



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

## **PUBLIC SERVICE DEATH BENEFIT ACCOUNT**

as at 31 March 2008

**Office of the Chief Actuary**

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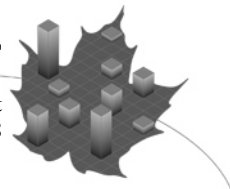
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## ACTUARIAL REPORT

PUBLIC SERVICE Death Benefit Account  
as at 31 March 2008



14 August 2009

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

Dear Minister:

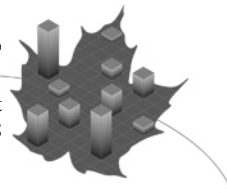
Pursuant to Section 59 of the *Public Service Superannuation Act*, I am pleased to submit the report on the actuarial review as at 31 March 2008 of the Public Service Death Benefit Account established under Part II of this Act.

Yours sincerely,

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

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



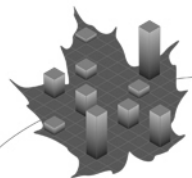


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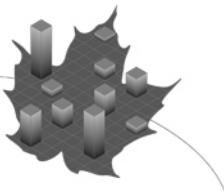
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## I. Executive Summary

This actuarial report on the Public Service Death Benefit Account was made pursuant to Section 59 of the *Public Service Superannuation Act* (PSSA) which states that “A valuation report on the state of the Public Service 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 death benefits and contributions defined by Part II of the PSSA.

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 Public Service Death Benefit (PSDB) 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 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 plan provisions enacted by legislation, summarized in Appendix 1.

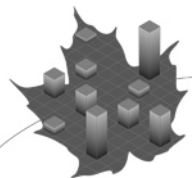
The financial data on which this valuation is based is the PSDB Account. The account data is summarized in Appendix 2. The membership data is summarized in Appendix 3.

The 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:

- A new compensation package has been approved for employees of Correctional Service Canada. For employees with actual operational service, the age related prerequisite for pensionable retirement<sup>1</sup> was eliminated. The eligibility is now entirely service based. The financial impact is negligible;
- A new compensation package has been approved for all Public Servants and Crown Corporations employees. A salary increase of 1.5% was granted for fiscal years 2009 to 2011.

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



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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 PSDB Account. Contributions by employees, Crown corporations and government are credited to the PSDB Account. Based on the balance of the PSDB Account, interest credits are calculated in such manner and at such rates and credited at such times as the PSDB Regulations provide. Therefore, the deterioration in financial markets since 31 March 2008 has no impact on the PSDB Account except insofar as long-term Government of Canada bond yields influence the interest credited by regulation.

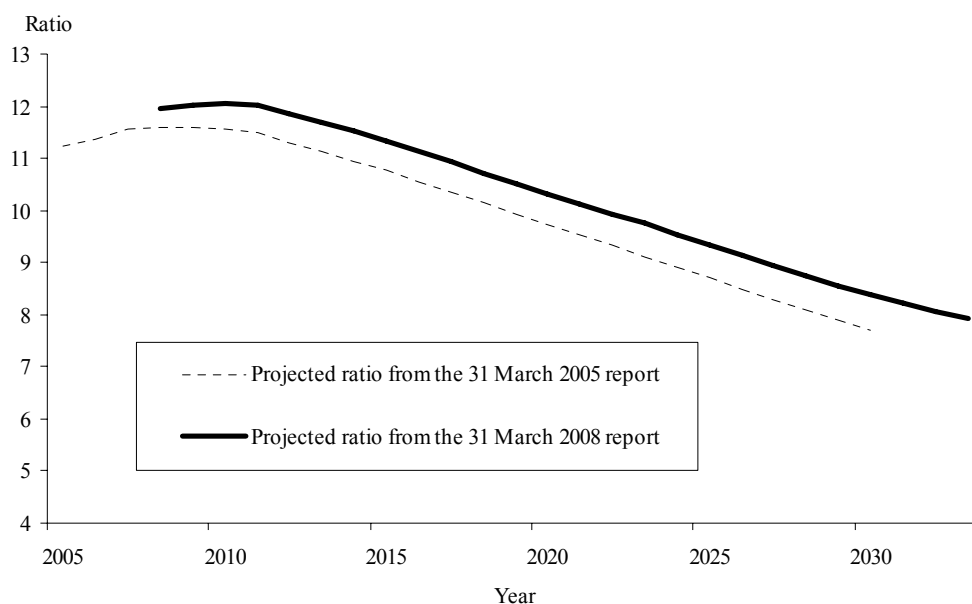
### C. Main Findings

As at 31 March 2008, the plan has an actuarial excess of \$2,067 million resulting from the difference between the assets of \$2,570 million and the liabilities of \$503 million.

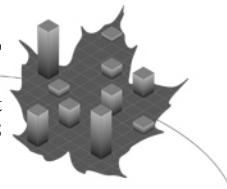
The actuarial excess is projected to reach \$3,422 million at the end of plan year 2033. Figure 1 shows the ratio of projected actuarial excess at the end of the plan year to annual benefit payments projected for the following plan year. This ratio is expected to continue at the current level of 12.0 until 2011, after which it is expected to steadily decline as death benefits paid continue to rise.

**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.)







## 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 also shown for comparison purposes.

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

	As at 31 March 2008	As at 31 March 2005
<b>Assets</b>	2,570	2,212
<b>Liabilities</b>		
Paid-up Death Benefit <sup>1</sup>	480	440
IBNR <sup>2</sup>	<u>23</u>	<u>22</u>
<b>Total Liabilities</b>	503	462
<b>Actuarial Excess</b>	2,067	1,750

### B. Financial Position

At 31 March 2008 the actuarial excess totals \$2,067 million, being 12.0 times the total amount of basic benefits projected for plan year 2009. By comparison, the actuarial excess as at 31 March 2005 under the previous report was \$1,750 million, which was 11.2 times the amount of basic benefits paid during plan year 2006.

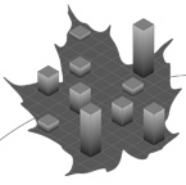
As shown in Appendix 2 and explained in Section IV, the projected contributions to the plan are less than the projected benefits for all future plan years. However, total income exceeds total expenditures in every year of the projection period because interest earnings more than offset the excess of 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

<sup>1</sup> The \$10,000 portion of the basic benefit for which monthly contributions are no longer required from either the participant or the government. See Appendix 4 – G.1

<sup>2</sup> Incurred But Not Reported claims. See Appendix 4 – G.2



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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 Interest Yields

As a measure of sensitivity, an increment of one percentage point in the projected yields would increase the actuarial excess projected at the end of plan year 2033 from \$3,422 million to \$5,331 million, an increase of 56%.

On the opposite side, a decrease of one percentage point in the projected yields would decrease the actuarial excess projected at the end of plan year 2033 from \$3,422 million to \$1,904 million, a decrease of 44%.

### 2. Mortality

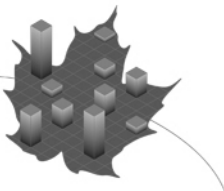
If the assumed improvements in longevity after the 2009 plan year were disregarded, then the monthly benefit cost rate of 22.1 cents projected for plan year 2033 would climb to 29.4 cents, an increase of 33%. The actuarial excess projected at the end of plan year 2033 would decrease by 55% from \$3,422 million to \$1,536 million.

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 21, then the monthly benefit cost rate of 22.1 cents projected for 2033 would decline to 18.9 cents, a decrease of 14%. The actuarial excess projected at the end of plan year 2033 would climb by 15% from \$3,422 million to \$3,925 million.

### 3. Non-elective population growth rate

If the assumed percentage increase in the non-elective population in each plan year were double the current assumption then the projected population will be relatively younger. The monthly cost projected for plan year 2033 would decrease by 5.0% from 22.1 to 21.0 cents. The actuarial excess projected at the end of plan year 2033 would climb by 3.4% from \$3,422 million to \$3,539 million.

If the assumed percentage increase in the non-elective population were set to 0% then the projected population will be relatively older. The monthly cost projected for plan year 2033 would increase by 5.0% from 22.1 to 23.2 cents. The actuarial excess projected at the end of plan year 2033 would decrease by 3.0% from \$3,422 million to \$3,320 million.



### III. Reconciliation of Results with Previous Report

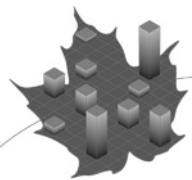
Table 2 illustrates the impact of the updated assumptions, intervaluation economic experience, and population changes since the last valuation report as at 31 March 2005. The projected monthly cost for plan year 2033 fell 1.8 cents from 23.9 cents as at 31 March 2005 to 22.1 cents as at 31 March 2008. The primary source of this decrease was the new mortality and mortality improvement assumptions.

The projected ratio of actuarial excess at the end of plan year 2033 to benefit payments in plan year 2034 increased 8.6% from 7.3 to 7.9. A portion of this increase resulted from an improvement to the valuation program to account for the contributions from Crown corporations and public boards<sup>1</sup>.

**Table 2 Reconciliation of Projected Results**

	Monthly Cost Per \$1000 of Term Insurance in Specified Projection Year (Cents)	Year End Actuarial Excess to Benefit Payments in the Year After the Specified Projection Year (Ratio)
<b><u>Projection Year 2030</u></b>		
<b>Projection as at 31 March 2005</b>	<b>24.3</b>	<b>7.7</b>
<b><u>Projection Year 2033</u></b>		
<b>Projection as at 31 March 2005</b>	<b>23.9</b>	<b>7.3</b>
New population	0.3	(9.6)
Intervaluation account experience	0.0	7.8
Include contributions from Crown employers	0.0	0.2
Change in projected yields	0.0	(0.7)
Change in assumed rate of salary increase (both economic and seniority/promotional)	0.0	0.4
Change in assumed mortality rates for plan year 2009	(1.8)	2.2
Change in longevity improvement factors	(0.5)	0.2
Change in all other assumptions	<u>0.2</u>	<u>0.0</u>
<b><u>Projection as at 31 March 2008</u></b>	<b>22.1</b>	<b>7.9</b>

<sup>1</sup> Crown corporations and public boards whose employees are participants contribute at the rate of four cents per month for each \$1,000 of death benefit.



### IV. Legislated Contribution Rates

The aggregate amount of death benefit payments projected for plan year 2009 is \$172.8 million, which is made up of \$129.8 million in respect of the term insurance and \$43.0 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 less the \$10,000 paid-up insurance applicable from age 65.

#### A. Paid-Up Insurance

For plan year 2009, the estimated single premiums at age 65 for each \$10,000 of paid-up insured benefit are \$3,944 and \$3,488 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 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.

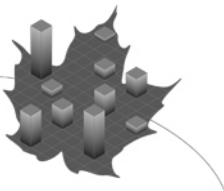
The net effect of longevity improvements and decreasing projected yields is to increase the projected single premiums at age 65 for each \$10,000 of paid-up insured benefit. A male participant's projected single premium increases from \$3,944 for plan year 2009 to \$3,983 for plan year 2033; for a female participant the increase is from \$3,488 to \$3,560.

#### B. Term Insurance

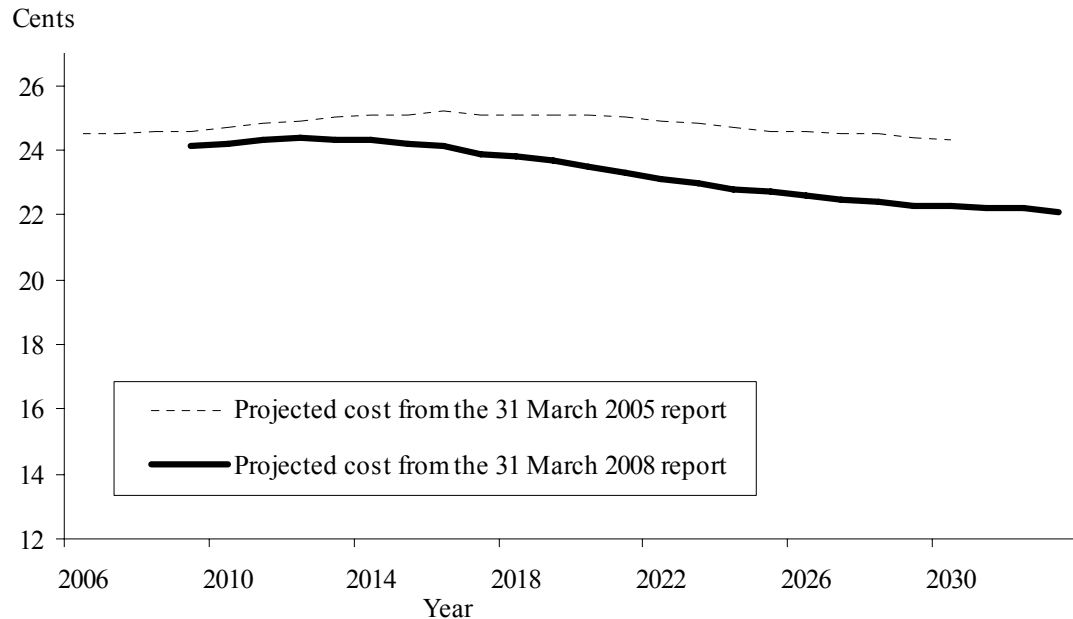
The total amount of term insurance proceeds projected to be payable during plan year 2009 is \$129.8 million. Given that the total amount of term insurance projected to be in force for plan year 2009 is \$44,884 million, the benefit cost rate projected for plan year 2009 is 24.1 cents per month per \$1,000 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 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 2.0 cents per \$1,000 of term insurance.

The total amount contributed by participants and the government in plan year 2009 is therefore 17.0 cents (15 cents plus 2.0 cents) per month per \$1,000 of term insurance, i.e. significantly less than the estimated monthly cost of 24.1 cents per \$1,000 of term insurance for plan year 2009.



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

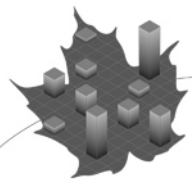


As shown in Figure 2, the monthly cost per \$1,000 of term insurance is projected to increase from 24.1 cents to 24.4 cents by plan year 2012. Thereafter, the monthly cost is projected to decrease gradually to 22.1 cents by plan year 2033. In comparison, the combined contribution rate in 2033 is projected to be 16.8 cents (15 cents for participants plus one-twelfth of 22.1 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	13.6	12.6	12.0	11.9	11.7
Elective	70.5	65.3	62.5	61.3	59.2
All	24.1	24.1	23.0	22.4	22.1



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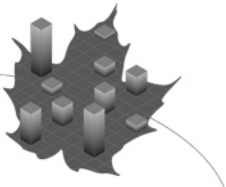
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For non-elective participants, the monthly cost projected for plan year 2033 is 86% of the monthly cost estimated for plan year 2009. This results mainly from the following two factors:

- 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 21 applied to the current mortality rates shown in Table 20.
- 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 84% of the monthly cost projected for plan year 2009. This decrease is mostly the result of the assumed mortality improvements.

For all plan participants in aggregate, the monthly cost projected for plan year 2033 is 92% of the monthly cost projected for plan year 2009.



## 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 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 Public Service 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 Public Service 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.

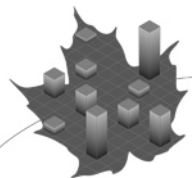
In particular, this report was prepared in accordance with the Standards of Practice (Standard of Practice – General Standards) published by the Canadian Institute of Actuaries.

To the best of our knowledge, after inquiring with the 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

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

Ottawa, Canada  
14 August 2009



## 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 a plan participant.

#### A. Plan Amendments

Employees of Correctional Service Canada (CSC) became entitled to new benefit entitlement provisions during the intervalation period. Operational employees of CSC can now receive an immediate annuity or an annual allowance based on a minimum 20 years of service regardless of age. Non-operational employees of CSC are still subject to the same plan provisions that existed before the new provisions. An immediate or annual allowance is available from age 45 with a minimum of 20 years of service.

#### B. Plan Participants

##### 1. Non-Elective Participants

The term *Non-elective participant* means 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.

##### 2. Elective Participants

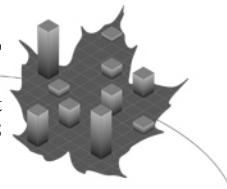
The term *Elective participant* means all participants who have ceased to be employed in the Public Service following disability or retirement and have opted for continuing their coverage under the Supplementary Death Benefit plan. Such right is limited to participants who, at the time they ceased to be employed in the Public Service, have 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 an individual has the right to opt out of the plan, effective on the 31<sup>st</sup> day.

#### C. Assets

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





## D. Contributions

### 1. 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 death 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 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**

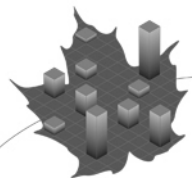
Age Last Birthday	Annual	Monthly
25	\$9.70	\$0.82
30	11.42	0.97
35	13.58	1.15
40	16.29	1.39
45	19.72	1.67
50	24.11	2.05
55	29.80	2.53
60	37.65	3.20

### 3. Government

The Government credits monthly to the PSDB Account an amount equal to one-twelfth of the total amount of death benefits paid in the month.

Crown corporations and public boards whose employees are participants contribute at the rate of four cents per month for each \$1000 of death 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 basic benefit in respect of which contributions are no longer required from the participant.



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The legislated amount of single premium for each such \$10,000 paid-up portion of basic benefit is shown in the following table and corresponds to one-twentieth of \$10,000 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 \$10,000 of Basic Benefit**

Age Last Birthday	Male	Female
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

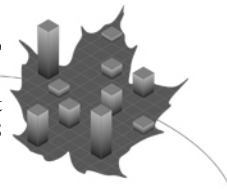
Under the statutes, if for whatever reason the PSDB Account were to become exhausted, the Government would then credit special contributions to the Account in an amount at least equal to the basic benefits then due but not paid by reason of such cash shortfall.

### **E. 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 \$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.

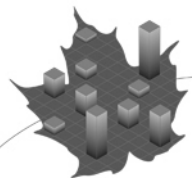
The amount of basic benefit described above is reduced by 10% a year starting at age 66 until it would normally vanish at age 75. However, the amount of basic benefit cannot at any time be reduced below a basic floor value of \$10,000 subject to the following exceptions:

- For those elective participants who had, upon cessation of employment prior to 5 October 1992, made an election to reduce their basic benefit to \$500 and further had made a second election, within one year thereafter, to keep their basic benefit at \$500, the floor value is \$500 instead of \$10,000. Such election is irrevocable.



- For non-elective participants, the amount of basic benefit 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 1 October 1999 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 PSSA may opt to reduce their amount of basic benefit to \$10,000.



## ACTUARIAL REPORT

PUBLIC SERVICE Death Benefit Account  
as at 31 March 2008

### Appendix 2 Plan Assets

#### A. Public Service Death Benefit Account

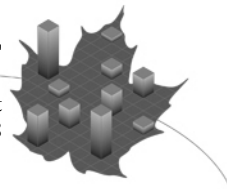
The plan is entirely financed through the PSDB Account, which forms part of the Accounts of Canada. The PSDB Account is:

- credited with all contributions made by participants, Crown corporations 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 basic benefit payments when they become due.

Table 6 shows the reconciliation of the balance of the PSDB Account from the last valuation date to the current valuation date. Since the last valuation, the PSDB Account balance has grown by \$358 million (i.e. a 16% increase) to reach \$2,570 million as at 31 March 2008. The net growth in the Account balance is to a large extent the result of interest credits made.

**Table 6 Public Service Death Benefit Account**  
(\$ millions)

Plan Year	2006	2007	2008	2006-2008
Opening balance	2,212	2,323	2,443	2,212
INCOME				
Employee contributions	68	73	77	218
Employer contributions				
- Term insurance	9	9	9	27
- Paid-up insurance	1	2	2	5
Interest earnings	<u>170</u>	<u>173</u>	<u>176</u>	<u>520</u>
Subtotal	249	256	264	769
EXPENDITURES				
Death benefit claims				
- Term insurance	98	96	98	293
- Paid-up insurance	<u>40</u>	<u>40</u>	<u>39</u>	<u>118</u>
Subtotal	138	136	137	411
Closing balance	2,323	2,443	2,570	2,570



## **B. Rates of Interest**

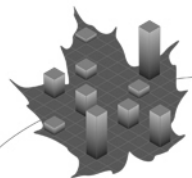
The following rates of interest on the PSDB Account by plan year were calculated using the foregoing entries.

**Table 7 Rates of Interest**

Plan Year	Interest
2006	7.91%
2007	7.63%
2008	7.37%

## **C. Sources of Asset Data**

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



## ACTUARIAL REPORT

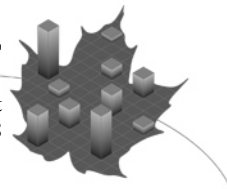
PUBLIC SERVICE Death Benefit Account  
as at 31 March 2008

### D. Account Projection

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

**Table 8 Account 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	Actuarial Excess	
2008	2,570	503	2,067	12.0
2009	2,672	518	2,154	12.0
2010	2,770	533	2,237	12.0
2011	2,867	549	2,318	12.0
2012	2,955	572	2,383	11.9
2013	3,040	597	2,443	11.7
2014	3,121	621	2,500	11.5
2015	3,199	644	2,555	11.3
2016	3,272	669	2,604	11.1
2017	3,345	694	2,651	10.9
2018	3,416	721	2,695	10.7
2019	3,486	748	2,738	10.5
2020	3,557	775	2,781	10.3
2021	3,626	803	2,823	10.1
2022	3,697	831	2,866	9.9
2023	3,769	859	2,910	9.8
2024	3,839	888	2,951	9.5
2025	3,909	916	2,993	9.3
2026	3,984	945	3,039	9.1
2027	4,058	972	3,086	9.0
2028	4,133	999	3,134	8.8
2029	4,211	1,026	3,186	8.6
2030	4,289	1,051	3,238	8.4
2031	4,371	1,075	3,295	8.2
2032	4,456	1,098	3,358	8.1
2033	4,542	1,119	3,422	7.9



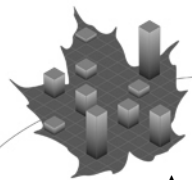
## E. Income and Expenditure Projection

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

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

Plan Year	Contributions				Benefit Payments			Interest Credits	Net Credits
	Participants	Government <sup>1</sup>		Total					
		Term	Paid-Up		Term	Paid-Up	Total		
2009	81	11.9	1.9	95	130	43	173	180	101
2010	84	12.5	1.9	99	136	43	179	179	98
2011	88	13.1	2.1	103	142	43	186	180	97
2012	92	13.7	2.6	108	149	44	193	172	88
2013	97	14.5	2.8	114	157	44	201	172	85
2014	102	15.2	2.7	120	165	44	209	171	81
2015	107	16.0	2.7	126	173	44	217	169	78
2016	112	16.8	2.9	132	181	45	225	167	74
2017	118	17.6	2.9	139	189	45	234	168	73
2018	124	18.4	3.0	146	197	45	242	168	71
2019	130	19.2	3.0	152	205	46	251	168	69
2020	137	20.0	3.0	160	214	46	260	172	71
2021	143	20.8	3.0	167	222	47	269	172	69
2022	150	21.7	3.1	175	231	48	279	175	71
2023	156	22.5	3.1	182	239	49	288	178	72
2024	163	23.4	3.2	190	249	50	299	178	70
2025	171	24.4	3.2	198	258	51	309	182	70
2026	178	25.3	3.2	206	268	53	321	189	75
2027	186	26.3	3.1	215	278	54	333	192	75
2028	193	27.4	3.1	224	289	56	345	196	75
2029	201	28.4	3.1	233	300	58	358	203	78
2030	210	29.6	3.1	243	312	60	372	207	78
2031	219	30.8	2.9	252	324	62	386	215	81
2032	228	32.0	2.8	263	337	64	401	224	85
2033	237	33.2	2.8	274	350	67	416	228	85

<sup>1</sup> Government term contributions include the four cents per month per \$1,000 contribution made by participating Crown companies and public boards.



### Appendix 3 Participant Data

#### A. Source of Participant Data

As a consequence of the Pension Modernization project, the structure of the data provided to OSFI has changed. Previously the Compensation Systems Branch of Department of Public Works and Government Services Canada (PWGSC) were responsible for summarizing their data into a single file containing all the relevant data. Beginning with this valuation report the Compensation Systems Branch simply provides OSFI with multiple files reflecting the raw data as it exists in their system.

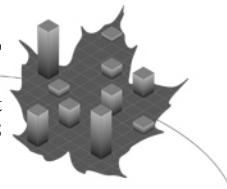
Subsequently, OSFI validates and corrects the data before transforming it into a structure amenable to analysis, interpretation, and valuation.

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 2004 to 31 March 2008 as required for reconciliation and experience studies.

#### B. Participant Data Summary

Tables 10 to 12 on the following pages show the detailed participant data upon which this valuation is based. Comparisons are made with the population as at 31 March 2004 because this was the most recent data available when the previous valuation report was produced.





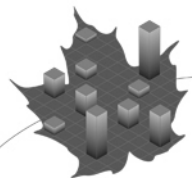
**Table 10 Non-Elective Participants<sup>1</sup>**  
As at 31 March 2008

Age <sup>2</sup>	Number			Basic Benefits (\$ thousands)		
	Male	Female	Total	Male	Female	Total
15-19	71	122	193	4,748	8,078	12,825
20-24	2,729	4,155	6,884	245,997	369,947	615,944
25-29	9,539	14,504	24,043	1,044,166	1,555,050	2,599,216
30-34	13,672	20,182	33,854	1,704,729	2,400,506	4,105,234
35-39	15,125	20,570	35,695	2,023,910	2,560,013	4,583,923
40-44	17,759	23,602	41,361	2,468,186	2,953,924	5,422,110
45-49	21,728	28,355	50,083	3,072,659	3,528,051	6,600,710
50-54	22,884	27,184	50,068	3,312,249	3,412,741	6,724,990
55-59	16,147	15,532	31,679	2,395,858	1,916,646	4,312,504
60-64	6,200	4,936	11,136	941,407	581,991	1,523,399
65-69	1,339	822	2,161	205,322	90,395	295,717
70-74	<u>20</u>	<u>14</u>	<u>34</u>	<u>3,042</u>	<u>1,510</u>	<u>4,551</u>
Total	127,213	159,978	287,191	17,422,271	19,378,851	36,801,123

	<u>Average</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
<b>As at 31 March 2004</b>	Age <sup>2</sup>	45.4	42.9	44.1
	Service <sup>2</sup>	15.8	13.4	14.6
	Basic Benefit (\$)	123,889	106,468	114,443
<b>As at 31 March 2008</b>	Age <sup>2</sup>	45.5	43.4	44.4
	Service <sup>2</sup>	13.9	12.5	13.1
	Basic Benefit (\$)	136,954	121,135	128,142

<sup>1</sup> Includes Correctional Services Canada employees and members from participating Crown companies and public boards.

<sup>2</sup> Expressed in completed years calculated at the beginning of the plan year. Averages are calculated on a dollar-weighted basis.



## ACTUARIAL REPORT

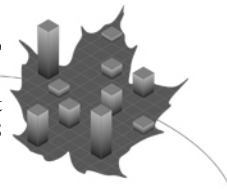
**PUBLIC SERVICE** Death Benefit Account  
as at 31 March 2008

**Table 11 Elective Participants in Receipt of a Disability Pension**  
As at 31 March 2008

Age <sup>1</sup>	Number			Basic Benefits (\$ thousands)		
	Male	Female	Total	Male	Female	Total
30- 34	1	6	7	178	541	719
35- 39	8	50	58	645	4,367	5,012
40- 44	61	180	241	5,424	16,210	21,635
45- 49	199	476	675	18,600	40,023	58,623
50- 54	574	962	1,536	51,126	79,861	130,988
55- 59	1,008	1,230	2,238	91,664	102,367	194,031
60- 64	979	976	1,955	82,350	73,658	156,009
65- 69	895	735	1,630	54,549	38,837	93,385
70- 74	850	627	1,477	18,851	11,041	29,892
75- 79	616	415	1,031	6,160	4,150	10,310
80- 84	420	261	681	4,200	2,610	6,810
85- 89	239	166	405	2,390	1,660	4,050
90- 94	32	56	88	320	560	880
95- 99	8	3	11	80	30	110
100-104	<u>0</u>	<u>1</u>	<u>1</u>	<u>0</u>	<u>10</u>	<u>10</u>
Total	5,890	6,144	12,034	336,537	375,927	712,464

	<u>Average</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
<b>As at 31 March 2004</b>	Age <sup>1</sup>	59.5	56.5	57.9
	Basic Benefit (\$)	53,371	54,866	54,072
<b>As at 31 March 2008</b>	Age <sup>1</sup>	60.0	57.0	58.4
	Basic Benefit (\$)	57,137	61,186	59,204

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



**Table 12 Elective Retired Participants<sup>1</sup>**  
(In Receipt of an Immediate Annuity or an Annual Allowance)  
As at 31 March 2008

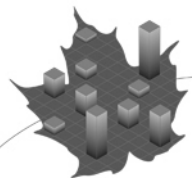
Age <sup>2</sup>	Number			Basic Benefits (\$ thousands)		
	Male	Female	Total	Male	Female	Total
45- 49	10	6	16	1,326	730	2,056
50- 54	592	701	1,293	77,450	84,683	162,134
55- 59	8,507	6,923	15,430	1,226,909	833,641	2,060,550
60- 64	15,791	9,496	25,287	2,017,924	952,412	2,970,336
65- 69	13,647	7,110	20,757	1,299,590	507,004	1,806,594
70- 74	11,069	4,785	15,854	348,371	107,753	456,123
75- 79	11,105	4,264	15,369	111,050	42,640	153,690
80- 84	9,575	3,999	13,574	95,750	39,990	135,740
85- 89	6,565	2,701	9,266	65,650	27,010	92,660
90- 94	1,946	1,074	3,020	19,460	10,740	30,200
95- 99	278	271	549	2,780	2,710	5,490
100-104	27	26	53	270	260	530
105-109	<u>0</u>	<u>2</u>	<u>2</u>	<u>0</u>	<u>20</u>	<u>20</u>
Total	79,112	41,358	120,470	5,266,530	2,609,593	7,876,124

	<u>Average</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
<b>As at 31 March 2004</b>	Age <sup>2</sup>	64.0	63.2	63.8
	Basic Benefit (\$)	53,719	46,336	51,472

<b>As at 31 March 2008</b>	Age <sup>2</sup>	63.6	62.3	63.2
	Basic Benefit (\$)	66,571	63,098	65,378

<sup>1</sup> Participants entitled to a deferred annuity were not taken into account for valuation purposes. Their impact is considered negligible.

<sup>2</sup> Expressed in completed years calculated at the beginning of the plan year. Averages are calculated on a dollar-weighted basis.



### Appendix 4 Methodology

#### A. Assets

The assets of the plan consist essentially of the recorded balance in the 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 PSDB Account balance corresponds to the cumulative historical excess of contributions and interest credits over basic benefit payments. Assets are accordingly projected to the end of a given plan year by adding to the PSDB 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 charged to the PSDB Account.

#### B. Contributions

##### 1. Participants

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 and by the assumed seniority and promotional salary increases described in Table 15. Elective participants' salaries are frozen at time of retirement or disability and are not subject to further increases.

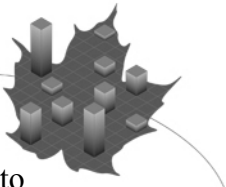
##### 2. Government

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

##### 3. Crown Corporations and Public Boards

Crown corporations and public boards' annual contributions are projected for a given plan year by multiplying



- the legislated annual contribution rate of \$0.48 per \$1,000 of coverage (equivalent to the monthly rate of 4 cents per \$1,000 of coverage)  
by
- the aggregate of two times the salaries of each participant who is employed by the Crown corporation or public board 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.

**C. Discount Rates**

The rates used to calculate the present value of actuarial liabilities in respect of paid-up death benefits 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 PSDB Account balance in that plan year.

**E. Treatment of Correctional Service Canada (CSC) Elective Employees**

For matter of simplicity, all employees of CSC have been treated as Operational service employees. As at 31 March 2008, approximately 10,000 employees of CSC were reported as operational as compared to approximately 500 non-operational employees. The treatment of non-operational employees as operational employees has a negligible impact on the results of the valuation.

**F. Basic Benefit Payments**

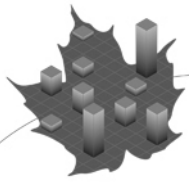
The total amount of basic benefits (term and paid-up insurance) for a given plan year is projected as the total amount of insurance in force during that plan year multiplied by the mortality rates assumed to apply during that plan year. The amount of basic benefit in force depends on the salary projected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

**G. Liabilities****1. Paid-up Reserve**

At the end of a given plan year, the liabilities associated with the individual \$10,000 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 \$10,000 paid-up death benefit projected payable on the basis of the assumed mortality rates.

**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



## ACTUARIAL REPORT

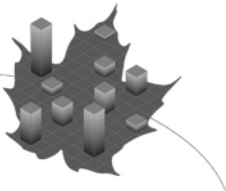
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**PUBLIC SERVICE** Death Benefit Account  
as at 31 March 2008

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 2009-2011 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.

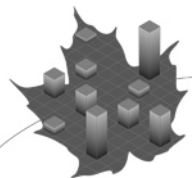
The resulting assumed increases in average earnings<sup>2</sup> are shown in Table 13.

### B. Projected Yields on PSDB Account

These yields are required for the long-term projection of the actuarial assets, liabilities and excess or deficit. The projected yields on the PSDB Account 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.

<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.



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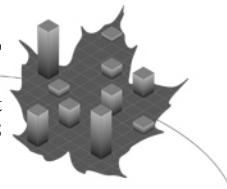
PUBLIC SERVICE Death Benefit Account  
as at 31 March 2008

**Table 13 Summary of Economic Assumptions**  
(percentage)

Plan Year	Average Salary Increase <sup>1</sup> of Non-Elective Participants	Projected Yield
2009	1.50	7.10
2010	1.50	6.80
2011	1.50	6.60
2012	2.80	6.10
2013	3.00	5.90
2014	3.20	5.70
2015	3.30	5.50
2016	3.40	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.

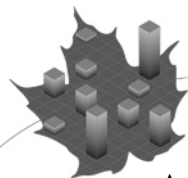




## Appendix 6 Demographic and Other Assumptions

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):

Description	Basis	Comments	Tables
<b>Non-elective Service</b>			
Withdrawal			
Main group (Before age 50)	Sex, Service	The assumed rates are on average 23% lower than those of the previous valuation.	16
Operational service (o/s)	Service	The assumed rates for the operational service group are on average 27% lower than previously.	16
Pensionable retirement			
Main group (From age 50)	Age, Sex and Service	The rates of pensionable retirement assumed for the main group of contributors were reduced by around 15% for males and around 10% for females.	17
Operational service (o/s)	Age, Service	Rates for all members age 61 and over are unchanged. For ages 50-60 retirement rates were increased by around 44%, but this average conceals considerable variability. The financial impact is marginal.	18
Disability	Age, Sex	The disability incidence rates for males are about 14% lower than assumed in the previous valuation while female incidence rates are about 13% lower.	19
Mortality	Age, Sex and Year	The assumed rates are less than those used in the previous valuation at most ages. The biggest decline is for males. In particular, at ages 30-40 mortality rates declined by about 29% for males and about 10% for females. At ages 65-75 mortality rates declined by about 12% for males and about 5% for females.	20
		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 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.	21
<b>Elective Participants opting to continue coverage after termination of employment</b>	Age, Sex	This assumption was revised to reflect the intervaluation experience. The rates were increased by 2-4% for ages 62-68. The rates were decreased by 3-7% at ages 50-55. The financial impact is marginal.	22
<b>Mortality of Elective participants</b>			
Normal Retirement	Age, Sex and Year	Same rates as mortality-in-service.	20
		Mortality improvement is the same as for mortality-in-service.	21
Disability Retirement	Age, Sex and Year	The assumed rates are on average 13% lower than those in the previous valuation. The average decline is approximately the same for each gender.	20
		Mortality improvement is the same as for mortality-in-service.	21



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### A. Other Demographic Assumptions

#### 1. Option to Reduce Coverage to \$10,000

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

#### 2. 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 excess. 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.

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

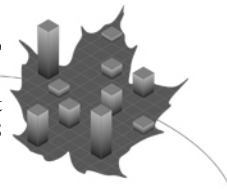
Due to their negligible impact on costs and liabilities, actual and future deferred annuitants are not taken into consideration for the purpose of this valuation.

#### 4. 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 non elective participants would increase as shown in Table 14. The assumed rates for each plan year are unchanged from the previous report.

**Table 14 Percentage of Increase of Non-Elective Participants**

Plan Year	Increase
2009	0.90%
2010	0.90%
2011	0.90%
2012	0.90%
2013	0.90%
2014	0.90%
2015	0.90%
2016	0.90%
2017	0.80%
2018	0.80%
2019	0.80%
2020	0.80%
2021	0.80%
2022+	0.50%

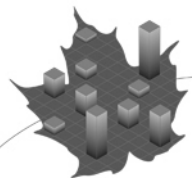


## **5. Seniority and Promotional Salary Increases**

The experience of the last four years has been for promotional and seniority increases to trend downwards from the elevated experience of the last two valuation reports. This downward trend was anticipated and incorporated into the previous report by grading an initial select assumption down to a lower ultimate assumption for plan years 2010+. No select period was used for this report. Full credibility was given to the experience from 1 April 2004 to 31 March 2008. For males with 10-26 years of service the assumption is 11% to 19% higher than the previous ultimate rate. For females in the same service range, the assumption was on average 6% higher than the previous ultimate rate. For males and females with 0 to 2 years of completed service the assumption was between 8% and 16% less than the previous ultimate rate.

## **6. Administrative Expenses**

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



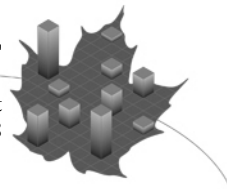
## ACTUARIAL REPORT

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**Table 15 Assumed Seniority and Promotional Salary Increases**  
(percentage)

Service <sup>1</sup>	Male	Female
0	5.04	5.28
1	4.51	4.75
2	4.07	4.13
3	3.70	3.65
4	3.38	3.26
5	3.10	2.96
6	2.87	2.71
7	2.66	2.51
8	2.48	2.35
9	2.32	2.22
10	2.17	2.10
11	2.04	2.00
12	1.93	1.92
13	1.82	1.84
14	1.72	1.78
15	1.63	1.72
16	1.55	1.66
17	1.48	1.61
18	1.41	1.57
19	1.35	1.52
20	1.30	1.48
21	1.25	1.45
22	1.20	1.41
23	1.16	1.37
24	1.11	1.33
25	1.07	1.30
26	1.03	1.26
27	0.98	1.22
28	0.94	1.19
29	0.89	1.15
30	0.84	1.11
31	0.80	1.07
32	0.75	1.03
33	0.69	0.99
34	0.64	0.95
35+	0.59	0.91

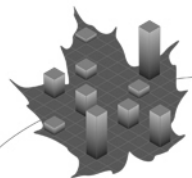
<sup>1</sup> Expressed in completed years calculated at the beginning of the plan year.



**Table 16 Assumed Rates of Withdrawal Prior to Age 50**  
(per 1,000 individuals)

Service <sup>1</sup>	Main Group		Operational Service Group
	Male	Female	Male/Female
0	189	207	55
1	94	94	40
2	57	55	30
3	43	40	24
4	36	34	20
5	31	29	18
6	28	26	17
7	25	23	16
8	22	21	15
9	20	20	14
10	18	18	14
11	16	16	13
12	14	15	13
13	13	14	12
14	12	13	12
15	11	12	11
16	11	12	11
17	10	11	10
18	10	11	10
19	10	11	10
20+	9	10	10

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



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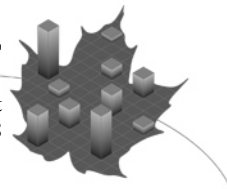
**Table 17 Assumed Rates of Retirement – Main Group**  
For a representative subset of service years (per 100 individuals)

Age <sup>1</sup>	Completed Years of Service (Male Members)												
	<u>1</u>	<u>5</u>	<u>10</u>	<u>15</u>	<u>20</u>	<u>25</u>	<u>29</u>	<u>30</u>	<u>31</u>	<u>32</u>	<u>33</u>	<u>34</u>	<u>35</u>
49	3	2	2	1	1	1	1	2	2	3	3	5	4
50	3	2	1	1	1	1	1	1	2	2	2	6	4
51	4	2	1	1	1	1	2	2	2	2	3	7	5
52	4	3	2	1	1	1	2	2	3	3	5	8	7
53	5	3	1	1	1	1	3	3	4	4	5	11	12
54	7	4	3	2	2	1	22	23	25	29	34	60	58
55	8	6	3	2	2	2	23	21	21	24	27	55	41
56	8	6	3	3	2	2	23	19	20	22	24	49	36
57	10	7	4	3	2	2	24	20	20	21	24	49	34
58	10	7	4	3	2	2	23	22	21	23	24	49	34
59	11	14	16	17	18	25	30	31	31	33	36	53	42
60	11	14	15	15	17	21	25	26	27	28	31	50	35
61	11	12	13	14	16	18	21	22	23	25	29	41	32
62	12	14	14	15	17	19	22	24	25	28	31	46	33
63	13	15	15	16	18	21	23	24	25	27	30	45	34
64	26	34	39	40	42	43	43	44	45	47	49	58	43
65	26	28	29	29	31	31	32	33	34	35	38	46	38
66	26	27	27	27	28	29	32	33	35	37	39	45	35
67	25	25	26	28	30	30	32	33	34	36	38	53	33
68	22	26	28	28	30	34	38	39	40	41	43	48	42
69	20	25	28	30	31	32	35	36	38	39	40	43	34

Age <sup>1</sup>	Completed Years of Service (Female Members)												
	<u>1</u>	<u>5</u>	<u>10</u>	<u>15</u>	<u>20</u>	<u>25</u>	<u>29</u>	<u>30</u>	<u>31</u>	<u>32</u>	<u>33</u>	<u>34</u>	<u>35</u>
49	6	3	1	1	1	1	2	2	2	3	3	5	4
50	4	3	2	1	1	1	2	2	2	3	4	5	4
51	4	3	2	1	1	1	2	2	2	3	3	8	2
52	4	3	2	1	1	2	3	3	3	3	4	8	8
53	5	3	2	2	1	2	3	4	4	5	5	12	11
54	8	4	3	3	3	3	26	28	28	29	31	58	53
55	9	5	3	4	4	4	28	23	24	24	23	51	36
56	10	5	4	4	4	4	28	20	20	20	20	46	32
57	9	6	4	4	5	5	26	23	21	21	21	45	30
58	11	6	4	4	4	6	32	26	26	26	21	47	29
59	9	12	15	20	25	32	34	34	34	34	35	54	31
60	9	12	14	18	22	27	27	27	28	30	32	43	32
61	10	12	14	17	20	24	25	26	27	28	30	45	27
62	10	12	14	17	21	24	25	26	27	28	29	40	29
63	11	13	15	18	22	25	26	27	28	29	30	42	33
64	28	36	41	45	46	46	46	47	48	49	50	50	43
65	20	26	31	32	32	32	33	34	36	37	38	43	33
66	14	20	26	28	29	31	34	34	35	36	37	40	28
67	20	22	23	25	27	28	31	32	33	34	36	40	31
68	19	23	26	28	29	30	31	31	31	32	32	61	32
69	27	27	27	27	27	27	27	27	27	27	27	28	25

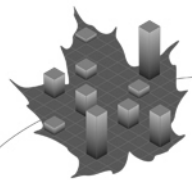
<sup>1</sup> Expressed in completed years calculated at the beginning of the plan year.



**Table 18 Assumed Rates of Retirement – Operational Service Group**  
For a representative subset of service years (per 100 individuals)

<u>Age</u> <sup>1</sup>	Completed Years of Service (Male/Female)												
	<u>1</u>	<u>5</u>	<u>10</u>	<u>15</u>	<u>20</u>	<u>25</u>	<u>29</u>	<u>30</u>	<u>31</u>	<u>32</u>	<u>33</u>	<u>34</u>	<u>35</u>
34-48	0	0	0	0	0	3	6	7	7	7	7	19	17
49	3	3	2	1	1	8	16	17	23	23	23	19	17
50	6	3	2	1	2	6	11	12	14	16	16	19	17
51	3	4	4	2	1	8	11	12	14	16	18	20	17
52	6	5	3	1	1	6	12	14	16	17	19	20	17
53	9	7	6	3	2	8	15	16	17	19	20	22	19
54	7	12	11	6	4	10	20	23	26	30	35	40	55
55	16	11	8	6	5	9	18	22	26	32	39	48	55
56	2	8	7	6	6	12	20	23	27	31	36	42	55
57	11	10	7	6	8	15	24	26	29	32	36	40	55
58	14	12	9	7	9	15	23	25	27	30	33	37	55
59	23	28	30	32	35	37	39	39	40	41	42	62	50
60	26	27	27	27	28	30	34	35	37	40	43	53	45
61	18	18	18	18	22	28	31	31	31	31	31	50	41
62	20	20	20	20	24	28	34	34	38	38	38	50	41
63	25	25	25	25	27	31	35	35	37	37	37	60	48
64	50	50	50	50	60	60	60	60	65	65	65	70	60
65	40	40	40	40	45	45	50	50	50	50	50	65	48
66	40	40	40	40	40	40	50	50	50	50	50	65	48
67	40	40	40	40	40	40	50	50	50	50	50	65	48
68	40	40	40	40	40	40	50	50	50	50	50	65	48
69	40	40	40	40	40	40	50	50	50	50	50	65	48

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



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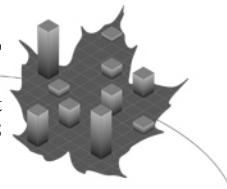
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**Table 19 Assumed Rates of Pensionable Disability**  
(per 1,000 individuals)

Age <sup>1</sup>	Male	Female
25 and less	0.2	0.1
26	0.2	0.1
27	0.2	0.1
28	0.2	0.1
29	0.2	0.1
30	0.2	0.2
31	0.2	0.3
32	0.2	0.3
33	0.2	0.4
34	0.2	0.5
35	0.2	0.6
36	0.3	0.7
37	0.4	0.8
38	0.6	0.9
39	0.6	1.0
40	0.7	1.2
41	0.8	1.4
42	0.9	1.6
43	0.9	1.9
44	1.0	2.0
45	1.2	2.2
46	1.5	2.4
47	1.7	2.8
48	1.9	3.1
49	2.2	3.3
50	2.6	3.5
51	3.1	3.8
52	3.3	4.5
53	3.5	4.9
54	3.7	5.1
55	3.9	5.7
56	4.3	6.6
57	4.9	7.6
58	5.9	8.7

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

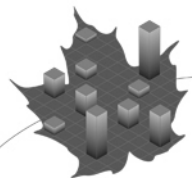




**Table 20 Assumed Mortality Rates**  
For plan year 2009 (per 1,000 individuals)

Age <sup>1</sup>	Non-Elective Participants and Elective Participants who Retired Normally		Elective Participants who Retired on Disability	
	Male	Female	Male	Female
20	0.3	0.2	2.7	5.9
25	0.4	0.3	5.2	6.4
30	0.5	0.3	7.9	6.9
35	0.6	0.3	10.7	7.4
40	0.9	0.5	13.6	7.7
45	1.3	0.9	15.4	8.1
50	2.1	1.4	17.4	9.0
55	3.5	2.3	19.4	11.0
60	6.5	4.3	23.4	13.7
65	11.1	7.7	32.0	18.5
70	20.5	12.7	46.6	27.0
75	34.1	22.2	67.6	41.6
80	63.1	40.8	99.1	66.6
85	106.5	76.3	145.8	108.9
90	168.3	126.7	213.0	176.3
95	250.1	195.9	315.3	281.1
100	351.2	315.2	476.0	441.7
105	499.8	499.8	499.8	499.8
110	500.0	500.0	500.0	500.0
115	1,000.0	1,000.0	1,000.0	1,000.0

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



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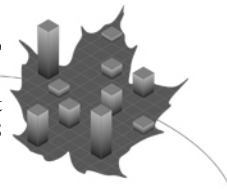
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**Table 21 Assumed Longevity Improvement Factors**  
(%, Annual Mortality Reduction<sup>1</sup>)

Age <sup>2</sup>	Male		Female	
	2009	2029+	2009	2029+
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
105	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.



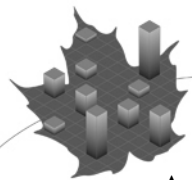
**Table 22 Election Proportions**

(Non-elective participants choosing to become elective participants at retirement)

Age <sup>1</sup>	Pensionable Retirement <sup>2</sup>		Disability Retirement	
	Male	Female	Male	Female
15-43	0.00	0.00	1.00	1.00
44	0.38	0.35	1.00	1.00
45	0.44	0.38	1.00	1.00
46	0.49	0.41	1.00	1.00
47	0.53	0.44	1.00	1.00
48	0.58	0.47	1.00	1.00
49	0.62	0.51	1.00	1.00
50	0.66	0.55	1.00	1.00
51	0.70	0.60	1.00	1.00
52	0.75	0.66	1.00	1.00
53	0.80	0.74	1.00	1.00
54	0.85	0.80	1.00	1.00
55	0.89	0.86	1.00	1.00
56	0.91	0.89	1.00	1.00
57	0.92	0.90	1.00	1.00
58	0.93	0.91	1.00	1.00
59	0.93	0.91	1.00	1.00
60	0.93	0.92	1.00	1.00
61	0.93	0.93	1.00	1.00
62	0.93	0.93	1.00	1.00
63	0.93	0.94	1.00	1.00
64	0.93	0.94	1.00	1.00
65	0.93	0.94	1.00	1.00
66	0.93	0.95	1.00	1.00
67	0.93	0.95	1.00	1.00
68	0.94	0.95	1.00	1.00
69	0.94	0.95	1.00	1.00
70+	1.00	1.00	1.00	1.00

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

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



### **Appendix 7 Acknowledgements**

The Superannuation Directorate of the Department of Public Works and Government Services Canada provided the data on plan members.

The following individuals were instrumental in the preparation of this report:

Chris Dieterle

Annie St-Jacques, A.S.A.