

Office of the Superintendent
of Financial Institutions

Bureau du surintendant
des institutions financières

Actuarial Report
as at 31 December 1990
on the

REGULAR FORCE
Death Benefit Account

HB
1321
.R35
1990

Canada

5 October 1995

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

Dear Minister:

Pursuant to section 71 of the *Canadian Forces Superannuation Act*, I am pleased to transmit my report on the actuarial review, as at 31 December 1990, of the Regular Force Death Benefit Account established under Part II of this Act.

Yours sincerely,

A handwritten signature in cursive script, reading "Bernard Dussault".

Bernard Dussault
Chief Actuary

TABLE OF CONTENTS

	<u>Page</u>
I- Introduction	1
II- Data	2
III- Methods	3
IV- Assumptions	5
V- Valuation Results	8
VI- Conclusions	15

APPENDICES

1. Summary of Plan Provisions	16
2. Sample Demographic Assumptions	20
3. Summaries of Data	29

I- Introduction

Part II (Supplementary Death Benefits) of the *Canadian Forces Superannuation Act* (CFSA) provides for lump sum benefits in case of the death of members. The contributions made in respect of these benefits are credited to the Regular Force Death Benefit (RFDB) Account, and benefits are charged against this Account.

This actuarial report was prepared in accordance with section 71 of the CFSA which requires *...an estimate of the extent to which the amounts standing to the credit of the Account and the contributions payable under Part II of the CFSA are sufficient to meet the benefits chargeable against the Account.*

The previous actuarial report was prepared as at 31 December 1987. There have been no changes to the plan provisions in the inter-valuation period.

The provisions of the plan deemed to apply for purposes of this report are described in Appendix 1 (page 16) and take into account exclusively those that were effective as at the valuation date.

II- Data

A- Overview

As at 31 December 1990, the supplementary death benefit plan included 141,211 members*. Of this number, 87,282 were active members and 53,929 were inactive members in receipt of an immediate annuity. The total amount of death benefits insured at that date was \$4,136.8 million.

B- Source

The valuation data in respect of members are maintained on electronic files at the National Defence Headquarters. The Directorate of Pay and Services is responsible for the administration of the computer programs designed for the extraction of the valuation data.

The balance of the Account as at 31 December 1990, as well as the amount of contributions and interest due, was provided by the National Defence Headquarters.

C- Validation

The data that were provided for purposes of this report were examined for their consistency, interrelationships and general reasonableness, and adjustments were made as deemed appropriate.

D- Acknowledgements

We acknowledge the co-operation of the various sections of the Department of National Defence during the course of this actuarial review.

E- Summaries

Summaries of data on members are provided in Appendix 3 (page 29) of this report.

* See Appendix 1 for the definition of the various categories of members.

III- Methods

Due to their negligible effect on costs and liabilities, the 34 inactive members in receipt of an annual allowance or entitled to a deferred annuity were not taken into consideration for the purposes of this valuation.

A- Assets

Apart from contributions and interest due, the balance of the Regular Force Death Benefit Account corresponds to the excess of past contributions to the plan over past benefit payments, all accrued with interest. Because the balance of the Account is not marketable, it is shown at its book value as opposed to market value.

B- Liabilities

1. Due to the negligible effect of the 30-day extension of the term insurance upon termination of coverage and to the nature of term insurance paid for on a monthly basis, no liability is deemed to exist specifically in respect of these two provisions.
2. In respect of the individual \$500 paid-up portions of insured benefits, liabilities as at 31 December of a given year correspond to the amount which, together with interest at the projected fund yield (page 5), is sufficient to pay for each individual \$500 portion of insured benefit on the eventual death of all relevant members insured as at 31 December of that year.
3. On the basis of the plan's experience, the reserve for claims incurred but not reported, and reported but not paid, is set equal to one-sixth of the average annual claims paid between 1 January 1985 and 31 December 1990.
4. The margin against adverse fluctuations, held only in respect of the insurance paid for on a term basis, correspond to the amount which, added to the current year's cost, provides a 99.5% statistical probability that the year's death benefits will not exceed the sum of the year's cost and this margin. It is deemed equal, assuming that the distribution of the number of deaths is binomial, to 2.6 times the standard deviation in the expected annual amount of death benefits. The standard deviation is deemed equal to the square root of the expected number of deaths weighted by the square of the average amount of insurance.

C- Costs

The expected future annual costs of the plan are not constant and do accordingly differ from the applicable contribution rates (item C, page 18). These projected costs are used in this report mainly in the projection of the ratio of surplus to annual benefit payments.

1. Paid-up Insurance

The single premium for the individual \$500 paid-up portion of insured benefit corresponds to the initial (at the time the insurance becomes paid-up) value of the reserve computed as described in paragraph B-2 above for the paid-up insured benefits.

2. Term Insurance

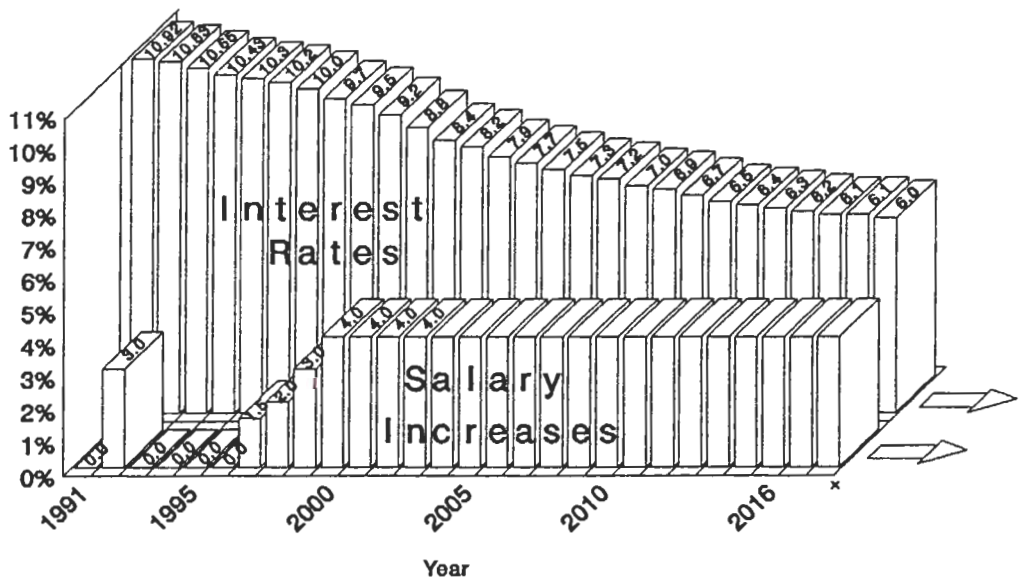
In respect of total insured death benefits in force paid for on a term basis, the estimated cost of insurance for a given month is equal to the corresponding amount of insured death benefits in force during that month multiplied by the mortality rate (probability of death estimated by age, sex and rank) assumed to apply during that month.

IV- Assumptions

A- Economic Assumptions

For purposes of projecting the Regular Force Death Benefit Account for future years, the economic assumptions are those of the Actuarial Report as at 31 December 1993 on the pension plan for the Canadian Forces. The assumed seniority and promotional increases (Table 2A, page 21) are those of the Actuarial Report as at 31 December 1990 on the pension plan for the Canadian Forces. For 1991 to 1994 however, the interest assumption, corresponding to the projected fund yield, has been replaced by the actual interest rate earned. Moreover, the assumed salary increases were modified to reflect the current wage restraint programs. The relevant basic economic assumptions are summarized in the graphic below:

Basic Economic Assumptions



B- Demographic Assumptions**1. New Members**

The projection of future members is required in the valuation process exclusively for the computation of expected future assets, liabilities and annual costs of life insurance.

(a) Number

The number of new active members was determined to produce for each sex, officers and other ranks, a stable total population of active members, except during the first three years where the size of the regular force is expected to reduce to approximately 75,000 by the end of that period.

(b) Age Distribution

The age distribution of new members in each future year is assumed to be, for each sex, officers and other ranks separately, the same as for new contributors to the Canadian Forces Superannuation Account during the period from 1 January 1988 to 31 December 1990.

2. Termination Rates

For active members, the probabilities of terminating employment and of retiring are the same as the corresponding probabilities assumed for purposes of the Actuarial Report as at 31 December 1990 on the pension plan for the Canadian Forces (Tables 2B to 2D, page 22). In any event, retirement is assumed to occur not later than at age 60.

3. Amount of Insurance**(a) Active Members**

The total amount of insured death benefits is deemed to be the one applicable as at 31 December 1990, or at the date of entry, if later, increased over time by both the average salary and the assumed seniority and promotional annual rates of increase.

(b) Inactive Members in Receipt of an Immediate Annuity

In the previous report, the percentage of healthy and disabled members electing to reduce to \$500 their amount of insured death benefit was assumed at 15% and 5% respectively. Current data indicate that such an election is virtually nonexistent and accordingly, no member was assumed to make such an election. The corresponding magnitude in surplus reduction is shown in part D of chapter V (page 14).

4. Mortality

Mortality rates are used for both the computation of death benefits and the survivorship of the insured members beyond the valuation date.

(a) Active Members

The mortality rates deemed to apply in 1991 (Table 2E, page 25) are those used in the Actuarial Report as at 31 December 1990 on the pension plan for the Canadian Forces. These mortality rates are only marginally lower than the mortality assumed for the purposes of the previous report on the Regular Force Death Benefit Account.

The mortality rates deemed to apply after 1991 are those assumed for 1991 and adjusted by the longevity improvement factors shown in Table 2H, page 28. The projection scale used is a modified version of Projection Scale H of the Society of Actuaries.

(b) Inactive Members in Receipt of an Immediate Annuity and/or Entitled to the Paid-up Insured Benefit on Reaching Age 65

The mortality rates assumed for these inactive members were determined separately for retired and disabled pensioners as in the Actuarial Report as at 31 December 1990 on the pension plan for the Canadian Forces.

The 1991 mortality rates are shown for retired pensioners in Table 2F, page 26 and for disabled pensioners in Table 2G, page 27. Mortality rates for years after 1991 are obtained by applying to the 1991 mortality rates the longevity improvement factors shown in Table 2H.

V- Valuation Results

A- Balance Sheet

The following balance sheet was prepared using the experience data described in Section II, the valuation methods described in Section III and the assumptions described in Section IV.

Assets	(\$ millions)
Balance of Account	116.2
Contributions and interest due	3.6
Total assets as at 31 December 1990	119.8
<hr/>	
Liabilities	(\$ millions)
Actuarial liability in respect of the \$500 paid-up insured death benefit for members at age 65 and over	3.5
Reserve for claims incurred but unreported, and reported but not paid	1.6
Margin against adverse fluctuations	1.4
Total liabilities as at 31 December 1990	6.5
<hr/>	
Surplus	(\$ millions)
As at 31 December 1990	113.3
<hr/>	

B- Costs and Contributions

The following costs were computed using the experience data described in Section II, the valuation methods described in Section III and the assumptions described in Section IV.

1. Recent Experience

The total cost of all insured benefits actually paid during 1991 was \$10.8 million. Insured benefits include the term insurance (one times annual salary) and the paid-up insurance (individual \$500 portions).

(a) Paid-up Insurance

The amount of total related benefits paid in 1991 was \$0.3 million. Considering the actual average total insured benefits of \$8.4 million during 1991, the total actual related benefit rate of payment was \$2.99 per month per \$1,000 of insured benefit in 1991. On the other hand, the estimated 1990 year-end single premium at age 65 per \$500 of insured benefit is \$149.85 and \$93.22 for males and females, respectively. The corresponding contribution rates (item 3.(b), page 19) applicable for the paid-up insured benefits are \$310 and \$291, respectively.

(b) Term Insurance

The total related cost for 1991 was \$10.5 million. Considering the actual total insured benefits of \$4,123.0 million during 1991, the total actual cost rate was \$0.213 per month per \$1,000 of insured benefit in 1991.

Active and inactive members in receipt of an immediate annuity are required by statute to contribute monthly \$0.20 per \$1,000 of insured benefit. On the other hand, the government contributes monthly an amount equal to one-sixth of the actual total amount of death benefits payable during the month in respect of the death of active members and of inactive members in receipt of an immediate annuity. For 1991, this government monthly contribution is estimated at \$0.036 per \$1,000 of insured benefit. Therefore, the total amount contributed by members and the government in respect of these members is \$0.236 per month per \$1,000 of insured benefit, as compared to the estimated monthly cost (paragraph above) of these benefits in 1991 of \$0.213 per \$1,000 of insured benefit.

From the annual report on the administration of the CFSA for each of the 11 fiscal years up to 31 March 1991, it may be derived that the actual average monthly cost rate varied between \$0.188 and \$0.366 per \$1,000 of insured benefit. These statistics also indicate that the actual costs have tended to decrease in recent years. The actual monthly benefit payments, averaged over six years, are shown below per \$1,000 of insured benefit:

Six-year Period Ending 31 March	Six-Year Average Monthly Benefit per \$1,000 of Insured Benefit
1989	0.233
1990	0.221
1991	0.217

2. Projected Costs and Applicable Contributions

(a) Paid-up Insurance

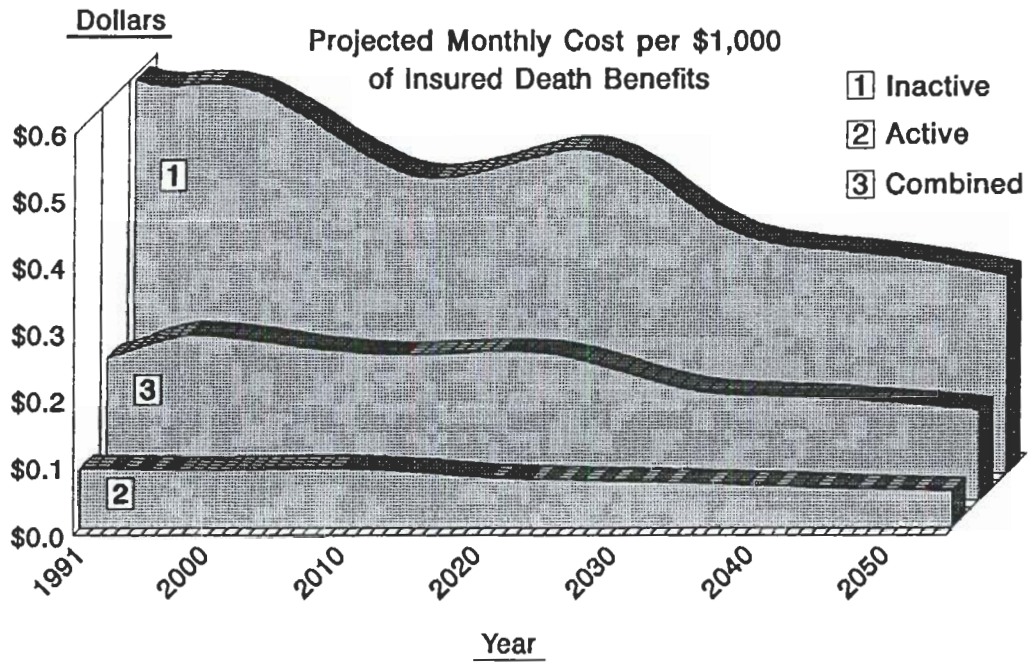
Consistent with assumed improvements in longevity, the single premium for the paid-up insurance would normally decrease over time. However, the assumed interest rate is lower at 6% ultimately than 10.98% for 1991. From the 1990 year-end to the 2050 year-end, the net effect of longevity improvements and decreasing assumed interest rates, on the single premiums at age 65 per \$500 of insured benefit, is an increase from \$149.85 to \$162.35 for males, and from \$93.22 to \$111.97 for females. The corresponding contributions rates (item 3.(b), page 19) applicable for the paid-up insured benefits are \$310 and \$291, respectively.

(b) Term Insurance

The monthly cost per \$1,000 of term insurance is expected to increase gradually to \$0.250 until 1999, and thereafter to decrease gradually to \$0.143 by 2050. This compares with the aggregate contribution rate of \$0.236 mentioned in section 1.(b) above. The table and the graphic of the following page illustrate the projected monthly cost per \$1,000 of insured death benefits for selected years from 1991 to 2050.

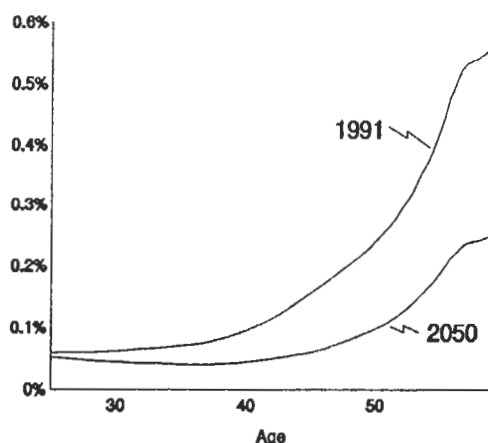
Projected Monthly Cost per \$1,000 of Insured Death Benefits

Category of Participants	1991	2000	2010	2025	2050
Active members	0.088	0.085	0.088	0.072	0.057
Inactive members in receipt of an immediate annuity	0.591	0.574	0.462	0.484	0.316
Active and inactive members combined	0.213	0.249	0.222	0.213	0.143



For active members, the monthly cost expected for 2050 for the term insurance is 64.77% of the monthly cost estimated for 1991. This results mainly from the following two factors:

- (i) There is a significant reduction in cost due to the assumed lower mortality for 2050 in accordance with the longevity improvement factors shown in Table 2H, page 28 applied to the current mortality rates shown in Table 2E, page 25. The adjacent graphic shows the mortality rates (both sexes combined) deemed applicable for 1991 and the corresponding mortality rates assumed for 2050.



- (ii) The projected distribution of active members in the year 2050 is weighted more heavily on older ages. This has the effect of increasing costs. However, this increase is more than offset by the effect of the assumed lower mortality for 2050.

In respect of inactive members in receipt of an immediate annuity, the monthly cost for 2050 is expected to decrease by approximately 46.53% from the monthly cost estimated for 1991. This reduction is mostly the result of the lower mortality assumed for 2050.

In aggregate, the 1991 cost in respect of active and inactive members in receipt of an immediate annuity is expected to decrease by 32.64% by the year 2050. The proportion of insured benefits for inactive members in receipt of an immediate annuity, who carry a much higher cost, is expected to increase from 24.79% in 1991 to 33.37% in 2050.

C- Surplus (in Respect of Both the Term and the Paid-up Insurance)**1. Recent Experience**

The surplus (i.e., the difference between the assets and the liabilities) was \$113.3 million as at 31 December 1990. It corresponds to 10.5 times the total amount of death benefits estimated to be payable during 1991 while the total contributions in 1991 by and in respect of all members correspond to 112% of these benefits. By comparison, the surplus as at 31 December 1987 under the previous report was \$79.0 million. It corresponded to 8.5 times the amount of death benefits payable during 1988 while the total 1988 contributions corresponded to 110% of these benefits.

2. Long Term Outlook

If interest accruals are not taken into account, the members' and government's contributions currently applicable (paragraph B-1 above and item C, page 18) are greater than the estimated costs (paragraph B-2 above) up to the year 1996 in respect of the term insurance and up to the year 2003 in respect of the paid-up insurance. However, accounting for the interest accruals on the Account results in a continuously increasing surplus, whether expressed in absolute dollar amounts or as a multiple of the expected annual benefits payments.

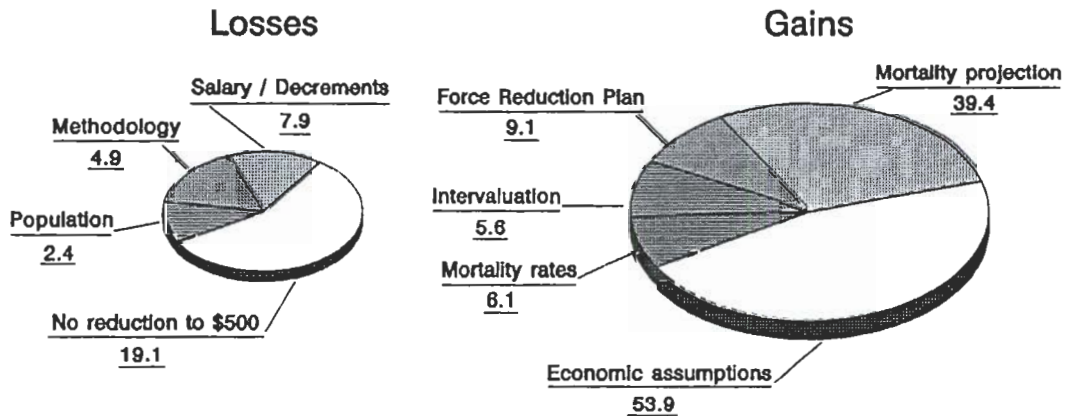
**Ratio of Projected Surplus
to Annual Benefit Payments in Following Year**

1991	2000	2010	2025	2050
10.5	20.4	32.3	50.6	136.2

D- Reconciliation of the Cost and the Surplus

	Monthly Cost Projected for 2050 per \$1,000 of Insured Death Benefit (excluding the paid-up insurance)	Ratio of Surplus in 2050 to Following Year's Benefit Payments (including the paid-up insurance)
Previous report as at 31 December 1987	0.160	56.4
· methodology improvement	0.000	(4.9)
· effect of intervaluation experience versus assumptions	0.000	5.6
· changes in population composition	0.002	(2.4)
· changes in economic assumptions	0.005	53.9
· changes in assumed promotional salary increases and assumed decrements other than mortality	0.006	(7.9)
· changes in assumed base-year mortality rates	(0.005)	6.1
· changes in mortality projection factors	(0.035)	39.4
· changes in \$500 election rates	0.009	(19.1)
· changes in new entrant assumption and effect of Force Reduction Plan	0.001	9.1
This report as at 31 December 1990	0.143	136.2

**Reconciliation
Ratio of Surplus in 2050 to Following Year's Benefit Outlay**



VI- Conclusions**A- Surplus**

There is a large surplus as at 31 December 1990 in the Regular Force Death Benefit Account. However, Bill C-55, enacted after the effective date of this valuation, significantly increased the benefits without any change to the dollar amount of contributions. The effect of these amendments will be shown in the next actuarial report (as at 31 December 1993).

B- Actuarial Standards

In my opinion,

- the valuation input data are sufficient and reliable;
- the assumptions used are in aggregate reasonable and appropriate;
- the methods employed are appropriate.

This report has been prepared, and my opinion given, in accordance with accepted actuarial practice, and particularly with the recommendations of the Canadian Institute of Actuaries for actuarial advice given with respect to self-insured employee benefit plans.



Bernard Dussault, B.Sc., F.S.A., F.C.I.A.
Chief Actuary

Ottawa, Canada
5 October 1995

APPENDIX 1

**Summary of Plan Provisions,
in Force as at 31 December 1990,
of the Supplementary Death Benefit Plan**

Following is a summary description of the main provisions of the supplementary death benefit (SDB) plan. The exact terms of this plan are set out in Part II (Supplementary Death Benefits) of the *Canadian Forces Superannuation Act* (CFSA).

A- Membership

1. Active Member

Active member is:

- (a) a member of the regular force on 31 December 1990, or
- (b) a member of the reserve force on 31 December 1990 who is, with the approval of the Chief of the Defence Staff, on full-time service in a position in a regular force establishment or as a supernumerary to a regular force establishment.

2. Inactive Members

Inactive members are all members who have ceased to be employed in the Canadian Forces and are still covered under the SDB plan. Such right is limited to members who, at the time they ceased to be employed in the Canadian Forces, had at least five years of continuous service in the Canadian Forces or membership in the SDB plan.

Members in receipt of an annual allowance or entitled to a deferred annuity under the CFSA upon cessation of employment may elect to continue their full coverage under the SDB plan, otherwise their membership is discontinued. This election must be made within the 13-month period running from one year before to the 30th day following cessation of employment. The insured death benefit is extended for 30 days after the date of cessation whether or not the member exercises the right of election.

An inactive member who becomes a participant in the Public Service Death Benefit (PSDB) Plan ceases to be a participant in this plan (i.e. RFDB). Any such person who subsequently ceases to be a participant in the PSDB Plan, without entitlement to an immediate annuity under the *Public Service Superannuation Act*, is deemed thereupon to regain the status of retired participant in the RFDB.

B- Amount of Insured Death Benefit

Subject to the applicable reductions described below, the insured benefit payable in case of death of a member is equal to the member's annual rate of pay*, if it is a multiple of \$250, and otherwise to the next higher multiple of \$250. The annual rate of pay* of an inactive member is defined as the annual rate of pay at the time of cessation of employment in the Canadian Forces.

Members entitled to an immediate annuity under the CFSA upon cessation of employment may then elect to reduce their amount of insured death benefit to \$500.

The amount of insurance described in the first paragraph above is reduced by 10% a year starting at age 61 until it would normally vanish at age 70. However, the amount of insurance cannot be reduced below a basic floor value of \$500.

C- Contributions

1. Active Members, and Inactive Members in Receipt of an Immediate Annuity

For active members, and for inactive members in receipt of an immediate annuity under Part I of the CFSA or the *Defence Services Pension Continuation Act* (DSPCA) on ceasing to be employed in the regular force, the rate of contribution is \$0.05 per month for each \$250 of insured benefit. At attainment of age 65 (or completion of five years of service, if later), the total contribution is reduced by \$0.10 per month in recognition of the fact that a \$500 portion of the insured death benefit becomes paid-up for the remaining lifetime of the member.

2. Inactive Members in Receipt of an Annual Allowance or Entitled to a Deferred Annuity

For inactive members in receipt, on ceasing to be employed in the regular force, of an annual allowance or entitled to a deferred annuity, the applicable contribution rate varies in accordance with the attained age of the member, and the corresponding contributions start being chargeable on the 30th day immediately following the date on which the member ceases to be employed. The adjacent table shows the applicable rates for quinary ages:

Age last birthday	Contribution per \$1,000 of insured benefit	
	Annual	Monthly
25	\$ 9.70	\$ 0.82
30	11.42	0.97
35	13.58	1.15
40	16.29	1.39
45	19.72	1.67
50	24.11	2.05
55	29.80	2.53
60	37.65	3.20

* For this purpose in respect of both active and inactive members, the annual rate of pay is taken as not less than \$3,000 for rank lower than warrant officer, and \$5,000 for warrant officer rank or higher.

3. Government

(a) Term Insurance

The government credits monthly to the Regular Force Death Benefit Account an amount equal to one-sixth of the total amount of death benefits actually payable (excluding the individual \$500 paid-up portions of insured benefits), at the time of their death during that month, in respect of active members and inactive members in receipt of an immediate annuity.

(b) Paid-up Insurance

In addition, the government credits to the Account, when a member reaches age 65, the single premium for the individual \$500 paid-up portion of insured benefit in respect of which contributions are no longer required from the member.

This single premium rate for each \$1 of paid-up insured benefit is computed on the basis of the Canada Life Tables for 1950-1952 and interest at 4% per annum. The amount of single premium for each individual \$500 paid-up portion of insured benefit is shown in the adjacent table:

Age nearest birthday	Single Premium (\$)	
	Males	Females
65	310	291
66	316	298
67	323	306
68	329	313
69	336	320
70	343	328
71	349	335
72	356	342
73	362	349
74	369	356
75	375	363

D- Interest

The Regular Force Death Benefit Account is credited quarterly with interest calculated on the balance in the Account, in accordance with section 55 of the *Supplementary Death Benefits Regulations*. The rates specified in the regulations are the same as those used in respect of the Canadian Forces Superannuation Account. These rates, which vary from quarter to quarter, are deemed to apply to notional investments in long-term Government of Canada securities and correspond to those prescribed for purposes of the Canada Pension Plan. For the quarter ended 31 December 1990, the effective rate of interest per quarter was 2.641% which is equivalent to an effective annual rate of 10.99%.

APPENDIX 2

Sample Demographic Assumptions

Table 2A

Assumed Seniority and Promotional Salary Increases

Service*	Officers %	Other Ranks %	Service*	Officers %	Other Ranks %
0	17.5	15.7	20	1.7	1.7
1	18.4	14.6	21	1.7	1.5
2	19.6	13.1	22	1.5	1.6
3	18.9	10.3	23	1.5	1.5
4	16.4	6.7	24	1.5	1.6
5	11.9	4.1	25	1.3	1.4
6	8.4	2.4	26	1.2	1.3
7	6.3	1.9	27	1.2	1.3
8	5.4	1.4	28	1.2	1.4
9	4.8	1.4	29	1.1	1.3
10	4.2	1.3	30	0.8	1.1
11	3.9	1.2	31	0.8	0.9
12	3.6	1.5	32	0.8	0.9
13	2.9	1.5	33	0.8	0.8
14	2.4	1.5	34	0.8	0.4
15	2.1	1.6	35	0.4	0.0
16	2.1	1.7	36	0.2	0.0
17	1.9	1.6	37	0.3	0.0
18	1.9	1.6	38	0.0	0.0
19	1.7	1.6	39 up	0.0	0.0

* Expressed in completed years.

Table 2B

**Sample Rates of Retirement/Withdrawal Assumed for Active Members
(with less than 20 years of service)**

Age nearest birthday	Officers		Other Ranks			
			Male		Female	
	Male	Female	Select*	Ultimate**	Select*	Ultimate**
17 and under	0.351	0.259	0.071	0.088	0.072	0.115
20	0.089	0.104	0.062	0.087	0.069	0.096
25	0.044	0.064	0.047	0.062	0.064	0.074
30	0.044	0.075	0.035	0.032	0.058	0.056
35	0.021	0.057	0.030	0.013	0.048	0.032
40	0.010	0.025	0.025	0.005	0.038	0.014
45	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
55 to 59	0.250	0.250	0.250	0.250	0.250	0.250

* Applicable from 1991 to 1993 inclusive.

** Applicable after 1993.

Table 2C

**Assumed Rates of Retirement for Active Members
(with 20 or more years of service)**

Age nearest birthday	Officers	Other Ranks	
		Select*	Ultimate**
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 to 59	0.650	0.907	0.900

* Applicable from 1991 to 1993 inclusive.

** Applicable after 1993.

Table 2D**Sample of Assumed Disability Rates***

Age nearest birthday	Male		Female
	Officers	Other Ranks	Officers / Other Ranks
17 and under	0.0022	0.009	0.0016
20	0.0022	0.007	0.0037
25	0.0018	0.004	0.0042
30	0.0010	0.002	0.0025
35	0.0007	0.002	0.0027
40	0.0010	0.004	0.0035
45	0.0012	0.005	0.0049
50	0.0025	0.008	0.0072
55	0.0042	0.017	0.0104
59	0.0048	0.022	0.0143

* Disability assumed to be permanent with no recovery possible.

Table 2E**Sample of Mortality Rates Assumed for 1991
in Respect of Active Members**

Age nearest birthday	Males	Females
20	.0007	.0003
25	.0008	.0004
30	.0008	.0005
35	.0008	.0006
40	.0011	.0009
45	.0018	.0014
50	.0028	.0021
55	.0057	.0029
59*	.0073	.0040

* It was assumed that the highest age for an active member is 59 years.

Table 2F

**Sample of Mortality Rates Assumed for 1991
in Respect of Retirement Pensioners**

Age nearest birthday	Male		Female
	Officers	Other Ranks	Officers / Other Ranks
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

Table 2G

**Sample of Mortality Rates Assumed for 1991
in Respect of Disabled Pensioners**

Age nearest birthday	Male		Female	
	Officers	Other Ranks	Officers	Other Ranks
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

Table 2H

**Annual Longevity Improvement Factors
Assumed for 1992 and Later Years**

Age nearest birthday	Assumed constant annual reduction in 1991 mortality (as a percentage)	
	Males	Females
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	1.30	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 3

Summaries of Data

Table 3A

Active Members as at 31 December 1990

Officers

Age nearest birthday	Number			Insured Benefits in thousands of dollars		
	Male	Female	Total	Male	Female	Total
to 24	2,612	507	3,119	48,016	9,359	57,375
25-29	3,612	541	4,153	139,967	20,950	160,917
30-34	2,925	314	3,239	146,347	14,811	161,158
35-39	2,202	190	2,392	126,056	10,266	136,322
40-44	1,927	150	2,077	117,651	8,417	126,068
45-49	1,787	59	1,846	114,260	3,453	117,713
50-54	1,047	30	1,077	67,860	1,726	69,586
55-59	192	2	194	13,267	117	13,384
Subtotal	16,304	1,793	18,097	773,423	69,099	842,522

Other Ranks

Age nearest birthday	Number			Insured Benefits in thousands of dollars		
	Male	Female	Total	Male	Female	Total
to 24	13,267	1,936	15,203	292,926	40,859	333,785
25-29	16,835	2,493	19,328	551,176	78,378	629,554
30-34	13,127	1,948	15,075	479,022	68,457	547,479
35-39	7,500	801	8,301	289,284	29,635	318,919
40-44	5,909	286	6,195	242,465	11,138	253,603
45-49	3,338	38	3,376	144,041	1,521	145,561
50-54	1,561	14	1,575	69,964	579	70,543
55-59	132	0	132	6,137	0	6,137
Subtotal	61,669	7,516	16,304	2,075,014	230,566	2,305,580
Total	77,973	9,309	34,401	2,848,437	299,665	3,148,103

Table 3B

**Inactive Members in Receipt of an Immediate Annuity
Because of Disability as at 31 December 1990**

Age nearest birthday	Officers					
	Number			Insured Benefits in thousands of dollars		
	Male	Female	Total	Male	Female	Total
to 24	0	0	0	0.0	0.0	0.0
25-29	1	0	1	33.6	0.0	33.6
30-34	4	0	4	197.1	0.0	197.1
35-39	10	3	13	353.2	133.5	486.7
40-44	7	3	10	292.3	121.3	413.6
45-49	29	4	33	965.7	170.4	1,136.1
50-54	30	1	31	843.0	21.7	864.6
55-59	34	1	35	897.6	29.8	927.4
60-64	54	1	55	653.1	12.4	665.5
65-69	90	4	94	313.9	5.6	319.6
70-74	53	1	54	28.4	0.5	28.9
75-79	16	0	16	8.0	0.0	8.0
80-84	0	0	0	0.0	0.0	0.0
85-89	1	0	1	0.5	0.0	0.5
Subtotal	329	18	347	4,586.4	495.2	5,081.6
Age nearest birthday	Other Ranks					
	Number			Insured Benefits in thousands of dollars		
	Male	Female	Total	Male	Female	Total
to 24	0	0	0	0.0	0.0	0.0
25-29	6	6	12	199.5	209.2	408.7
30-34	83	16	99	2,686.0	524.0	3,210.0
35-39	127	16	143	3,784.5	458.8	4,243.3
40-44	306	11	317	7,875.0	302.0	8,177.0
45-49	495	2	497	10,213.9	56.9	10,270.8
50-54	762	0	762	12,644.0	0.0	12,644.0
55-59	1,021	1	1,022	12,087.1	7.8	12,094.8
60-64	926	3	929	6,865.9	25.1	6,890.9
65-69	684	0	684	1,631.5	0.0	1,631.5
70-74	367	0	367	183.5	0.0	183.5
75-79	57	0	57	28.5	0.0	28.5
80-84	6	0	6	3.0	0.0	3.0
Subtotal	4,840	55	4,895	58,202.4	1,583.8	59,786.0
Total	5,169	73	5,242	62,788.8	2,079.0	64,867.6

Table 3C

**Inactive Members in Receipt of an Immediate Annuity for Reasons
Other than Disability as at 31 December 1990**

Age nearest birthday	Officers			Insured Benefits in thousands of dollars		
	Male	Female	Total	Male	Female	Total
to 24	0	0	0	0.0	0.0	0.0
25-29	0	0	0	0.0	0.0	0.0
30-34	2	1	3	115.5	41.5	157.0
35-39	22	1	23	1,213.8	89.9	1,303.7
40-44	353	7	360	19,671.6	372.6	20,044.1
45-49	734	10	744	38,658.4	549.2	39,207.6
50-54	1,088	16	1,104	53,764.8	791.7	54,556.5
55-59	1,666	28	1,694	76,127.2	1,335.1	77,462.3
60-64	1,758	40	1,798	52,584.4	1,088.6	53,673.0
65-69	2,161	26	2,187	15,184.0	194.1	15,378.1
70-74	2,078	25	2,103	1,241.0	14.4	1,255.4
75-79	974	19	993	486.5	9.0	495.5
80-84	253	4	257	126.5	2.0	128.5
85-89	40	0	40	20.0	0.0	20.0
90 up	1	0	1	0.5	0.0	0.5
Subtotal	11,130	177	11,307	259,194.2	4,488.1	263,682.2
Age nearest birthday	Other Ranks			Insured Benefits in thousands of dollars		
	Male	Female	Total	Male	Female	Total
to 24	0	0	0	0.0	0.0	0.0
25-29	2	0	2	71.3	0.0	71.3
30-34	11	7	18	348.2	224.9	573.1
35-39	98	7	105	3,551.1	222.2	3,773.4
40-44	1,581	43	1,624	56,927.9	1,501.8	58,429.7
45-49	3,775	39	3,814	122,642.0	1,182.3	123,824.4
50-54	6,718	57	6,775	177,381.9	1,564.0	178,945.9
55-59	8,452	41	8,493	181,889.8	844.6	182,734.3
60-64	6,366	17	6,383	87,114.6	212.8	87,327.4
65-69	5,072	6	5,078	21,817.6	35.5	21,853.1
70-74	3,408	6	3,414	1,728.2	3.1	1,731.3
75-79	1,352	0	1,352	675.5	0.0	675.5
80-84	293	0	293	146.5	0.0	146.5
85-89	28	0	28	14.0	0.0	14.0
90 up	1	0	1	0.5	0.0	0.5
Subtotal	37,157	223	37,380	654,309.1	5,791.2	660,100.4
Total	48,287	400	48,687	913,503.3	10,279.3	923,782.6