementary Retirement Benefits Act (SRBA), benefit adjustments corresponding to increases in the Benefit Index are provided in respect of the basic allowances payable from the CFS Account to retired contributors and their survivors.

For purposes of administering the SRBA, the Benefit Index, in respect of each calendar year, is normally\* calculated as the Benefit Index for the preceding year multiplied by the average of the CPI for the 12-month period ending on September 30 of that preceding year, all divided by the average for a corresponding period one year earlier.

The supplementary benefits are payable to all retired contributors in receipt of annuities or annual allowances who have attained age 60 or, if less than that age, are unfit to perform duties as a member of the Regular Force by reason of any mental or physical disability, and to all spouses and children in receipt of annual allowances. Payment of benefits to retired contributors in receipt of annuities or annual allowances may commence from age 55 onward in cases where the total of years of service plus age equals or exceeds 85 years.

\* Increases for 1983 and 1984 were limited to 6.5% and 5.5% respectively.

The SRBA provides for a return of contributions paid by a member to the SRB Account with interest to the extent that such contributions exceed any benefit that has been or may be paid to or in respect of the member.

#### **D. Explanatory Notes**

##### **Note 1: Pay**

The term "pay", as it applies to a contributor under this plan and as it is used throughout this report, means pay at the rates 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.

##### **Note 2: Pensionable Service**

The amount of any annuity, cash termination allowance or annual allowance to which a contributor or the spouse or children of a contributor may become entitled under the CFSA depends upon the number of years of credited "pensionable service" at the date the contributor ceases to be a member of the Regular Force.

"Pensionable service" is described in detail in the CFSA. In general, pensionable service includes any period of service in the Regular Force for which a contributor has contributed or elected to contribute, if eligible to do so, and such other types of service for which the contributor has elected to make the required special contributions to the CFS Account.

##### **Note 3: Service in the Regular Force**

For most purposes, "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 and for which he or she did not elect to pay on subsequent enrolment.

The length of "service in the Regular Force" together with circumstances of termination of service govern the type of benefit payable to a contributor or to the surviving spouse or children.

**Note 4: Short Engagement**

As defined in the CFSA, short engagement means a fixed 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 nine years for a short engagement for commissioned Officers.

**Note 5: Intermediate Engagement**

As defined in the CFSA, intermediate engagement means a fixed period of service of a member of the Regular Force of such duration as is prescribed by regulation. A period of service to complete 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.

**Note 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 has been prescribed by regulations made under the National Defence Act for all members serving under the career programs adopted in 1975.

For those members enrolled prior to the introduction of the new programs who are not subject to their provisions, the previous retirement ages varying by rank as prescribed by the regulations continue to apply. These latter retirement ages, effective 1 February 1968, for contributors who enrolled on or after that date, or those serving on that date who elected to have such ages apply to them are shown below.

	<u>Old Retirement Ages</u>		
	<u>General Service</u>	<u>Specialist Service</u>	<u>Commissioned from Ranks</u>
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
Other Ranks above Corporal	50		
Corporal and below	44		

For those contributors serving on 1 February 1968 who did not elect to have these ages apply to them, the retirement ages are similar to those above but vary slightly by rank and by branch of the Forces.

For those contributors to whom the above ages would normally apply, the regulations also prescribe, for purposes of compulsory retirement under certain conditions or voluntary retirement, that retirement age will be deemed to have been reached 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.

	<u>Years of Service</u>
Colonel and above	30
Officers below Colonel	28
Other Ranks above Corporal	30
Corporal and below	25

#### **Note 7: Return of Contributions**

"Return of contributions" means the payment of an amount equal to the total current and prior service contributions paid by the contributor into the CFS and SRB Accounts, or paid into any other superannuation account or pension fund, and transferred to the CFS and SRB Accounts, plus interest on all amounts at the rate of 4% per annum to December 31 of the year immediately preceding the year the contributor ceased to be a member of the Regular Force. Interest is credited each December 31 (beginning in 1974) on the accumulated contributions with interest as at the preceding December 31.

#### **Note 8: Cash Termination Allowance**

"Cash termination allowance" means an amount equal to one month's pay 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 contributions to the CFS Account as a result of integration of the Plan with the Canada Pension Plan.



**Note 9: Immediate Annuity**

"Immediate annuity" means an annuity that becomes payable immediately upon retirement. The annual amount of the annuity is equal to 2% of the contributor's average annual pay in respect of any selected six-year period of pensionable service multiplied by the number of years of pensionable service not exceeding 35. For a contributor who has reached age 65 or is entitled to a disability pension under the Canada Pension Plan or the Quebec Pension Plan, the amount of the annuity that is payable under the CFSA is reduced by 0.7% of the average annual pay used in determining the amount of the annuity (not exceeding the "Average Maximum Pensionable Earnings") multiplied by the number of years of pensionable service after 1965 or after attaining age 18, whichever is later, but not exceeding 35 years. "Average Maximum Pensionable Earnings" is the average of the Year's Maximum Pensionable Earnings, as defined in the Canada Pension Plan, during the contributor's last three years of service.

All annuities are normally payable in equal monthly instalments in arrears until the end of the month in which the contributor dies.

**Note 10: 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 promoting economy or efficiency, CFS regulation prescribes an annuity that is equal to the greater of an immediate annuity based on the pensionable service to the date of completion of the intermediate engagement only and the six-year average annual pay at date of retirement. An immediate annuity based upon the total pensionable service to the date of retirement and the six-year average annual pay at that date reduced by 5% of such amount of annuity for each full year by which

- (a) 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
- (b) 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.

**Note 11: Deferred Annuity**

"Deferred annuity" means an annuity that becomes payable upon attainment of age 60. The annual payment is determined on the same basis as for an immediate annuity.

If a former contributor under age 60 and eligible for a deferred annuity under the CFSA becomes disabled and receives a pension under the terms of the Canada Pension Plan or the Quebec Pension Plan, the annuity is converted to an immediate annuity. If the contributor later ceases to be entitled to a disability pension and has not reached age 60, the immediate annuity reverts to a deferred annuity.

**Note 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 retire to promote economy or efficiency and has 10 or more years but less than 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

- (a) the period of service in the Regular Force is less than 20 years; or
- (b) 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 promoting 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

(i) the period of service in the Regular Force is less than 25 years, or

(ii) the age at the time of retirement is less than the retirement age applicable to the contributor's rank,

whichever is the lesser.

### **Note 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, economy and efficiency, completion of short or intermediate engagement and misconduct) at the same date. However, in no case shall the capitalized value of any reduced benefit (based by Regulation on the Canadian Life Table No. 2 (1941) and an interest rate of 4%) be less than the return of contributions.

### **Note 14: Eligible Children**

The expression "eligible children under 25" includes all children of the contributor under age 18, and any child of the contributor aged 18 or over but under 25, unmarried and 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 died, whichever occurred later.

**Note 15: Annual Allowances**

"Annual allowances" to the surviving spouse and children of a contributor means annuities that become payable immediately upon the death of the contributor. The amounts of the allowances are determined with reference to a basic allowance and are ordinarily payable in equal monthly instalments.

The basic allowance is equal to 1% of the average annual pay of the deceased contributor in respect of any selected six-year period of his or her pensionable service multiplied by the number of years of pensionable service not exceeding 35. A surviving spouse is entitled to an annual allowance equal to the basic allowance except under the following circumstances:

- (a) If the contributor dies within one year after marriage, no allowance is payable to the surviving spouse if the Minister of National Defence is not satisfied that the contributor was at the time of that marriage in such a condition of health as to justify his or her having an expectation of surviving for at least one year thereafter.
- (b) If a member of the Regular Force marries after age 60, his or her surviving spouse is not entitled to any annual allowance, unless after the marriage the member became or continued to be a current contributor.
- (c) No allowance is payable to a surviving spouse of a contributor who was not a member of the Regular Force on or after 20 December 1975.

The annual allowance for an eligible child is equal to 20% of the basic allowance or, if the contributor died leaving no spouse or the spouse is dead, to 40% of the basic allowance, provided that when the number of eligible children of a deceased contributor exceeds four, the total amount of allowances to such children shall not exceed the amount that would be payable if there were only four. Allowances are not payable to children of a spouse who is not entitled to an allowance as the result 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.

**Note 16: Minimum 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, in respect of the CFSA, the "return of contributions" is taken as at least equal to five times the immediate annuity to which the contributor was or would have been entitled at the time of his or her death;
- (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 Canada Pension Plan, the amount payable in (a) or (b) above cannot be less than the amount by which the cash termination allowance exceeds the aggregate of all amounts paid to those persons and to the contributor.

## **APPENDIX 3**

### **Demographic Assumptions**

**This Appendix is divided into four main components: current contributor assumptions, retired contributor assumptions, surviving spouses assumptions, and administrative expenses.**

#### **A- Assumptions for Current Contributors**

##### **1. New entrants**

With respect to the new entrant assumption for Other Ranks as well as Officers, a three-year calendar select period was introduced such that the replacement rate of terminations was less than 1 during the select period, in order to have a Regular Force size of approximately 75,000 at the end of the select period. The select replacement rate therefore stood at 24.8%. The ultimate replacement rate was 1.

##### **2. Promotional salary increases**

Separate rates were used for Other Ranks and Officers. We have retained the rates that were used in the previous valuation. These graduated rates were based on giving 50% credibility to the 1981-83 experience and 50% credibility to the 1984-87 experience (see Appendix 4).

##### **3. Rates of retirement (less than 20 years' service, other than disability)**

###### **(a) Rates of retirement**

Separate rates were derived for four groups: male Other Ranks, female Other Ranks, male Officers, female Officers. We have used a three-year calendar select period for Other Ranks to account for the Force Reduction Plan. The same rate by age was applied in each of the three years. For all groups, ultimate rates were based on the 1984-90 experience (see Appendix 5).

**(b) Proportions electing an immediate reduced annuity**

Contributors retiring (for reasons other than disability) with less than 10 years of service are assumed to receive either a return of contributions or a cash termination allowance.

Contributors retiring (reasons other than disability) with 10 or more years of service but less than 20 are assumed to receive either

- a return of contributions, or
- an immediate reduced annuity offered under "compulsory retirement to promote economy and efficiency" (see Note 12, Appendix 2).

We derived separate rates for Other Ranks and Officers. We have used a three-year calendar select period for Other Ranks to account for the Force Reduction Plan. The same rate by age was applied in each of the three years. For both groups, ultimate rates were based on the 1984-90 experience where all types of annuity election (e.g., deferred annuity and immediate reduced annuity) were grouped under the immediate reduced annuity option (see Appendix 6).

**4. Rates of retirement (with 20 or more years' service, other than disability)****(a) Rates of retirement**

Separate rates were derived for Other Ranks and Officers. We have used a three-year calendar select period for Other Ranks to account for the Force Reduction Plan. The same rate by age was applied in each of the three years. For both groups, ultimate rates were based on the graduated 1984-90 experience (see Appendix 7).

**(b) Percentage reduction in immediate annuity**

Contributors retiring (reasons other than disability) with 20 or more years of service are assumed to receive either

- an immediate unreduced annuity, or
- an immediate reduced annuity offered under "retirement for reasons other than compulsory retirement to promote economy and efficiency" (see Note 12, Appendix 2).

Separate reduction rates were derived for Other Ranks and Officers. We have used a three-year calendar select period for Other Ranks to account for the Force Reduction Plan. The same rate by age was applied in each of the three years. For both groups, ultimate rates were based on the 1984-90 experience (see Appendix 8).

**(c) Integration with Canada/Quebec Pension Plan**

As described in Note 4, Appendix 2, the basic annuity of a former contributor reaching age 65 or becoming entitled to a disability pension under the Canada/Quebec Pension Plan (CPP/QPP) is reduced by reason of the co-ordination of the Canadian Forces Pension Plan with the CPP/QPP.

To value the liability of future benefits, we assumed that the average salary for each age/service/sex/rank (Officer versus Other Ranks) cell projected to the six-year average salary at retirement would be compared without modification with the projected three-year average CPP maximum.

**5. Rates of retirement because of disability**

Separate rates were derived for three groups: male Other Ranks, male Officers, and females. We retained the assumptions used in the previous valuation report. Rates in the previous valuation were based on the 1984-87 graduated experience but giving only 50% credibility to that experience in the case of male officers and all female contributors and 50% credibility to the rates used in the 31 December 1983 valuation report (see Appendix 9).

**6. Rates of mortality and mortality projection factors**

Based on mortality comparison studies, we decided to use the same rates as used in the valuation of the Public Service Superannuation Act as at 31 December 1989 but projected one year to 1991 for mortality improvement. Separate rates are applied for males and females (see Appendix 10).

Beginning with this valuation, the mortality assumption for current contributors takes into account the expected continued reductions in the rates of mortality at the various ages. In the previous valuation, the mortality reduction factors were used only in respect of retired lives and spouses.



Mortality rates after 1991 were adjusted by assuming constant annual percentage decreases of such rates, varying by age. The projection factors were used in conjunction with the 1991 mortality rates for current contributors, former contributors and surviving spouses. The projection scale used is a modification of Projection Scale H of the Society of Actuaries. The projection factors used for males aged 55 to 91 and for females aged 56 to 85 are somewhat higher than those used in the previous valuation. Sample projection factors are in Appendix 14.

## **7. Survivor assumptions**

### **(a) Proportions of current contributors married at death**

Separate rates were used for males and females. For males, the rates were set equal to the graduated 1984-90 experience of current and former contributors. For females, we retained the rates used in the previous valuation (see Appendix 15).

### **(b) Number of children at death of contributor**

On the basis of experience studies, we used the same rates as used in the valuation of the Public Service Superannuation Act as at 31 December 1989. See Appendix 16 for sample assumptions of the number of children at death of the contributor.

### **(c) Average age of spouse at death of contributor**

We derived separate ages of spouse for males and females. For males, the average ages were set equal to the graduated 1984-90 experience of current and former contributors. For females, the average ages used in the previous valuation were retained (see Appendix 15).

### **(d) Average age of children at death of contributor**

On the basis of experience studies, we have used the same ages as used in the valuation of the Public Service Superannuation Act as at 31 December 1989 (see Appendix 16).

## **B- Assumptions for Former Contributors**

### **1. Rates of mortality**

For former contributors (for reasons other than disability on medical grounds unfit to perform duties as a member of the Service), separate rates were derived for three groups: male Other Ranks, male Officers, and females. We used the same rates as used in the previous valuation but also included three years for projected mortality improvement from 1988 to base year 1991. "Other than disability" includes individuals who are medically unfit to perform their duties and not otherwise advantageously employable in the Canadian Forces (see Appendix 11).

For former contributors (because of disability on medical grounds unfit to perform duties as a member of the Service), separate rates were derived for four groups: male Other ranks, female Other Ranks, male Officers, female Officers. The mortality rates assumed applicable for 1986 were percentages of the rates according to the Life Tables 1985-87, Canada: 110% for retired Officers and 140% for retired Other Ranks. Rates were then projected five years for mortality improvement to arrive at base year 1991 (see Appendix 12).

### **2. Other assumptions**

Considering their negligible effect on liabilities and normal costs, the following rates were assumed to be zero:

- rates of disablement for non-disabled retired contributors;
- rates of recovery for disabled annuitants.

For former contributors, we used the same assumptions as for current contributors regarding:

- mortality projection factors;
- proportions married at death;
- average age of spouse at death of contributor;
- number of children at death of contributor;
- average age of children at death of contributor.

**C- Assumptions for Survivors****1. Rates of mortality**

Separate rates were derived for males and females. For females, we used the same rates as used in the previous valuation (which were based on 1981-87 experience) but projected for mortality improvement to base year 1991. For males, we used the rates of the 1985-87 Life Tables for Canada, with a one-year age setback. Rates were then projected five years for mortality improvement to arrive at base year 1991 (see Appendix 13).

**2. Proportions of students still eligible for allowances**

We used the same rates as used in the valuation of the Public Service Superannuation Act as at 31 December 1989 (see Appendix 16).

**D- Administrative Expenses**

We made provision in the liabilities or in the normal cost with respect to the cost of administering the plan.

## APPENDIX 4

## Promotional Pay Increases

<u>Pensionable Service*</u>	<u>Officers</u> (%)	<u>Other Ranks</u> (%)
0	17.5	15.7
1	18.4	14.6
2	19.6	13.1
3	18.9	10.3
4	16.4	6.7
5	11.9	4.1
6	8.4	2.4
7	6.3	1.9
8	5.4	1.4
9	4.8	1.4
10	4.2	1.3
11	3.9	1.2
12	3.6	1.5
13	2.9	1.5
14	2.4	1.5
15	2.1	1.6
16	2.1	1.7
17	1.9	1.6
18	1.9	1.6
19	1.7	1.6
20	1.7	1.7
21	1.7	1.5
22	1.5	1.6
23	1.5	1.5
24	1.5	1.6
25	1.3	1.4
26	1.2	1.3
27	1.2	1.3
28	1.2	1.4
29	1.1	1.3
30	0.8	1.1
31	0.8	0.9
32	0.8	0.9
33	0.8	0.8
34	0.8	0.4
35	0.4	0
36	0.2	0
37	0.3	0
38 and up	0	0

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\* Expressed in completed years.

## APPENDIX 5

**Rates of Retirement/Withdrawal assumed for Current Contributors  
(with less than 20 years of service)**

<u>Age Nearest Birthday</u>	<u>Male Officers</u>	<u>Female Officers</u>	<u>Other Ranks</u>		<u>Other Ranks</u>	
			<u>Males</u>		<u>Females</u>	
			<u>Select*</u>	<u>Ultimate</u>	<u>Select*</u>	<u>Ultimate</u>
17 and under	0.351	0.259	0.071	0.088	0.072	0.115
18	0.234	0.259	0.068	0.088	0.071	0.108
19	0.117	0.161	0.065	0.088	0.070	0.102
20	0.089	0.104	0.062	0.087	0.069	0.096
21	0.069	0.085	0.059	0.085	0.068	0.090
22	0.055	0.073	0.056	0.081	0.067	0.085
23	0.048	0.066	0.053	0.076	0.066	0.081
24	0.044	0.063	0.050	0.069	0.065	0.077
25	0.044	0.064	0.047	0.062	0.064	0.074
26	0.046	0.066	0.044	0.055	0.063	0.070
27	0.047	0.069	0.041	0.049	0.062	0.067
28	0.048	0.072	0.038	0.043	0.061	0.064
29	0.047	0.074	0.036	0.037	0.060	0.060
30	0.044	0.075	0.035	0.032	0.058	0.056
31	0.040	0.074	0.034	0.027	0.056	0.052
32	0.036	0.071	0.033	0.023	0.054	0.047
33	0.031	0.067	0.032	0.020	0.052	0.042
34	0.026	0.062	0.031	0.016	0.050	0.037
35	0.021	0.057	0.030	0.013	0.048	0.032
36	0.017	0.050	0.029	0.010	0.046	0.027
37	0.014	0.044	0.028	0.008	0.044	0.022
38	0.012	0.037	0.027	0.007	0.042	0.019
39	0.011	0.030	0.026	0.006	0.040	0.016
40	0.010	0.025	0.025	0.005	0.038	0.014
41	0.011	0.019	0.024	0.005	0.036	0.014
42	0.012	0.016	0.023	0.006	0.034	0.015
43	0.014	0.013	0.015	0.015	0.030	0.030
44	0.020	0.020	0.020	0.020	0.050	0.050
45	0.030	0.030	0.020	0.020	0.050	0.050
46	0.030	0.030	0.020	0.020	0.050	0.050
47	0.030	0.030	0.020	0.020	0.050	0.050
48	0.030	0.030	0.020	0.020	0.050	0.050
49	0.030	0.030	0.020	0.020	0.050	0.050
50	0.150	0.150	0.020	0.020	0.050	0.050
51	0.030	0.030	0.020	0.020	0.050	0.050
52	0.030	0.030	0.020	0.020	0.050	0.050
53	0.030	0.030	0.100	0.100	0.100	0.100
54	0.100	0.100	0.250	0.250	0.250	0.250
55 to 59	0.250	0.250	0.250	0.250	0.250	0.250

\* Applicable only from 1991 to 1993 inclusive.

## APPENDIX 6

**Proportions of Retiring Contributors  
(with 10 to 19 years of service)  
electing an Immediate Reduced Annuity**

<u>Age Nearest Birthday</u>	<u>Officers</u>	<u>Other Ranks</u>	
		<u>Select*</u>	<u>Ultimate</u>
26 and under	0.000	0.000	0.000
27	0.006	0.030	0.015
28	0.009	0.030	0.015
29	0.011	0.032	0.016
30	0.014	0.032	0.016
31	0.017	0.034	0.017
32	0.020	0.038	0.019
33	0.023	0.044	0.022
34	0.027	0.056	0.028
35	0.031	0.082	0.041
36	0.035	0.124	0.062
37	0.060	0.192	0.096
38	0.109	0.292	0.146
39	0.177	0.432	0.216
40	0.241	0.622	0.311
41	0.297	0.874	0.437
42	0.344	1.000	0.599
43	0.382	1.000	0.792
44	0.417	1.000	1.000
45	0.459	1.000	1.000
46	0.517	1.000	1.000
47	0.600	1.000	1.000
48	0.714	1.000	1.000
49	0.851	1.000	1.000
50 to 59	1.000	1.000	1.000

\* Applicable only from 1991 to 1993 inclusive.

## APPENDIX 7

**Rates of Retirement assumed for Current Contributors  
(with 20 or more years of service)**

<u>Age Nearest Birthday</u>	<u>Officers</u>	<u>Other Ranks</u>	
		<u>Select*</u>	<u>Ultimate</u>
34 and under	0.000	0.000	0.000
35	0.048	0.115	0.075
36	0.048	0.115	0.075
37	0.048	0.115	0.075
38	0.048	0.115	0.075
39	0.052	0.115	0.075
40	0.082	0.115	0.075
41	0.050	0.115	0.075
42	0.050	0.115	0.090
43	0.050	0.132	0.115
44	0.064	0.132	0.115
45	0.071	0.115	0.100
46	0.082	0.115	0.100
47	0.090	0.127	0.110
48	0.094	0.151	0.131
49	0.098	0.186	0.185
50	0.107	0.292	0.290
51	0.122	0.212	0.210
52	0.137	0.212	0.210
53	0.151	0.212	0.210
54	0.300	0.367	0.364
55	0.650	0.856	0.850
56	0.650	0.907	0.900
57	0.650	0.907	0.900
58	0.650	0.907	0.900
59	0.650	0.907	0.900

\* Applicable only from 1991 to 1993 inclusive.

## APPENDIX 8

**Factors reflecting reduction in Immediate Annuity for Retiring Contributors  
(with 20 or more years of service)**

<u>Age Nearest Birthday</u>	<u>Officers</u>	<u>Other Ranks</u>	
		<u>Select*</u>	<u>Ultimate</u>
34 and under	N/A	N/A	N/A
35	0.90	0.83	0.75
36	0.90	0.85	0.75
37	0.92	0.88	0.80
38	0.93	0.91	0.85
39	0.93	0.93	0.90
40	0.93	0.95	0.93
41	0.93	0.97	0.95
42	0.93	0.99	0.97
43	0.93	1.00	0.98
44	0.95	1.00	0.99
45	0.97	1.00	1.00
46	0.98	1.00	1.00
47	0.99	1.00	1.00
48	0.99	1.00	1.00
49	1.00	1.00	1.00
50	1.00	1.00	1.00
51	1.00	1.00	1.00
52	1.00	1.00	1.00
53	1.00	1.00	1.00
54	1.00	1.00	1.00
55	1.00	1.00	1.00
56	1.00	1.00	1.00
57	1.00	1.00	1.00
58	1.00	1.00	1.00
59	1.00	1.00	1.00

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\* Applicable only from 1991 to 1993 inclusive.



## APPENDIX 9

## Rates of Disability\*

<u>Age Nearest Birthday</u>	<u>Male Officers</u>	<u>Male Other Ranks</u>	<u>Females</u>
17	0.0022	0.0087	0.0016
18	0.0022	0.0084	0.0024
19	0.0022	0.0081	0.0032
20	0.0022	0.0074	0.0037
21	0.0022	0.0063	0.0042
22	0.0022	0.0058	0.0044
23	0.0021	0.0055	0.0045
24	0.0020	0.0049	0.0044
25	0.0018	0.0043	0.0042
26	0.0017	0.0036	0.0039
27	0.0015	0.0025	0.0033
28	0.0013	0.0023	0.0028
29	0.0012	0.0023	0.0025
30	0.0010	0.0022	0.0025
31	0.0009	0.0022	0.0025
32	0.0008	0.0022	0.0026
33	0.0007	0.0021	0.0026
34	0.0007	0.0020	0.0026
35	0.0007	0.0021	0.0027
36	0.0007	0.0023	0.0028
37	0.0008	0.0027	0.0029
38	0.0009	0.0030	0.0031
39	0.0009	0.0033	0.0032
40	0.0010	0.0038	0.0035
41	0.0010	0.0044	0.0037
42	0.0010	0.0047	0.0039
43	0.0010	0.0048	0.0043
44	0.0011	0.0049	0.0046
45	0.0012	0.0049	0.0049
46	0.0013	0.0050	0.0053
47	0.0015	0.0054	0.0058
48	0.0018	0.0062	0.0062
49	0.0021	0.0071	0.0067
50	0.0025	0.0082	0.0072
51	0.0029	0.0093	0.0078
52	0.0033	0.0104	0.0084
53	0.0036	0.0119	0.0090
54	0.0039	0.0139	0.0097
55	0.0042	0.0165	0.0104
56	0.0043	0.0195	0.0112
57	0.0045	0.0210	0.0121
58	0.0047	0.0217	0.0131
59	0.0048	0.0221	0.0143

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\* Disability assumed to be permanent with no recovery possible.

## APPENDIX 10

## Rates of Current Contributor Mortality for 1991

<u>Age Nearest Birthday</u>	<u>Males</u>	<u>Females</u>
17	0.0006	0.0002
18	0.0006	0.0003
19	0.0006	0.0003
20	0.0007	0.0003
21	0.0007	0.0003
22	0.0007	0.0003
23	0.0008	0.0003
24	0.0008	0.0003
25	0.0008	0.0004
26	0.0008	0.0004
27	0.0008	0.0004
28	0.0008	0.0004
29	0.0008	0.0005
30	0.0008	0.0005
31	0.0008	0.0005
32	0.0008	0.0006
33	0.0008	0.0006
34	0.0008	0.0006
35	0.0008	0.0006
36	0.0009	0.0006
37	0.0010	0.0006
38	0.0010	0.0007
39	0.0010	0.0008
40	0.0011	0.0008
41	0.0012	0.0009
42	0.0013	0.0010
43	0.0014	0.0011
44	0.0016	0.0012
45	0.0018	0.0013
46	0.0020	0.0014
47	0.0022	0.0016
48	0.0023	0.0017
49	0.0025	0.0019
50	0.0028	0.0021
51	0.0031	0.0022
52	0.0035	0.0024
53	0.0041	0.0025
54	0.0048	0.0027
55	0.0057	0.0029
56	0.0066	0.0032
57	0.0069	0.0038
58	0.0070	0.0038
59	0.0073	0.0040

## APPENDIX 11

## Rates of Retirement Pensioner Mortality for 1991

Age Nearest <u>Birthday</u>	<u>Males</u>		<u>Females</u>
	<u>Officers</u>	<u>Other Ranks</u>	
20	0.0004	0.0004	0.0002
25	0.0004	0.0006	0.0002
30	0.0005	0.0008	0.0003
35	0.0007	0.0012	0.0004
40	0.0010	0.0021	0.0006
45	0.0017	0.0027	0.0008
50	0.0033	0.0044	0.0014
55	0.0052	0.0080	0.0021
60	0.0089	0.0127	0.0035
65	0.0150	0.0206	0.0059
70	0.0220	0.0342	0.0101
75	0.0392	0.0531	0.0199
80	0.0661	0.0772	0.0363
85	0.1032	0.1098	0.0601
90	0.1533	0.1614	0.0969
95	0.2228	0.2306	0.1602
100	0.3128	0.3192	0.2682
105	0.4695	0.4695	0.4384
109	1.0000	1.0000	1.0000

## APPENDIX 12

## Rates of Disability Pensioner Mortality for 1991

Age Nearest Birthday	Males		Females	
	Officers	Other Ranks	Officers	Other Ranks
20	0.0014	0.0018	0.0005	0.0006
25	0.0015	0.0018	0.0004	0.0006
30	0.0014	0.0018	0.0005	0.0007
35	0.0015	0.0020	0.0007	0.0009
40	0.0021	0.0026	0.0011	0.0014
45	0.0032	0.0041	0.0019	0.0024
50	0.0054	0.0069	0.0032	0.0041
55	0.0094	0.0119	0.0050	0.0063
60	0.0151	0.0193	0.0077	0.0097
65	0.0242	0.0308	0.0120	0.0153
70	0.0379	0.0483	0.0190	0.0242
75	0.0587	0.0747	0.0316	0.0402
80	0.0897	0.1142	0.0529	0.0673
85	0.1369	0.1742	0.0909	0.1157
90	0.2054	0.2615	0.1531	0.1948
95	0.3026	0.3852	0.2493	0.3172
100	0.3954	0.5032	0.3550	0.4518
105	0.8756	1.0000	0.8642	1.0000
109	1.0000	1.0000	1.0000	1.0000

## APPENDIX 13

## Rates of Survivor Mortality for 1991

<u>Age Nearest Birthday</u>	<u>Widows</u>	<u>Widowers</u>
20	0.0002	0.0012
25	0.0003	0.0014
30	0.0004	0.0013
35	0.0005	0.0014
40	0.0007	0.0017
45	0.0010	0.0026
50	0.0018	0.0044
60	0.0059	0.0126
65	0.0092	0.0200
70	0.0143	0.0317
75	0.0227	0.0489
80	0.0400	0.0751
90	0.1060	0.1732
95	0.1761	0.2564
100	0.2952	0.3444
105	0.4878	0.6603
109	1.0000	1.0000

## APPENDIX 14

## Mortality Projection Factors

<u>Age Nearest Birthday</u>	<u>Annual Reductions after 1991</u>	
	<u>Males</u> (%)	<u>Females</u> (%)
20	0.10	0.50
25	0.10	0.50
30	0.50	0.75
35	0.75	1.25
40	1.00	1.75
45	1.50	1.75
50	1.50	1.50
55	1.50	1.50
60	1.30	1.50
65	1.30	1.50
70	1.25	1.50
75	1.25	1.45
80	1.20	1.45
85	0.90	1.45
90	0.55	1.05
95	0.10	0.30
100	-	-

## APPENDIX 15

**Proportion of Current and Former Contributors  
Married at Death  
and  
Average Age of Surviving Spouse Corresponding  
to Age of Contributor at Death**

<u>Age Last Birthday of Contributor at Death</u>	<u>Proportion Married</u>		<u>Average Age</u>	
	<u>Male</u> (%)	<u>Female</u> (%)	<u>Widow</u>	<u>Widower</u>
25	59.8	43.0	25	26
30	76.6	60.0	29	32
35	88.4	63.0	34	37
40	91.1	63.0	38	42
45	89.8	62.0	43	47
50	86.7	57.0	48	53
55	84.7	47.0	53	58
60	84.4	36.0	58	63
65	82.1	31.0	63	67
70	77.9	26.0	67	72
75	72.2	21.0	71	76
80	62.9	16.0	75	79
85	42.5	1.0	79	82
90	32.9	0.0	82	--
95	19.7	0.0	84	--
100	0.0	0.0	--	--

## APPENDIX 16

## Number and Average Age of Children at Death of Contributor

<u>Age Last Birthday of Contributor at Death</u>	<u>Number of Children</u>		<u>Average Age of Children</u>	
	<u>Male Contributors</u>	<u>Female Contributors</u>	<u>Male Contributors</u>	<u>Female Contributors</u>
25	0.482	0.297	2	1
30	0.866	0.551	5	5
35	1.156	0.750	8	10
40	1.300	0.815	11	13
45	1.089	0.663	14	16
50	0.711	0.374	16	17
55	0.421	0.145	17	18
60	0.200	0.034	18	19
65	0.071	0.007	19	21
70	0.024	0.005	21	23
75	0.009	0.000	23	n/a
80	0.000	0.000	n/a	n/a

Proportion of Students Retaining Eligibility\* Throughout Following Year

<u>Age</u>	<u>Proportion</u>
18	0.68
19	0.78
20	0.80
21	0.76
22	0.71
23	0.68
24	0.58

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\* In this context, "eligibility" refers to both survivorship and student status.



## APPENDIX 17A

## Male Officers as at 31 December 1990

**Number of Current Contributors  
and  
Average Current Pay and Allowances**

<u>Age/Serv.</u>	<u>0-4</u>	<u>5-9</u>	<u>10-14</u>	<u>15-19</u>	<u>20-24</u>	<u>25-29</u>	<u>30-34</u>	<u>35+</u>	<u>TOTAL</u>
15-19	450 \$11,090								450 \$11,090
20-24	1,811 \$17,667	351 30,497	-	-	-	-	-	-	2,162 \$19,750
25-29	1,296 \$31,371	1,939 41,943	377 46,501	-	-	-	-	-	3,612 \$38,625
30-34	307 \$38,138	914 48,796	1,360 51,944	344 55,322	-	-	-	-	2,925 \$49,908
35-39	76 \$47,981	132 53,138	422 58,099	1,290 57,164	282 59,792	-	-	-	2,202 \$57,121
40-44	32 \$50,020	25 56,015	65 66,349	431 61,219	1,026 60,527	348 62,098	-	-	1,927 \$60,929
45-49	9 \$56,947	14 60,731	28 69,608	51 68,145	219 64,616	1,171 63,226	295 64,614	-	1,787 \$63,814
50-54	5 \$69,360	4 54,927	7 61,927	14 67,924	27 70,704	142 63,786	708 64,320	143 66,097	1,050 \$64,674
55-59	1 \$53,508	1 100,260	5 59,400	4 62,316	4 65,166	7 70,682	41 68,858	130 69,433	193 \$68,937
60-70	0 \$ 0	1 53,508	0	0	1 64,404	1 62,316	0	0	3 \$60,076
TOTAL	3,987 \$23,955	3,381 43,262	2,264 52,864	2,134 58,029	1,559 61,159	1,669 63,069	1,044 64,581	273 67,685	16,311 \$47,318

Average Age: 34.3 years

Average Service: 13.8 years

## APPENDIX 17B

## Male Other Ranks as at 31 December 1990

Number of Current Contributors  
and  
Average Current Pay and Allowances

<u>Age/Serv.</u>	<u>0-4</u>	<u>5-9</u>	<u>10-14</u>	<u>15-19</u>	<u>20-24</u>	<u>25-29</u>	<u>30-34</u>	<u>35+</u>	<u>TOTAL</u>
15-19	1,488	-	-	-	-	-	-	-	1,488
	\$16,509	-	-	-	-	-	-	-	\$16,509
20-24	10,987	803	-	-	-	-	-	-	11,790
	\$21,853	33,339	-	-	-	-	-	-	\$22,635
25-29	4,653	9,996	2,194	-	-	-	-	-	16,843
	\$26,500	34,669	36,162	-	-	-	-	-	\$32,606
30-34	424	2,767	8,484	1,453	-	-	-	-	13,128
	\$28,085	35,112	36,921	37,916	-	-	-	-	\$36,365
35-39	52	115	1,772	4,795	766	-	-	-	7,500
	\$27,809	35,012	37,139	38,783	40,596	-	-	-	\$38,446
40-44	15	10	60	699	4,183	942	-	-	5,909
	\$30,371	38,214	38,163	38,734	40,918	42,847	-	-	\$40,908
45-49	3	5	5	15	440	2,437	433	-	3,338
	\$28,912	39,389	39,362	40,784	40,959	43,164	44,613	-	\$43,027
50-54	1	6	3	4	23	302	1,057	168	1,564
	\$38,400	41,330	38,488	38,166	41,526	42,561	45,107	46,908	\$44,707
55-59	0	1	1	0	1	4	54	75	136
	\$ 0	48,360	49,296	0	41,088	40,359	45,537	47,211	\$46,324
TOTAL	17,623	13,703	12,519	6,966	5,413	3,685	1,544	243	61,696
	\$22,805	34,691	36,828	38,601	40,878	43,031	44,984	47,001	\$33,518

Average Age: 31.3 years

Average Service: 11.3 years

## APPENDIX 17C

## Female Officers as at 31 December 1990

**Number of Current Contributors  
and  
Average Current Pay and Allowances**

<u>Age/Serv.</u>	<u>0-4</u>	<u>5-9</u>	<u>10-14</u>	<u>15-19</u>	<u>20-24</u>	<u>25-29</u>	<u>30-34</u>	<u>35+</u>	<u>TOTAL</u>
15-19	98	-	-	-	-	-	-	-	98
	\$10,825	-	-	-	-	-	-	-	\$10,825
20-24	335	74	-	-	-	-	-	-	409
	\$17,672	31,275	-	-	-	-	-	-	\$20,133
25-29	235	274	32	-	-	-	-	-	541
	\$31,743	43,732	44,937	-	-	-	-	-	\$38,595
30-34	63	136	105	10	-	-	-	-	314
	\$36,346	50,235	48,912	51,449	-	-	-	-	\$47,044
35-39	18	34	59	78	1	-	-	-	190
	\$43,555	51,501	55,841	55,985	45,888	-	-	-	\$53,907
40-44	7	9	33	68	32	1	-	-	150
	\$52,178	51,860	53,919	57,175	57,725	51,768	-	-	\$55,988
45-49	1	3	13	19	16	7	0	-	59
	\$73,668	46,364	55,828	55,063	58,865	74,199	0	-	\$58,406
50-54	0	2	3	4	9	7	4	1	30
	\$ 0	50,292	50,304	55,884	56,827	59,911	59,898	77,208	\$57,422
55-59	0	0	0	0	1	1	0	0	2
	\$ 0	0	0	0	54,372	62,316	0	0	\$58,344
<b>TOTAL</b>	<b>757</b>	<b>532</b>	<b>245</b>	<b>179</b>	<b>59</b>	<b>16</b>	<b>4</b>	<b>1</b>	<b>1,793</b>
	<b>\$23,716</b>	<b>44,335</b>	<b>51,120</b>	<b>56,083</b>	<b>57,640</b>	<b>65,804</b>	<b>59,898</b>	<b>77,208</b>	<b>\$38,412</b>

Average Age: 29.6 years

Average Service: 7.6 years

## APPENDIX 17D

## Female Other Ranks as at 31 December 1990

Number of Current Contributors  
and  
Average Current Pay and Allowances

<u>Age/Serv.</u>	<u>0-4</u>	<u>5-9</u>	<u>10-14</u>	<u>15-19</u>	<u>20-24</u>	<u>25-29</u>	<u>30-34</u>	<u>35+</u>	<u>TOTAL</u>
15-19	249 \$16,114	- -	- -	- -	- -	- -	- -	- -	249 \$16,114
20-24	1,573 \$20,848	116 33,106	- -	- -	- -	- -	- -	- -	1,689 \$21,690
25-29	812 \$24,649	1,417 34,345	265 35,468	- -	- -	- -	- -	- -	2,494 \$31,307
30-34	142 \$24,330	429 34,547	1,236 36,150	141 37,278	- -	- -	- -	- -	1,948 \$35,017
35-39	30 \$22,999	30 34,293	289 36,370	445 38,240	7 41,253	- -	- -	- -	801 \$36,873
40-44	3 \$21,192	5 34,704	19 36,512	111 38,367	145 39,811	3 46,772	- -	- -	286 \$38,820
45-49	1 \$34,008	1 35,340	0 0	5 37,862	13 39,252	17 41,519	1 41,088	- -	38 \$39,891
50-54	0 \$ 0	0 0	0 0	1 45,300	2 40,308	4 39,072	7 42,146	0 0	14 \$41,230
<b>TOTAL</b>	2,810 \$21,731	1,998 34,317	1,809 36,089	703 38,074	167 39,834	24 41,768	8 42,014	0 0	7,519 \$30,545

Average Age: 28.6 years

Average Service: 7.9 years

## APPENDIX 18

Former Contributors as at 31 December 1990

Age Nearest Birthday	Other than Disability Pension					Disability Pension				
	Number*			Annual Pension**		Number*			Annual Pension***	
	Male	Fem.	Total	CFSA \$	SRBA \$	Male	Fem.	Total	CFSA (\$)	SRBA (\$)
26-28	3	3	6	34,092	780	0	0	0	0	0
29-31	34	9	43	256,725	12,675	0	0	0	0	0
32-34	69	18	87	563,557	52,310	10	1	11	55,860	3,780
35-37	76	10	86	584,437	69,885	5	3	8	36,420	4,692
38-40	346	17	363	3,869,741	301,728	12	4	16	73,908	17,124
41-43	1,278	40	1,318	17,163,674	1,550,792	45	3	48	178,728	93,804
44-46	2,415	29	2,444	34,257,898	4,272,662	99	1	100	245,076	277,680
47-49	3,754	46	3,800	51,689,520	10,421,649	203	1	204	539,940	699,540
50-52	5,144	49	5,193	65,910,652	20,215,825	311	1	312	858,660	1,304,784
53-55	6,612	44	6,656	78,652,693	34,322,443	431	1	432	1,136,904	2,099,292
56-58	7,769	49	7,818	90,672,509	49,245,427	649	2	651	1,854,036	3,480,012
59-61	7,489	50	7,539	72,370,312	60,906,387	846	4	850	2,183,568	4,868,280
62-64	5,968	42	6,010	43,898,348	57,878,904	687	3	690	1,807,248	4,368,120
65-67	5,899	33	5,932	32,165,107	64,341,428	644	1	645	1,549,200	4,375,704
68-70	5,675	28	5,703	27,621,915	67,600,678	538	3	541	1,393,656	4,059,588
71-73	4,153	23	4,176	17,471,623	48,631,711	335	1	336	853,008	2,636,256
74-76	2,718	46	2,764	10,281,223	30,973,747	140	0	140	350,232	1,116,828
77-79	1,352	22	1,374	4,559,076	14,599,389	41	2	43	103,416	345,780
80-82	509	9	518	1,513,104	5,170,432	12	0	12	19,308	72,924
83-85	201	3	204	483,816	1,748,016	2	0	2	2,460	9,420
85-88	66	1	67	124,428	470,976	2	0	2	4,884	17,172
89-91	14	0	14	30,756	116,904	1	0	1	828	3,612
92-94	3	0	3	3,288	12,684	0	0	0	0	0
<b>TOTAL</b>	<b>61,547</b>	<b>571</b>	<b>62,118</b>	<b>554,178,493</b>	<b>473,017,432</b>	<b>5,013</b>	<b>31</b>	<b>5,044</b>	<b>13,247,340</b>	<b>29,854,392</b>

\* 1310 males and 49 females who were medically discharged under Q.R. & O. 15.01 Article 3B), which are cases of persons medically unfit to perform their duties in present trade or employment and not otherwise advantageously employable in the Forces, were included among "other than disability pension".

\*\* CFSA benefits deferred to age 60 as well as SRBA benefits deferred to the earlier of age 60 and the age when age plus service equal 85 are included in these amounts. Benefit amounts also reflect accrued indexation to and including 1 January 1991 as well as CPP offsets for ages greater than 64 or for disability pensions where applicable.

\*\*\* SRBA amounts are all currently payable and therefore not deferred. Benefit amounts also reflect accrued indexation to and including 1 January 1991 as well as CPP offsets for ages greater than 64 or for disability pensions where applicable.

## APPENDIX 19

## Surviving Spouses\* as at 31 December 1990

Age Nearest <u>Birthday</u>	<u>Number</u>	<u>Annual Allowance</u>	
		<u>CFSA</u> (\$)	<u>SRBA**</u> (\$)
20 - 22	1	3,216	72
23 - 25	5	8,124	696
26 - 28	23	37,740	5,808
29 - 31	21	47,412	7,968
32 - 34	46	118,968	23,088
35 - 37	71	217,560	68,652
38 - 40	85	288,972	143,028
41 - 43	136	473,796	264,996
44 - 46	186	824,904	412,656
47 - 49	300	1,092,684	855,000
50 - 52	448	1,683,204	1,435,356
53 - 55	649	1,918,788	2,348,100
56 - 58	880	2,542,908	3,523,596
59 - 61	1,167	2,800,416	5,033,436
62 - 64	1,387	3,132,420	6,553,596
65 - 67	1,852	3,697,140	9,321,120
68 - 70	1,924	3,585,708	9,997,848
71 - 73	1,524	2,665,176	7,823,952
74 - 76	1,141	1,892,100	5,904,552
77 - 79	762	1,122,336	3,752,856
80 - 82	372	491,340	1,731,624
83 - 85	194	250,644	901,872
86 - 88	87	86,628	330,516
89 - 91	36	43,164	164,244
92 - 94	13	9,624	38,664
95 - 97	<u>1</u>	<u>624</u>	<u>2,172</u>
TOTAL	13,311	29,035,596	60,645,468

\* 13 of the surviving spouses are widowers.

\*\* Accumulated indexing includes increase effective 1 January 1991.

## APPENDIX 20

## Surviving Children and Students as at 31 December 1990

Age Nearest Birthday	Number	Annual Allowance	
		CFSA (\$)	SRBA* (\$)
0	2	612	24
1	2	1,104	96
2	7	3,348	516
3	5	3,312	228
4	13	8,532	972
5	21	11,676	2,460
6	12	7,752	2,148
7	22	15,936	2,988
8	34	21,696	8,988
9	31	25,188	10,080
10	33	24,252	9,000
11	42	34,464	14,352
12	39	28,092	14,076
13	52	47,364	21,540
14	62	50,472	36,024
15	101	95,748	47,016
16	91	84,084	39,240
17	140	119,376	67,968
18	143	99,240	89,700
19	85	56,976	54,282
20	61	41,430	39,074
21	52	30,735	35,440
22	36	19,577	26,373
23	17	9,418	12,198
24	<u>10</u>	<u>5,130</u>	<u>8,431</u>
TOTAL	1,113	845,514	543,214

\* Accumulated indexing includes increase effective 1 January 1991.