

2003

ACTUARIAL REPORT

ON THE

PUBLIC SERVICE DEATH BENEFIT ACCOUNT

AS AT 31 MARCH 2002



Office of the Superintendent of
Financial Institutions Canada

Office of the Chief Actuary

Bureau du surintendant des
institutions financières Canada

Bureau de l'actuaire en chef

Canada

To obtain a copy of this report, please contact:
Office of the Chief Actuary
Office of the Superintendent of Financial Institutions Canada
12th Floor, Kent Square Building
255 Albert Street
Ottawa, Ontario
K1A 0H2

Fax: (613) 990-9900
E-mail: oca-bac@osfi-bsif.gc.ca

An electronic version of this report is available
on our Web site, at www.osfi-bsif.gc.ca


12 September 2003

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

Dear Minister:

Pursuant to section 59 of the *Public Service Superannuation Act* (PSSA), I am pleased to submit the report on the actuarial review as at 31 March 2002 of the Public Service Death Benefit (PSDB) Account established under Part II of the PSSA.

Yours sincerely,

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

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

TABLE OF CONTENTS

	<u>Page</u>
I- Executive Summary	5
A- Purpose of this Actuarial Report.....	5
B- Scope of the Report.....	5
C- Main Findings	5
II- Financial Position of the Plan	7
A- Balance Sheet as at 31 March 2002	7
B- Financial Position	7
C- Sensitivity of Valuation Results to Variations in Key Assumptions	7
III- Reconciliation of Results with Previous Report	9
IV- Legislated Contribution Rates	10
A- Paid-Up Insurance.....	10
B- Term Insurance	10
V- Actuarial Opinion	13
APPENDICES	14
Appendix 1 - Summary of Plan Provisions.....	14
Appendix 2 - Plan Assets.....	18
Appendix 3 - Participant Data	22
Appendix 4 - Methodology	26
Appendix 5 - Economic Assumptions	29
Appendix 6 - Demographic and Other Assumptions.....	31
Appendix 7 - Acknowledgements.....	42

I- Executive Summary

A- Purpose of this Actuarial Report

This actuarial report on the supplementary death benefit plan established under Part II of the *Public Service Superannuation Act* (PSSA) was made as at 31 March 2002 pursuant to section 59 of the PSSA, which states that for valuation purposes the plan shall be treated as if it were a pension plan subject to the *Public Pensions Reporting Act* (PPRA). The previous review was made as at 31 March 1999. The scheduled date of the next periodic review pursuant to section 59 is 31 March 2005.

In accordance with accepted actuarial practice and with the PPRA to which section 59 refers, the main purpose of this actuarial report is to show realistic long-term projections of the assets, liabilities and financial position of the plan to assess the adequacy of the legislated contribution rates.

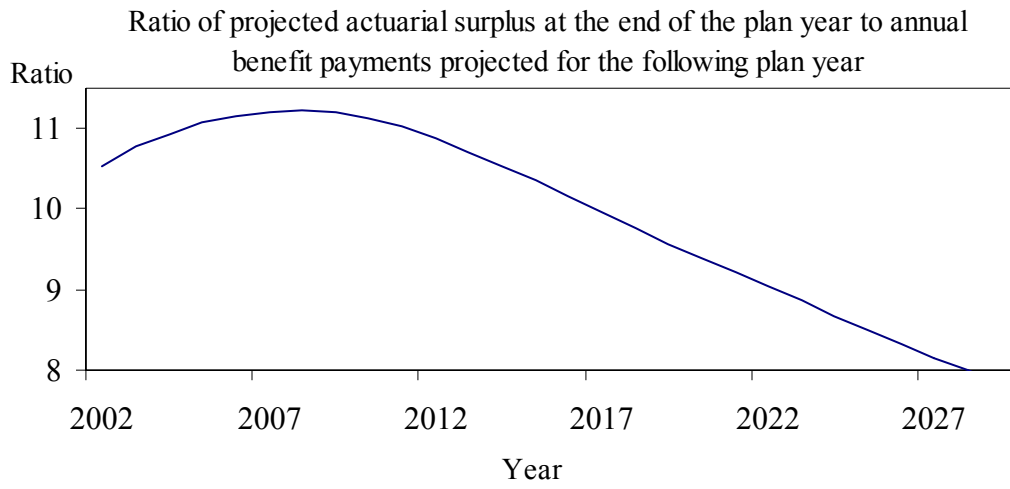
B- Scope of the Report

The previous valuation report was based on the plan provisions as they stood after the enactment of Bill C-78 on 14 September 1999. There were no further changes to the plan provisions since the last valuation. This valuation report is based on the plan provisions shown in Appendix 1.

C- Main Findings

As at 31 March 2002, the plan had an actuarial surplus of \$1,466 million resulting from the difference between the assets of \$1,897 million and the liabilities of \$431 million.

The current actuarial surplus of \$1,466 million in the PSDB Account is projected to reach \$2,553 million at the end of plan year 2027. The graph on the following page shows the ratio of projected actuarial surplus at the end of the plan year to annual benefit payments projected for the following plan year. This ratio is expected to increase until plan year 2009 due to excess investment earnings, after which it should steadily decline as total death benefits continue to rise.



II- Financial Position of the Plan

A- Balance Sheet as at 31 March 2002

The following balance sheet was prepared using the plan assets described in Appendix 2, the participant data described in Appendix 3, the methodology described in Appendix 4, and the assumptions described in Appendices 5 and 6.

	(\$ millions)
Assets	1,897
Liabilities	
For paid-up life insurance on participants ages 65 and over	411
For incurred but unreported or pending claims	<u>20</u>
Total	431
Actuarial Surplus	1,466

B- Financial Position

At 31 March 2002 the actuarial surplus totalled \$1,466 million, being 10.5 times the total amount of death benefits projected for plan year 2003. By comparison, the actuarial surplus as at 31 March 2000 under the previous report was \$1,298 million, which was 10.8 times the amount of death benefits paid during plan year 2001.

As shown in Appendix 3 and explained in section 4 below, the projected contributions to the plan are less than the projected benefits for all future plan years. However, total income exceeds total expenditures in every year of the projection period because investment earnings more than offset the excess of benefits over contributions.

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.

1. Projected Investment Yields

The valuation reflects a deemed investment policy of buying and holding until maturity long-term Government of Canada bonds. If the investment portfolio also included a significant equity component, it would be appropriate to project higher rates of return.

As a measure of sensitivity, an increment of one percentage point in the projected yields would increase the actuarial surplus projected at the end of plan year 2027 from \$2,553 million to \$4,029 million, an increase of 58%.

On the opposite side, a decrease of one percentage point in the projected yields would decrease the actuarial surplus projected at the end of plan year 2027 from \$2,553 million to \$1,340 million, a decrease of 48%.

2. Mortality

If the assumed improvements in longevity after the 2003 plan year were disregarded, then the monthly benefit cost rate of 27.3 cents projected for 2027 would climb to 38.1 cents, an increase of 40%. The actuarial surplus projected at the end of plan year 2027 would decrease by 78% from \$2,553 million to \$566 million.

However, if the assumed improvements in longevity after the 2003 plan year were kept at the level of plan year 2003, resulting in greater improvements in longevity than those assumed in table 6H, then the monthly benefit cost rate of 27.3 cents projected for 2027 would decline to 22.8 cents, a decrease of 16%. This would correspond to an increase of 15% in the actuarial surplus projected at the end of plan year 2027, from \$2,553 million to \$2,924 million.

III- Reconciliation of Results with Previous Report

The following table shows the main reasons for the decrease in the projected benefit cost rate of 27.7 cents shown in the previous report to that of 27.3 cents of this report.

<u>Projections for Plan Year 2027</u>	Monthly Cost per \$1,000 of Term Insurance (Cents)	Year End Actuarial Surplus to Benefit Payments in plan Year 2028 (Ratio)
As at 31 March 2000 (Projection for plan year 2025)	27.7	11.7
As at 31 March 2000 (Projection for plan year 2027)	27.2	11.6
Correction of errors	0.0	(0.1)
Intervaluation economic experience and change in population	0.9	(2.6)
Departure of participants covered by transfer agreements	(0.1)	0.5
Change in new entrant assumptions	(0.6)	(0.9)
Change in economic assumptions	0.3	0.0
Change in longevity improvement factors	0.1	(0.5)
Change in demographic assumptions other than mortality rate	(0.9)	0.9
Change in assumed proportion electing SDB at retirement	0.4	(0.7)
As at 31 March 2002 (Projection for plan year 2027)	27.3	8.2

The intervaluation experience showed average salary increases of 17% and 21% respectively for non-elective male and female participants. This contributed to a decrease of 2.6 in the year end actuarial surplus to benefit payments in plan year 2028 ratio. The change in the demographic profile of the population contributed to an increase of 0.9 cents in the plan year 2027 monthly cost per \$1,000 of term insurance.

¹ Includes paid-up insurance as well as term insurance

IV- Legislated Contribution Rates

The aggregate amount of death benefit payments projected for plan year 2003 is \$139.3 million, which is made up of \$98.8 million in respect of the term insurance and \$40.5 million in respect of the paid-up insurance. In this report, *term insurance* means the basic coverage (two times salary) less the 10% per year reduction applicable from age 66 and the \$10,000 paid-up insurance applicable from age 65.

A- Paid-Up Insurance

For plan year 2003, the estimated single premiums at age 65 for each \$10,000 of paid-up insured benefit are \$3,575 and \$2,961 for males and females, respectively. The corresponding legislated contribution rates for each \$10,000 of paid-up insured benefits are \$310 and \$291, respectively.

The assumed improvements in longevity cause the projected single premium for the paid-up insurance to decrease over time. However, the projected ultimate yield of 5.70% is lower than the yield of 8.43% projected for plan year 2003. This has the effect of gradually increasing the projected single premium over the years.

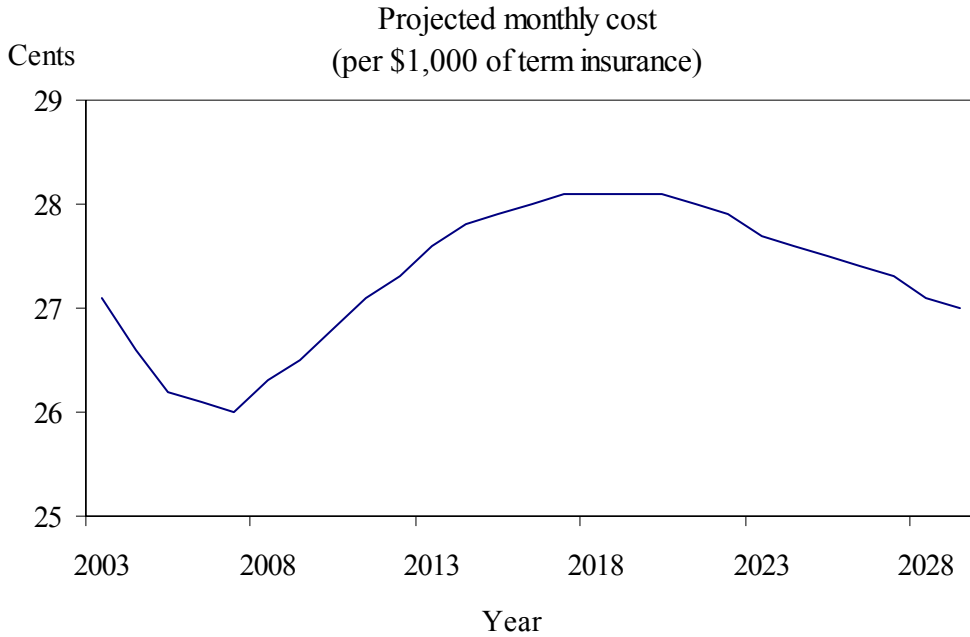
The net effect of longevity improvements and decreasing projected yields is to increase the projected single premiums at age 65 for each \$10,000 of paid-up insured benefit. A male participant's projected single premium increases from \$3,575 for plan year 2003 to \$3,884 for plan year 2027; for a female participant the increase is from \$2,961 to \$3,269. The corresponding legislated contribution rates for each \$10,000 of paid-up insured benefit are only \$310 and \$291, respectively.

B- Term Insurance

The total amount of term insurance proceeds projected to be payable during plan year 2003 is \$98.8 million. Given that the total amount of term insurance projected to be in force for plan year 2003 is \$30,435 million, the benefit cost rate projected for plan year 2003 is 27.1 cents per month per \$1,000 of term insurance.

Non-elective participants and elective participants in receipt of an immediate annuity or an annual allowance are required to contribute monthly 15 cents per \$1,000 of insured benefit. As a minimum, the Government contributes monthly an amount equal to one-twelfth of the actual total amount of term insurance proceeds payable during the month. For plan year 2003, the Government's monthly contribution is estimated at 2.3 cents per \$1,000 of insured benefit.

The total amount contributed by participants and the government is therefore 17.3 cents (15 cents plus 2.3 cents) per month per \$1,000 of term insurance benefit, i.e. significantly less than the estimated monthly cost of 27.1 cents per \$1,000 of term insurance benefit for plan year 2003.



As shown in the above graph, the monthly cost per \$1,000 of term insurance is projected to fluctuate between 26 cents and 28.1 cents in the first 17 years. Thereafter the monthly cost is projected to decrease gradually to 27.3 cents by plan year 2027. This 27.3 cents cost compares to the combined (Government and participants) legislated contribution rate of 17.3 cents (i.e. 15 cents for participants plus one-twelfth of 27.3 cents for Government) projected for plan year 2027.

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

Projected Monthly Cost (Cents Per \$1,000 of Term Insurance)					
	Plan Year				
	2003	2010	2020	2025	2027
Participants					
Non-elective	13.9	13.7	12.9	12.7	12.7
Elective	88.4	73.8	72.1	71.5	71.2
All	27.1	26.8	28.1	27.5	27.3

For non-elective participants, the monthly cost projected for plan year 2027 is 91% of the monthly cost estimated for plan year 2003. This results mainly from the following two factors:

- There is a reduction in cost due to the assumed lower mortality for plan year 2027 in accordance with the longevity improvement factors shown in table 6H applied to the current mortality rates shown in table 6G.
- The distribution of non-elective participants in the plan year 2027 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 2027 is 81% of the monthly cost estimated for plan year 2003. This reduction is mostly the result of assumed mortality improvements.

For all plan participants in aggregate, the monthly cost projected for plan year 2027 is 101% of the monthly cost estimated for plan year 2003.

V- Actuarial Opinion

In our opinion, considering that this report was prepared pursuant to the *Public Pensions Reporting Act* per section 59 of the *Public Service Superannuation Act*,

- the valuation input data on which it is based are sufficient and reliable;
- the assumptions that have been used are, in aggregate, appropriate;
- the methodology employed is appropriate; and
- the value of assets exceeds the wind-up liabilities at the valuation date.

This report has been prepared, and our opinions 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.



Daniel Hébert
Senior Actuary
Office of the Chief Actuary
Fellow of the Canadian Institute of Actuaries
Actuaries



Jean-Claude Ménard
Chief Actuary
Office of the Chief Actuary
Fellow of the Canadian Institute of

Ottawa, Canada
12 September 2003

APPENDICES

Appendix 1 - Summary of Plan Provisions

Following is a summary description of the main provisions of the Supplementary Death Benefit plan established for public servants under Part II - *Supplementary Death Benefits* of the *Public Service Superannuation Act* (PSSA). This plan supplements the pension plan by providing a lump sum benefit upon the death of an insured participant.

I- Plan Participants

A- Non-Elective Participants

Non-elective participant includes all contributors to the pension plan established under the PSSA who are employed in the Public Service except employees of Crown corporations covered under other group life insurance plans.

B- Elective Participants

Elective participant means all participants who have ceased to be employed in the Public Service following disability or retirement and have opted for continuing their coverage under the Supplementary Death Benefit plan. Such right is limited to participants who, at the time they ceased to be employed in the Public Service, had completed at least two years of continuous service in the Public Service or two years of membership in the Supplementary Death Benefit plan.

A non-elective participant who ceases employment and becomes entitled to a PSSA immediate annuity or annual allowance automatically becomes an elective participant. During the first 30 days as elective participant, such individual has the right to opt out of the plan, effective on the 31st day.

II- Assets

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

III- Contributions

A- Non-Elective Participants, and Elective Participants in Receipt of an Immediate Annuity or an Annual Allowance

For non-elective participants as well as elective participants in receipt of an immediate annuity (disability or retirement) or an annual allowance, the rate of contribution is 15 cents per month for each \$1,000 of insured benefit. When these participants attain age 65 (or complete two years of service, if later), their contribution is reduced by \$1.50 per month in recognition of the fact that \$10,000 of insured death benefit becomes paid-up (by the Government) for the remaining lifetime of the participant.

B- 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:

<u>Age Last Birthday</u>	<u>Contribution per \$2,000 of Insured Benefit</u>	
	<u>Annual</u>	<u>Monthly</u>
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

C- Government

The Government credits monthly to the Public Service Death Benefit (PSDB) Account an amount equal to one-twelfth of the total amount of term insurance death benefits paid in the month.

Crown corporations and public boards whose employees are participants contribute at the rate of one cent per month for each \$250 of insured benefit.

When a participant, other than one entitled to a deferred annuity, reaches age 65 (or completes two years of service, if later), the Government credits to the PSDB Account a single premium for the individual \$10,000 paid-up portion of insured benefit in respect of which contributions are no longer required from the participant.

The legislated amount of single premium for each such \$10,000 paid-up portion of insured benefit is shown in the following table and corresponds to one-twentieth of \$10,000 times the single premium rate for each dollar of insured benefit, computed on the basis of the Life Tables, Canada, 1950-1952 and interest at 4% per annum.

<u>Age Last Birthday</u>	<u>Single Premium per \$10,000 of Insured Benefit</u>	
	<u>Male</u>	<u>Female</u>
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

Under the statutes, if for whatever reason the Public Service Death Benefit Account were to become exhausted, the Government would then have to make special contributions to the Account in an amount at least equal to the death benefits then due but not paid by reason of such cash shortfall.

IV- Amount of Insured Death 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 \$1,000 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 Public Service.

The amount of insurance described above is reduced by 10% a year starting at age 66 until it would normally vanish at age 75. However, the amount of insurance cannot at any time be reduced below a basic floor value of \$10,000 subject to the following exceptions:

- For those elective participants 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, within one year following the introduction of Bill C-55, to keep their insured death benefit at \$500, the floor value is \$500 instead of \$10,000. Such election is irrevocable.
- For non-elective participants, the amount of insurance cannot be reduced below the multiple of \$1,000 equal to or next above one-third of the participant's annual salary, even if the resulting amount is higher than \$10,000.
- All participants aged between 61 and 70 prior to the enactment of Bill C-78 may elect to retain the 10% a year reduction schedule starting at age 61.
- For elective participants entitled to a deferred annuity there is no coverage past age 75.

Upon ceasing to be employed in the Public Service, elective participants in receipt of an immediate annuity or in receipt of an annual allowance under the *Public Service Superannuation Act* may opt to reduce their amount of insured death benefit to \$10,000.

Appendix 2 - Plan Assets

Public Service Death Benefit Account

The plan is entirely financed through the Public Service Death Benefit Account, which forms part of the Accounts of Canada. The Account is:

- credited with all contributions made by participants and the Government;
- credited with investment earnings as though net cash flows were invested quarterly in 20-year Government of Canada bonds issued at prescribed interest rates and held to maturity;
- credited with investment 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
- charged with the death benefit payments when they become due;

The table below shows the reconciliation of assets in the Public Service Death Benefit Account from the last valuation date to the current valuation date¹. Since the last valuation, the Account balance has grown by \$304 million (i.e. a 19% increase) to reach \$1,897 million as at 31 March 2002. The net growth in the Account balance is to a large extent the result of interest credits made.

	(in millions of dollars)			
Account Balance as at 31 March 1999				1,593.0
Plan year	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2000-2002</u>
Accounts of Canada opening balance	1,593.0	1,707.0	1,799.1	1,593.0
INCOME				
Employee contributions	60.5	53.2	53.1	166.8
Employer contributions				
- Term insurance	8.6	8.7	7.3	24.6
- Paid-up insurance	1.3	1.3	1.2	3.8
Investment earnings	<u>147.3</u>	<u>151.4</u>	<u>155.5</u>	<u>454.2</u>
Subtotal	217.7	214.6	217.0	649.3
EXPENDITURES				
Death claims				
- Term insurance	73.1	81.7	78.2	233.0
- Paid-up insurance	<u>30.6</u>	<u>40.7</u>	<u>40.7</u>	<u>112.0</u>
Subtotal	103.7	122.4	119.0	345.1
Accounts of Canada closing balance	1,707.0	1,799.1	1,897.2	1,897.2
Account Balance as at 31 March 2002			1,897.2	1,897.2

¹ Some totals in this page might err by a margin of \$0.1 million due to rounding.

Rates of Return

The following rates of return on the Public Service Death Benefit Account by plan year were calculated using the foregoing entries.

<u>Plan Year</u>	<u>Return</u>
2000	9.44%
2001	9.19%
2002	8.93%

Sources of Asset Data

The Account entries shown previously were taken from the Accounts of Canada. In accordance with section 8 of the *Public Pensions Reporting Act*, the Office of the Comptroller General of Canada provided a certification of the assets of the plan as at 31 March 2002.

Account Projection

The following table shows a projection of the Public Service Death Benefit Account over the next 25 years.

Plan Year	<u>Balance Sheet at the End of Plan Year</u>			Ratio of Projected Actuarial Surplus at the End of the Plan Year to Annual Benefit Payments Projected for the Following Plan Year
	Account	Liabilities	Actuarial Surplus	
2002	1,897.2	431.5	1,465.7	10.5
2003	1,978.5	439.5	1,539.0	10.8
2004	2,063.2	447.3	1,615.9	10.9
2005	2,148.9	455.2	1,693.8	11.1
2006	2,234.5	463.7	1,770.8	11.2
2007	2,320.2	472.9	1,847.2	11.2
2008	2,405.2	484.3	1,920.9	11.2
2009	2,488.5	495.8	1,992.8	11.2
2010	2,569.6	507.5	2,062.1	11.1
2011	2,647.7	520.8	2,126.9	11.0
2012	2,717.6	538.0	2,179.6	10.9
2013	2,783.5	556.9	2,226.5	10.7
2014	2,845.7	574.6	2,271.0	10.5
2015	2,904.2	592.8	2,311.4	10.4
2016	2,957.4	612.4	2,345.1	10.2
2017	3,006.3	632.9	2,373.4	10.0
2018	3,051.8	654.0	2,397.7	9.8
2019	3,095.9	675.5	2,420.4	9.6
2020	3,139.4	697.6	2,441.8	9.4
2021	3,181.4	719.5	2,461.9	9.2
2022	3,222.5	741.2	2,481.3	9.0
2023	3,262.7	763.0	2,499.7	8.9
2024	3,301.9	784.2	2,517.7	8.7
2025	3,340.9	805.5	2,535.4	8.5
2026	3,379.7	826.5	2,553.2	8.3
2027	3,418.3	846.5	2,571.8	8.2

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 Public Service Death Benefit Account over 25 years commencing with plan year 2003.

Income and Expenditure During the Plan Year									(\$ millions)
Plan Year	Participants	Contributions			Benefit Payments			Investment Earnings	Net Cash Flow
		Term	Paid-Up	Total	Term	Paid-Up	Total		
2003	54.2	8.2	1.2	63.7	98.8	40.5	139.3	156.9	81.3
2004	56.9	8.5	1.3	66.7	101.8	41.1	142.9	161.0	84.7
2005	60.1	8.8	1.3	70.2	106.1	41.6	147.7	163.2	85.7
2006	63.1	9.2	1.5	73.8	110.9	42.1	152.9	164.7	85.6
2007	66.4	9.7	1.6	77.7	116.3	42.5	158.8	166.8	85.6
2008	69.0	10.2	1.8	80.9	121.9	42.9	164.8	168.9	85.1
2009	71.8	10.7	1.8	84.3	128.0	43.2	171.2	170.3	83.3
2010	74.7	11.2	1.9	87.8	134.6	43.5	178.1	171.3	81.1
2011	77.8	11.8	2.0	91.6	141.5	43.7	185.2	171.8	78.1
2012	81.0	12.4	2.4	95.8	148.8	43.9	192.7	166.8	69.9
2013	84.3	13.0	2.5	99.8	156.1	44.2	200.3	166.3	65.8
2014	87.7	13.6	2.4	103.7	163.5	44.5	207.9	166.4	62.2
2015	91.2	14.2	2.5	107.9	170.8	44.7	215.5	166.2	58.5
2016	94.7	14.8	2.6	112.2	178.1	45.0	223.1	164.2	53.2
2017	98.4	15.4	2.7	116.5	185.4	45.3	230.7	163.0	48.8
2018	102.1	16.0	2.7	120.8	192.4	45.7	238.1	162.8	45.5
2019	105.8	16.6	2.8	125.1	199.4	46.2	245.6	164.6	44.1
2020	109.5	17.2	2.8	129.5	206.1	46.8	252.9	166.9	43.5
2021	113.3	17.7	2.8	133.8	212.6	47.4	260.1	168.3	42.0
2022	117.2	18.2	2.7	138.2	218.9	48.2	267.1	170.1	41.1
2023	121.2	18.8	2.7	142.7	225.3	49.1	274.4	171.9	40.2
2024	125.3	19.3	2.7	147.3	231.9	50.1	282.0	173.9	39.2
2025	129.5	19.9	2.7	152.1	238.6	51.3	289.9	176.8	39.0
2026	133.8	20.5	2.7	157.0	245.6	52.6	298.1	179.9	38.8
2027	138.3	21.0	2.6	162.0	252.6	54.0	306.5	183.1	38.6

Appendix 3 - Participant Data

Source of Participant Data

The valuation input data required in respect of all participants are extracted from master computer files maintained by the Superannuation Directorate of the Department of Public Works and Government Services Canada.

The main valuation data file supplied by the Superannuation Directorate contained all the status information of a participant during the period from 1 April 1998 to 31 March 2001.

These data were projected to 31 March 2002 generally using the demographic assumptions of the current valuation and the actual economic experience (2.3% per year for general pay increases for non-elective participants) for the relevant one-year projection period.

Participants Data Summary

Tables 3A to 3E on the following pages show the detailed participant data upon which this valuation is based.

Table 3A

Non-Elective Participants as at 31 March 2001						
<u>Age²</u>	<u>Number¹</u>			<u>Insured Benefits (\$ thousands)</u>		
	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
15-19	47	52	99	3,194	3,329	6,523
20-24	1,835	2,765	4,600	141,579	205,695	347,274
25-29	6,307	9,015	15,322	551,885	763,525	1,315,410
30-34	9,648	13,501	23,149	936,746	1,223,426	2,160,172
35-39	14,526	19,596	34,122	1,497,965	1,824,540	3,322,505
40-44	18,784	24,496	43,280	2,017,913	2,308,784	4,326,697
45-49	22,314	23,965	46,279	2,516,677	2,309,808	4,826,485
50-54	20,968	17,151	38,119	2,513,916	1,657,053	4,170,969
55-59	9,317	6,597	15,914	1,156,167	608,454	1,764,621
60-64	2,888	1,883	4,771	355,989	167,272	523,261
65-69	<u>177</u>	<u>104</u>	<u>281</u>	<u>19,654</u>	<u>7,858</u>	<u>27,512</u>
Total	106,811	119,125	225,936	11,711,685	11,079,744	22,791,429

<u>Average</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
Age ²	45.0	42.4	43.7
Service ²	15.2	12.4	13.9
Insured Benefit (\$thousands)	109,649	93,009	100,876

¹ Includes Correctional Services Canada participants in operational service.

² Expressed in completed years calculated at the beginning of the plan year.

Table 3B

Elective Participants in Receipt of a Disability Pension as at 31 March 2001						
Age ¹	Number			Insured Benefits (\$ thousands)		
	Male	Female	Total	Male	Female	Total
30- 34	3	9	12	224	583	807
35- 39	40	71	111	3,011	4,847	7,858
40- 44	151	275	426	10,665	18,894	29,559
45- 49	392	532	924	29,480	36,416	65,896
50- 54	811	760	1,571	63,669	53,154	116,823
55- 59	894	720	1,614	68,878	48,709	117,587
60- 64	1,090	811	1,901	78,590	49,686	128,276
65- 69	1,014	640	1,654	53,149	27,453	80,602
70- 74	838	447	1,285	14,062	6,270	20,332
75- 79	780	382	1,162	7,800	3,820	11,620
80- 84	412	230	642	4,120	2,300	6,420
85- 89	85	93	178	850	930	1,780
90- 94	10	18	28	100	180	280
95- 99	<u>1</u>	<u>3</u>	<u>4</u>	<u>10</u>	<u>30</u>	<u>40</u>
Total	6,521	4,992	11,513	334,608	257,930	592,538

<u>Average</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
Age ¹	58.9	56.1	57.6
Insured Benefit (\$ thousands)	51,014	50,572	50,822

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

Table 3C

Elective Retirement Participants in Receipt of an Immediate Annuity or an Annual Allowance as at 31 March 2001						
<u>Age¹</u>	<u>Number</u>			<u>Insured Benefits (\$ thousands)</u>		
	<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
45- 49	6	1	7	645	58	703
50- 54	2,781	1,689	4,470	290,446	142,774	433,220
55- 59	9,475	4,123	13,598	993,828	330,250	1,324,078
60- 64	10,352	4,510	14,862	1,078,327	341,165	1,419,492
65- 69	12,518	4,640	17,158	944,824	258,894	1,203,718
70- 74	13,376	4,837	18,213	355,067	95,617	450,684
75- 79	14,561	5,063	19,624	145,610	50,630	196,240
80- 84	9,581	3,374	12,955	95,810	33,740	129,550
85- 89	3,775	1,787	5,562	37,750	17,870	55,620
90- 94	909	683	1,592	9,090	6,830	15,920
95- 99	136	124	260	1,360	1,240	2,600
100-104	<u>4</u>	<u>25</u>	<u>29</u>	<u>40</u>	<u>250</u>	<u>290</u>
Total	77,474	30,856	108,330	3,952,796	1,279,318	5,232,114

<u>Average</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
Age ¹	63.5	63.1	63.4
Insured Benefit (\$ thousands)	50,701	41,281	48,013

Table 3D

Elective Participants Entitled to a Deferred Annuity as at 31 March 2001	
<u>Number²</u>	<u>Insured Benefits (\$ thousands)</u>
111	3,637

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

² 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

I- Assets

The assets of the plan consist essentially of the recorded balance in the Public Service Death Benefit (PSDB) 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 Account balance corresponds to the excess of past contributions and investment earnings over past benefit payments. Assets are accordingly projected to the end of a given plan year by adding to the Account at the beginning of that plan year the net income (i.e. the excess of contributions and investment earnings over benefits) projected as described below for that plan year. Administration expenses are ignored because they are not charged to the Account.

II- Projected Yields

The projected yields (shown in Appendix 5) assumed in computing the present value of benefits accrued under the Superannuation Account (i.e. the Account liabilities) are the projected annual yields on the combined book value of the Superannuation Accounts of the Public Service, Canadian Forces, and the Royal Canadian Mounted Police pension plans.

An iterative process involving the following determined the projected Account yields:

- the combined notional bond portfolio of the three Accounts as at the valuation date;
- the assumed future new money interest rates;
- the expected future benefits payable in respect of all pension entitlements accrued up to 31 March 2002;
- the expected future contributions for prior service elections, and
- the expected future administrative expenses,

always taking into account that each quarterly interest credit to an Account is calculated as if the principal at the beginning of a quarter remains unchanged during the quarter.

III- Contributions

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

- the legislated annual contribution rate of \$1.80 per \$1,000 of coverage (equivalent to the monthly rate of 15 cents per \$1,000 of coverage)
- by
- the aggregate of two times the salaries of participants projected for that plan year on an open-group basis, less
 - the 10% a year reduction from age 66 if applicable, and
 - the \$10,000 paid-up coverage after age 65, if applicable.

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

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 (or participants completing two years of service, if older).

IV- Investment Earnings

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

V- Benefits

The total amount of death benefits (term and paid-up insurance) for a given plan year is projected as the total amount of insurance in force during that plan year multiplied by the mortality rates assumed to apply during that plan year. The amount of insurance in force depends on the salary projected to time of death. 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 below.

VI- Liabilities

A- Paid-up Reserve

At the end of a given plan year, the liabilities associated with the individual \$10,000 paid-up insurance in force correspond to the amount which, together with interest at the projected yields, is sufficient to pay for each individual \$10,000 paid-up death benefit projected payable on the basis of the assumed mortality rates.

B- 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 benefits paid on average during the six previous plan years.

C- Extension of Coverage

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 in respect of that term insurance provision.

Appendix 5 - Economic Assumptions

Increases in Average Earnings

Salary increases consist of a combination of inflation, productivity growth (i.e. real 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.

Price increases, as measured by changes in the Consumer Price Index, tend to fluctuate from year to year. Based on historical trends, the renewed commitment of the Bank of Canada and the government to keep inflation between 1% and 3% over the next five years and judgement about the long-term outlook for inflation, an ultimate rate of price increase of 2.7% was assumed for 2014 and thereafter. Recognizing recent experience, the rate of price increase is assumed at 2.2% for plan year 2003 and 2.0% for years 2004 to 2007. From 2008 the rate is then uniformly increased to its ultimate level of 2.7% in 2014. In the previous valuation the ultimate rate of price increase was assumed to be 3.0%.

The assumed ultimate productivity rate was 0.9% per annum. This is closer to the average Canadian experience of the past 50 years (1.43% per annum) than that of the past 25 years (-0.06% per annum). Real increases in average earnings were assumed to rise gradually over a 15-year select period to reach the ultimate 0.9% per annum in plan year 2016. In the previous valuation an ultimate productivity rate of 1.0% was used.

Projected Yields on Account

These yields are required for the estimates of the long-term projection of the assets, liabilities and actuarial surplus/deficit. The methodology used to determine the projected yields on the Account is described in Appendix 4.

Summary of Key and Derived Economic Assumptions

Plan Year	Average Salary Increase ¹ (Non-Elective Participants)	Projected Yield
2003	4.50%	8.43%
2004	2.30	8.30
2005	2.30	8.06
2006	2.40	7.81
2007	2.50	7.60
2008	2.60	7.42
2009	2.80	7.21
2010	3.00	7.01
2011	3.10	6.81
2012	3.20	6.42
2013	3.30	6.23
2014	3.40	6.09
2015	3.50	5.96
2016	3.60	5.76
2017	3.60	5.62
2018	3.60	5.52
2019	3.60	5.50
2020	3.60	5.50
2021	3.60	5.47
2022	3.60	5.46
2023	3.60	5.45
2024	3.60	5.44
2025	3.60	5.47
2026	3.60	5.50
2027	3.60	5.54
2028	3.60	5.57
2029	3.60	5.60
2030	3.60	5.63
2031	3.60	5.65
2032	3.60	5.68
2033+	3.60	5.70

¹ 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 available intervaluation experience (usually April 1998 to March 2001). Described below are the assumptions related to causes of termination (employment or participation):

Description	Basis	Comments	Tables
Non-elective Service less than 2 years			
All causes	Service	The assumed rates for the main group females are 15% to 20% lower than those of the previous valuation; for males the decreases are half as much as for females.	6B
Non-elective Service from 2 years			
Other than disability or mortality			
Age less than 50	Sex, Service		
Main group		The assumed rates for the main group females are 15% to 20% lower than those of the previous valuation; for males the decreases are half as much as for females.	6C
Operational service (o/s)		The assumed rates for the operational service group are 40% lower than previously.	6C
Age from 50	Age, Sex and Service		
Main group		The rates of pensionable retirement assumed for the main group of contributors are generally 5% to 10% lower than assumed in the previous valuation.	6D
Operational service (o/s)		The pensionable retirement rates for the operational service group have more or less decreased to the same extent except for those retiring before age 60 with less than 25 years of service, where the decrease is roughly 60%.	6E
Disability	Age, Sex	The disability incidence rates were significantly revised to reflect the intervaluation experience. All disability incidence rates are about 15% lower than assumed in the previous valuation.	6F
Mortality	Age, Sex and Year	The assumed rates are either the same as or generally very close to those projected for plan year 2003 and latter in the previous valuation	6G
		The mortality improvement assumption was based on a 25-year select period with an ultimate mortality improvement of 0.5% at all ages. The first-year improvement factors (i.e. for year 2000) were revised to reflect the mortality improvement of the 1995-97 Life Table for Canada relative to the 1985-87 Table. The intermediate factors were obtained by linear interpolation between the first-year and ultimate factors.	6H

Description	Basis	Comments	Tables
Elective Participants opting to continue coverage after termination of employment	Age, Sex	The proportions of participant electing to continue coverage were increased on average by 1% for male participants and by 2.3% for female participants to reflect the intervaluation experience.	6I
Mortality of Elective participants			
Normal Retirement	Age, Sex and Year	Same rates as mortality-in-service. Mortality improvement was the same as for mortality-in-service.	6G 6H
Disability Retirement	Age, Sex and Year	The assumed rates are either the same as or generally very close to those projected for plan year 2003 and latter in the previous valuation. Mortality improvement was the same as for mortality-in-service.	6G 6H

Other Demographic Assumptions

Option to Reduce Coverage to \$10,000

The valuation data indicates that the proportion of elective participants opting to reduce their insured death benefit to \$10,000 is negligible. Accordingly, no elective participants were assumed to make such an option.

Option to Continue the Annual 10% Reduction from age 61

Bill C-78 introduced this option to participants effective 1 October 1999. Election of this option by participants would have a positive effect on the plan's actuarial surplus. The valuation data indicates that approximately 1.5% of participants have opted to continue their 10% annual reduction from age 61 instead of age 66. Accordingly, no participants were assumed to make such an election.

Seniority and Promotional Salary Increases

The assumed rates for males were increased by roughly 25% at most durations; for females the increase was approximately half as much. The assumptions for seniority and promotional increases, broken down by years of service, are shown in table 6A.

New Participants

It was assumed that the distribution of new participants by age, sex and initial salary rate would be the same as that of participants 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 was assumed that the number of new participants would be such that the total number of plan participants would increase as follows:

<u>Plan Year</u>	<u>Increase</u>
2002	7.0%
2003	4.7%
2004	4.0%
2005	2.5%
2006	2.5%
2007+	0.0%

Other Assumptions

Administrative Expenses

In the projection of the Account, no assumption was made regarding the expenses incurred for the administration of the plan. These expenses, which are not charged to the PSDB Account, are borne by the Government and are commingled with all other government expenses.

Table 6A

Assumed Seniority and Promotional Salary Increases

<u>Service</u> ¹	<u>Male</u>	<u>Female</u>
0	6.00%	6.00%
1	5.20	5.20
2	4.50	4.50
3	3.90	3.90
4	3.50	3.50
5	3.20	3.20
6	2.90	2.90
7	2.65	2.70
8	2.40	2.50
9	2.15	2.30
10	1.95	2.10
11	1.80	2.00
12	1.65	1.90
13	1.50	1.80
14	1.45	1.70
15	1.40	1.65
16	1.35	1.60
17	1.30	1.55
18	1.25	1.50
19	1.20	1.45
20	1.15	1.40
21	1.10	1.35
22	1.05	1.30
23	1.00	1.25
24	0.95	1.20
25	0.90	1.15
26	0.90	1.10
27	0.90	1.05
28	0.90	1.05
29	0.90	1.05
30+	0.90	1.05

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

Table 6B
Assumed Rates of Termination without Right to a Pension
(Per 1,000 individuals)

<u>Service²</u>	Main Group		Operational Service Group ¹
	<u>Male</u>	<u>Female</u>	<u>Male & Female</u>
0	207	230	81

Table 6C
Assumed Rates of Termination
Prior to Age 50 with Right to a Pension
(Per 1,000 individuals)

<u>Service²</u>	Main Group		Operational Service Group ¹
	<u>Male</u>	<u>Female</u>	<u>Male & Female</u>
1	122	125	47
2	95	90	36
3	82	72	29
4	67	62	25
5	56	54	21
6	47	47	18
7	41	41	16
8	37	37	14
9	33	33	12
10	29	29	10
11	26	26	9
12-18	19	22	7
19+	19	22	8

¹ Comprise Correctional Service Canada members in operational service.

² Expressed in completed years calculated as at the beginning of the plan year.

Table 6D
Assumed Rates of Retirement – Main Group
(per 1,000 individuals)

Age Last Birthday ¹	Male Participants												
	Years of Service ¹												
	<u>1-3</u>	<u>4-8</u>	<u>9-13</u>	<u>14-18</u>	<u>19-23</u>	<u>24-28</u>	<u>29</u>	<u>30</u>	<u>31</u>	<u>32</u>	<u>33</u>	<u>34</u>	<u>35+</u>
49	90	40	30	20	20	20	30	40	40	50	50	90	70
50	90	40	30	20	20	20	40	40	40	50	60	110	70
51	90	40	30	20	20	30	50	50	50	60	70	130	90
52	90	40	30	20	20	30	60	60	60	70	100	150	150
53	90	40	30	20	20	40	80	90	90	90	120	190	190
54	90	40	30	20	20	40	250	250	260	300	330	590	540
55	110	60	30	30	20	40	230	230	240	260	290	540	450
56	110	60	30	30	30	40	230	230	230	250	290	500	400
57	140	80	40	30	30	40	230	230	230	250	290	500	400
58	140	80	40	40	40	40	230	230	230	250	290	500	400
59	190	190	190	190	190	290	380	380	380	330	320	550	450
60	190	190	190	190	190	260	310	310	310	290	290	500	400
61	170	170	170	170	190	240	280	280	280	280	280	400	400
62	190	190	190	190	220	250	290	310	330	330	330	500	400
63	210	210	210	210	230	270	320	320	320	320	320	500	400
64	470	470	470	470	570	570	570	570	610	610	610	650	550
65	360	360	360	360	410	410	450	450	450	450	450	600	450
66	360	360	360	360	360	360	450	450	450	450	450	600	450
67	360	360	360	360	360	360	450	450	450	450	450	600	450
68	360	360	360	360	360	360	450	450	450	450	450	600	450
69	360	360	360	360	360	360	450	450	450	450	450	600	450

Age Last Birthday ¹	Female Participants												
	Years of Service ¹												
	<u>1-3</u>	<u>4-8</u>	<u>9-13</u>	<u>14-18</u>	<u>19-23</u>	<u>24-28</u>	<u>29</u>	<u>30</u>	<u>31</u>	<u>32</u>	<u>33</u>	<u>34</u>	<u>35+</u>
49	90	40	30	30	30	40	50	60	60	60	60	90	70
50	100	40	30	30	30	40	50	60	60	70	70	100	80
51	100	40	30	30	30	40	50	60	60	70	70	110	90
52	100	40	30	30	30	40	60	70	70	70	70	120	100
53	110	40	30	30	30	50	70	70	70	80	80	170	130
54	110	40	30	30	30	50	270	270	270	270	270	570	470
55	120	50	40	40	50	60	260	260	260	260	210	480	350
56	120	50	40	40	50	70	250	250	250	250	220	480	350
57	130	50	40	40	50	70	230	230	230	230	230	480	350
58	130	50	50	50	50	90	290	290	290	290	240	480	350
59	130	130	180	220	260	320	350	350	350	350	270	600	350
60	140	140	180	220	260	300	300	300	300	300	300	550	350
61	140	140	180	220	260	300	300	300	300	300	300	550	350
62	140	140	180	220	260	300	300	300	300	300	300	550	320
63	140	140	180	230	260	300	300	300	300	300	300	550	320
64	450	450	550	550	550	550	550	550	550	650	650	650	500
65	370	370	370	370	370	370	450	450	450	450	450	550	450
66	270	270	320	320	320	320	320	370	370	370	370	550	400
67	270	270	320	320	320	320	320	370	370	370	370	550	400
68	270	270	320	320	320	320	320	370	370	370	370	550	400
69	270	270	320	320	320	320	320	370	370	370	370	550	400

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

Table 6E
Assumed Rates of Retirement – Operational Service Group¹
(per 1,000 individuals)

Male and Female Participants

Age Last Birthday ²	Years of Service ²												
	<u>1-3</u>	<u>4-8</u>	<u>9-13</u>	<u>14-18</u>	<u>19-23</u>	<u>24-28</u>	<u>29</u>	<u>30</u>	<u>31</u>	<u>32</u>	<u>33</u>	<u>34</u>	<u>35+</u>
49	30	13	8	6	6	70	90	90	90	90	90	190	170
50	30	13	8	6	6	70	90	90	90	90	90	190	170
51	30	13	8	6	8	70	90	90	90	90	90	190	170
52	30	13	8	6	8	80	120	120	120	120	120	190	170
53	30	13	8	6	11	100	150	150	150	150	150	255	185
54	40	20	10	10	19	125	240	240	240	240	240	650	550
55	45	30	10	13	23	131	288	288	288	288	288	650	550
56	45	30	15	13	23	144	288	288	288	288	288	650	550
57	55	40	20	13	26	153	288	288	288	288	288	650	550
58	55	40	20	18	26	167	288	288	288	288	288	650	550
59	190	190	210	210	210	310	410	410	410	370	350	600	500
60	190	190	210	210	210	310	350	350	370	340	320	550	450
61	180	180	180	180	220	280	310	310	310	310	310	500	410
62	200	200	200	200	240	280	340	360	380	380	380	500	410
63	250	250	250	250	270	310	350	350	370	370	370	600	480
64	500	500	500	500	600	600	600	600	650	650	650	700	600
65	400	400	400	400	450	450	500	500	500	500	500	650	480
66	400	400	400	400	400	400	500	500	500	500	500	650	480
67	400	400	400	400	400	400	500	500	500	500	500	650	480
68	400	400	400	400	400	400	500	500	500	500	500	650	480
69	400	400	400	400	400	400	500	500	500	500	500	650	480

¹ Comprise Correctional Service Canada members in operational service.

² Expressed in completed years calculated as at the beginning of the plan year.

Table 6F

Assumed Rates of Termination with Right to a Disability Pension¹
 (per 1,000 individuals)

<u>Age Last Birthday²</u>	<u>Male</u>	<u>Female</u>
To 25	0.3	0.1
26	0.3	0.2
27	0.3	0.2
28	0.3	0.3
29	0.3	0.3
30	0.3	0.4
31	0.3	0.5
32	0.3	0.5
33	0.3	0.6
34	0.4	0.7
35	0.5	0.9
36	0.7	1.0
37	0.9	1.2
38	1.0	1.4
39	1.1	1.5
40	1.2	1.7
41	1.3	1.8
42	1.4	2.0
43	1.5	2.1
44	1.7	2.4
45	1.9	2.6
46	2.0	2.9
47	2.1	3.2
48	2.6	3.7
49	3.0	4.1
50	3.4	4.5
51	3.8	5.0
52	4.3	5.5
53	4.7	6.1
54	5.1	6.8
55	5.7	7.6
56	6.4	8.4
57	7.2	9.3
58	8.1	10.2

¹ For ages 55 and over, the rates are applicable only if service is less than 30 years.

² Expressed in completed years calculated as at the beginning of the plan year.

Table 6G

Sample of Assumed Mortality Rates for 2003 Plan Year
(per 1,000 individuals)

Age Last Birthday ¹	Non-Elective Participants and Elective Participants who <u>Retired Normally</u>		Elective Participants who <u>Retired on Disability</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
20	0.4	0.2	3.0	6.2
25	0.5	0.3	5.9	6.8
30	0.7	0.4	9.0	7.4
35	0.9	0.4	12.2	7.8
40	1.2	0.6	14.9	8.3
45	1.5	1.1	17.3	9.0
50	2.2	1.6	19.5	10.4
55	3.6	2.4	21.7	12.7
60	7.6	4.7	26.3	15.8
65	14.4	8.5	36.1	20.6
70	24.6	14.1	52.8	28.2
75	41.5	23.2	71.1	41.1
80	69.6	42.7	96.0	64.8
85	109.8	77.8	136.9	112.4
90	169.4	128.2	207.9	178.4
95	253.0	193.2	315.5	281.3
100	352.1	316.0	474.8	440.6
105	500.0	500.0	500.0	500.0
110	500.0	500.0	500.0	500.0
115	1,000.0	1,000.0	1,000.0	1,000.0

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

Table 6H

Sample of Assumed Longevity Improvement¹ Factors
(annual % mortality reductions)

<u>Age Last Birthday²</u>	<u>Male</u>		<u>Female</u>	
	<u>2000</u>	<u>2025+</u>	<u>2000</u>	<u>2025+</u>
20	3.00	0.50	2.00	0.50
25	2.50	0.50	1.75	0.50
30	1.50	0.50	1.25	0.50
35	0.75	0.50	1.25	0.50
40	1.00	0.50	1.25	0.50
45	1.75	0.50	1.75	0.50
50	2.50	0.50	2.00	0.50
55	2.75	0.50	1.75	0.50
60	2.75	0.50	1.50	0.50
65	2.50	0.50	1.50	0.50
70	2.00	0.50	1.50	0.50
75	1.50	0.50	1.25	0.50
80	1.25	0.50	1.00	0.50
85	0.75	0.50	0.75	0.50
90	0.50	0.50	0.50	0.50
95	0.25	0.25	0.25	0.25
100	0.25	0.25	0.25	0.25
105+	0.00	0.00	0.00	0.00

¹ Mortality improvement is based on a 25-year select period with an ultimate annual mortality improvement of 0.5% at all ages. During the select period, the annual mortality reduction is linearly interpolated between the figures for 2000 and 2025.

² Expressed in completed years calculated as at the beginning of the plan year.

Table 6I
Proportion of Non-Elective Participants
Choosing to become Elective Participants at Retirement

Age Last Birthday ¹	<u>Pensionable Retirement</u> ²		<u>Disability Retirement</u>	
15 - 43	0.00	0.00	1.00	1.00
44	0.42	0.53	1.00	1.00
45	0.49	0.55	1.00	1.00
46	0.55	0.57	1.00	1.00
47	0.60	0.60	1.00	1.00
48	0.65	0.62	1.00	1.00
49	0.69	0.64	1.00	1.00
50	0.73	0.66	1.00	1.00
51	0.76	0.68	1.00	1.00
52	0.79	0.70	1.00	1.00
53	0.81	0.72	1.00	1.00
54	0.83	0.74	1.00	1.00
55	0.84	0.76	1.00	1.00
56	0.85	0.78	1.00	1.00
57	0.86	0.81	1.00	1.00
58	0.87	0.83	1.00	1.00
59	0.88	0.86	1.00	1.00
60	0.89	0.88	1.00	1.00
61	0.89	0.90	1.00	1.00
62	0.90	0.92	1.00	1.00
63	0.91	0.93	1.00	1.00
64	0.92	0.94	1.00	1.00
65	0.92	0.95	1.00	1.00
66	0.93	0.95	1.00	1.00
67	0.94	0.96	1.00	1.00
68	0.95	0.96	1.00	1.00
69+	1.00	1.00	1.00	1.00

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

² A pensionable retirement is a retirement resulting in either an immediate annuity for reasons other than disability or an annual allowance.

Appendix 7 - Acknowledgements

François Boulé of the Office of the Chief Actuary has been instrumental in the production of this report.