

Office of the Superintendent
of Financial Institutions

Bureau du surintendant
des institutions financières

Actuarial Report
as at 31 December 1993
on the

REGULAR FORCE
Death Benefit Account

Canada

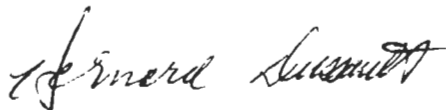
5 October 1995

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 1993, of the Regular Force Death Benefit Account established under Part II of this Act.

Yours sincerely,

A handwritten signature in cursive script, appearing to read "Bernard Dussault".

Bernard Dussault
Chief Actuary

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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 has been prepared in accordance with section 71 of the CFSA which, pursuant to Bill C-55 enacted 29 September 1992, now encompasses supplementary death benefits since 5 October 1992 for purposes of subsection 3(1) of the *Public Pensions Reporting Act* (PPRA).

The previous actuarial report was prepared as at 31 December 1990. During the period from 1 January 1991 to December 1993, Bill C-55 brought important changes to the plan provisions by doubling the basic death benefit and by increasing the paid-up benefit from \$500 to \$5,000. The applicable contribution rate in respect of members was redefined at \$0.05 for every \$250 of the participant's salary (formerly \$0.05 for every \$250 of the participant's amount of insurance). The applicable government contribution rate in respect of the basic insured benefits was cut in half from one sixth to one-twelfth of the expected annual costs, while government contributions in respect of the paid-up insured benefits have remained unchanged.

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

II- Data

A- Overview

As at 31 December 1993, the supplementary death benefit plan included 134,884 members* . Of this number, 76,518 were active members and, 58,366 were inactive members in receipt of an immediate annuity. The total amount of death benefits insured at that date was \$8,655.7 million.

B- Source

The valuation data in respect of members are maintained on electronic files at 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.

In accordance with section 8 of the PPRA, the Comptroller General of Canada provided a certification of the assets of the plan for purposes of this valuation.

C- Validation

The records 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, starting on page 30 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 38 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 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 \$5,000 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 (shown on page 5), is sufficient to pay for each individual \$5,000 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 1988 and 31 December 1993.
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 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 \$5,000 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

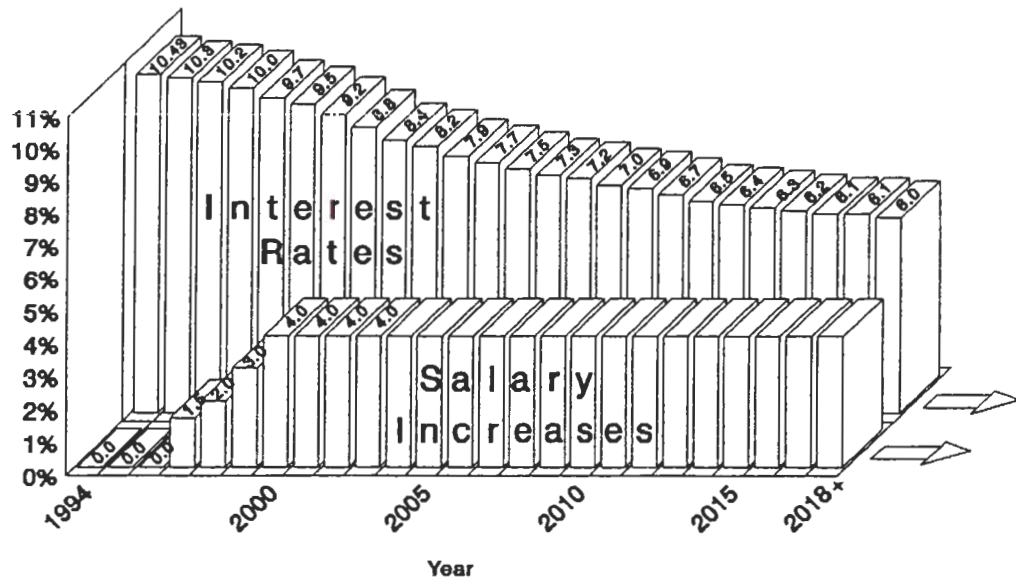
In respect of total insured death benefits in force paid for on a term basis, the estimated cost of insurance for a given month is equal to the corresponding amount of insured death benefits in force during that month multiplied by the mortality rate (probability of death estimated by age, sex and rank) 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, including the assumed seniority and promotional increases (Table 2A, page 22), are those adopted for the actuarial report (as at 31 December 1993) on the pension plan for the Canadian Forces. For 1994, however, the interest assumption, corresponding to the projected fund yield, has been replaced by the actual fund yield for that year. Moreover, the 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 future 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 four years where the size of the regular force is expected to be reduced to approximately 66,700 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 1991 to 31 December 1993.

2. Termination Rates

For active members, the probabilities of terminating employment and of retiring are the same as those assumed for purposes of the actuarial report (as at 31 December 1993) on the pension plan for the Canadian Forces (Tables 2B to 2D, page 23). 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 1993, 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

Current data indicate that the percentage of healthy and disabled members electing to reduce to \$5,000 their amount of insured death benefit is virtually nonexistent. Accordingly, no member was assumed to make such an election.

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 1994 (Table 2E, page 26) are those adopted for the actuarial report (as at 31 December 1993) on the pension plan for the Canadian Forces. These mortality rates are the same rates as used in the previous valuation for calendar year 1991, but projected three years to 1994 for mortality improvements. The mortality rates of the previous report were based on 95% of the graduated 1984-1989 experience under the pension plan for the Public Service but projected one year to 1991 for mortality improvements.

The mortality rates deemed to apply after 1994 are those assumed for 1994 and adjusted by the longevity improvement factors shown in Table 2H, page 29. The projection scale was derived by giving 50% credibility to a modified version of Projection Scale H, and 50% credibility to the Projection Scale AA, both scales as published by 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 those adopted for the actuarial report (as at 31 December 1993) on the pension plan for the Canadian Forces.

The mortality rates for retired male pensioners are based on the 1984-1987 experience and for retired female pensioners, on the 1983 GAM Table with a one year age set-back. Both sets of mortality rates were projected to 1994 for mortality improvements.

The mortality rates for disabled pensioners are based on proportions of the rates according to the Life Tables 1985-87, Canada: 110% for officers and 140% for other ranks. These rates were projected to 1994 for mortality improvements.

The 1994 mortality rates are shown for retired pensioners in Table 2F on page 27 and for disabled pensioners in Table 2 on page 28. Mortality rates for years after 1994 are obtained by applying to the 1994 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)
Total assets as at 31 December 1993	155.2
<hr/>	
Liabilities	(\$ millions)
Actuarial liability in respect of the \$5,000 paid-up insured death benefit for members at age 65 and over	40.8
Reserve for claims incurred but unreported, and reported but not paid	3.4
Margin against adverse fluctuations	2.7
Total liabilities as at 31 December 1993	46.9
<hr/>	
Surplus	(\$ millions)
As at 31 December 1993	108.3
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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 1994 was \$28.9 million. Insured benefits include the term insurance (two times annual salary) and the paid-up insurance (individual \$5,000 portions).

(a) Paid-up Insurance

The amount of total related benefits paid in 1994 was \$5.2 million. Considering the actual total insured benefits of \$92.5 million during 1994, the total actual related benefit rate of payment was \$4.68 per month per \$1,000 of insured benefit in 1994. On the other hand, the estimated 1993 year-end single premium (cost) at age 65 per \$1,000 of insured benefit is \$320.36 and \$227.68 for males and females, respectively. The corresponding contribution rates (item 3.(b), page 19) applicable for each \$1,000 of paid-up insured benefits are \$62 and \$58, respectively.

(b) Term Insurance

The total related cost for 1994 was \$23.7 million. Considering the actual total insured benefits of \$8,535.7 million during 1994, the total actual cost rate was \$0.231 per month per \$1,000 of insured benefit in 1994.

Active and inactive members in receipt of an immediate annuity are required by statute to contribute monthly \$0.20 per \$1,000 of salary or, \$0.099 per \$1,000 of coverage. On the other hand, the government contributes monthly an amount equal to one-twelfth 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 1994, this government monthly contribution is estimated at \$0.019 per \$1,000 of insured benefit. Therefore, the total amount contributed by members and the government in respect of these members is \$0.118 per month per \$1,000 of insured benefit, as compared to the estimated monthly cost (paragraph above) of these benefits in 1994 of \$0.231 per \$1,000 of insured benefit.

From the annual report on the administration of the CFSA for each of the 14 years up to 31 March 1994, 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 fluctuate 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
1990	0.233
1991	0.221
1992	0.217
1993	0.211
1994	0.214

2. Projected Costs and Applicable Contributions

(a) Paid-up Insurance

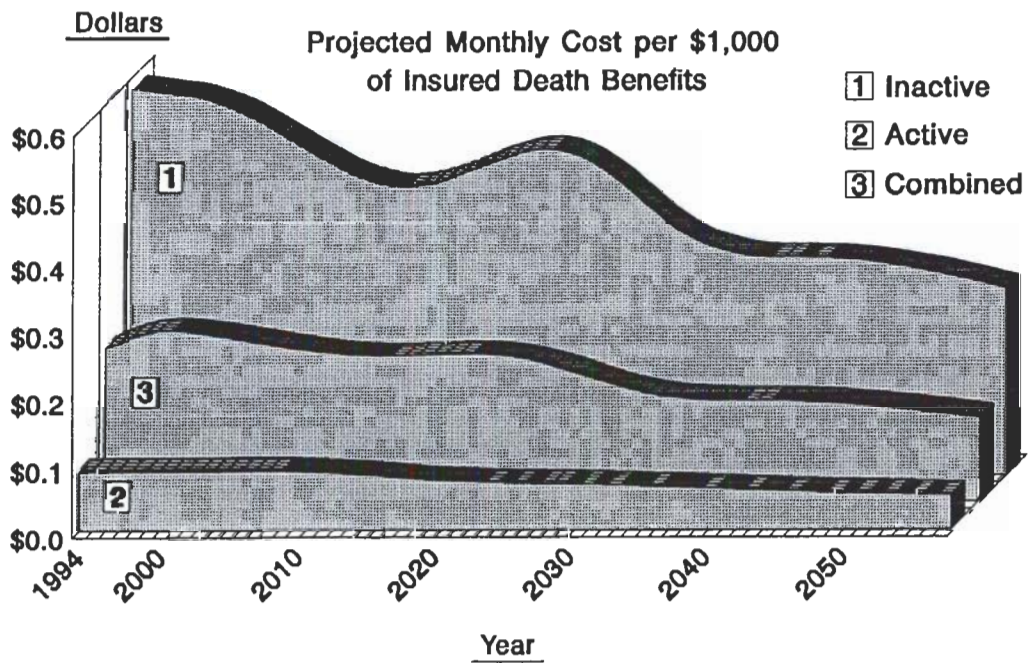
Consistent with the assumed improvements in longevity, the single premium for the paid-up insurance would normally decrease over time. However, the assumed interest rate is lower at 6.0% ultimately than 10.43% for 1994. From the 1993 year-end to the 2050 year-end, the net effect of longevity improvements and decreasing assumed interest rates, on the single premiums at age 65 per \$1,000 of insured benefit, is an increase from \$320.36 to \$326.18 for males, and from \$227.68 to \$259.85 for females. The corresponding contributions rates (item 3.(b), page 19) applicable for each \$1,000 of paid-up insured benefits are \$62 and \$58, respectively.

(b) Term Insurance

The monthly cost per \$1,000 of term insurance is expected to increase gradually to a level of approximately \$0.255 until 1999, and thereafter to decrease gradually to \$0.142 by 2050. This compares with the aggregate contribution rate of \$0.118 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 1994 to 2050.

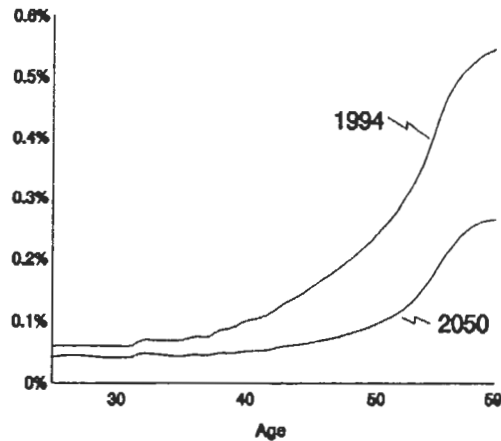
Projected Monthly Cost per \$1,000 of Insured Death Benefits

Category of Participants	1994	2000	2010	2025	2050
Active members	0.087	0.087	0.087	0.070	0.055
Inactive members in receipt of an immediate annuity	0.580	0.560	0.451	0.488	0.313
Active and inactive members combined	0.231	0.254	0.223	0.212	0.142



For active members, the monthly cost expected for 2050 for the term insurance is 63.22% of the monthly cost estimated for 1994. 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 29 applied to the current mortality rates shown in Table 2E on page 26. The following graphic shows the mortality rates (both sexes combined) deemed applicable for 1994 and the corresponding mortality rates assumed for 2050.



- ii) The 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 46.03% from the monthly cost estimated for 1994. This reduction is mostly the result of the lower mortality assumed for 2050.

In aggregate, the 1994 cost in respect of active and inactive members in receipt of an immediate annuity is expected to decrease by 38.48% 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 29.21% in 1994 to 33.85% 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 \$108.3 million as at 31 December 1993. It corresponds to 3.7 times the total amount of death benefits estimated to be payable during 1994 while the total contributions in 1994 by and in respect of all members correspond to 44% of these benefits. By comparison, the surplus as at 31 December 1990 under the previous report was \$113.3 million. It corresponded to 10.5 times the amount of death benefits payable during 1991 while the total 1991 contributions corresponded to 112% of these benefits.

2. Long Term Outlook

As explained in Section B above, the members' and government's contributions currently applicable (paragraph B-1., above and item C-, page 18) are less than the estimated present and future costs (paragraph B-2. above). This shortfall, even reduced by the future interest accruals on the Account, results in a continuously decreasing surplus, whether expressed in absolute dollar amounts or as a multiple of the expected annual benefits payments. The surplus is expected to become exhausted during the year 2004.

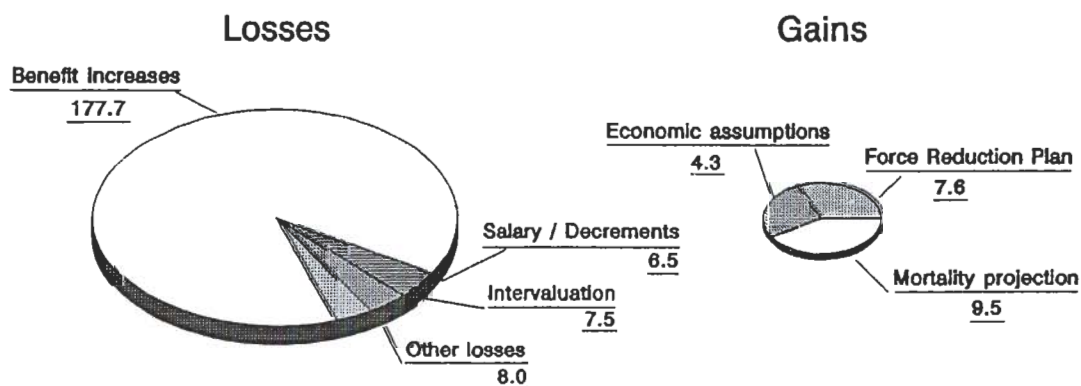
**Ratio of Projected Surplus
to Annual Benefit Payments in Following Year**

	1994	2000	2010	2025	2050
Without insured benefit increases	11.7	18.6	30	47.9	130.6
With insured benefit increases	3.7	1.3	(3.8)	(14.4)	(47.1)

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 1990	0.144	131.2
· effect of intervaluation experience versus assumptions	0.000	(7.5)
· changes in population composition	0.002	(4.1)
· changes to age/service from <i>nearest</i> to <i>last</i> basis	0.001	(0.6)
· changes in economic assumptions	(0.001)	4.3
· changes in assumed promotional salary increases and assumed decrements other than mortality	0.001	(6.5)
· changes in assumed base-year mortality rates	0.002	(3.3)
· changes in mortality projection factors	(0.008)	9.5
· changes in new entrant assumption and effect of Force Reduction Plan	0.002	7.6
· Increases in insured benefits	(0.001)	(177.7)
This report as at 31 December 1993	0.142	(47.1)

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



VI- Conclusions**A- Surplus**

There is still a large surplus as at 31 December 1993 in the Regular Force Death Benefit Account. However, the increase in the amount of insured death benefits recently implemented pursuant to Bill C-55 without any increase in total contributions is expected to reduce this surplus until it would become exhausted during year 2004. The actuarial projections of this report therefore indicate that the current contributions rates would need to be increased by year 2004.

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 1993,
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 means:

- (a) a member of the regular force on 31 December 1993, or
- (b) a member of the reserve force on 31 December 1993 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 means 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 two times 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 in receipt of an immediate annuity under the CFSA upon cessation of employment may then elect to reduce their amount of insured death benefit to \$5,000 (\$500 before enactment of Bill C-55).

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 \$5,000 subject to the following exception:

- for those inactive members who had upon cessation of employment prior to the enactment of Bill C-55, made an election to reduce their insured death benefit to \$500 and further had made a second election to keep their insured death benefit at \$500 within one year following the introduction of Bill C-55, the floor value is \$500 instead of \$5,000. Such elections are irrevocable.

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 salary. At attainment of age 65 (or completion of five years of service, if later), the total contribution is reduced by \$0.50 per month in recognition of the fact that a \$5,000 portion of the insured death benefit becomes paid-up for the remaining lifetime of the member.

* 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.

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, to 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

3. Government

(a) Term Insurance

The government credits monthly to the Regular Force Death Benefit Account an amount equal to one-twelfth of the total amount of death benefits actually payable (excluding the individual \$5,000 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 \$5,000 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 Canadian Life Tables 1950-1952 and interest at 4% per annum. The amount of contribution for each individual \$5,000 paid-up portion of insured benefit corresponds to 1/10 of the single premium rate described above and 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 1993, the effective rate of interest per quarter was 2.557% which is equivalent to an effective annual rate of 10.63%.

APPENDIX 2

Sample Demographic Assumptions

Table 2A

Assumed Seniority and Promotional Salary Increases

Pensionable Service*	Officers (%)	Other Ranks (%)	Pensionable Service*	Officers (%)	Other Ranks (%)
1	11.1	18.8	21	1.7	1.7
2	16.5	17.9	22	1.7	1.5
3	18.6	16.8	23	1.5	1.6
4	19.7	13.8	24	1.5	1.5
5	16.8	8.6	25	1.5	1.6
6	11.9	4.0	26	1.3	1.4
7	8.6	1.9	27	1.2	1.3
8	6.3	1.5	28	1.2	1.3
9	5.4	1.4	29	1.2	1.4
10	4.8	1.4	30	1.1	1.3
11	4.2	1.3	31	0.8	1.1
12	3.9	1.2	32	0.8	0.9
13	3.6	1.5	33	0.8	0.9
14	2.9	1.5	34	0.8	0.8
15	2.4	1.5	35	0.8	0.4
16	2.1	1.6	36	0.4	0.0
17	2.1	1.7	37	0.2	0.0
18	1.9	1.6	38	0.3	0.0
19	1.9	1.6	39	0.0	0.0
20	1.7	1.6	40 and over	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 Last Birthday	Officers		Other Ranks			
	Male	Female	Male		Female	
			Select*	Ultimate**	Select*	Ultimate**
20	0.062	0.079	0.075	0.086	0.091	0.093
25	0.051	0.062	0.051	0.059	0.068	0.072
30	0.040	0.083	0.033	0.030	0.051	0.054
35	0.017	0.047	0.028	0.012	0.038	0.029
40	0.012	0.023	0.023	0.005	0.026	0.014
45	0.029	0.030	0.020	0.020	0.031	0.050
50	0.090	0.090	0.032	0.020	0.050	0.050
55	0.250	0.250	0.083	0.250	0.250	0.250
59	0.250	0.250	0.083	0.250	0.250	0.250

* Applicable from 1994 to 1996

** Applicable after 1996

Table 2C

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

Age Last Birthday	Officers	Other Ranks	
		Select*	Ultimate**
33 and under	N/A	N/A	N/A
34	0.108	0.120	0.075
35	0.078	0.120	0.075
36	0.059	0.117	0.075
37	0.054	0.111	0.075
38	0.058	0.098	0.075
39	0.067	0.094	0.075
40	0.064	0.094	0.075
41	0.050	0.102	0.083
42	0.045	0.114	0.103
43	0.047	0.133	0.115
44	0.056	0.122	0.108
45	0.074	0.116	0.100
46	0.086	0.126	0.105
47	0.092	0.140	0.121
48	0.097	0.167	0.158
49	0.105	0.225	0.238
50	0.112	0.235	0.250
51	0.119	0.223	0.210
52	0.149	0.227	0.210
53	0.260	0.325	0.287
54	0.450	0.574	0.607
55	0.622	0.826	0.875
56	0.700	0.937	0.900
57 to 59	0.700	0.950	0.900

* Applicable from 1994 to 1996

** Applicable after 1996

Table 2D

Sample of Assumed Disability Rates*

Age Last Birthday	Male		Female
	Officers	Other Ranks	Officers / Other Ranks
20	0.0022	0.0068	0.0040
25	0.0017	0.0040	0.0040
30	0.0009	0.0022	0.0025
35	0.0007	0.0022	0.0027
40	0.0010	0.0041	0.0036
45	0.0012	0.0050	0.0051
50	0.0027	0.0087	0.0075
55	0.0042	0.0180	0.0108
59	0.0049	0.0223	0.0148

* Disability assumed to be permanent with no recovery possible.

Table 2E

**Sample of Mortality Rates Assumed for 1994
in Respect of Active Members**

Age Last Birthday	Males	Females
20	0.0007	0.0003
25	0.0008	0.0004
30	0.0007	0.0005
35	0.0008	0.0006
40	0.0011	0.0009
45	0.0018	0.0013
50	0.0028	0.0020
55	0.0059	0.0030
59*	0.0070	0.0039

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

Table 2F

**Sample of Mortality Rates Assumed for 1994
in Respect of Retirement Pensioners**

Age Last Birthday	Male		Female
	Officers	Other Ranks	Officers / Other Ranks
25	0.0004	0.0006	0.0003
30	0.0005	0.0009	0.0004
35	0.0007	0.0012	0.0005
40	0.0011	0.0021	0.0007
45	0.0018	0.0026	0.0010
50	0.0032	0.0045	0.0014
55	0.0052	0.0079	0.0023
60	0.0090	0.0127	0.0044
65	0.0150	0.0208	0.0086
70	0.0222	0.0344	0.0137
75	0.0400	0.0532	0.0227
80	0.0671	0.0770	0.0394
85	0.1050	0.1117	0.0677
90	0.1568	0.1650	0.1163
95	0.2293	0.2373	0.1862
100	0.3235	0.3301	0.2764
105	0.4957	0.4957	0.3836
109	1.0000	1.0000	1.0000

Table 2G

**Sample of Mortality Rates Assumed for 1994
in Respect of Disabled Pensioners**

Age Last Birthday	Male		Female	
	Officers	Other Ranks	Officers	Other Ranks
25	0.0014	0.0020	0.0004	0.0006
30	0.0014	0.0029	0.0005	0.0007
35	0.0015	0.0048	0.0007	0.0009
40	0.0021	0.0063	0.0011	0.0014
45	0.0032	0.0077	0.0019	0.0024
50	0.0055	0.0103	0.0032	0.0041
55	0.0094	0.0146	0.0050	0.0064
60	0.0152	0.0220	0.0078	0.0099
65	0.0243	0.0331	0.0122	0.0155
70	0.0380	0.0476	0.0194	0.0247
75	0.0589	0.0653	0.0322	0.0409
80	0.0906	0.0903	0.0541	0.0688
85	0.1395	0.1353	0.0936	0.1192
90	0.2106	0.2173	0.1589	0.2022
95	0.3131	0.3606	0.2595	0.3303
100	0.4114	0.5999	0.3728	0.4745
105	0.9378	1.0000	0.9321	1.0000
109	1.0000	1.0000	1.0000	1.0000

Table 2H

**Annual Longevity Improvement Factors
Assumed for 1995 and Later Years**

Age Last Birthday	Assumed constant annual reduction in 1994 mortality (as a percentage)	
	Males	Females
20	1.00	1.05
25	0.55	0.95
30	0.50	0.88
35	0.63	1.18
40	0.90	1.63
45	1.40	1.68
50	1.65	1.60
55	1.60	1.15
60	1.45	1.00
65	1.35	1.00
70	1.38	1.00
75	1.33	1.13
80	1.10	1.08
85	0.80	0.83
90	0.48	0.50
95	0.10	0.20
100	0.00	0.00
105	0.00	0.00
109	0.00	0.00

APPENDIX 3

Summaries of Data

Table 3A

Active Members as at 31 December 1993

Officers

Age Last Birthday	Number			Insured Benefits in thousands of dollars		
	Male	Female	Total	Male	Female	Total
to 24	2,192	507	2,699	89,422	18,216	107,638
25-29	2,843	474	3,317	247,710	41,403	289,113
30-34	3,285	350	3,635	342,978	35,699	378,677
35-39	2,441	234	2,675	291,548	25,823	317,371
40-44	1,721	148	1,869	218,553	17,716	236,269
45-49	1,730	88	1,818	230,774	10,671	241,445
50-54	1,172	26	1,198	159,590	3,301	162,890
55-59	90	1	91	12,983	113	13,096
Subtotal	15,474	1,828	17,302	1,593,558	152,941	1,746,499

Other Ranks

Age Last Birthday	Number			Insured Benefits in thousands of dollars		
	Male	Female	Total	Male	Female	Total
to 24	7,111	1,008	8,119	403,212	57,755	460,966
25-29	12,466	1,719	14,185	869,789	118,134	987,923
30-34	14,803	2,098	16,901	1,116,078	154,287	1,270,365
35-39	9,196	1,277	10,473	736,859	98,129	834,988
40-44	4,762	378	5,140	407,787	30,459	438,246
45-49	3,057	95	3,152	278,508	8,053	286,561
50-54	1,183	16	1,199	112,824	1,405	114,228
55-59	47	0	47	4,481	0	4,481
Subtotal	52,625	6,591	59,216	3,929,537	468,221	4,397,759
Total	68,099	8,419	76,518	5,523,095	621,163	6,144,258

Table 3B

**Inactive Members in Receipt of an Immediate Annuity
because of Disability as at 31 December 1993**

Age Last 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	76.7	0.0	76.7
30-34	3	1	4	267.6	97.7	365.3
35-39	8	0	8	756.1	0.0	756.1
40-44	12	5	17	934.2	451.3	1,385.6
45-49	22	5	27	1,673.2	499.4	2,172.6
50-54	36	3	39	3,165.6	176.6	3,342.2
55-59	45	1	46	3,065.0	59.4	3,124.4
60-64	45	0	45	1,503.1	0.0	1,503.1
65-69	63	2	65	522.8	21.5	544.2
70-74	75	4	79	375.0	20.0	395.0
75-79	26	0	26	130.0	0.0	130.0
80-84	3	0	3	15.0	0.0	15.0
85-89	1	0	1	5.0	0.0	5.0
Subtotal	340	21	361	12,489.2	1,325.9	13,815.1
Age Last 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	4	0	4	286.9	0.0	286.9
30-34	149	32	181	10,462.4	2,224.2	12,686.6
35-39	221	40	261	15,306.1	2,713.8	18,020.0
40-44	317	26	343	20,407.8	1,785.5	22,193.3
45-49	525	10	535	29,903.0	532.3	30,435.3
50-54	755	1	756	33,723.9	79.2	33,803.1
55-59	852	1	853	26,136.8	14.9	26,151.6
60-64	1,001	3	1,004	16,220.4	37.3	16,257.7
65-69	714	0	714	4,529.5	0.0	4,529.5
70-74	462	0	462	2,310.0	0.0	2,310.0
75-79	136	0	136	680.0	0.0	680.0
80-84	18	0	18	90.0	0.0	90.0
Subtotal	5,154	113	5,267	160,057.0	7,387.2	167,444.1
Total	5,494	134	5,628	172,546.2	8,713.0	181,259.2

Table 3C

**Inactive Members in Receipt of an Immediate Annuity for Reasons
Other than Disability as at 31 December 1993**

Age Last 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	76.7	0.0	76.7
30-34	4	0	4	514.5	0.0	514.5
35-39	49	4	53	5,840.6	488.4	6,329.0
40-44	284	14	298	32,835.4	1,741.9	34,577.3
45-49	780	21	801	87,867.3	2,353.5	90,220.8
50-54	1,278	29	1,307	139,775.9	3,206.2	142,982.1
55-59	1,765	40	1,805	187,468.5	4,350.7	191,819.3
60-64	1,893	31	1,924	126,949.0	1,961.7	128,910.7
65-69	1,641	34	1,675	27,742.8	582.7	28,325.5
70-74	2,262	25	2,287	11,305.0	120.5	11,425.5
75-79	1,300	21	1,321	6,495.0	100.0	6,595.0
80-84	369	6	375	1,845.0	30.0	1,875.0
85-89	70	1	71	350.0	5.0	355.0
90-94	6	0	6	30.0	0.0	30.0
Subtotal	11,702	226	11,928	629,095.8	14,940.6	644,036.4
Age Last 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	21	4	25	1,538.7	292.4	1,831.1
30-34	242	42	284	17,955.8	3,078.0	21,033.8
35-39	551	56	607	41,916.4	4,222.0	46,138.4
40-44	1,698	78	1,776	132,301.5	6,168.2	138,469.7
45-49	4,079	74	4,153	305,420.1	5,316.2	310,736.3
50-54	6,427	73	6,500	415,122.0	4,491.9	419,614.0
55-59	8,399	45	8,444	431,586.9	2,255.9	433,842.8
60-64	7,338	28	7,366	232,825.7	874.6	233,700.2
65-69	5,203	12	5,215	48,528.1	110.2	48,638.3
70-74	4,027	4	4,031	20,105.0	15.0	20,120.0
75-79	1,815	3	1,818	9,075.0	15.0	9,090.0
80-84	516	0	516	2,580.0	0.0	2,580.0
85-89	73	0	73	365.0	0.0	365.0
90-94	2	0	2	10.0	0.0	10.0
Subtotal	40,391	419	40,810	1,659,330.3	26,839.4	1,686,169.6
Total	52,093	645	52,738	2,288,426.1	41,779.9	2,330,206.0