



Office of the Superintendent of  
Financial Institutions Canada

Bureau du surintendant des  
institutions financières Canada

Office of the Chief Actuary

Bureau de l'actuaire en chef



# ACTUARIAL REPORT

on the

# REGULAR FORCE DEATH BENEFIT ACCOUNT

as at 31 March 2008

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18 September 2009

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

Dear Minister:

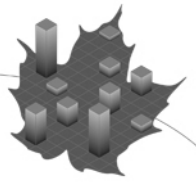
Pursuant to section 71 of the *Canadian Forces Superannuation Act*, I am pleased to submit the report on the actuarial review as at 31 March 2008 of the Regular Force Death Benefit Account established under Part II of this Act.

Yours sincerely,

A handwritten signature in cursive script that reads "Jean-Claude Ménard".

Jean-Claude Ménard, F.C.I.A., F.S.A.  
Chief Actuary



**TABLE OF CONTENTS**

	<u>Page</u>
I. Executive Summary .....	7
A. Purpose of this Actuarial Report.....	7
B. Valuation Basis .....	7
C. Main Findings .....	8
II. Financial Position of the Plan .....	10
A. Balance Sheet.....	10
B. Financial Position .....	10
C. Sensitivity of Valuation Results to Variations in Key Assumptions .....	10
III. Reconciliation of Results with Previous Report .....	12
IV. Legislated Contribution Rates .....	13
A. Paid-Up Insurance.....	13
B. Term Insurance .....	13
V. Actuarial Opinion .....	16

**APPENDICES**

Appendix 1	Summary of Plan Provisions.....	17
Appendix 2	Plan Assets .....	20
Appendix 3	Participant Data.....	24
Appendix 4	Methodology .....	29
Appendix 5	Economic Assumptions .....	31
Appendix 6	Demographic and Other Assumptions .....	33
Appendix 7	Acknowledgements.....	43



# ACTUARIAL REPORT

REGULAR FORCE Death Benefit Account  
as at 31 March 2008

## TABLES

	<u>Page</u>
Table 1	Balance Sheet ..... 10
Table 2	Reconciliation of Projected Results ..... 12
Table 3	Projected Monthly Cost..... 14
Table 4	Contribution per \$2,000 of Death Benefit..... 18
Table 5	Legislated Single Premium per \$5,000 of Paid-up Benefit..... 19
Table 6	Regular Force Death Benefit Account ..... 20
Table 7	Rates of Interest..... 21
Table 8	Account and Liabilities Projection..... 22
Table 9	Income and Expenditure Projection ..... 23
Table 10	Non-Elective Officers ..... 25
Table 11	Non-Elective Other Ranks ..... 26
Table 12	Elective Disabled (3A) Participants ..... 27
Table 13	Elective Retired and Disabled (3B) Participants..... 28
Table 14	Elective Participants Entitled to a Deferred Annuity ..... 28
Table 15	Summary of Economic Assumptions..... 32
Table 16	Assumed Rates of Increase in Non-Elective Participants ..... 35
Table 17	Assumed Seniority and Promotional Salary Increases..... 36
Table 18	Assumed Rates of Withdrawal ..... 37
Table 19	Assumed Election Proportions ..... 38
Table 20	Assumed Rates of Retirement ..... 39
Table 21	Assumed Rates of Termination due to Disability ..... 40
Table 22	Assumed Rates of Mortality..... 41
Table 23	Assumed Longevity Improvement Factors ..... 42

## FIGURES

	<u>Page</u>
Figure 1	Projected Ratio of Actuarial Excess to Annual Benefit Payments ..... 9
Figure 2	Projected Monthly Cost..... 14



## I. Executive Summary

This actuarial report on the Regular Force Death Benefit Account was made pursuant to Section 71 of the *Canadian Forces Superannuation Act* (CFSA) which states that “A valuation report on the state of the Regular Force Death Benefit Account shall be prepared ... in accordance with the *Public Pensions Reporting Act* and as if the supplementary death benefit plan established by this Part were a pension plan established under an Act referred to in subsection 3(1) of that Act”.

This actuarial valuation is as at 31 March 2008 and is in respect of the death benefits and contributions defined by Part II of the CFSA.

The previous actuarial report was made as at 31 March 2005. The date of the next periodic review is scheduled to occur no later than 31 March 2011.

### A. Purpose of this Actuarial Report

The purpose of this actuarial valuation is to determine the state of the Regular Force Death Benefit (RFDB) Account as well as to assist the President of the Treasury Board in making informed decisions regarding the adequacy of the legislated contribution rates. This is achieved by providing a realistic long-term projection of the RFDB Account based on the projected contributions and interest credited to the account and projected death benefits debited from the account.

### B. Valuation Basis

This valuation report is based on the supplementary death benefit (SDB) plan provisions enacted by legislation, summarized in Appendix 1.

The financial data on which this valuation is based is the RFDB Account. The account data is summarized in Appendix 2.

This valuation is based on the participant data summarized in Appendix 3. The methods and assumptions used to validate and correct the participant data have been updated since the last report. The most significant change was the decision to eliminate from the valuation population many of the elective participants who were not included in the annuitant data supplied by Public Works and Government Services Canada (PWGSC). As a result, the number of elective participants is approximately 1,500 less than it otherwise would have been and the actuarial excess is projected to become an actuarial deficit in 2022 instead of 2021.

This valuation was prepared using accepted actuarial practices, methods and assumptions which are summarized in Appendices 4 to 6.

This valuation takes into account plan amendments and new salary agreements since the last valuation, which are as follows:

- In May 2005 the Department of National Defence (DND) introduced new terms of service for members of the regular force. These terms of service differentiation were not included in the 31 March 2005 Actuarial Report on the Regular Forces Death Benefit Account. This valuation recognizes for the first time the new terms of service. The financial impact on the Account projection is minimal.



## ACTUARIAL REPORT

REGULAR FORCE Death Benefit Account  
as at 31 March 2008

- A salary increase of 2.0% was granted to most members of the regular force as at 1 April 2008 and salary increases will be 1.5% as at 1 April 2009 and 1 April 2010.

All actuarial assumptions used in this report are best-estimate assumptions. They are individually reasonable for the purposes of the valuation at the date of this report.

Actuarial assumptions used in the previous report were revised based on economic trends and demographic experience. A complete description of the assumptions is shown in Appendices 5 and 6.

Death benefits are paid from the Consolidated Revenue Fund and charged against the RFDB Account. Contributions by participants and the government are credited to the RFDB Account. Based on the balance of the RFDB Account, interest credits are calculated in such manner and at such rates and credited at such times as the RFDB Regulations provide. Therefore, the deterioration in financial markets since 31 March 2008 has no impact on the RFDB Account except insofar as long-term Government of Canada bond yields influence the interest credited by regulation.

### C. Main Findings

As at 31 March 2008, the plan has an actuarial excess of \$105 million resulting from the difference between the assets of \$197 million and the liabilities of \$92 million.

The actuarial excess is projected to gradually vanish and become a deficit during plan year<sup>1</sup> 2022 because projected annual benefits paid exceed for each plan year the sum of legislated contributions and projected interest credits.

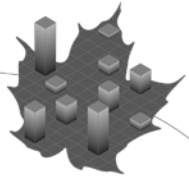
For the same reason, the RFDB Account is projected to become exhausted during plan year 2029.

Figure 1 shows the ratio of the projected actuarial excess at the end of the plan year to the annual benefit payments projected for the following plan year. This ratio is expected to decrease to zero by plan year 2022 as death benefits paid continue to exceed the combined projected contributions and interest credits for all future plan years.

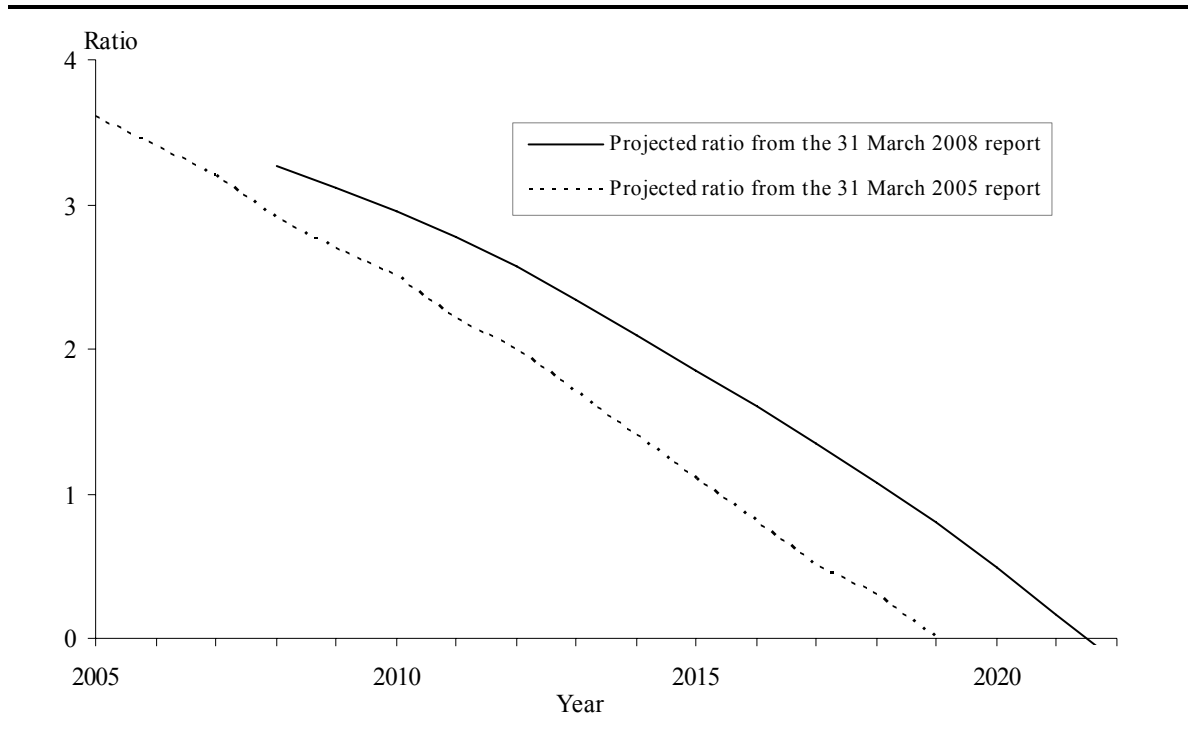
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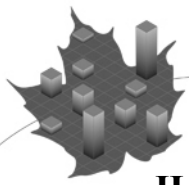
<sup>1</sup> Any reference to a given *plan year* in this report should be taken as the 12-month period ending 31 March of the given year.





**Figure 1 Projected Ratio of Actuarial Excess to Annual Benefit Payments**  
(Actuarial excess is measured at the end of the plan year and annual payments are those of the following plan year.)





# ACTUARIAL REPORT

REGULAR FORCE Death Benefit Account  
as at 31 March 2008

## II. Financial Position of the Plan

### A. Balance Sheet

The following balance sheet as at 31 March 2008 was prepared using the assets described in Appendix 2, the data described in Appendix 3, the methodology described in Appendix 4, and the assumptions described in Appendices 5 and 6. The results of the previous valuation are shown for comparison purposes.

**Table 1 Balance Sheet**  
(\$ millions)

	As at 31 March 2008	As at 31 March 2005
<b>Assets</b>	197	196
<b>Liabilities</b>		
Paid-up death benefit <sup>1</sup>	86	75
IBNR <sup>2</sup>	<u>6</u>	<u>5</u>
<b>Total Liabilities</b>	92	80
<b>Actuarial Excess</b>	105	116

### B. Financial Position

At 31 March 2008 the actuarial excess totals \$105 million, being 3.3 times the total amount of death benefits projected for plan year 2009. By comparison, the actuarial excess as at 31 March 2005 under the previous report was \$116 million, which was 3.4 times the amount of death benefits that were projected for plan year 2006.

As shown in Appendix 2 and explained in section IV below, the projected contributions to the plan are less than the projected death benefits for all future plan years. This projected annual shortfall is greater than the projected annual interest credits on the RFDB Account and accordingly entails a continuously decreasing actuarial excess. The actuarial excess is therefore projected to become an actuarial deficit during plan year 2022, while the RFDB Account is projected to become exhausted in plan year 2029.

### C. Sensitivity of Valuation Results to Variations in Key Assumptions

The following supplementary estimates indicate the degree to which the valuation results depend on some of the key assumptions. These resulting differences can also serve as a basis for approximating the effect of other numerical variations in a key assumption, to the extent that such effects are indeed linear.

<sup>1</sup> The \$5,000 portion of the basic benefit for which monthly contributions are no longer required from either the participant or the government. See Appendix 4 – F.1.

<sup>2</sup> Incurred but not reported claims. See Appendix 4 – F.2



## 1. Projected Interest Yields

As a measure of sensitivity, an increment of one percentage point in the projected yields would change from 2022 to 2025 the plan year during which the actuarial excess is projected to become exhausted as well as change from 2029 to 2033 the plan year during which the RFDB Account is projected to become exhausted.

On the opposite side, a decrease of one percentage point in the projected yields would change from 2022 to 2019 the plan year during which the actuarial excess is projected to become exhausted as well as change from 2029 to 2026 the plan year during which the RFDB Account is projected to become exhausted as well.

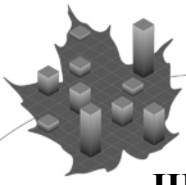
## 2. Mortality

If the assumed improvements in longevity after the 2009 plan year were disregarded, then the monthly benefit cost rate<sup>1</sup> of 13.3 cents projected for 2033 would climb to 18.5 cents, an increase of 39%. The RFDB Account would become exhausted by plan year 2022 instead of 2029.

However, if the assumed improvements in longevity after the 2009 plan year were kept at the level of plan year 2009, resulting in greater improvements in longevity than those assumed in Table 23, then the monthly benefit cost rate of 13.3 cents projected for 2033 would decline to 10.1 cents, a decrease of 24%. The RFDB Account would become exhausted by plan year 2031 instead of 2029.

---

<sup>1</sup> The expression *monthly benefit cost rate* is defined as the ratio of the total expected monthly *term insurance* payments over the total amount of expected monthly term insurance benefit coverage, where coverage is expressed per thousand dollars. In this report, *term insurance benefit* means the basic benefit excluding the \$5,000 paid-up death benefit applicable from age 65.



# ACTUARIAL REPORT

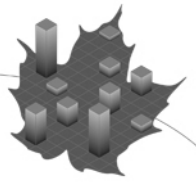
REGULAR FORCE Death Benefit Account  
as at 31 March 2008

## III. Reconciliation of Results with Previous Report

Table 2 illustrates the impact of the updated assumptions, intervaluation economic experience, and population changes since the last valuation report as at 31 March 2005. The projected monthly cost for plan year 2033 fell 0.7 cents from 14.0 cents as at 31 March 2005 to 13.3 cents as at 31 March 2008. The primary source of this decrease is the new proportion of healthy pensioners opting for full coverage and the new mortality rates assumption.

**Table 2 Reconciliation of Projected Results**

	Monthly Cost per \$1,000 of Term Insurance in Specified Projection Year (Cents)
<b><u>Projection Year 2030</u></b>	
<b>Projection as at 31 March 2005</b>	<b>15.0</b>
<b><u>Projection Year 2033</u></b>	
<b>Projection as at 31 March 2005</b>	<b>14.0</b>
Intervaluation economic experience and change in population	0.6
Change in economic assumptions	-
Change in assumed mortality rates for plan year 2009	(0.6)
Change in longevity improvement factors	(0.4)
Change in demographic assumptions other than mortality	0.6
Change in proportion of healthy pensioners opting for full coverage	<u>(0.9)</u>
<b>Projection as at 31 March 2008</b>	<b>13.3</b>



## IV. Legislated Contribution Rates

The aggregate amount of death benefit payments projected for plan year 2009 is \$32.1 million, which is made up of \$24.8 million in respect of the term insurance and \$7.3 million in respect of the paid-up insurance. In this report, *term insurance* means the basic coverage (two times salary rounded to next \$250) less the 10% per year reduction applicable from age 61 and less the \$5,000 paid-up insurance applicable from age 65.

### A. Paid-Up Insurance

For plan year 2009, the estimated single premium at age 65 for each \$5,000 of paid-up insured benefit is \$1,978 and \$1,700 for males and females, respectively. The corresponding legislated contribution rates for each \$5,000 of paid-up insured benefit are \$310 and \$291, respectively. The legislated contributions are determined on the basis of the original \$500 of paid-up insured benefit and were not readjusted on 5 October 1992 when Part II of the CFSA was amended to increase the paid-up insured benefit from \$500 to \$5,000.

The assumed improvements in longevity cause the projected single premium for the paid-up death benefit to decrease over time. However, the projected ultimate yield of 5.20% is lower than the yield of 7.10% projected for plan year 2009. This has the effect of gradually increasing the projected single premium over the years.

The net effect of longevity improvements and decreasing projected yields is to increase the projected single premiums at age 65 for each \$5,000 of paid-up insured benefit. A male participant's projected single premium increases from \$1,978 for plan year 2009 to \$1,995 for plan year 2033; for a female participant the increase is from \$1,700 to \$1,734.

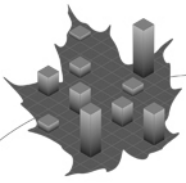
### B. Term Insurance

The total amount of term insurance proceeds projected to be payable during plan year 2009 is \$24.8 million. Given that the total amount of term insurance projected to be in force for plan year 2009 is \$12,095 million, the benefit cost rate projected for plan year 2009 is 17.1 cents per month per \$1,000 of term insurance.

Non-elective participants and elective participants in receipt of an immediate annuity are required to contribute monthly 20 cents per \$1,000 of salary or, 9.96<sup>1</sup> cents per \$1,000 of term insurance. As a minimum, the Government contributes monthly an amount equal to one-twelfth of the total amount of term insurance proceeds payable during the month. For plan year 2009, the Government's monthly contribution is estimated at 1.4 cents per \$1,000 of term insurance.

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<sup>1</sup> If it were not for the rounding to the next lower multiple of \$250 of salary involved in the computation of contributions and the rounding to the next higher multiple of \$250 involved in the computation of the amount of death benefit, the legislated contribution rate would be \$0.10 (i.e. \$0.20 divided by two) instead of \$0.0996.

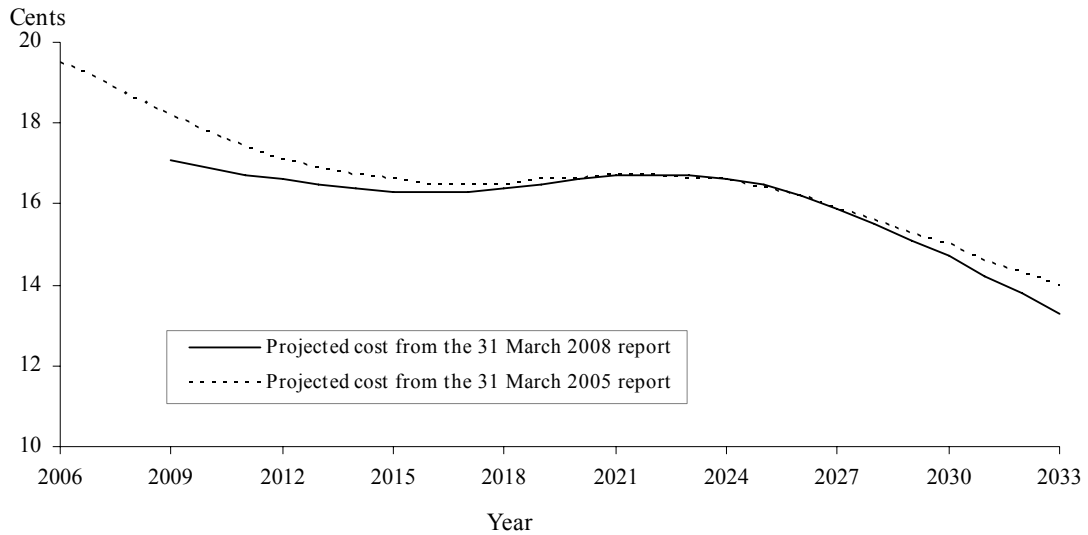


# ACTUARIAL REPORT

REGULAR FORCE Death Benefit Account  
as at 31 March 2008

The total amount contributed by participants and the government in plan year 2009 is therefore 11.4 cents (9.96 cents plus 1.4 cents) per month per \$1,000 of term insurance, i.e. significantly less than the estimated monthly cost of 17.1 cents per \$1,000 of term insurance for plan year 2009.

**Figure 2 Projected Monthly Cost**  
(cents per \$1,000 of term insurance)

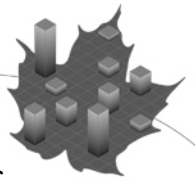


As shown in Figure 2, the monthly cost per \$1,000 of term insurance is projected to first decrease from 17.1 cents to 16.3 cents in the first nine years and then increase slightly to 16.7 cents by plan year 2023. Thereafter the monthly cost is projected to decrease gradually to 13.3 cents by plan year 2033. In comparison, the combined contribution rate in 2033 is projected to be 11.1 cents (i.e. 9.96 cents for participants plus one-twelfth of 13.3 cents for Government).

The following table illustrates the projected monthly costs per \$1,000 of term insurance for selected plan year and participant type.

**Table 3 Projected Monthly Cost**  
(cents per \$1,000 of term insurance)

Participants	2009	2016	2023	2028	2033
Non-elective	8.0	7.4	6.8	6.7	6.8
Elective	33.4	32.1	37.8	40.5	37.4
All	17.1	16.3	16.7	15.5	13.3

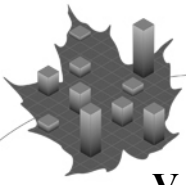


For non-elective participants, the monthly cost projected for plan year 2033 is 85% of the monthly cost estimated for plan year 2009. This results mainly from the following two factors:

- There is a reduction in cost due to the assumed lower mortality for plan year 2033 in accordance with the longevity improvement factors shown in Table 23 applied to the current mortality rates shown in Table 22.
- The distribution of non-elective participants in the plan year 2033 is weighted more heavily at the older ages than currently. This has the effect of increasing costs. However, this increase is more than offset by the effect of the assumed mortality improvements.

In respect of elective participants in receipt of an immediate annuity or an annual allowance, the monthly benefit cost rate projected for plan year 2033 is 112% of the monthly cost projected for plan year 2009. This increase is due to the expected aging of the elective population as the trend in the regular force towards older retirement ages continues.

For all plan participants in aggregate, the monthly cost projected for plan year 2033 is 78% of the monthly cost projected for plan year 2009.



## ACTUARIAL REPORT

REGULAR FORCE Death Benefit Account  
as at 31 March 2008

### V. Actuarial Opinion

In our opinion, considering that this report was prepared pursuant to the *Public Pensions Reporting Act* per Section 71 of the *Canadian Forces Superannuation Act*,

- the valuation input data on which the valuation is based are sufficient and reliable for the purposes of the valuation;
- the assumptions that have been used are, individually and in aggregate, appropriate for the purposes of determining the financial status as at 31 March 2008 of the Regular Force Death Benefit Account and assisting the President of the Treasury Board in making informed decisions regarding the adequacy of the legislated contribution rates;
- the methodology employed is appropriate for the purposes of determining the financial status as at 31 March 2008 of the Regular Force Death Benefit Account and assisting the President of the Treasury Board in making informed decisions regarding the adequacy of the legislated contribution rates; and
- this report has been prepared, and our opinions given, in accordance with accepted actuarial practice.

In particular, this report was prepared in accordance with the Standards of Practice (Standard of Practice – General Standards) published by the Canadian Institute of Actuaries.

To the best of our knowledge, after inquiring with the Canadian Forces and the Treasury Board of Canada Secretariat, there were no other subsequent events between the valuation date and the date of this report that would have a material impact on the results of this valuation.

---

Daniel Hébert, F.C.I.A., F.S.A.  
Senior Actuary  
Office of the Chief Actuary

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Jean-Claude Ménard, F.C.I.A., F.S.A.  
Chief Actuary  
Office of the Chief Actuary

Ottawa, Canada  
18 September 2009





## APPENDICES

### Appendix 1 - Summary of Plan Provisions

Following is a summary description of the main provisions of the Supplementary Death Benefit (SDB) plan established for the members of the regular force under Part II - *Supplementary Death Benefits* of the *Canadian Forces Superannuation Act* (CFSA). This plan supplements the pension plan by providing a lump sum benefit upon the death of a plan participant.

#### A. Plan Participants

##### 1. Non-Elective Participants

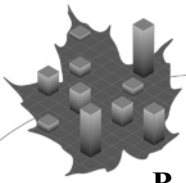
The term *non-elective participant* means a member of the regular force, or a member of the reserve force who is, with the approval of the Chief of the Defence Staff, on full-time service in a position in a regular force establishment or as a supernumerary to a regular force establishment.

##### 2. Elective Participants

The term *elective participant* means all previously non-elective participants who have ceased to be employed in the Canadian Forces by reason of disability or retirement (i.e. when they become entitled to an immediate retirement or disability annuity) and have opted to continue their coverage under the SDB plan. Such right is limited to members who, at the time they cease to be employed in the Canadian Forces, have completed at least five years of continuous service in the Canadian Forces or five years of membership in the SDB plan.

Elective participants entitled to a deferred annuity under the CFSA upon cessation of employment may elect to continue their coverage in the SDB plan; otherwise their membership and coverage 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 basic benefit is extended for 30 days after the date of cessation whether or not a participant exercises the right of election for continuous coverage.

An elective participant who becomes a participant in the SDB plan established under Part II of the *Public Service Superannuation Act* (PSSA) automatically ceases to be a participant in the SDB plan established under the CFSA. Any such person, who subsequently ceases to be a participant in the SDB plan under the PSSA, without entitlement to an immediate annuity under the PSSA, is deemed thereupon to regain the status of elective participant in the SDB plan established under the CFSA.



# ACTUARIAL REPORT

REGULAR FORCE Death Benefit Account  
as at 31 March 2008

## B. Assets

The plan is financed through the Regular Force Death Benefit (RFDB) Account, which forms part of the Accounts of Canada. The RFDB Account is credited with all contributions made by the participants and the Government, and debited with all benefit payments as they become due. The RFDB Account is also credited with interest earnings based on interest rates applying to the Superannuation Accounts.

## C. Contributions

### 1. Non-Elective Participants, and Elective Participants in Receipt of an Immediate Annuity

For non-elective participants as well as elective participants in receipt of an immediate annuity (disability or retirement) under Part I of the CFSA or the *Defence Services Pension Continuation Act*, the legislated contribution rate is 5 cents per month for each \$250 of salary (for this purpose the salary is in practice rounded to the next lower multiple of \$250 if not already equal to such a multiple). When these participants attain age 65, their contribution is reduced by 50 cents per month in recognition of the fact that \$5,000 of basic benefit becomes paid-up (by the Government) for the remaining lifetime of the participant.

### 2. Elective Participants Entitled to a Deferred Annuity

For elective participants entitled to a deferred annuity, the legislated contribution rate varies in accordance with the attained age of the participant, and the corresponding contributions become chargeable on the 30th day immediately following cessation of employment. The legislated rates for selected ages are shown in the following table:

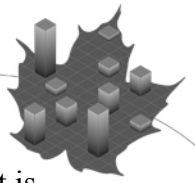
**Table 4 Contribution per \$2,000 of Death Benefit**

Age Last Birthday	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

The Government credits monthly to the RFDB Account an amount equal to one-twelfth of the total amount of term insurance death benefit paid in the month.

When a participant, other than one entitled to a deferred annuity, reaches age 65, the Government credits to the RFDB Account a single premium for the \$5,000 paid-up insured benefit in respect of which contributions are no longer required from the participant.



The legislated amount of single premium for each such \$5,000 paid-up insured benefit is shown in the following table and corresponds to one-tenth of \$5,000 times the single premium rate for each dollar of death benefit, computed on the basis of the Life Tables, Canada, 1950-1952 and interest at 4% per annum.

**Table 5 Legislated Single Premium per \$5,000 of Paid-up Benefit**

Age Last Birthday	Male	Female
65	\$310	\$291
66	316	298
67	323	306
68	329	313
69	336	320

Under the statutes, if for whatever reason the RFDB Account were to become exhausted, the Government would then credit special contributions to the RFDB Account in an amount at least equal to the basic benefits then due but not paid by reason of such shortfall.

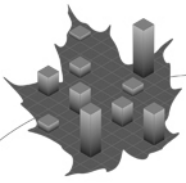
**D. Amount of Basic Benefit**

Subject to the applicable reductions described below, the lump sum benefit payable upon the death of a participant is equal to twice the participant’s current salary, the result being rounded to the next higher multiple of \$250 if not already equal to such a multiple. For this purpose, the current salary of an elective participant is defined as the annual rate of pay at the time of cessation of employment in the Canadian Forces.

The amount of basic benefit described above is reduced by 10% a year starting at age 61 until it would normally vanish at age 70. However, the amount of basic benefit cannot at any time be reduced below a basic floor value of \$5,000 subject to the following exceptions:

- For those elective participants who had, upon cessation of employment prior to 5 October 1992, made an election to reduce their basic benefit to \$500 and further had made a second election prior to 5 October 1993, to keep their basic benefit at \$500, the floor value is \$500 instead of \$5,000. Such election is irrevocable. The plan administrator has advised OSFI that all members whom have opted to reduce their paid-up coverage to \$500 will nonetheless be receiving a minimum death benefit of \$5,000 upon death. As at 31 March 2008, only three members are reported to have opted for a \$500 paid-up benefit.
- For elective participants entitled to a deferred annuity there is no coverage past age 70.

Upon ceasing to be employed in the Canadian Forces, elective participants in receipt of an immediate annuity under Part I of the CFSA or the *Defence Services Pension Continuation Act* may opt to reduce their amount of basic benefit to \$5,000.



# ACTUARIAL REPORT

REGULAR FORCE Death Benefit Account  
as at 31 March 2008

## Appendix 2 - Plan Assets

### A. Regular Force Death Benefit Account

The plan is entirely financed through the RFDB Account, which forms part of the Accounts of Canada. The RFDB Account is:

- credited with all contributions made by participants and the Government;
- credited with interest earnings every three months on the basis of the actual average yield for the same period on the combined Superannuation Accounts of the Public Service, Canadian Forces and Royal Canadian Mounted Police pension plans. These accounts generate interest earnings as though net cash flows were invested quarterly in 20-year Government of Canada bonds issued at prescribed interest rates and held to maturity; and
- debited with annual benefit payments when they become due.

Table 6 shows the reconciliation of the balance of the RFDB Account from the last valuation date to the current valuation date. Since the last valuation, the RFDB Account balance has grown by \$0.6 million to reach \$197 million as at 31 March 2008. The net growth in the Account balance is minimal due to actual death benefit payments being comparable to contributions and interest earnings over the observation period.

**Table 6 Regular Force Death Benefit Account**  
(\$ millions)

Plan Year	2006	2007	2008	2006-2008
Opening balance	196	197	197	196
INCOME				
Employee contributions	14	14	15	43
Employer contributions				
- Term insurance	2	2	2	6
- Paid-up insurance	1	1	1	2
Interest earnings	<u>15</u>	<u>14</u>	<u>14</u>	<u>43</u>
Subtotal	31	32	31	94
EXPENDITURES				
Benefit Claims	30	32	31	94
Closing balance	197	197	197	197

**B. Rates of Interest**

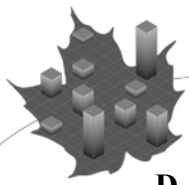
The following effective rates of interest on the RFDB Account by plan year were calculated using the foregoing entries.

**Table 7 Rates of Interest**

Plan Year	Interest
2006	7.84%
2007	7.56%
2008	7.33%

**C. Sources of Asset Data**

The Account entries shown previously were taken from the Public Accounts of Canada.



# ACTUARIAL REPORT

REGULAR FORCE Death Benefit Account  
as at 31 March 2008

## D. Account and Liabilities Projection

The following table shows a projection of the RFDB Account and liabilities over 25 years commencing 1 April 2008.

**Table 8 Account and Liabilities Projection**

(\$ millions)

Plan Year	Balance Sheet at the End of Plan Year			Ratio of Projected Actuarial Excess at the End of the Plan Year to Annual Benefit Payments Projected for the Following Plan Year
	Account	Liabilities	Excess / Deficit	
2008	<b>196.7<sup>1</sup></b>	91.9	104.8	3.3
2009	195.1	94.2	100.9	3.1
2010	192.7	95.8	96.9	3.0
2011	189.7	97.2	92.6	2.8
2012	185.7	99.1	86.7	2.6
2013	181.0	100.7	80.3	2.3
2014	175.5	102.0	73.5	2.1
2015	169.0	102.7	66.3	1.9
2016	161.6	102.7	58.9	1.6
2017	153.3	102.7	50.6	1.4
2018	144.1	102.6	41.5	1.1
2019	134.0	102.5	31.5	0.8
2020	122.9	102.9	20.1	0.5
2021	110.9	103.5	7.3	0.2
2022	97.9	104.6	(6.7)	-
2023	84.1	106.4	(22.2)	-
2024	69.5	108.0	(38.5)	-
2025	54.3	110.0	(55.7)	-
2026	38.7	112.4	(73.7)	-
2027	22.8	115.3	(92.6)	-
2028	6.6	118.3	(111.7)	-
2029	0.0	121.3	(121.3)	-
2030	0.0	123.6	(123.6)	-
2031	0.0	124.9	(124.9)	-
2032	0.0	125.8	(125.8)	-
2033	0.0	126.5	(126.5)	-

<sup>1</sup> Bold figures denote actual experience.



**E. Income and Expenditure Projection**

The following table shows a projection of the income and expenditure which served as the basis of the projection of the RFDB Account over 25 years commencing with plan year 2009.

**Table 9 Income and Expenditure Projection**  
(\$ millions)

Plan Year	Contributions								
	Participants	Government			Benefit Payments			Interest Credits	Net Credits
		Term	Paid-Up	Total	Term	Paid-Up	Total		
2009	14.5	2.1	0.6	17.1	24.8	7.3	32.1	13.4	(1.6)
2010	14.8	2.1	0.5	17.4	25.1	7.4	32.5	12.7	(2.4)
2011	15.1	2.1	0.4	17.6	25.3	7.5	32.8	12.2	(3.0)
2012	15.4	2.1	0.6	18.2	25.7	7.6	33.3	11.1	(4.0)
2013	15.8	2.2	0.6	18.6	26.1	7.7	33.8	10.5	(4.7)
2014	16.3	2.2	0.5	19.0	26.7	7.7	34.4	9.9	(5.5)
2015	16.7	2.3	0.5	19.5	27.3	7.8	35.1	9.2	(6.4)
2016	17.2	2.3	0.4	19.9	28.0	7.9	35.9	8.5	(7.5)
2017	17.6	2.4	0.4	20.5	28.8	7.9	36.7	8.0	(8.3)
2018	18.1	2.5	0.4	21.0	29.6	7.9	37.6	7.4	(9.2)
2019	18.6	2.5	0.5	21.6	30.6	7.9	38.5	6.8	(10.2)
2020	19.0	2.6	0.5	22.2	31.5	8.0	39.5	6.3	(11.0)
2021	19.5	2.7	0.6	22.8	32.4	8.0	40.4	5.6	(12.1)
2022	19.9	2.8	0.7	23.4	33.3	8.0	41.3	5.0	(13.0)
2023	20.3	2.8	0.8	23.9	34.0	8.1	42.0	4.3	(13.8)
2024	20.8	2.9	0.8	24.4	34.5	8.1	42.6	3.6	(14.6)
2025	21.2	2.9	0.8	24.9	34.8	8.2	43.0	2.9	(15.2)
2026	21.6	2.9	0.9	25.3	35.0	8.2	43.2	2.2	(15.6)
2027	21.9	2.9	1.0	25.8	34.9	8.3	43.2	1.5	(15.9)
2028	22.3	2.9	1.0	26.2	34.7	8.4	43.0	0.7	(16.2)
2029	22.7	12.6	1.0	36.2	34.4	8.4	42.8	-	(6.6)
2030	23.1	18.5	0.8	42.5	34.0	8.5	42.5	-	-
2031	23.6	17.9	0.7	42.1	33.6	8.6	42.2	-	-
2032	24.1	17.2	0.6	41.8	33.2	8.7	41.8	-	-
2033	24.7	16.3	0.6	41.6	32.9	8.7	41.6	-	-



## Appendix 3 - Participant Data

### A. Source of Participant Data

As a consequence of the Pension Modernization project which required the overall of the data validation process within OSFI, the structure of the data requested by OSFI has changed. Previously the Department of National Defence (DND) was responsible for summarizing their data into a single file containing all the relevant data. Beginning with this valuation report, DND provides OSFI with multiple files reflecting the summarized raw data as it exists in their system based on mutually agreed data specifications. In addition, Public Works and Government Services Canada (PWGSC) provides OSFI with data on regular force annuitants.

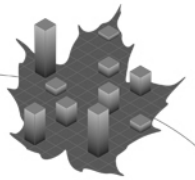
The data provided contains all required information in respect of contributors, pensioners and survivors. In particular, the data shows the historical progression of members during period from 31 March 2005 to 31 March 2008 required for reconciliation and experience studies.

Subsequently, OSFI validates and corrects, as necessary, the data before transforming it into a structure amenable to analysis, interpretation, and valuation.

### B. Participant Data Summary

Tables 10 to 14 on the following pages show the detailed participant data upon which this valuation is based.





**Table 10 Non-Elective Officers**  
As at 31 March 2008

Age <sup>1</sup>	Number			Basic Benefit (\$ thousands)		
	Male	Female	Total	Male	Female	Total
15-19	402	125	527	15,361	4,617	19,978
20-24	1,268	339	1,607	85,586	23,677	109,263
25-29	1,706	495	2,201	211,340	61,433	272,773
30-34	1,848	425	2,273	289,174	69,122	358,296
35-39	1,891	349	2,240	333,437	60,492	393,929
40-44	2,142	311	2,453	413,098	59,334	472,432
45-49	2,042	189	2,231	417,571	38,316	455,887
50-54	1,108	97	1,205	243,349	20,454	263,803
55-59	<u>233</u>	<u>22</u>	<u>255</u>	<u>52,575</u>	<u>4,831</u>	<u>57,406</u>
Total	12,640	2,352	14,992	2,061,491	342,276	2,403,767

	<u>Average</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
<b>As at 31 March 2005</b>	Age <sup>1</sup>	37.1	32.7	36.5
	Service <sup>1</sup>	15.3	10.5	14.6
	Basic Benefit (\$)	150,357	129,366	147,301
<b>As at 31 March 2008</b>	Age <sup>1</sup>	37.4	33.6	36.8
	Service <sup>1</sup>	14.5	9.9	13.7
	Basic Benefit (\$)	163,092	145,526	160,336

<sup>1</sup> Expressed in completed years calculated at the beginning of the plan year. Averages are calculated on a dollar-weighted basis.



# ACTUARIAL REPORT

REGULAR FORCE Death Benefit Account  
as at 31 March 2008

**Table 11 Non-Elective Other Ranks**  
As at 31 March 2008

Age <sup>1</sup>	Number			Basic Benefit (\$ thousands)		
	Male	Female	Total	Male	Female	Total
15-19	1,170	117	1,287	77,380	7,607	84,987
20-24	6,817	682	7,499	572,309	56,592	628,901
25-29	7,834	1,122	8,956	785,938	108,988	894,926
30-34	6,276	1,035	7,311	684,122	106,398	790,520
35-39	7,362	1,304	8,666	870,451	144,429	1,014,880
40-44	7,269	1,252	8,521	909,921	145,946	1,055,867
45-49	4,701	656	5,357	625,026	79,834	704,860
50-54	1,448	173	1,621	203,568	22,013	225,581
55-59	<u>176</u>	<u>11</u>	<u>187</u>	<u>25,218</u>	<u>1,348</u>	<u>26,566</u>
Total	43,053	6,352	49,405	4,753,933	673,155	5,427,088

	<u>Average</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
<b>As at 31 March 2005</b>	Age <sup>1</sup>	34.7	34.9	34.7
	Service <sup>1</sup>	13.0	11.0	12.8
	Basic Benefit (\$)	104,022	99,347	103,461
<b>As at 31 March 2008</b>	Age <sup>1</sup>	34.6	35.4	34.7
	Service <sup>1</sup>	11.8	9.5	11.5
	Basic Benefit (\$)	110,420	105,975	109,849

<sup>1</sup> Expressed in completed years calculated at the beginning of the plan year.

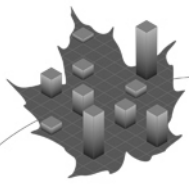


**Table 12 Elective Disabled (3A) Participants**  
As at 31 March 2008

Age <sup>1</sup>	Number			Term and Paid-up Insurance Benefit (\$ thousands)		
	Male	Female	Total	Male	Female	Total
35-39	2	5	7	178	441	619
40-44	44	9	53	4,150	773	4,923
45-49	73	28	101	6,674	2,377	9,051
50-54	64	16	80	5,973	1,427	7,400
55-59	60	15	75	4,151	1,273	5,424
60-64	155	6	161	4,494	375	4,869
65-69	307	1	308	2,210	5	2,215
70-74	465	1	466	2,325	5	2,330
75-79	515	1	516	2,575	5	2,580
80-84	261	2	263	1,305	10	1,315
85-89	116	0	116	580	0	580
90-94	13	0	13	65	0	65
95-99	1	0	1	5	0	5
100-104	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<b>Total</b>	<b>2,076</b>	<b>84</b>	<b>2,160</b>	<b>34,685</b>	<b>6,691</b>	<b>41,376</b>

	<u>Average</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
<b>As at 31 March 2005</b>	Age <sup>1</sup>	69.5	48.8	68.8
	Term and Paid-up Insurance Benefit (\$)	15,564	80,346	17,761
<b>As at 31 March 2008</b>	Age <sup>1</sup>	71.4	51.6	70.6
	Term and Paid-up Insurance Benefit (\$)	16,708	79,655	19,156

<sup>1</sup> Expressed in completed years calculated at the beginning of the plan year.



# ACTUARIAL REPORT

REGULAR FORCE Death Benefit Account  
as at 31 March 2008

**Table 13 Elective Retired and Disabled (3B) Participants**  
As at 31 March 2008

Age <sup>1</sup>	Number			Term and Paid-up Insurance Benefit (\$ thousands)		
	Male	Female	Total	Male	Female	Total
20-29	2	1	3	214	151	365
30-34	92	14	106	10,117	1,961	12,078
35-39	786	163	949	85,741	17,558	103,299
40-44	4,104	644	4,748	467,900	70,365	538,265
45-49	8,347	1,273	9,620	901,599	129,220	1,030,819
50-54	7,373	979	8,352	771,517	96,260	867,777
55-59	7,078	460	7,538	756,536	47,695	804,231
60-64	8,443	201	8,644	627,432	17,127	644,559
65-69	8,728	121	8,849	185,445	2,935	188,380
70-74	8,213	70	8,283	41,065	350	41,415
75-79	6,051	53	6,104	30,255	265	30,520
80-84	3,559	25	3,584	17,795	125	17,920
85-89	2,127	15	2,142	10,635	75	10,710
90-94	500	8	508	2,500	40	2,540
95-104	<u>55</u>	<u>1</u>	<u>56</u>	<u>275</u>	<u>5</u>	<u>280</u>
Total	65,458	4,028	69,486	3,909,026	384,132	4,293,158

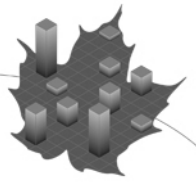
	<u>Average</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
<b>As at 31 March 2005</b>	Age <sup>1</sup>	61.4	49.0	60.7
	Term and Paid-up Insurance Benefit (\$)	57,962	88,215	59,562
<b>As at 31 March 2008</b>	Age <sup>1</sup>	62.3	50.7	61.6
	Term and Paid-up Insurance Benefit (\$)	59,718	95,365	61,785

**Table 14 Elective Participants Entitled to a Deferred Annuity<sup>2</sup>**  
As at 31 March 2008

Number	Term Insurance Benefit (\$ thousands)
37	5,669

<sup>1</sup> Expressed in completed years calculated at the beginning of the plan year.

<sup>2</sup> Due to their negligible effect on costs and liabilities, these participants were not taken into consideration for the purpose of this valuation.



## Appendix 4 - Methodology

### A. Assets

The assets of the plan consist essentially of the recorded balance in the RFDB Account, which forms part of the Accounts of Canada. These assets are shown at the book value of the underlying notional bond portfolio described in Appendix 2.

The RFDB Account balance corresponds to the cumulative historical excess of contributions and interest credits over past benefit payments. Assets are accordingly projected to the end of a given plan year by adding to the RFDB Account at the beginning of that plan year the net income (i.e. the excess of contributions and interest credits over benefits) projected as described below for that plan year. Administration expenses are ignored because they are not debited from the RFDB Account.

### B. Contributions

#### 1. Participants

Participants' annual contributions are projected for a given plan year by multiplying

- the legislated annual contribution rate of 60 cents per \$250 of salary (equivalent to the monthly rate of 5 cents per \$250 of salary)

by

- the projected participants' rounded salaries for that plan year on an open-group basis, reduced by 10% a year from age 61 if applicable, (the legislation expresses the annual reduction of 10% a year on the total amount of coverage)

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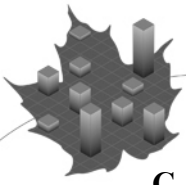
- \$6.00 annually corresponding to the \$5,000 paid-up coverage after age 65, if applicable (i.e. death benefit coverage of \$5,000 corresponds to an annual salary of \$2,500, hence an annual contribution of 60 cents per \$250 of salary would produce a contribution of \$6.00 annually).

Non-elective participants' salaries are projected for a given plan year using the assumed rates of increase described in Appendix 5 and by the assumed Seniority and Promotional salary increases given in Table 17. Elective participants' salaries are frozen at time of retirement or disability and are not subject to further increases.

#### 2. Government

The Government's annual contribution is projected for a given plan year as the sum of

- one-twelfth of the amount of term insurance death benefits projected to be paid during that plan year, and
- the legislated single premiums in respect of relevant participants 65 years of age.



## ACTUARIAL REPORT

REGULAR FORCE Death Benefit Account  
as at 31 March 2008

### C. Discount Rates

The rates used to calculate the present value of actuarial liabilities in respect of paid-up death benefit are the same as the yields described and shown in Appendix 5.

### D. Interest Credits

Annual interest credits are projected for a given plan year as the product of the yield projected for that plan year (Appendix 5) and the projected average RFDB Account balance in that plan year.

### E. Benefit Payments

The total amount of annual benefits (term and paid-up insurance) for a given plan year is projected as the sum of the participant annual benefits in force during that plan year multiplied by the mortality rates applicable to each participants during that plan year. The amount of annual benefit in force depends on the salary projected to time of death. Elective participants' salaries are frozen at time of retirement or disability and are not subject to further increases. Salaries are projected for this purpose using the assumed rates of increase in salaries and the number of participants projected on an open-group basis as described in Appendix 6.

### F. Liabilities

#### 1. Paid-up Reserve

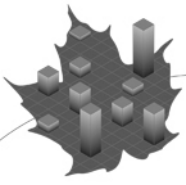
At the end of a given plan year, the liabilities associated with the individual \$5,000 paid-up death benefit in force correspond to the amount which, together with interest at the projected yields, is sufficient to pay for each individual \$5,000 paid-up death benefit projected payable on the basis of the assumed mortality rates. With the exception of elective participants entitled to a deferred annuity, this valuation assumes that the paid-up benefit of \$5,000 will be paid to all elective participants when it becomes available to them.

#### 2. IBNR and Pending Claims Reserves

On the basis of the plan's experience, the reserve at the end of a given plan year for claims incurred but not reported (IBNR), and for pending claims is set equal to one-sixth of the projected annual death benefits paid on average during the six previous plan years.

#### 3. Extension of Coverage

Due to the negligible financial impact of the 30-day extension of the basic benefit upon termination of coverage and to the nature of basic benefit paid for on a monthly basis, no explicit liability was calculated in respect of that basic benefit provision.



## Appendix 5 - Economic Assumptions

The following economic assumptions are required for valuation purposes:

### A. Increases in Average Earnings

Salary increases consist of a combination of inflation, productivity growth (i.e. real<sup>1</sup> increase in average employment earnings in excess of inflation) and seniority and promotional increase. Seniority and promotion is strongly service-based and is therefore considered to be a demographic assumption rather than an economic assumption.

The assumed increase in average earnings<sup>2</sup> was 1.5% for plan years 2010-2011 based on recently approved contracts which apply to the majority of non-elective participants. The assumed increase in average earnings<sup>2</sup> for plan years 2012+ was calculated as the sum of assumed inflation and assumed productivity growth.

Price increases, as measured by changes in the Consumer Price Index, tend to fluctuate from year to year. Based on the renewed commitment of the Bank of Canada and the government to keep inflation between 1% and 3% until 2011, a rate of price increase of 2.0% was assumed until plan year 2012. Recognizing past experience, the rate of price increase is to increase from 2.0% for plan year 2012 to 2.4% for plan year 2016. The ultimate rate of 2.4% is 0.1% lower than the assumed ultimate rate from the previous valuation.

The assumed ultimate productivity rate of 1.1% per annum is 0.1% higher than the previous valuation. One of the key elements underlying the productivity rate assumption is the expected labour shortage due to the aging of the Canadian population and the retirement of the baby boom generation between 2010 and 2030. A growing labour shortage, especially after 2010, is assumed to force higher real wage growth. Labour force growth will weaken as the working age population expands at a slower pace. Real increases in average earnings are assumed to rise gradually from 0.8% in plan year 2012 to reach the ultimate 1.1% in 2013.

The resulting assumed increases in average earnings<sup>2</sup> are shown in Table 15.

### B. Projected Yields on RFDB Account

These yields are required for the long-term projection of the actuarial assets, liabilities and excess or deficit. The projected yields on the RFDB Account are the projected annual yields on the combined book value of the Superannuation Accounts of the Public Services, Canadian Forces, and Royal Canadian Mounted Police pension plans.

<sup>1</sup> The real rates in this report are differentials, i.e. the difference between the effective annual rate and the inflation rate.

<sup>2</sup> Exclusive of seniority and promotional increases.



# ACTUARIAL REPORT

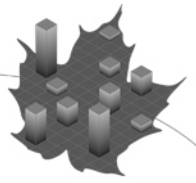
REGULAR FORCE Death Benefit Account  
as at 31 March 2008

**Table 15 Summary of Economic Assumptions**  
(percentage)

Plan Year	Average Salary Increase <sup>1</sup> of Non-Elective Participants	Projected Yield
2009	2.00	7.10
2010	1.50	6.80
2011	1.50	6.60
2012	3.00	6.10
2013	3.20	5.90
2014	3.30	5.70
2015	3.40	5.50
2016	3.50	5.30
2017	3.50	5.20
2018	3.50	5.10
2019	3.50	5.00
2020	3.50	5.00
2021	3.50	4.90
2022	3.50	4.90
2023	3.50	4.90
2024	3.50	4.80
2025	3.50	4.80
2026	3.50	4.90
2027	3.50	4.90
2028	3.50	4.90
2029	3.50	5.00
2030	3.50	5.00
2031	3.50	5.10
2032	3.50	5.20
2033	3.50	5.20
2034+	3.50	5.20

<sup>1</sup> Exclusive of seniority and promotional increases.





## Appendix 6 - Demographic and Other Assumptions

Except where otherwise noted, all demographic assumptions were determined from the plan's own experience as was done in the past. Where applicable, assumptions of the previous valuation were updated to reflect the intervaluation experience. Described below are the assumptions related to causes of termination (employment or participation):

Termination Cause	Rate Basis	Comments			
Withdrawal	Service, Rank, Sex, Terms of Service	Giving partial credibility to the experience data of the 2005-2008 plan years, the rates were modified from the previous valuation as follows:		Table 18	
		Male Officers	4% increase		35% increase
		Male Other Ranks	29% increase		29% increase
		Female Officers	3% increase		13% decrease
		Female Other Ranks	25% increase		5% increase
Pensionable Retirement	Service, Rank, Terms of Service	Giving partial credibility to the experience data of the 2005-2008 plan years, the rates were modified from the previous valuation as follows:		Table 20	
		Officers	12% increase		41% increase
		Other Ranks	9% increase		19% increase
Disability	Occupation Age, Rank, Sex	Disability releases 3A (any occupation). Giving partial credibility to the experience data of the 2005-2008 plan years, the rates for males were reduced by 19% from the previous valuation. The rates for females remain unchanged.		Table 21	
		Disability releases 3B (own occupation). Giving partial credibility to the experience data of the 2005-2008 plan years, the rates were modified from the previous valuation as follows:			
		Male Officers	31%		decrease
		Male Other Ranks	9%		increase
Mortality (ages 30 to 60)	Age, Rank, Sex, Year	Giving partial credibility to the experience data of the 2005-2008 plan years, the rates were modified from the previous valuation as follows:		Table 22	
		Male Officers	12%		decrease
		Male Other Ranks	2%		decrease
		Female	4%	decrease	



# ACTUARIAL REPORT

REGULAR FORCE Death Benefit Account  
as at 31 March 2008

The mortality improvements are higher than those used in the previous valuation. These ultimate rates of improvement are established by analyzing the trend by age and sex of the Canadian experience over the last 30 years. Rates of improvement for the plan year 2009 are assumed Table 23 to be those experienced on average over the last 15 years (1989 to 2004). After 2009, the rates are assumed to reduce annually to their ultimate level by year 2029.

Description	Basis	Comments
<b>Elective retired participants</b>		
Mortality (ages 30 to 80)	Age, Rank, Sex, Year	Giving partial credibility to the experience data of the 2005-2008 plan years, the rates were modified from the previous valuation as follows:
		Male Officers                      13%    decrease                      Table 22
		Male Other Ranks                      4%    decrease
		Female                                      5%    decrease
		Same longevity improvements as for non-elective participants.                      Table 23
<b>Elective disabled participant</b>		
Disabled (3A) Mortality (ages 30 to 80)	Age, Rank, Sex, Year	Giving partial credibility to the experience data of the 2005-2008 plan years, the rates were modified from the previous valuation as follows:
		Male Officers                      5%    decrease                      Table 22
		Male Other Ranks                      9%    decrease
		Female                                      3%    decrease
		Same longevity improvements as for non-elective participants.                      Table 23
Disabled (3B) Mortality	Age, Rank, Sex, Year	These members have been released under cause 3B, and are unable to perform the duties of their own occupations. The mortality assumption for these pensioners is set equal to the mortality assumption of healthy pensioners.                      Table 22
		Same longevity improvements as for non-elective participants.                      Table 23

## A. Other Assumptions

### 1. Option to Reduce Coverage to \$5,000

The valuation data indicates that the proportion of elective participants opting to reduce their basic benefit to \$5,000 is negligible. Accordingly, no elective participants were assumed to make such an option.

### 2. Non-Elective Participants Choosing to Become Elective Participants at Retirement

In the previous valuation, the assumed proportion of new retirees choosing to continue their coverage under the SDB plan was 90% regardless of service, age, or rank. This assumption was revised based on the experience for plan years 2005 to 2008. The



assumed proportion of new retirees choosing to become elective participants at retirement is now determined on the basis of service and rank as shown in Table 19. Overall, the proportion of new retirees expected to become elective participants decreased by approximately 7%.

**3. Seniority and Promotional Salary Increases**

The assumed rates of seniority and promotional salary increase were revised based on the experience for plan years 2005 to 2008. The assumed rates were decreased by approximately 4% for officers and approximately 13% for all other ranks. The assumed rates of seniority and promotional salary increase are determined on the basis of service and rank and are shown in Table 17.

**4. New Participants**

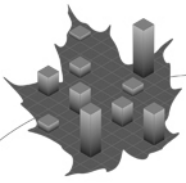
It was assumed that the distribution of new members by age, sex and initial salary rate would be the same as that of members with less than one year of service at the valuation date. Initial salary is assumed to increase in future plan years in accordance with the assumption for average earnings increase. It is assumed that the number of new participants would be such that the total number of non-elective participants would increase as follows:

**Table 16 Assumed Rates of Increase in Non-Elective Participants**

<u>Plan Year</u>	<u>Increase</u>
2009	0.47%
2010	0.47%
2011+	0.00%

**5. Administrative Expenses**

In the projection of the RFDB Account, no assumption was made regarding the expenses incurred for the administration of the plan. These expenses, which are not debited to the RFDB Account, are commingled with all other government charges.



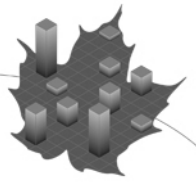
# ACTUARIAL REPORT

REGULAR FORCE Death Benefit Account  
as at 31 March 2008

**Table 17 Assumed Seniority and Promotional Salary Increases**  
(percentage)

<u>Service<sup>1</sup></u>	<u>Officer</u>	<u>Other Rank</u>
0	6.0	15.6
1	4.8	13.6
2	10.7	4.4
3	18.9	7.8
4	13.2	1.9
5	5.8	1.6
6	7.5	1.4
7	5.7	1.2
8	3.8	1.1
9	3.7	1.0
10	4.0	1.0
11	4.1	1.0
12	4.1	1.0
13	3.2	1.0
14	2.5	1.0
15	1.9	1.0
16	1.8	1.1
17	1.7	1.1
18	1.7	1.1
19	1.6	1.2
20	1.5	1.2
21	1.4	1.2
22	1.3	1.2
23	1.2	1.2
24	1.2	1.2
25	1.1	1.1
26	1.0	1.1
27	0.9	1.1
28	0.8	1.0
29	0.7	1.0
30	0.7	0.9
31	0.6	0.9
32	0.5	0.8
33	0.4	0.7
34	0.3	0.7
35+	0.3	0.6

<sup>1</sup> Expressed in completed years calculated at the beginning of the plan year.



**Table 18 Assumed Rates of Withdrawal**  
(per 1,000 individuals)

Service <sup>1</sup>	Old Terms of Service				New Terms of Service			
	Officer		Other Rank		Officer		Other Rank	
	Male	Female	Male	Female	Male	Female	Male	Female
0	93.0	83.1	74.0	57.9	66.0	66.8	67.9	64.7
1	60.8	59.6	32.8	33.1	31.6	32.8	25.1	31.8
2	44.3	42.8	125.7	68.3	30.6	30.8	93.2	78.6
3	36.8	34.6	57.9	44.9	25.9	21.5	36.4	36.8
4	31.4	30.6	45.7	46.6	18.0	33.3	31.7	39.6
5	25.0	30.9	42.0	45.3	16.5	26.7	44.8	44.8
6	22.7	35.0	52.5	54.0	24.6	20.6	59.2	59.3
7	27.5	42.6	32.1	26.9	28.6	28.7	33.2	46.0
8	36.8	75.3	28.0	33.2	55.0	54.9	20.0	20.5
9	38.5	52.2	24.6	31.6	56.5	63.8	21.3	29.2
10	33.0	49.9	24.4	25.7	22.9	51.1	13.2	50.1
11	27.8	46.4	23.2	32.9	28.9	55.4	18.0	25.4
12	26.0	53.7	21.5	59.3	38.9	54.7	17.0	28.1
13	19.5	34.8	19.4	21.8	35.2	32.6	19.9	17.0
14	12.9	18.0	17.1	21.6	28.5	17.7	16.4	13.5
15	8.9	16.5	15.0	19.6	22.0	17.3	19.9	14.8
16	6.5	13.2	13.1	18.9	17.5	11.9	18.9	9.6
17	6.0	12.6	11.2	16.7	14.3	8.7	19.7	11.0
18	5.6	12.6	5.2	15.6	11.7	8.7	5.2	11.0
19	-	-	-	-	9.8	8.7	5.2	11.0
20	-	-	-	-	8.4	8.7	5.2	11.0
21	-	-	-	-	7.5	8.7	5.2	11.0
22	-	-	-	-	7.0	8.7	5.2	11.0
23	-	-	-	-	6.7	15.3	5.2	11.0

<sup>1</sup> Expressed in completed years calculated at the beginning of the plan year.



# ACTUARIAL REPORT

REGULAR FORCE Death Benefit Account  
as at 31 March 2008

**Table 19 Assumed Election Proportions**  
Proportion of non-elective participants choosing to become elective participants at retirement

<u>Service<sup>2</sup></u>	<u>Pensionable Retirement<sup>1</sup></u>		<u>Disability Retirement</u>	
	<u>Officer</u>	<u>Other Rank</u>	<u>Officer</u>	<u>Other Rank</u>
19	0.85	0.86	1.00	1.00
20	0.85	0.85	1.00	1.00
21	0.84	0.85	1.00	1.00
22	0.84	0.84	1.00	1.00
23	0.83	0.84	1.00	1.00
24	0.83	0.84	1.00	1.00
25	0.82	0.84	1.00	1.00
26	0.82	0.84	1.00	1.00
27	0.81	0.84	1.00	1.00
28	0.81	0.84	1.00	1.00
29	0.81	0.84	1.00	1.00
30	0.81	0.84	1.00	1.00
31	0.81	0.84	1.00	1.00
32	0.81	0.84	1.00	1.00
33	0.81	0.84	1.00	1.00
34	0.82	0.85	1.00	1.00
35+	0.82	0.85	1.00	1.00

<sup>1</sup> A pensionable retirement is a retirement resulting in either an immediate annuity for reasons other than disability or an annual allowance.

<sup>2</sup> Expressed in completed years calculated at the beginning of the plan year.



**Table 20 Assumed Rates of Retirement**  
(per 1,000 individuals)

<u>Service<sup>1</sup></u>	<u>Old Terms of Service</u>		<u>New Terms of Service</u>	
	<u>Officer</u>	<u>Other Rank</u>	<u>Officer</u>	<u>Other Rank</u>
19	96	98	-	-
20	81	111	-	-
21	64	97	-	-
22	52	89	-	-
23	43	102	-	-
24	43	117	147	204
25	51	113	127	184
26	68	106	106	165
27	80	103	85	145
28	89	112	64	126
29	98	127	43	117
30	107	134	68	106
31	120	146	89	112
32	120	175	107	134
33	144	189	144	189
34	300	334	300	334
35	396	406	396	406
36	454	468	454	468
37	492	516	492	516
38	492	558	492	558

<sup>1</sup> Expressed in completed years calculated at the beginning of the plan year.



## ACTUARIAL REPORT

REGULAR FORCE Death Benefit Account  
as at 31 March 2008

**Table 21 Assumed Rates of Termination due to Disability<sup>1</sup>**  
(per 1,000 individuals)

<u>Age<sup>2</sup></u>	<u>Any Occupation (3A)</u>		<u>Own Occupation (3B)</u>		
	<u>Male</u>	<u>Female</u>	<u>Male Officer</u>	<u>Male Other Rank</u>	<u>Female</u>
20	0.4	0.4	2.8	2.7	5.5
25	0.2	0.7	2.8	5.6	7.5
30	0.1	1.3	1.0	7.7	8.9
35	0.3	1.7	0.9	13.5	15.5
40	0.5	2.5	2.6	24.0	22.7
45	0.4	3.6	3.4	28.4	27.3
50	0.9	5.0	7.1	32.1	30.4
55	2.1	6.8	14.4	52.9	42.8
59	3.6	8.2	21.3	63.6	57.0

<sup>1</sup> Disability 3A refers to the inability to perform any occupations while 3B refers to the inability to perform his/her own occupation.

<sup>2</sup> Expressed in completed years calculated at the beginning of the plan year.





**Table 22 Assumed Rates of Mortality**  
For plan year 2009  
(per 1,000 individuals)

Age <sup>1</sup>	Elective and Non-Elective Participants			Elective Disabled (3A) Participants		
	Male		Female	Male		Female
	Officer	Other Rank		Officer	Other Rank	
20	0.4	0.7	0.4	0.6	3.3	0.4
25	0.4	0.8	0.4	0.7	3.5	0.4
30	0.5	0.8	0.4	0.7	3.7	0.5
35	0.6	0.8	0.4	0.9	4.1	0.7
40	0.6	0.9	0.5	1.2	4.6	1.1
45	0.8	1.6	0.8	2.9	5.3	1.8
50	1.3	2.7	1.3	7.2	6.4	2.8
55	2.1	4.9	2.2	11.9	10.1	4.7
60	3.9	9.1	3.9	16.6	17.3	7.5
65	7.5	15.6	7.1	22.5	28.1	11.7
70	15.2	26.1	12.4	31.4	43.5	18.9
75	31.1	43.1	21.6	47.6	63.1	31.4
80	58.8	69.1	37.4	70.8	86.8	49.8
85	97.5	106.0	65.0	106.8	118.4	81.5
90	148.7	156.7	112.2	146.6	160.6	130.9
95	222.2	227.9	193.0	220.4	216.0	192.4
95	222.2	227.9	193.0	220.4	216.0	192.4
100	315.1	328.6	287.3	312.6	288.4	287.2
105	495.5	495.5	415.0	495.4	495.4	414.9
110	500.0	500.0	492.4	500.0	500.0	492.4

<sup>1</sup> Expressed in completed years calculated at the beginning of the plan year.



# ACTUARIAL REPORT

REGULAR FORCE Death Benefit Account  
as at 31 March 2008

**Table 23 Assumed Longevity Improvement Factors**  
(effective at the end of plan year)

<u>Age</u> <sup>2</sup>	Initial and Ultimate Plan Year Mortality Reductions (%) <sup>1</sup>			
	Male		Female	
	<u>2009</u>	<u>2029+</u>	<u>2009</u>	<u>2029+</u>
20	2.80	0.70	1.50	0.70
25	2.95	0.70	1.80	0.70
30	3.25	0.70	1.85	0.70
35	2.80	0.70	1.45	0.70
40	2.05	0.70	1.25	0.70
45	1.75	0.70	1.40	0.70
50	1.86	0.70	1.46	0.70
55	2.05	0.70	1.40	0.70
60	2.24	0.70	1.34	0.70
65	2.43	0.70	1.28	0.70
70	2.35	0.70	1.25	0.70
75	2.10	0.70	1.25	0.70
80	1.70	0.70	1.10	0.70
85	1.05	0.64	0.70	0.64
90	0.60	0.40	0.35	0.40
95	0.20	0.40	0.10	0.40
100	0.00	0.40	0.00	0.40

<sup>1</sup> The mortality rate reduction applicable during any plan year within the 20-year select period is found by linear interpolation between the figures for plan years 2009 and 2029.

<sup>2</sup> Expressed in completed years calculated at the beginning of the plan year.



## **Appendix 7 - Acknowledgements**

The Department of National Defence provided relevant valuation data on participants. Public Works and Government Services Canada also provided additional information in respect of elective participants.

The co-operation and able assistance received from the above-mentioned data providers deserve to be acknowledged.

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