Office of the Superintendent of Financial Institutions
Bureau du surintendant des institutions financières

Pension Plan for the Public Service of Canada

Actuarial Report

(including cost certificate)

as at 31 December 1992

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Canada

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13 October 1994

The Honourable Arthur C. Eggleton, P.C., M.P.
President of the Treasury Board
Ottawa, Canada
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Dear Minister:

Pursuant to section 6 of the *Public Pensions Reporting Act*, I am pleased to submit my report on the actuarial review as at 31 December 1992 of the pension plan established under the *Public Service Superannuation Act*.

Yours sincerely,

Bernard Dussault

Bernard Dussault
Chief Actuary

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TABLE OF CONTENTS

APPENDICES

I- Introduction

Pursuant to the *Public Pensions Reporting Act* (PPRA), I have made an actuarial review as at 31 December 1992 of the pension plan established under the *Public Service Superannuation Act* (PSSA). The previous review had been made as at 31 December 1989. The date of the next periodical review contemplated by the PPRA is 31 December 1995.

The provisions of the plan deemed to apply for purposes of this report are described in Appendix 1 and take into account only those that were effective at the valuation date. Among the developments having taken place since the previous review, those materially affecting the valuation of the plan are described below.

A- The salary freeze which applies for four years in respect of economic increases and over two years in respect of seniority increases.

B- The work force adjustments and privatizations.

C- *Bill C-55*, which received Royal Assent 29 September 1992, amended certain Acts relating to pensions, including the PSSA, and also enacted the *Special Retirement Arrangements Act* and the *Pension Benefits Division Act*.

1. *Special Retirement Arrangements Act* (SRAA)
The SRAA had not yet come into force by the valuation date. Its main purpose is to allow the Governor in Council to establish Retirement Compensation Arrangements (RCAs) in order to provide for the normal accrual of pensions in respect of the portion of employment earnings that will be removed from the PSSA for compliance with the *Income Tax Act* (see also item 3h below).

2. *Pension Benefits Division Act* (PBDA)
The PBDA had not yet come into force by the valuation date. The purpose of the PBDA is to provide, under certain plans including the PSSA, for a division, upon marital (including common-law) breakdown, of pension benefits accrued during the spousal cohabitation. This provision is meant to be cost neutral.

3. Amendments to the PSSA
The main amendments to the PSSA as a result of *Bill C-55* are described below, of which only those described under "(a) Financing of the Plan" had come into force by the valuation date.

(a) Financing of the Plan
The financing provisions of the underlying legislation are deemed to have come into force on 1 April 1991. The financing amendments can be broken down as follows:

- **Supplementary Benefits**
  The related portion of the Supplementary Retirement Benefits Account (for inflation adjustments) was combined with the PSS Account. All supplementary benefits (inflation adjustments) are now paid from the PSS Account.

- **Government Contributions**
  The amended legislation provides for the full funding of existing pension obligations and those to accrue in the future. If an actuarial unfunded liability results as at any valuation date in respect of all benefits then accrued, the PSS Account must then be credited annually with such amounts that in the opinion of the President of the Treasury Board will fully amortize that unfunded liability over a period not exceeding 15 years. In respect of future pension benefits accruing during any given year following a valuation date, the government must credit such contributions during that year which, together with the yearly employees' contributions and subsequent investment earnings thereupon, are adequate in the opinion of the President of the Treasury Board to meet the full actuarial cost of the underlying pension obligations. Moreover, the resulting yearly government contributions may not be less than the yearly total employees' contributions.
- **Interest**
  The amount of investment earnings credited to the PSS Account may not be less than the amount computed using the interest rate determined in accordance with the formula described in item B2 of Appendix 1.

(b) Optional Survivor Benefit
The amended legislation allows plan members to provide survivor benefits in respect of spousal relationships established over age 60 while retired, at a cost to be actuarially determined. This provision is meant to be cost neutral, the full cost being borne by the pensioner electing the option through an adjustment being made to his/her own pension. The effective date of this piece of legislation is 18 February 1994.

(c) Pension Coverage for Part-Time Employees
Employees hired on or after 4 July 1994, the effective date of this provision, who work at least 12 hours per week are required to contribute to the PSSA. However, coverage is optional for part-time employees hired prior to that date. Employees are allowed to buy back prior part-time service which occurred after 31 December 1980.

(d) Leave Without Pay
Employees may now elect not to contribute in respect of leave without pay periods in excess of three months. They may also elect later on to contribute in respect of such periods. The effective date of this amendment is 9 September 1993.

(e) **Early Retirement Program for Correctional Services Canada (CSC)**
Effective 18 March 1994, all accrued benefits are immediately payable in full without reduction to CSC employees who, on leaving operational service, are at least 50 (*versus* 55 normally) years old and have at least 25 (*versus* 30 normally) years of such service. For those leaving service below age 50, provided not below age 45, reduced benefits are payable provided a minimum of 20 years of operational service. *Operational employees* means CSC employees other than those engaged in Staff Colleges or national or regional headquarters.

(f) **Loss of PSSA Contributory Status due to Receipt of a Canada or Québec Pension Plan Pension (C/QPP)**
The provision that barred employees in receipt of a C/QPP retirement pension from contributing to the PSSA was repealed as of 9 September 1993.

(g) **Employees Under Age 18 Joining the Pension Plan**
Employees under age 18 who meet all PSSA eligibility requirements must contribute to the pension plan. The applicable contribution rate is 7.5% integrated with the C/QPP as if they were contributing to the C/QPP. The effective date of this piece of legislation is 9 September 1993.

(h) **Compliance with the *Income Tax Act***
Under the amended legislation, the PSSA Regulations will prescribe yearly the maximum salary rate above which the PSSA will not apply for purposes of current pensionable service (see also item 1 above). The effective date of this amendment has not yet been determined. The *Section* of the PSSA that allows deputy heads ceasing employment under age 60 to elect, for the purposes of the PSSA only, to be deemed employed in the Public Service on a full-time basis, and, to be deemed absent from the Public Service on leave without pay up to age 60, will eventually be repealed. Other provisions of the PSSA may be amended by regulation for the purposes of conforming with any provision of *Section 147.1* of the *Income Tax Act* and Part LXXXV of the Income Tax Regulations, as they read on 15 January 1992.

II- Data

A- Overview

1. Current Contributors

There were 314,616 current contributors at the end of 1992 of whom 97.6% have a contributory status. A non-contributory status would normally correspond to an employee who would now be working less than 30 hours per week but who used to work more than 30 hours per week.

Male members comprise 57.1% of the contributory status group. Their average age was 42.2 years, the average length of pensionable service was 13.2 years, and the average annual salary was $44,618. Regarding female members, the average age was 39.3 years, the average length of pensionable service was 9.6 years, and the average annual salary was $36,217. Tables 3D and 3E of Appendix 3 show detailed information on the age, pensionable service and average salary of male and female members, respectively.

2. Pensioners and Survivors

As at 1 January 1993, the plan was paying benefits to pensioners and survivors at the following annual rates:

Type of beneficiary	Number	(% Male)	Annual benefit
Retirement pensioners	123,776	(71.4%)	1,922,585,019
Disability pensioners	11,754	(64.1%)	107,606,368
Surviving spouses	46,464	(3.4%)	305,351,779
Grand totals	181,994	(53.6%)	2,335,543,166

In addition there were 5,348 deferred annuitants and 2,714 surviving children beneficiaries.

Tables 3F, 3G and 3H of Appendix 3 show detailed information on the benefits to pensioners and survivors. In determining the yearly amounts of pension shown in these tables, the 1 January 1993 inflation increase adjustment was taken into account. As well, the figures in these tables recognize the benefit reductions resulting from C/QPP offsets applied to those at least age 65 years old and to some of those in receipt of disability pensions.

B- Source of Valuation Data

The valuation input data required in respect of current contributors, pensioners and survivors are extracted from master computer files maintained by the Superannuation Directorate of the Department of Public Works and Government Services Canada. The Compensation Systems Directorate of that department is responsible for the computer programs designed for the extraction of these valuation data from the master files.

C- Validation of Valuation Data

The principal tests applied to the basic data can be separated into two categories: status tests and benefit tests.

1. Status Tests

The valuation data supplied by the Superannuation Branch contains all the status information of a member during the intervaluation period of 1 January 1990 to 31 December 1992. The following status tests were made:

a) a consistency check that a status could be established for each record of a member. A member's status can change during the intervaluation period and therefore a member can have up to three statuses: current contributor, pensioner, and survivor;

b) a consistency check of the changes in status of a member during the intervaluation period, e.g.,

- if a current contributor record indicated that the member terminated, then a distinct pensioner record should exist; or
- if a current contributor or pensioner record indicated that the member died leaving an eligible survivor, then a distinct survivor record should exist;

c) a reconciliation was made between the status of members as at 1 January 1990 from the current valuation data and the status of members as at 31 December 1989 from the previous valuation data; and

d) a comparison of members valuation data as at 31 December 1992 with the membership shown in the Report on the Administration of the Public Service Account for the fiscal year ending 31 March 1993, taking into account status changes occurring in the three months following the valuation date.

2. Benefit Tests

Consistency tests were made to ensure that all proper information to value the members' status at 31 December 1992 was included:

a) For Active Members as at 31 December 1992

- verifying that the pensionable service was reasonable in relation to the attained age;
- verifying that the salary of the member was included and, if not, updating a salary from a previous year with an average salary increase. If no such previous salary was available, then using the average salary for that sex;
- verifying that salaries included negotiated increases in effect. If any negotiated increase was not reflected then the salary was increased; and
- verifying that the pay equity increase was included for the clerical, secretarial and nurse job classifications.

b) For Pensioners and Survivors in Receipt of an Annuity

- verifying that the amount of the annuity, including indexation, was included; and
- verifying that the benefits were indexed up to 1 January 1993.

c) Outstanding Terminations

- verifying that the lump sum payment was included.

Based on the omissions and discrepancies identified by these tests and several additional tests, appropriate adjustments were made to the basic data after consulting with the data providers.

In accordance with *Section 8* of the *Public Pensions Reporting Act*, the Comptroller General of Canada provided a certification of the assets of the plan.

D. Acknowledgements

The cooperation and able assistance from the Compensation Systems Directorate of Public Works and Government Services Canada, for the processing of the valuation data, deserves to be acknowledged.

III- Methods

A- Assets

The PSS Account corresponds to the excess, accumulated with interest, of past contributions to the Plan over past benefit payments. These assets are shown at their book value, as opposed to market value, because the balance in the PSS Account is exclusively constituted of non-marketable notional government securities that are held until maturity.

B- Normal Costs

The projected accrued benefit, or projected unit credit, actuarial cost method was used to compute normal costs in respect of active contributors. Under this method, the normal cost computed in respect of a given year corresponds to the present value of all future benefits accrued in respect of that year's pensionable service. Consistent with this cost method, salaries are projected up to retirement using the assumed annual increases in average salaries (including general economic increases as well as those arising from seniority and promotion).

C- Liabilities

- **Active Contributors**
  Consistent with the projected unit credit actuarial cost method employed to compute normal costs, the plan's liabilities as at the valuation date correspond to the present value of all future benefits accrued in respect of all prior years' pensionable service.

- **Pensioners, Survivors and Former Contributors Entitled to a Deferred Annuity**
  Consistent with actuarial practice and standards, the plan's liabilities as at the valuation date correspond to the present value of all future benefits.

IV- Assumptions

A- Basic Economic Assumptions

The following basic economic assumptions are required for valuation purposes in respect of each year following the valuation date:

- the year's average new money interest rate applicable to 20-year federal bonds purchased during the year;
- the year's increase in the Consumer Price Index (CPI);
- the year's increase in the Industrial Aggregate of average weekly earnings; and
- the year's increase in contributors' average annual salary (exclusive of seniority and promotional increases).

To determine these assumptions, analyses were made of short- (10-year), medium- (25-year) and long-term (50-year) experiences, of the current state and outlook of the economy, as well as of available economic forecasts like those included in the 1994 federal budget and those made by the Conference Board. Three main conclusions were reached as a result of these analyses:

1. High current real rates of return (i.e., the excess of new money interest rates over annual increases in the CPI) on long-term investments are expected to return eventually to 3% per annum.

2. Low current annual increases in the CPI will rise gradually to eventually reach an ultimate level of 3%.

3. Low current real annual increases in average earnings (productivity gains, i.e., the difference between annual increases in salary rates and annual increases in the CPI) will rise gradually to eventually reach an ultimate level of about 1%. The assumed annual increase in contributors' average annual salary would normally, for any year, be the same as the assumed increase in the Industrial Aggregate of average weekly earnings. However, it was adjusted in the short term to reflect the remaining four years of salary freeze imposed on government employees. This includes the two-year general economic salary freeze announced in the February 1994 budget.

Each of these conclusions differs somewhat from those underlying the ultimate (i.e., after year 2000) values assumed for the previous valuation. The differences, together with the rationale therefor, are as follows:

a) The assumed ultimate real rate of return on investments was changed from 2.5% to 3% per annum. The former proves to be somewhat low relative to the average experience of the last 25 years and the current outlook for the Canadian economy (globalization of markets, size of the public debt, etc.).

b) The assumed ultimate level of inflation was changed from 3.3% to 3% per annum. Inflation was fairly stable at levels of 4% to 5% in the 1983-1991 period, but dropped below 2% in 1992 and 1993. With the prospects of stable moderate inflation from now on, it appeared appropriate to reduce the long-term expectations by three-tenths of a percentage point at this time.

c) The assumed ultimate productivity rate was changed from 1.2% to 1.0% per annum. In the latest actuarial reports on the PSSA and some other public pension plans, consideration was given to assuming 1% instead of 1.2% for productivity. The 1% assumption has already been used in the three most recent reports on public pension plans. It has indeed become appropriate to now recognize fully this lower level which happens to correspond to the experience averaged over the last 25 years.

B- Margins Against Adverse Fluctuations

Actuarial valuations prepared for private employers' pension plans normally include safety margins. This is generally done mainly to ensure that in case of a plan wind-up there would be at that time, taking into account possible future fluctuations in economic and demographic factors, sufficient funds for the payment of all future benefits accrued as at the wind-up date. Such rationale does not appear to apply to the PSSA because the plan sponsor is the Canadian government.

However, a secondary objective of a margin consists of ensuring as much as possible that any eventual difference between assets and liabilities will be positive rather than negative, and therefore that any required financing adjustments will be in respect of a surplus rather than a deficit. The need for a moderate margin remains therefore valid, but an important change was made for this report in the approach used to compute the margin.

In previous reports, the margin corresponded to a reduction of 1% in the yearly projected fund yield provided it would not fall below 6%. For this report, the margin corresponds to an increase of a quarter of a percentage point of the pension indexing factor (section C below) derived for 1996 and subsequent years. The adjustments to the annual pension indexing factor for margin purposes commence only three years after the valuation date because this factor is already known for 1993 and 1994, and could be reasonably well estimated for 1995 when this report was finalized.

The rationale behind the new approach for computing the margin is that fluctuations in the CPI, in comparison to the three other basic assumptions, are the ones having, at the time of a fluctuation, the largest immediate impact on both the plan's cash flows and liabilities.

As may be seen in Appendix 4 (reconciliation of surplus/deficit and normal cost), the new approach for the margin entails, *ceteris paribus*, a material reduction in the liabilities and in the normal cost.

C- Derived Economic Assumptions

The following assumptions were derived from the basic economic assumptions:

1. **Yearly Fund Yields**
   Such yields are required for the computation of present values of benefits involved in the determination of the plan's liabilities. The average investment rate of return on the PSS Account was computed for each future year by deeming that the assets held on 31 December 1992 in the Public Service, the Royal Canadian Mounted Police and the Canadian Forces Superannuation Accounts would, through a buy-and-hold strategy, continue to accumulate an asset portfolio consisting entirely of 20-year federal bonds. It was assumed that no further contributions would be made after 31 December 1992. It was also assumed that any year's cash flow (i.e., the excess of investment earnings over benefit payments) would be invested at the assumed new money rates.

2. **Year's Increase in the C/QPP Year's Maximum Pensionable Earnings (YMPE)**
   The YMPE is involved in the valuation process by virtue of the integration of the PSSA with the C/QPP. The assumed increase in the YMPE for a given year was derived, in accordance with the *CPP Act*, to correspond to the increase in the assumed Industrial Aggregate of average weekly earnings over the two consecutive 12-month periods ending 30 June of the previous year.

3. **Year's Increase in the Pension Indexing Factor.**
   The year's pension indexing factor is involved in the valuation process by virtue of its role in the pension inflation adjustments. It was derived by applying the Benefit Index formula which relates to (assumed) CPI increases over successive 12-month periods ending with September.

D- Administrative Expenses

No provision was made regarding the expenses incurred for the administration of the plan in computing its liabilities and normal costs because the PSSA is administered by the government with no related charge applied to the PSS Account.

E- Summary of Basic and Derived Economic Assumptions

	Interest		Inflation		Employment Earnings		
Year	New Money Interest (%)	Projected Fund Yield (%)	CPI Increase (%)	Pension Indexing* (%)	Industrial Aggregate (%)	YMPE Increase (%)	Contributors' avrg. Salary Increase** (%)
1993	8.2***	10.7***	1.8***	2.1***	1.6***	3.7***	0.4***
1994	8.1	10.6	0.8	1.9***	2.0	3.0***	0.3
1995	8.0	10.4	1.7	1.1	2.7	1.8	0.0
1996	7.8	10.3	2.0	1.5	3.0	2.4	0.5
1997	7.5	10.1	2.3	1.9	3.3	2.9	1.5
1998	7.0	9.9	2.7	2.2	3.7	3.2	3.5
1999	6.5	9.7	3.0	2.6	4.0	3.5	3.7
2000	6.0	9.4	3.0	2.9	4.0	3.9	4.0
2001	6.0	9.1	3.0	3.0	4.0	4.0	4.0
2002	6.0	8.7	3.0	3.0	4.0	4.0	4.0
2003	6.0	8.4	3.0	3.0	4.0	4.0	4.0
2004	6.0	8.2	3.0	3.0	4.0	4.0	4.0
2005	6.0	7.9	3.0	3.0	4.0	4.0	4.0
2006	6.0	7.7	3.0	3.0	4.0	4.0	4.0
2007	6.0	7.5	3.0	3.0	4.0	4.0	4.0
2008	6.0	7.4	3.0	3.0	4.0	4.0	4.0
2009	6.0	7.2	3.0	3.0	4.0	4.0	4.0
2010	6.0	7.0	3.0	3.0	4.0	4.0	4.0
2011	6.0	6.7	3.0	3.0	4.0	4.0	4.0
2012	6.0	6.5	3.0	3.0	4.0	4.0	4.0
2013	6.0	6.4	3.0	3.0	4.0	4.0	4.0
2014	6.0	6.3	3.0	3.0	4.0	4.0	4.0
2015	6.0	6.2	3.0	3.0	4.0	4.0	4.0
2016	6.0	6.2	3.0	3.0	4.0	4.0	4.0
2017	6.0	6.1	3.0	3.0	4.0	4.0	4.0
2018+	6.0	6.0	3.0	3.0	4.0	4.0	4.0

* Exclusive of the increment, in respect of the margin, of 0.25% for 1996 and later years.

** Exclusive of seniority and promotional increases.

*** These figures reflect actual experience.

F- Demographic Assumptions

For the previous valuation, the membership data and demographic assumptions were grouped by individual age and number of years of service on a *nearest* basis, i.e., the actual age and years of service of members as at the valuation date were rounded to the nearest integer (the demographic assumptions had also been derived on this basis). For this valuation, the *nearest* basis was changed to *last*, i.e., age and years of service were truncated to the next lower integer. The reason for this change is the large proportion of members retiring on the anniversary of their birth date.

1. Current Contributors

(a) New Members

To estimate the normal costs shown in the cost certificate (section V), assumptions are required regarding the number, age, sex and initial salary rate of future new members for 1993, 1994 and 1995. For each of these years, it was assumed that the number of new members would be equal to the year's assumed number of terminations, and that the distribution of new members by age and sex would be the same as for 1992.

(b) Seniority and Promotional Salary Increases

Promotion means changing to a higher position level, and *seniority* means length of service within a position. In the previous valuation both these job evolution factors were regrouped under *promotions*.

Pursuant to the federal budget of February 1994, seniority increases in respect of government employees were suspended for two years. Moreover, there will be no catch-up when the suspension is lifted. Because this is a temporary suspension, i.e., seniority increases will resume in two years, it is expected that it will not materially affect the projected amount of retirement pensions, which depend on the highest consecutive six-year earnings average, and was accordingly ignored for valuation purposes.

For this valuation, rates of seniority and promotional salary increases assumed for the previous valuation were maintained, i.e., they were set equal to the corresponding graduated average experience from 1986 to 1987, 1987 to 1988, and 1988 to 1989 year ends. Experience data include approximately 80% of the PSSA covered members; the portion of their annual salary increase relating to their actual basic (i.e., exclusive of seniority and promotional increases) salary increases was dropped out, and seniority and promotional increases could then be analyzed by job classification. The assumptions for seniority and promotional salary increases, broken down by year of service, are shown in table 2A of Appendix 2.

(c) Rates of Nonvested Termination

Subject to certain minor exceptions, a return of contributions is the only benefit applicable in respect of a contributor who dies or otherwise ceases to be employed in the Public Service before five years of pensionable service have accrued. Thus, for valuation purposes, the rates of termination required for each of the first five years of pensionable service are the rates at which contributors cease to be employed for any reason.

For the previous valuation, these rates (then identified as short-term rates of termination) were assumed to vary by age, sex and number of years of service. For this valuation, they are assumed to vary only by sex and number of years of service because experience data indicate that these rates do not vary significantly by age.

For purposes of determining the assumption, the experience of groups subject to privatizations (section H of Appendix 4) was excluded. The assumed rates of nonvested of termination were set equal to the graduated average 1987-1992 experience. These assumptions are shown in table 2B of Appendix 2.

(d) Vested Terminations (for Reasons Other than Disability or Death) Prior to Age 50, or Age 60 with less than 25 Years of Pensionable Service

i) Termination Rates

Contributors who terminate their employment with at least 5 but less than 25 years of pensionable service may opt for a return of contributions, a deferred annuity to commence at age 60, or an annual allowance that may commence immediately if the contributor's age is 50 or over, but not before age 50 if the contributor's age is under 50. However, contributors terminating their employment over age 44 with at least 10 years of pensionable service may not opt for a return of contributions and are automatically entitled to a deferred annuity or an annual allowance in respect of service after 30 September 1967.

Some changes were made to this assumption in comparison with the previous valuation (then identified as *rates of termination for reasons other than age, age and service, disability or death, after five or more years of pensionable service*):

- contributors at least 50 years of age with at least 25 years of pensionable service are no longer included under this assumption because they may opt for an annual allowance that is substantially greater in value than the value of a deferred annuity, and
- for the previous valuation, these rates were assumed to vary by age, sex and number of years of service. For this valuation, these rates are assumed to vary only by sex and number of years of service because experience data indicate that these rates do not vary significantly by age.

For purposes of determining the assumed rates, the experience of groups subject to work force adjustments and privatizations (sections G and H of Appendix 4) was excluded. The assumed termination rates were set equal to the graduated average 1987-1992 experience. Rates are assumed to vary by sex but to be constant for numbers of years of service in excess of 11. Assumed values are shown in table 2C of Appendix 2.

ii) Election Rates in respect of Terminating Contributors Opting for a Deferred Annuity or an Annual Allowance

The amount of an annual allowance is equal to the amount of deferred annuity that the contributor could have elected to receive, reduced by a percentage equal to 5% times the difference between 60 and the contributor's age. Annual allowances are assumed to be actuarially equivalent to deferred annuities.

The election rates, assumed to vary by age and sex, are those of the previous report, except for male members aged 50 and over. Experience data for 1990-1992 indicate that the rates previously assumed needed to be increased. The assumed election rates were accordingly set equal to the graduated average 1981-1986 experience, except for male members in respect of whom they were increased for ages 50 to 59. For age 50, the increase is 4% plus 4% of the difference between 100% and the election rate increased by 4%. The 4% increase was increased by 4% for each subsequent age until it reached 36% at age 58.

For members at least 45 years of age with at least 10 of pensionable service, the election rate assumed in respect of benefits accruing after September 1967 is 100%.

Assumed values are shown in table 2D of Appendix 2.

(e) Rates of Vested Termination (for Reasons other than Disability and Death) from Age 60 or from Age 50 with at least 25 Years of Pensionable Service

i) Termination Rates

Contributors who terminate at age 60 or over, or at age 55 or over with at least 30 years of pensionable service, are entitled to an immediate annuity. Those who terminate at ages 50 to 54 with at least 25 years of service or at ages 55 to 59 with 25 to 29 years of service, are entitled, at their option, to either a deferred annuity commencing at age 60 or to an annual allowance, commencing immediately upon termination, equal to the amount of the immediate annuity reduced by 5% times the greater of 55 minus the age and 30 minus the number of years of pensionable service, subject to a maximum of 60 minus the contributor's age.

Contrary to the previous report, in which the related assumption was identified as *rates of retirement because of age or age and service*, contributors entitled to either a deferred annuity or an annual allowance are now all assumed to opt for the annual allowance. The reason for this change is that such an annual allowance is in most cases substantially greater in value than the deferred annuity.

For purposes of determining the assumed rates, the experience of groups subject to work force adjustments and privatizations (see sections G and H, respectively, of Appendix 4) was excluded. Assumed rates were determined as the graduated average experience for 1987 to 1992. Rates, assumed to vary by age, sex and service, are shown in table 2E of Appendix 2.

ii) Integration with the Canada and the Québec Pension Plans (C/QPP)
As described in Note 4 of Appendix 1, the basic annuity of a retired contributor reaching age 65 or becoming entitled to a disability pension under the C/QPP is reduced in accordance with the method of integration of the Public Service Superannuation Plan with the C/QPP.

In the previous valuation, it was necessary to develop assumptions as to
- the proportions of contributors, by age, whose highest consecutive six-year average salary is below the final three-year average YMPE, and
- the average ratios of the corresponding six-year average salary of such contributors to the three-year average YMPE. The YMPE, which was $33,400 for 1993, is indexed to the Industrial Aggregate of average weekly earnings.

For this valuation, input data were grouped by individual age and number of years of service, and by $5,000 annual salary ranges. For the previous valuation, amounts of salaries were fully aggregated. With this new aggregation of salaries by $5,000 ranges, the above two assumptions are no more required.

(f) Rates of Vested Termination due to Disability
This assumption was identified as *rates of retirement because of disability* in the previous valuation. Based on a review of the recent disability experience, it was decided to retain the assumed rates used in the previous valuation which reflected the average 1984-1986 experience. These rates vary by age and are shown in table 2F of Appendix 2. It was assumed that all members becoming disabled would opt for an immediate annuity. On the basis of the average 1987-1992 experience, it was further assumed that 80% of disability terminations would be eligible for immediate C/QPP disability benefits. In the previous valuation, 70% had been assumed.

(g) Mortality Rates and Longevity Improvements Factors
The mortality rates deemed to apply in 1993 were set equal to the 1990 base year mortality rates used in the previous valuation, reduced to account for three years of improvement in longevity.

For the previous valuation, mortality rates deemed to apply in 1990 to current contributors, were assumed to vary by age and set equal to 95% of the graduated average 1984-1989 experience. These rates are shown in table 2G of Appendix 2.

Mortality rates deemed to apply after 1993 are those assumed for 1993 but adjusted on account of expected future improvements in longevity. The corresponding longevity improvement factors shown in table 2H of Appendix 2 were used for contributors, retirees and survivors. The projection scale used is a modification of Projection Scale H of the Society of Actuaries.

2. Former Contributors

(a) Mortality Rates

The mortality rates assumed for the previous valuation were not changed except for certain groups for which the previous valuation 1990 base rates were not projected three years for deemed improvements in longevity. The resulting bases can be summarized as follows:

	Non-disabled	Disabled
Male	1990 projected 3 years	1990 base
Female	1990 base	1990 projected 3 years

In the previous valuation, 1990 mortality rates assumed for former contributors (except disabled annuitants) had been set at 97% of the rates of the 1983 Group Annuity Mortality Basic Table.

In the previous valuation, 1990 mortality rates assumed for disabled annuitants had been set equal to:

- for male members, 80.75% of the graduated average 1984-1986 experience rates, for the second and later years of disability;
- for female members, 110% of the previous valuation assumptions.

To determine mortality rates deemed to apply after 1993 to former contributors, the longevity improvements assumed for current contributors were applied.

A sample of 1993 mortality rates is shown in table 2G of Appendix 2.

(b) Other Assumptions

Considering their negligible effect on liabilities and normal costs, the following rates were assumed to be zero:

- disablement incidence rates for non-disabled former contributors; and
- disablement recovery rates for disabled annuitants.

The following assumptions used for former contributors were also used for current contributors:

- longevity improvement factors;
- average age of spouse at death of contributor;
- number of children at death of contributor; and
- average age of children at death of contributor.

3. Survivors

(a) Mortality Rates

The mortality rates assumed for the previous valuation were maintained for this report except that rates for ages 85 and over were decreased. The mortality rates deemed to apply in 1993 were set equal to the 1990 base year mortality rates used in the previous valuation, but projected for three years of deemed longevity improvement.

For the previous valuation, the mortality rates of surviving spouses deemed to apply in 1990 had been set equal to 90% and 100% of the 1980-1982 Canada Life Table rates for widows and widowers, respectively.

A sample of the rates deemed to apply to 1993 is shown in table 2G of Appendix 2.

Mortality rates deemed to apply to surviving spouses after 1993 were determined by applying the longevity improvement factors assumed for current contributors.

For the current as well as preceding valuations, mortality was ignored in projecting the allowances payable to eligible children because its effect at the relevant ages (below 25) is negligible.

(b) Proportions of Contributors Married at Death

These proportions are assumed to vary by age and sex. For male members, separate assumptions were made for current and former contributors.

In respect of male current contributors, the proportions assumed are those of the previous report and correspond to the graduated average 1981-1986 experience. In respect of male former contributors, the proportions assumed are those of the previous report, i.e., 105% of the graduated average 1978-1980 experience, except that the table was extrapolated beyond age 101 to reach a zero value for age 109.

In respect of female members under the age of 56, the proportions were set equal to 0.55, decreasing each year by 0.01 until age 60. Over age 60, the proportions are assumed to decrease in accordance with the 1993 base year mortality of widowers.

A sample of these assumed values is shown in table 2I of Appendix 2.

(c) Average Age of Spouse at Death of Contributor

This assumption was modified slightly as compared to the previous valuation but still applies to both current and former contributors. It was equal to the graduated average 1981-1986 experience in respect of both current and former contributors, and then adjusted by 1 for some ages as suggested by the 1990-1992 experience data. A sample of the assumed average ages is shown in table 2I of Appendix 2.

(d) Number of Children at Death of Contributor

The assumptions of the previous valuation, varying by age of the contributor, were retained. They correspond to

- for male contributors, the graduated average 1984-1989 experience;
- for female contributors, 110% of the graduated average 1981-1989 experience.

Sample values are shown in table 2J of Appendix 2.

(e) Average Age of Children at Death of Contributor

The assumptions of the previous valuation were retained. They correspond to 95% of the graduated average 1981-1986 experience rounded to the next lower integer. Sample values are shown in table 2J of Appendix 2.

(f) Proportions of Children Remaining Eligible for Allowances over age 17

The payment of an allowance to a child between ages 18 and 25 is conditional on the child attending school full-time.

The corresponding assumptions used for the previous valuation were retained. The proportions of students remaining eligible for an allowance were set equal to the graduated average 1981-1986 experience. Sample values are shown in table 2J of Appendix 2.

V- Valuation Results

A- Valuation Balance Sheet

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

Assets	Millions of dollars
Balance in Public Service Superannuation Account	49,558.1
Actuarial present value of future contributions and matching government credits in respect of prior service	
• Current contributors	209.6
• Former contributors	476.3
Total assets	50,244.0
Liabilities	
For benefits to and in respect of current contributors:	
• Contributory status	20,559.1
• Non-contributory status	194.4
For benefits to and in respect of former contributors	
• Retirement pensioners	18,428.7
• Disability pensioners	1,088.1
• Surviving spouses	2,602.0
• Surviving children	14.5
Outstanding terminations	184.7
Total liabilities	43,071.5
Surplus	7,172.5

B- Cost Certificate

The normal costs and the assets and liabilities of the plan were computed using the valuation methods described in section III, the assumptions described in section IV and the experience data described in section II. Emerging experience, differing from the corresponding assumptions, will result in gains or losses which will be revealed in future reports.

1. Normal Costs

Normal costs were computed using the relevant assumed new money interest rates (deemed to apply for 20 years and replaced by the assumed ultimate rate thereafter), as opposed to the projected fund yields reduced by 1%, minimum 6%, used in the previous report. The plan provisions upon which the normal costs were based do not take into account those provisions of *Bill C-55* that had not yet come into force by the valuation date. The normal costs are expressed below as a percentage of the pensionable payroll which corresponds to the sum of all salaries paid during the year to current contributors with no more than 35 years of pensionable service.

Year	Normal cost (%)	Employees' portion (%)	Government's portion (%)
1993	12.53	5.76	6.77
1994	13.20	5.67	7.53
1995	13.92	5.58	8.34

The above table shows increases for 1994 and 1995 in the aggregate normal cost as well as in the government's portion of that cost. This gradual increase in the normal cost mainly reflects a partial transition from the current to the ultimate economic assumptions. On the other hand, the employees' portion of the normal cost decreases for 1994 and 1995. This results from the integration of the PSSA contributions with the C/QPP (described in Appendix 1). The C/QPP employees' contributions offset corresponds to the actual amount of contributions to C/QPP. As the C/QPP contribution rate started to increase in 1987 and is expected to continue to increase each year until about 2030, the employees' portion of the PSSA normal cost decreases yearly as the C/QPP offset increases.

2. Assets and Liabilities

The total liabilities for the plan are estimated at $43.07 billion as at 31 December 1992. The assets of $50.24 billion as at the same date therefore exceed the liabilities, corresponding to a surplus of $7.17 billion.

C- Sensitivity of Estimates to Variations in Economic Assumptions

The supplementary results shown below provide an indication of the degree to which the results shown in the above Cost Certificate depend on some of its basic assumptions. The differences between the results below and those shown in the Cost Certificate can also serve as the basis for deriving a reasonable approximation of the projected effect of larger or smaller changes in the value specified by one or more of the basic assumptions. However, one must bear in mind that any such calculation does not take into account either the extent to which the effect of changing a given assumption may not be strictly linear, or the interaction effect that may come into play when more than one assumption is changed.

1. Constant, as Opposed to Streamed, Economic Assumptions

The 1993 normal cost of 12.53% of pensionable payroll takes into account, among other things, that the 1993 new money interest rate of 8.2%, deemed to apply for 20 years, is higher than the ultimate level of 6% assumed for the rest of the projection period. If new money interest rates and other economic factors were deemed constant at their otherwise assumed ultimate value (i.e., 6% for interest, 4% for annual increase in average salaries, and 3% for inflation) throughout the projection period, the resulting normal cost for 1993 would be 20.24% instead of 12.53% of pensionable payroll.

2. Productivity (Real Rate of Increase in Average Salaries)

If the assumed productivity gains were reduced by 0.5% from 1998 onward, then the 1993 normal cost would decrease by 0.34% of pensionable payroll from 12.53% to 12.19%.

3. Margin Against Adverse Fluctuations

If the 0.25% marginal increase deemed to apply after 1995 to the assumed pension indexing factors were removed, the 1993 normal cost of 12.53% would decline by 0.37% to 12.16%, and the liabilities would decrease by $979.2 million.

4. Interest Rate

(a) Yield *versus* New Money

If the projected fund yields were used instead of the assumed new money interest rates, the 1993 normal cost would be 1.12% less, i.e., 11.41% instead of 12.53% of pensionable payroll.

(b) Investment Policy

The normal cost calculations are based on a deemed investment policy of buying and holding 20-year government bonds. If the deemed investments also included a significant equity component, it would be appropriate to assume higher real rates of return. As a measure of sensitivity, an increment of one percentage point in the real interest rate would decrease the 1993 normal cost by 2.53% of pensionable payroll from 12.53% to 10.00%.

VI- Conclusions

A- Surplus

In comparison with the previous report, the financial results of this report rest, among other things, on a major change in the approach used for the computation of margins against adverse fluctuations. This change entails a sizeable reduction in the total liabilities for the plan, which found itself with a large surplus as at 31 December 1992. Considering the unusual increase in the surplus since the last valuation and my opinion that

- the liabilities estimated in respect of all benefits accrued by 31 December 1992 include a reasonable margin against adverse fluctuations, and

- the normal costs computed for 1993, 1994 and 1995 make adequate provision for the full funding of benefits projected to accrue during those years,

it would be appropriate to take measures now to reduce the PSSA surplus over time. The methodology for achieving this surplus reduction could require, *inter alia*, actuarial advice, the provision of which is not among the objectives of this statutory actuarial report.

B- Actuarial Standards

In my opinion, considering that this report was prepared pursuant to the *Public Pensions Reporting 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 methods employed are appropriate;
- the value of the plan assets would be greater than the liabilities if the plan were to be wound up at the valuation date; and
- this report has been prepared, and my opinion given, in accordance with accepted actuarial practice, and particularly with the Canadian Institute of Actuaries' standard of practice for the valuation of pension plans.

Bernard Dussault

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

Ottawa, Canada
13 October 1994

APPENDIX 1

Summary of Provisions, in Force as at 31 December 1992, of the Pension Plan Established under the *Public Service Superannuation Act*

A- Membership

Subject to the exceptions mentioned in the next paragraph, membership in the plan is compulsory for all full-time employees in the Public Service having reached age 18 or being otherwise designated as contributors by the President of the Treasury Board. This includes all positions in any department or portion of the executive government of Canada, and of the Senate and House of Commons, the Library of Parliament and any board, commission or corporation listed in a *Schedule to the Act*. Persons engaged as sessional employees, postmasters or assistant postmasters in revenue post offices and some others may be designated as contributors by the President of the Treasury Board either individually or as members of a class.

The main groups of persons employed in the Public Service to which the *Act* does not apply are part-time employees, persons engaged locally outside Canada and employees of some Crown corporations, boards or commissions covered by separate pension plans.

B- Credits and Charges to the PSS Account

1. Contributions

All contributions made by members and the government are credited to the PSS Account.

(a) Members

Contributions in respect of current service are required at the following rates applying to salary:

Group	Contribution Rate
Air Traffic Controllers (ATC)	9.5%, less contributions to C/QPP*, for a maximum of 35 years**, thereafter 1%
Others	7.5%, less contributions to C/QPP*, for a maximum of 35 years**, thereafter 1%

A contributor may elect to contribute for prior service.

(b) Government

- The government credits such amount to the PSS Account that, in the opinion of the President of the Treasury Board, is required to meet the cost of all pension obligations as they accrue. The government and the Crown corporations, as employers, must contribute an amount at least equal to the current service contributions made by members.

- If an unfunded actuarial liability is identified through a triennial statutory actuarial report, the PSS Account is to be credited with such annual amounts that in the opinion of the President of the Treasury Board will fully amortize this deficit over a period not exceeding 15 years.

2. Interest

The interest rate applying to net cash flows (contributions minus benefits) to the PSS Account is revised every three months on the basis applying to the Canada Pension Plan, i.e., the applicable rate corresponds to the average rate on outstanding Government of Canada bonds with 20 or more years to maturity. Investment earnings are credited to the PSS Account.

3. Payments of Benefits

All benefits payments pursuant to the PSSA are charged to the PSS Account.

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* C/QPP refers to the Canada Pension Plan or the Québec Pension Plan, as the case may be.

** The underlying 35-year period includes years for which contributions were made pursuant to the *Canadian Forces Superannuation Act* and/or the *Royal Canadian Mounted Police Superannuation Act*.

C. Summary Description of Benefits

The explanatory notes referred to in this summary are given in section D of this Appendix.

1. Contributors with less than Five Years of Pensionable Service (Note 1)

With a few exceptions, the only benefit to which a contributor in this category is entitled upon termination of service is a *return of contributions* (Note 2).

2. Contributors with Five or More Years of Pensionable Service

Circumstance	Type of Benefit
Termination because of age or age and service (Note 3)	Immediate annuity (Note 4)
Termination because of disability	At option of contributor (Note 5): (A) immediate annuity (Note 4), or (B) cash termination allowance (Note 6) or return of contributions, whichever is greater
Termination for reasons other than age, age and service, disability, misconduct or death	At option of contributor (Note 5): (A) return of contributions, or (B) deferred annuity (Note 7), or (C) annual allowance payable immediately, if age 50 or over, and otherwise upon attaining age 50 (Note 8)
Dismissal because of misconduct	(A) return of contributions, or (B) with the consent of the Treasury Board, the whole or part specified by the Treasury Board of any benefit to which the contributor would have been entitled if employment had ceased for a reason other than misconduct (Note 9)
Death leaving no surviving spouse or eligible children	Minimum benefit (Note 12)
Death leaving surviving spouse and/or eligible children	Annual allowances (Notes 10, 11 and 12)

3. Former Contributors Entitled to Annuities or Annual Allowances

Circumstance	Type of Benefit
Disability before age 60 while entitled to a deferred annuity or an annual allowance	Immediate annuity (Note 4)
Death leaving no surviving spouse or eligible children	Minimum benefit (Note 12)
Death leaving surviving spouse and/or eligible children	Annual allowances (Notes 10, 11 and 12)

4. Indexation

All annuities and annual allowances are subject to full indexing from the moment the contributor terminates his or her employment. Indeed, pursuant to Part III of the PSSA, benefit adjustments corresponding to increases in the Benefit Index are provided in respect of the basic allowances payable under Part I of the PSSA to former contributors and their survivors. For purposes of administering the indexing provisions, the Benefit Index, in respect of each calendar year, is calculated as the Benefit Index for the preceding year multiplied by the average of the CPI for the 12-month period ending on 30 September of that preceding year, all divided by the average for a corresponding period one year earlier. However, as part of a general economic restraint program, increases for 1983 and 1984 were limited to 6.5% and 5.5%, respectively.

D- Explanatory Notes

Note 1: Pensionable Service

Pensionable service of a contributor is defined in the PSSA and includes in general terms any period of service in the Public Service for which the contributor has been required to contribute or has elected to contribute, if eligible to do so, and such other types of service for which the contributor has elected to make the required special contributions to the PSS Account.

The amount of any annuity or allowance to which a contributor or the surviving spouse or children may become entitled and, in some cases, the reduction factor used in determining the amount of an annual allowance payable to a contributor, depend on the number of years of pensionable service to the credit of the contributor at the date employment in the Public Service ceased.

Note 2: Return of Contributions
Return of Contributions means the payment of an amount equal to the total contributions, accumulated with interest, made by a given member in respect of current and prior service. Interest is credited at a rate of 4% per annum, beginning in 1974, up to 31 December of the year immediately preceding the year the given contributor ceased to be employed in the Public Service.

Note 3: Termination Because of Age or Age and Service
Termination because of age or age and service means ceasing to be employed in the Public Service, for any reason other than misconduct or death, while over age 59 and with at least five years of pensionable service, or at ages 55 to 59 with at least 30 years of pensionable service. In the case of air traffic controllers it also means ceasing to be employed after completing 20 years of operational service in case of *involuntary retirement* or after attaining age 50 and completing at least 25 years of operational service in case of *voluntary retirement.*

Note 4: Immediate annuity
Immediate annuity means an annuity that becomes payable to a contributor immediately upon becoming entitled thereto. The annual amount of *basic annuity* is equal to 2% multiplied by the number of years of pensionable service up to a maximum of 35 and by the highest value resulting from averaging any series of six consecutive annual pensionable earnings. If the number of years of pensionable service is less than six, earnings are averaged over the total period of pensionable service. Any *basic* (before the indexation adjustments described above in paragraph C4) annuity or annual allowance is normally payable in equal monthly instalments at the end of each month until the month in which the survivor dies or ceases to be entitled thereto.

When a contributor entitled to an annuity or annual allowance reaches age 65 or has become entitled to a disability pension under the terms of the C/QPP, the annuity or annual allowance is reduced by an amount equal to 0.7% multiplied by the number of years of pensionable service after 1965 that are counted in the calculation of the *basic annuity*, and by the six-year average salary as defined in the preceding paragraph but limited to the YMPE averaged over the three-year period ending with the year during which the annuity commences.

When a contributor, being entitled while still under age 60 to an immediate annuity in respect of a disability, recovers from that disability (i.e., is certified in accordance with regulations to have regained his or her health as to be capable of performing the duties of his or her former position in the Public Service or any other position in the Public Service commensurate with the contributor's qualifications), the disability annuity payments are terminated and the contributor becomes entitled to a deferred annuity.

When a contributor entitled to a deferred annuity or annual allowance becomes disabled before reaching age 60, the contributor ceases to be entitled to that deferred annuity or annual allowance and becomes entitled to an immediate annuity adjusted in accordance with regulations to take into account the amount of any annual allowance which the contributor may have received prior to becoming disabled.

Note 5: Restriction on Contributor's Options
If on termination of employment, a contributor has reached age 45 and has at least 10 years of pensionable service, then the contributor's right to select a *return of contributions* or a *cash termination allowance* benefit is limited to the period of pensionable service prior to 1 October 1967. With respect to the service on and after that date, the contributor is entitled, as the case may be, to a deferred or immediate annuity or an annual allowance.

Note 6: Cash Termination Allowance
Cash termination allowance means an amount equal to the number of years of pensionable service times one month's salary (normally at the rate of salary payable to the contributor at the time the contributor ceases to be employed in the Public Service), less an amount corresponding to the reduction, in the employee's PSSA contributions, applying in connection with the integration of the PSSA with the C/QPP.

Note 7: Deferred Annuity
Deferred annuity means an annuity that becomes payable to a former contributor upon reaching age 60. The annual amount of the annuity is computed as described in Note 4.

Note 8: Annual Allowance
The amount of the annual allowance is equal to the amount of the deferred annuity, to which the contributor is entitled, reduced by 5% times a factor depending on age and length of pensionable service at retirement.

For a contributor aged at least 50 with at least 25 years of pensionable service, this factor is equal to the greater of 55 minus the contributor's age, and 30 minus the number of years of pensionable service, subject to a maximum of 60 minus the contributor's age.

For a contributor aged at least 55 who has been employed in the Public Service on a full-time basis for a period or periods totalling at least 10 years and who does not retire voluntarily, the factor is equal to 30 minus the number of years of pensionable service, subject to a maximum of 60 minus the contributor's age. In any such case the whole or part of the reduction calculated using this factor may be waived by the Treasury Board.

In all other cases, the factor is 60 minus the contributor's age.

In any case, the factor is determined by expressing age and length of service to the nearest one-tenth of a year.

Note 9: Dismissal Because of Misconduct
In the case of dismissal because of misconduct, the capitalized value of any annuity or annual allowance granted by the Treasury Board computed in accordance with regulations on the basis of the a(f) and a(m) Ultimate Tables of mortality and interest at 4% per annum may not be less than the *return of contributions* as defined in Note 2.

Note 10: Annual Allowance to Surviving Spouse
Annual allowance to the surviving spouse of an active contributor or a former contributor entitled to receive an annuity or annual allowance means one-half of the annual amount of *basic annuity* computed as described in Note 4. This is identified as the *basic allowance.* No allowance is payable to the widower of a female contributor, unless the contributor was employed in the Public Service and had completed 35 years of pensionable service or was required to contribute to the PSS Account on or after 20 December 1975. Moreover, if a contributor marries after having become entitled to an annuity or annual allowance, the surviving spouse is not entitled to any annual allowance unless, after the marriage, the former contributor was reinstated as a contributor.

Note 11: Annual Allowance to Surviving Children
Annual allowance to each child of a deceased contributor means one-fifth of the *basic allowance* described above, or if there is no living spouse, two-fifths of the basic allowance. The allowance is payable to any children under age 18 until they reach their eighteenth birthday, and to any children 18 years or older until they reach their twenty-fifth birthday provided they have been in full-time attendance at school or university substantially without interruption since their eighteenth birthday or the death of the contributor whichever occurred later. The total amount of allowance payable to the eligible children of a deceased contributor may not exceed that which would be payable if there were four eligible children.

A child born to the widow of a contributor is not entitled to an annual allowance unless the child was conceived before the death of the contributor. Also a child who was born to or adopted by a contributor or who became the stepchild of a contributor after the contributor ceased to be employed in the Public Service is not entitled to an annual allowance unless, in the case of a child born to a contributor, the child was conceived before the contributor ceased to be employed.

Note 12: Minimum Benefit
If an active contributor or a pensioner dies without leaving an eligible survivor, there is paid a lump sum equal to the greater of the return of contributions and five times the *basic annuity* to which the contributor would have been, or the pensioner was entitled, at the time of death, less all amounts (excluding indexation adjustments) already paid to the pensioner.

The same formula is used to determine the lump sum payable upon the death of an eligible survivor, except that all amounts (excluding indexation adjustments) already paid to the survivor are also subtracted.

APPENDIX 2

Sample Demographic Assumptions

Table 2A

Assumed Annual Seniority and Promotional Salary Increases

Service* (years)	Male (%)	Female (%)
0	4.75	5.60
1	4.05	4.80
2	3.40	4.05
3	2.85	3.35
4	2.35	2.75
5	1.95	2.30
6	1.70	1.95
7	1.50	1.70
8	1.35	1.55
9	1.25	1.45
10	1.15	1.35
11	1.05	1.25
12	1.00	1.20
13	0.95	1.15
14	0.90	1.10
15	0.85	1.05
16	0.80	1.00
17	0.80	0.95
18	0.75	0.90
19	0.70	0.85
20	0.70	0.80
21	0.70	0.80
22	0.65	0.75
23	0.60	0.70
24	0.60	0.70
25	0.60	0.70
26	0.60	0.70
27	0.60	0.65
28	0.60	0.60
29	0.60	0.60
30	0.60	0.60
31	0.65	0.60
32	0.70	0.60
33	0.70	0.60
34	0.75	0.65
35	0.80	0.70
36	0.80	0.70
37	0.85	0.70
38+	0.90	0.70

* Expressed in completed years calculated as at the beginning of the calendar year.

Table 2B

Assumed Rates of Nonvested Termination

Service*	Male (%)	Female (%)
0	20.0	25.0
1	10.5	12.5
2	8.0	9.0
3	6.5	7.2

Table 2C

Assumed Rates of Vested Termination (for Reasons Other than Death or Disability) Prior to Age 50, or prior to Age 60 with Less Than 25 Years of Pensionable Service

Service*	Male (%)	Female (%)
4	5.5	6.2
5	4.6	5.5
6	4.0	4.9
7	3.5	4.4
8	3.1	4.0
9	2.7	3.6
10	2.3	3.3
11	2.0	3.0
12+	1.4	2.5

* Expressed in completed years calculated as at the beginning of the calendar year.

Table 2D

Assumed Election Rates*
(Proportions of Contributors Opting for a Deferred Annuity or Annual Allowance)

Age**	Male	Female
21	0.000	0.001
22	0.000	0.001
23	0.001	0.002
24	0.002	0.003
25	0.004	0.005
26	0.006	0.007
27	0.008	0.009
28	0.011	0.011
29	0.013	0.014
30	0.017	0.016
31	0.020	0.020
32	0.025	0.024
33	0.029	0.028
34	0.034	0.032
35	0.040	0.036
36	0.048	0.043
37	0.058	0.050
38	0.069	0.059
39	0.080	0.067
40	0.090	0.073
41	0.097	0.078
42	0.103	0.082
43	0.108	0.086
44	0.112	0.091
45	0.121	0.098
46	0.137	0.112
47	0.162	0.136
48	0.196	0.171
49	0.243	0.216
50	0.327	0.268
51	0.408	0.325
52	0.489	0.387
53	.0567	0.455
54	0.642	0.526
55	0.713	0.600
56	0.783	0.676
57	0.847	0.752
58	0.908	0.828

* These benefit option rates apply to terminated vested members (for reasons other than death or disability) who have not attained age 60, or age 50 with at least 25 years of pensionable service. For members at least 45 years of age with at least 10 of pensionable service, the election rate assumed in respect of benefits accruing after September 1967 is 100%.

** Expressed in completed years calculated at the beginning of the calendar year.

Table 2E

Assumed Rates of Vested Termination (for Reasons Other than Disability or Death) From Age 60, or From Age 50 with 25 or More Years of Pensionable Service

Male Members

Age*	Years of Service*: 4-9	10-14	15-19	20-23	24	25-28	29	30	31	32	33	34	35+
49	0.000	0.000	0.000	0.000	0.015	0.015	0.020	0.025	0.025	0.030	0.040	0.060	0.060
50	0.000	0.000	0.000	0.000	0.020	0.020	0.025	0.030	0.030	0.035	0.045	0.065	0.065
51	0.000	0.000	0.000	0.000	0.020	0.025	0.030	0.040	0.040	0.045	0.055	0.075	0.075
52	0.000	0.000	0.000	0.000	0.025	0.030	0.035	0.045	0.050	0.060	0.065	0.095	0.095
53	0.000	0.000	0.000	0.000	0.035	0.040	0.045	0.060	0.070	0.080	0.090	0.150	0.150
54	0.000	0.000	0.000	0.000	0.045	0.050	0.270	0.270	0.270	0.270	0.270	0.550	0.500
55	0.000	0.000	0.000	0.000	0.045	0.050	0.250	0.250	0.210	0.210	0.210	0.460	0.360
56	0.000	0.000	0.000	0.000	0.050	0.055	0.250	0.250	0.210	0.210	0.210	0.460	0.360
57	0.000	0.000	0.000	0.000	0.060	0.060	0.250	0.250	0.210	0.210	0.210	0.460	0.360
58	0.000	0.000	0.000	0.000	0.060	0.065	0.250	0.250	0.210	0.210	0.210	0.460	0.360
59	0.170	0.170	0.170	0.210	0.270	0.280	0.390	0.390	0.370	0.320	0.320	0.600	0.450
60	0.180	0.180	0.180	0.220	0.230	0.280	0.350	0.350	0.330	0.320	0.320	0.550	0.400
61	0.180	0.180	0.180	0.220	0.230	0.280	0.315	0.315	0.315	0.315	0.315	0.500	0.410
62	0.200	0.200	0.200	0.235	0.250	0.285	0.325	0.325	0.325	0.325	0.325	0.500	0.410
63	0.250	0.250	0.250	0.275	0.275	0.305	0.350	0.350	0.350	0.350	0.350	0.600	0.480
64	0.690	0.690	0.690	0.760	0.760	0.790	0.800	0.760	0.710	0.710	0.710	0.830	0.730
65	0.400	0.400	0.400	0.420	0.420	0.420	0.480	0.480	0.480	0.480	0.480	0.480	0.480
66	0.400	0.400	0.400	0.420	0.420	0.420	0.480	0.480	0.480	0.480	0.480	0.480	0.480
67	0.400	0.400	0.400	0.420	0.420	0.420	0.480	0.480	0.480	0.480	0.480	0.480	0.480
68	0.400	0.400	0.400	0.420	0.420	0.420	0.480	0.480	0.480	0.480	0.480	0.480	0.480
69	0.400	0.400	0.400	0.420	0.420	0.420	0.480	0.480	0.480	0.480	0.480	0.480	0.480

Female Members

Age*	Years of Service*: 4-9	10-14	15-19	20-23	24	25-28	29	30	31	32	33	34	35+
49	0.000	0.000	0.000	0.000	0.035	0.035	0.040	0.040	0.045	0.045	0.050	0.070	0.070
50	0.000	0.000	0.000	0.000	0.035	0.035	0.045	0.045	0.050	0.055	0.065	0.090	0.090
51	0.000	0.000	0.000	0.000	0.040	0.040	0.050	0.060	0.060	0.060	0.070	0.095	0.095
52	0.000	0.000	0.000	0.000	0.040	0.045	0.055	0.065	0.065	0.070	0.070	0.100	0.100
53	0.000	0.000	0.000	0.000	0.055	0.060	0.070	0.085	0.090	0.090	0.090	0.140	0.140
54	0.000	0.000	0.000	0.000	0.090	0.095	0.260	0.260	0.260	0.260	0.260	0.520	0.480
55	0.000	0.000	0.000	0.000	0.090	0.095	0.240	0.240	0.210	0.190	0.190	0.400	0.270
56	0.000	0.000	0.000	0.000	0.090	0.095	0.240	0.240	0.210	0.190	0.190	0.400	0.270
57	0.000	0.000	0.000	0.000	0.090	0.095	0.240	0.240	0.210	0.190	0.190	0.400	0.270
58	0.000	0.000	0.000	0.000	0.090	0.095	0.240	0.240	0.210	0.190	0.190	0.400	0.270
59	0.120	0.170	0.220	0.250	0.280	0.310	0.380	0.380	0.360	0.310	0.300	0.640	0.330
60	0.130	0.190	0.220	0.270	0.270	0.310	0.330	0.320	0.310	0.310	0.300	0.520	0.330
61	0.120	0.170	0.210	0.250	0.250	0.280	0.310	0.300	0.300	0.300	0.300	0.500	0.330
62	0.150	0.200	0.230	0.270	0.270	0.300	0.310	0.300	0.300	0.300	0.300	0.500	0.310
63	0.190	0.260	0.280	0.340	0.340	0.370	0.390	0.340	0.320	0.350	0.350	0.550	0.400
64	0.650	0.720	0.720	0.720	0.720	0.720	0.720	0.720	0.720	0.770	0.770	0.800	0.700
65	0.400	0.400	0.400	0.420	0.420	0.420	0.480	0.480	0.480	0.480	0.480	0.480	0.480
66	0.400	0.400	0.400	0.420	0.420	0.420	0.480	0.480	0.480	0.480	0.480	0.480	0.480
67	0.400	0.400	0.400	0.420	0.420	0.420	0.480	0.480	0.480	0.480	0.480	0.480	0.480
68	0.400	0.400	0.400	0.420	0.420	0.420	0.480	0.480	0.480	0.480	0.480	0.480	0.480

* Expressed in completed years calculated at the beginning of the calendar year.

Table 2F

Assumed Rates of Termination due to Disability

Age*	Male	Female
21	0.0002	0.0000
22	0.0002	0.0000
23	0.0002	0.0001
24	0.0002	0.0002
25	0.0002	0.0002
26	0.0002	0.0003
27	0.0002	0.0003
28	0.0002	0.0004
29	0.0002	0.0004
30	0.0003	0.0004
31	0.0003	0.0005
32	0.0003	0.0005
33	0.0003	0.0005
34	0.0004	0.0006
35	0.0004	0.0006
36	0.0005	0.0007
37	0.0005	0.0008
38	0.0006	0.0009
39	0.0008	0.001
40	0.0009	0.0012
41	0.0011	0.0014
42	0.0013	0.0016
43	0.0015	0.0019
44	0.0018	0.0023
45	0.0022	0.0028
46	0.0026	0.0033
47	0.0032	0.0039
48	0.0039	0.0047
49	0.0047	0.0055
50	0.0056	0.0064
51	0.0066	0.0074
52	0.0077	0.0084
53	0.0088	0.0094
54	0.0100	0.0104
55	0.0113	0.0114
56	0.0125	0.0123
57	0.0138	0.0132
58	0.0151	0.0140

* Expressed in completed years calculated at the beginning of the calendar year.

Table 2G

Sample of Assumed Mortality Rates Deemed Applicable in 1993

	Current Contributors		Former Contributors (other than disabled)		Former Contributors (disabled)		Surviving Spouses	
Age*	Male	Female	Male	Female	Male	Female	Male	Female
25	.0008	.0004	.0005	.0003	.0064	.0075	.0014	.0005
30	.0008	.0005	.0007	.0004	.0095	.0080	.0013	.0005
35	.0009	.0006	.0010	.0005	.0126	.0084	.0016	.0008
40	.0011	.0009	.0014	.0007	.0155	.0091	.0022	.0011
45	.0018	.0013	.0024	.0011	.0185	.0101	.0037	.0019
50	.0029	.0021	.0042	.0019	.0214	.0117	.0063	.0031
55	.0060	.0030	.0066	.0029	.0241	.0138	.0104	.0048
60	.0088	.0046	.0100	.0048	.0291	.0169	.0163	.0073
65	.0142	.0075	.0172	.0080	.0395	.0220	.0257	.0113
69	.0210	.0111	.0271	.0126	.0532	.0282	.0361	.0163
75	-	-	.0487	.0276	.0756	.0440	.0596	.0291
80	-	-	.0808	.0488	.1009	.0687	.0898	.0491
85	-	-	.1254	.0789	.1413	.1179	.1334	.0824
90	-	-	.1827	.1265	.2124	.1841	.2030	.1386
95	-	-	.2592	.2070	.3193	.2873	.3088	.2331
100	-	-	.3558	.3343	.4801	.4486	.4698	.3922
105	-	-	.6317	.6145	.7217	.7002	.7148	.6597
109	-	-	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

See table 2H below for a sample of assumed longevity improvement factors.

* Expressed in completed years calculated at the beginning of the calendar year.

Table 2H

Sample of Assumed Longevity Improvement Factors

Age*	Annual % Reduction in 1993 Assumed Mortality Rates	
	Male	Female
25	.10	.50
30	.50	.75
35	.75	1.25
40	1.00	1.75
45	1.50	1.75
50	1.50	1.50
55	1.30	1.50
60	1.30	1.50
65	1.30	1.50
70	1.25	1.50
75	1.25	1.45
80	1.20	1.45
85	.90	1.05
90	.55	.70
95	.10	.30
100	.00	.00
105	.00	.00
109	.00	.00

* Expressed in completed years calculated at the beginning of the calendar year.

Table 2I

Assumed Proportions of Contributors Married at Death and Assumed Average Age of the Surviving Spouse

Age* of deceased Contributor	Proportion Married Current Contributors		Proportion Married Former Contributors		Average Age* of Surviving Spouse	
	Male	Female	Male	Female	Male	Female
25	.528	.550	.363	.550	26	24
30	.607	.550	.503	.550	32	29
35	.687	.550	.610	.550	37	33
40	.763	.550	.692	.550	42	38
45	.791	.550	.760	.550	47	43
50	.811	.550	.814	.550	53	48
55	.840	.550	.852	.550	58	53
60	.848	.500	.870	.500	62	57
65	.796	.452	.859	.452	66	62
69	.758	.402	.822	.402	70	66
75	-	-	.716	.305	74	71
80	-	-	.596	.211	79	75
85	-	-	.483	.120	82	79
90	-	-	.383	.051	86	84
95	-	-	.307	.013	88	88
100	-	-	.225	.001	92	92
105	-	-	.009	.000	96	99
109	-	-	.000	.000	-	-

* Expressed in completed years calculated at the beginning of the calendar year.

Table 2J

Assumed Number and Average Age of Children at Death of Contributor

Age* of deceased Contributor	Average Number of Children: Male Contributors	Average Number of Children: Female Contributors	Average Age* of Children: Male Contributors	Average Age* of Children: Female Contributors
25	.522	.323	2	1
30	.901	.575	5	5
35	1.177	.763	8	10
40	1.298	.810	11	13
45	1.049	.636	14	16
50	.679	.346	16	17
55	.397	.130	17	18
60	.182	.029	18	19
65	.064	.007	19	21
70	.022	.005	21	23
75	.009	.000	23	n/a
80	.000	.000	n/a	n/a

Assumed Proportions of Children
Remaining Eligible (on account of school attendance)
for Allowances Throughout the Following Year

Age*	Proportion
17	0.680
18	0.730
19	0.790
20	0.780
21	0.735
22	0.695
23	0.630
24	1.000

* Expressed in completed years calculated at the beginning of the calendar year.

APPENDIX 3

Summaries of Data

Table 3A

Reconciliation of Current Contributors

	Male	Female	Total
At 31 December 1989*	183,157	129,965	313,122
New Members	35,119	44,024	79,143
Reinstatement to current contributor status	940	1,251	2,191
Subtotal	219,216	175,240	394,456
Terminations			
Return of contributions**			
- less than five years of pensionable service	(14,413)	(20,149)	(34,562)
- at least five years of pensionable service	(5,245)	(6,257)	(11,502)
Deferred annuity or deferred annual allowance	(926)	(649)	(1,575)
Disability annuity	(1,267)	(787)	(2,054)
Annuity or annual allowance (except disabled)	(15,598)	(5,944)	(21,542)
Option not yet chosen	(2,585)	(2,869)	(5,454)
Terminations that subsequently returned to current contributor status	(916)	(1,236)	(2,152)
Death with survivor annual allowance	(783)	(216)	(999)
Subtotal of terminations	(41,733)	(38,107)	(79,840)
At 31 December 1992	177,483	137,133	314,616
- non-contributory status only	2,266	5,427	7,693
- contributory status only	175,217	131,706	306,923

* Includes those in both contributory and non-contributory statuses.

** With respect to terminations with at least five years of pensionable service, return of contributions includes cash termination allowances in case of disability, or minimum pension guarantee in case of death with no survivors.

Table 3B

Reconciliation of Former Contributors

	Deferred annuity or Deferred AA*			Disability annuity			Annuity or AA*		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
At 31 December 1989	2,876	1,555	4,431	7,457	3,780	11,237	81,969	31,877	113,846
Transfer from current contributor	926	649	1,575	1,267	787	2,054	15,598	5,944	21,542
Transfer from deferred status	n/a	n/a	n/a	13	5	18	405	209	614
Transfer from disabled status	14	7	21	n/a	n/a	n/a	0	0	0
Transfer to current contributor status	(1)	0	(1)	0	0	0	(23)	(15)	(38)
Transfer to deferred status	n/a	n/a	n/a	(14)	(7)	(21)	0	0	0
Transfer to disabled status	(13)	(5)	(18)	n/a	n/a	n/a	0	0	0
Transfer to annuity or AA* status	(405)	(209)	(614)	0	0	0	n/a	n/a	n/a
Death with no survivors	(17)	(5)	(22)	(356)	(270)	(626)	(3,080)	(2,305)	(5,385)
Death with survivors	(21)	(3)	(24)	(827)	(81)	(908)	(6,492)	(311)	(6,803)
At 31 December 1992	3,359	1,989	5,348	7,540	4,214	11,754	88,377	35,399	123,776

* AA stands for Annual Allowance

Table 3C

Reconciliation of Survivors

	Surviving Spouses			Children and Students		
	Widows	Widowers	Total	Children	Students	Total
At 31 December 1989	42,047	1,158	43,205	1,591	1,446	3,037
New survivors from current contributors	735	190	925	573	244	817
New survivors from former contributors	7,308	392	7,700	146	182	328
Surviving spouses' deaths	(5,219)	(147)	(5,366)	n/a	n/a	n/a
Children attaining age 18 and terminating	n/a	n/a	n/a	(154)	n/a	(154)
Children attaining age 18 and becoming students	n/a	n/a	n/a	(681)	681	0
Students terminating	n/a	n/a	n/a	n/a	(1,314)	(1,314)
At 31 December 1992	44,871	1,593	46,464	1,475	1,239	2,714

Table 3D

Number and Average Salary Rate of Male Active Contributors on 31 December 1992

Age*	Years of Service* 0-4	5-9	10-14	15-19	20-24	25-29	30-34	35 and over	All Years of Service
to 24	2,884 $32,429	40 36,318							2,924 $32,483
25-29	9,994 $35,659	2,399 38,293	212 38,764						12,605 $36,213
30-34	9,140 $38,038	7,049 40,930	5,723 40,800	473 38,685					22,385 $39,669
35-39	6,373 $39,475	6,130 42,681	10,048 43,937	9,142 41,183	508 42,960				32,201 $42,017
40-44	4,421 $41,437	4,011 44,050	6,537 46,191	13,068 46,569	7,417 47,303	662 44,703			36,116 $45,709
45-49	3,146 $42,830	2,606 45,619	3,555 47,328	6,493 50,097	7,678 53,112	6,067 47,319	396 49,947		29,941 $48,823
50-54	1,802 $43,132	1,817 45,036	2,165 45,912	3,240 48,224	3,598 54,994	4,991 52,282	3,000 49,526	453 49,514	21,066 $49,607
55-59	1,041 $44,167	1,264 42,823	1,803 43,408	2,062 44,748	1,809 51,451	2,174 53,387	1,381 53,895	682 51,724	12,216 $48,255
60-64	449 $46,371	614 43,324	921 42,636	1,098 43,884	768 50,722	715 51,681	415 54,451	307 58,074	5,287 $47,514
65+	37 $44,968	55 61,076	64 54,408	91 53,858	89 57,262	57 62,914	42 61,243	41 56,481	476 $56,674
All ages combined	39,287 $38,518	25,985 42,523	31,028 44,276	35,667 45,707	21,867 51,011	14,666 50,063	5,234 51,195	1,483 52,495	175,217 $44,618

Average age last birthday = 42.2 Average pensionable service = 13.2 completed years

* Expressed in completed years.

Table 3E

Number and Average Salary Rate of Female Active Contributors on 31 December 1992

	Years of Service*								
Age*	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35 and over	All Years of Service
to 24	4,498 29,414	108 31,642							4,606 $29,466
25-29	11,299 $32,936	3,470 34,420	504 33,432						15,273 $33,290
30-34	9,209 $34,013	6,349 37,477	6,891 35,637	883 36,057					23,332 $35,513
35-39	7,501 $33,672	5,184 38,112	7,191 38,841	6,817 37,698	764 38,722				27,457 $37,004
40-44	5,718 $33,573	4,214 36,810	5,014 38,636	5,588 41,985	3,548 41,121	525 39,063			24,607 $38,275
45-49	3,599 $32,894	2,953 36,353	3,629 37,226	3,070 40,528	1,959 44,379	1,536 40,760	219 39,896		16,965 $37,933
50-54	1,682 $32,798	1,703 35,004	2,353 34,609	2,184 37,471	1,232 40,431	713 42,155	594 39,195	137 39,831	10,598 $36,484
55-59	697 31,970	776 33,333	1,412 33,305	1,544 34,586	841 36,785	492 39,191	218 38,478	154 37,676	6,134 $34,722
60-64	244 33,872	310 33,651	583 32,992	673 35,064	353 36,649	181 36,745	86 41,497	71 37,032	2,501 $34,912
65+	18 $33,275	38 39,866	36 35,358	52 37,927	32 37,852	19 47,413	15 42,822	23 37,531	233 $38,526
All Ages combined	44,465 $32,990	25,105 36,577	27,613 36,922	20,811 38,858	8,729 40,934	3,466 40,394	1,132 39,416	385 38,316	131,706 $36,217

Average age last birthday = 39.3 Average pensionable service = 9.6 completed years

* Expressed in completed years.

Table 3F

Former Contributors as at 31 December 1992
Other Than Disability Pensioners

Immediate Pensioners

Age**	Number of Pensioners: Male	Female	Total	Annual Pension*: Basic ($)	Supplementary*** ($)
35-39	4	0	4	20,980	2,748
40-44	23	2	25	251,038	31,740
45-49	24	0	24	337,186	40,872
50-54	1,485	803	2,288	32,073,575	2,142,756
55-59	8,134	2,793	10,927	214,520,629	22,701,768
60-64	15,301	5,583	20,884	334,009,501	65,199,348
65-69	20,847	8,317	29,164	310,914,512	117,989,136
70-74	21,419	7,480	28,899	238,297,251	180,581,880
75-79	12,614	5,244	17,858	99,011,701	143,901,876
80-84	5,702	3,096	8,798	33,129,589	77,046,396
85-89	2,110	1,434	3,544	9,420,941	28,630,776
90-94	571	514	1,085	2,262,630	7,725,132
95-99	132	118	250	438,751	1,669,308
100-104	10	15	25	43,245	181,620
105-109	1	0	1	1,546	6,588
Total	88,377	35,399	123,776	1,274,733,075	647,851,944

Deferred Pensioners

Age**	Number of Pensioners: Male	Female	Total	Annual Pension: Basic ($)	Supplementary*** ($)
25-29	5	1	6	22,859	1,592
30-34	35	43	78	347,712	42,952
35-39	136	161	297	1,792,255	279,355
40-44	443	368	811	6,495,837	1,399,474
45-49	1,001	528	1,529	15,542,842	3,413,529
50-54	1,030	503	1,533	15,394,949	4,770,751
55-59	709	385	1,094	7,597,341	4,085,344
Total	3,359	1,989	5,348	47,193,795	13,992,997

* Amounts of pension account for the integration of the PSSA with the C/QPP.

** Expressed in completed years.

*** Accumulated indexing includes increase effective 1 January 1993.

Table 3G

Former Contributors as at 31 December 1992
Disability Pensioners

Age**	Number of Pensioners: Male	Female	Total	Annual Pension*: Basic ($)	Supplementary*** ($)
25-29	1	1	2	3,091	36
30-34	17	28	45	135,217	12,024
35-39	62	106	168	683,402	84,048
40-44	188	188	376	1,993,645	260,964
45-49	372	244	616	3,991,948	568,356
50-54	690	389	1,079	8,953,992	1,386,288
55-59	1,194	670	1,864	15,981,673	3,652,332
60-64	1,558	755	2,313	15,196,268	6,665,736
65-69	1,435	626	2,061	9,280,689	9,838,272
70-74	1,286	563	1,849	6,061,851	11,117,136
75-79	541	384	925	2,151,099	5,752,296
80-84	141	173	314	648,498	2,108,820
85-89	41	56	97	173,014	636,072
90-94	8	24	32	37,290	158,076
95-99	6	6	12	14,007	56,724
100-104	0	1	1	1,332	2,172
Total	7,540	4,214	11,754	65,307,016	42,299,352

* Amounts of pensions account for the integration of the PSSA with the C/QPP.

** Expressed in completed years.

*** Accumulated indexing includes increase effective 1 January 1993.

Table 3H

Surviving Spouses Eligible for, and Amount of, Allowances as at 31 December 1992

Age*	Widows Number	Widows Basic ($)	Widows Supplementary** ($)	Widowers Number	Widowers Basic ($)	Widowers Supplementary** ($)
20-24	1	3,336	564	0	0	0
25-29	14	42,537	5,280	3	7,133	672
30-34	69	225,736	35,544	9	17,690	1,992
35-39	231	853,438	171,672	34	99,894	18,396
40-44	427	1,887,650	537,576	75	223,967	48,336
45-49	695	3,369,713	1,132,848	85	263,802	58,140
50-54	1,122	5,648,268	2,286,420	98	339,177	70,968
55-59	1,906	9,081,607	4,509,132	168	660,266	178,416
60-64	4,076	17,473,136	11,966,316	216	789,152	305,988
65-69	7,508	26,975,215	27,129,792	296	979,156	485,256
70-74	9,522	27,056,003	40,143,300	310	877,900	601,812
75-79	8,010	17,456,559	36,078,060	193	446,369	384,384
80-84	5,685	9,400,651	25,437,444	72	133,530	166,728
85-89	3,409	4,374,274	14,198,928	27	56,223	65,520
90-94	1,614	1,686,975	6,205,800	6	13,236	18,216
95-99	519	468,983	1,886,292	1	248	816
100-104	56	53,472	219,048	0	0	0
105-109	7	10,139	26,688	0	0	0
Total	44,871	126,067,692	171,970,704	1,593	4,907,743	2,405,640

* Expressed in completed years.

** Accumulated indexing includes increases effective 1 January 1993.

APPENDIX 4

Reconciliation of the Surplus/(Deficit) and Normal Cost

The table below shows the main factors reconciling the overall change in the excess of assets over liabilities, and in the normal cost, between the last valuation date (31 December 1989) and this one. Figures in brackets indicate negative amounts. Main items in the table below are explained in the following pages.

	Surplus/(Deficit) ($ millions)	Normal Cost (% of pensionable payroll)
At 31 December 1989	(2,411.6)	13.16 (for 1990)
Data corrections and assumption refinements	(386.7)	0.11
Interest on revised starting deficit	(922.9)	--
Increase in previous valuation's normal cost from 1990 to 1993	--	2.49
Cost/contributions difference	(668.0)	--
Change in demographic characteristics of current contributors	25.5	(0.35)
Indexation payments charged to Consolidated Revenue Fund	940.9	--
Work force adjustment	(94.8)	--
Privatizations	(50.1)	--
Other experience gains and losses	1,693.0	--
Effect of changes in assumptions	9,047.2	(2.88)
At 31 December 1992	7,172.5	12.53 (for 1993)

Explanations of the Above Reconciliation

A- Data Corrections and Methodology Refinements

The correction of errors (such as coding of status) in the data used for the previous valuation resulted in a decrease in the surplus of $283.7 million and an increase in normal cost of 0.5%.

Demographic assumptions, which used to be expressed on an age and years of service *nearest* basis, are now expressed on a *last* basis. This conversion, in conjunction with other refinements, resulted in a decrease of $103.0 million in the surplus and an increase of 0.06% in the normal cost. This conversion was effected to refine estimates which, among other things, are very sensitive, particularly at ages around 60, to variations in rates of vested termination for reasons other than death or disability.

The aggregate effect of the above two changes is a decrease of $386.7 million in the surplus and an increase of 0.11% in the normal cost.

B- Interest on the Revised Starting Deficit

The deficit was increased by $922.9 million as a result of accruing interest payments on the initial deficit revised for the amount of $283.7 million mentioned in the previous paragraph. The amount of expected interest for the three years to 31 December 1992 was computed using the interest rate assumed for the 1989 valuation report.

C- Effect, on the Normal Cost, of Lower Assumed New Money Interest Rates

Under the previous report, the normal cost estimated for 1993 exceeds by 2.49% that estimated for 1990.

D- Cost/Contributions Difference

A decrease in the surplus of $668.0 million resulted from the actual government contributions in the 1990-1992 period having been less than that corresponding to the government portion of the normal cost shown in the previous report cost certificate. The amount of $668.0 million includes interest accumulation on that difference.

E- Change in Demographic Characteristics of Current Contributors

A decrease in the normal cost of 0.35% of pensionable payroll has resulted from the differences between actual 1989 and 1992 year-end memberships regarding age distribution, proportion of female members, distribution of years of service and distribution of salaries relative to the YMPE. An increase of $25.5 million in the surplus resulted due to the differences between the actual and expected benefits accrued during the intervaluation period.

F- Indexation Payments Charged to the Consolidated Revenue Fund

Supplementary retirement (indexation) benefits (SRB) payable in excess of accumulated contributions (including interest) by and in respect of members made to the SRB Account were charged directly to the Consolidated Revenue Fund until 31 March 1991. Because these benefits were not paid from the SRB Account, the pension plan gained $940.9 million, and the surplus increased by the same amount.

G- Work Force Adjustment

Under the PSSA, the Treasury Board may waive the whole or any part of the annual allowance reduction in respect of a member who meets the following criteria:

- at least 55 years in age;
- involuntary termination; and
- a minimum of 10 years of employment in the Public Service.

This provision was applied during the intervaluation period in respect of less than 10% of the number of terminations entitling members to immediate annuities (not due to disability) or to annual allowances.

Assumed termination rates were not adjusted in connection with these recent developments because they were deemed not indicative of future expected experience. Similarly, the projected amount of allowances were not adjusted.

H- PSSA Privatizations

The government privatized numerous organizations during the intervaluation period. These include Yukon College, Petro-Canada, airports {Montreal (Mirabel & Dorval), Vancouver, Calgary, Edmonton}, Rideau Veteran's Hospital, Nordion, and Theratronics. In addition, some Revenue Canada (Customs and Excise) employees became employees of the Québec civil service due to transferring the administration of the GST to Québec. Members working for a privatized organization may choose to leave his/her accrued benefits with the PSSA, in which case future service with the privatized organization also counts for eligibility for annual allowance benefits, or to transfer the value of accrued benefits to the privatized organization's pension plan, such value being subject to a minimum of twice the employee past contributions accumulated with interest at the historical PSS Account rates of return.

Assumed termination rates were not adjusted to reflect these recent developments because they were deemed not indicative of future expected experience. The same approach had been applied for the previous valuation.

I- Other Experience Gains and Losses and Effect of Changes in Assumptions

The table below summarizes the analysis of the effect on the surplus and the normal cost of other experience gains and losses (actual experience during the three-year intervaluation period being different from that expected in the valuation report as at 31 December 1989) and of other changes in assumptions. Figures in brackets indicate decreases in the surplus or normal cost. Each item in the table below is explained in the following pages.

Components of Item I-
Other experience Gains and Losses and Effect of Changes in Assumptions

	Surplus/(Deficit) ($ millions)	Normal Cost (% of pensionable payroll)
▸ **Economic Experience**		
Interest earnings	1,319.0	--
Pension indexing	282.6	--
Average salary and YMPE increases	470.0	--
▸ **Demographic Experience**		
Promotional salary increases	(300.0)	--
Nonvested terminations	1.0	--
Vested terminations (other than deaths and disabilities)	(115.8)	--
Termination elections (see Table 2D)	(6.4)	--
Disabled eligible for immediate C/QPP	4.9	--
Vested terminations due to disability	11.6	--
Mortality	(12.5)	--
Surviving spouses*	17.6	--
Miscellaneous	21.0	--
Total Experience Gains and Losses	1,693.0	--
Effect of changes in assumptions		
▸ **Economic Assumptions**		
Margin	4,845.3	(1.92)
Select period	2,914.7	0.11
Real interest	1,318.4	(0.86)
Real average salary increase		98.3(0.10)
▸ **Demographic Assumptions**		
Nonvested terminations	(3.7)	0.01
Vested terminations (other than death, disability)	(224.5)	(0.05)
Termination elections (see Table 2D)	(0.6)	--
Disabled eligible for immediate C/QPP	23.8	(0.02)
Mortality (for base year 1993)	148.2	(0.04)
Surviving spouses* (143.9)	0.06	
Integration with C/QPP	71.2	(0.07)
Total Effect Due to Changes to Assumptions	9,047.2	(2.88)

* Proportion of contributors married at death and average age of spouse at contributor's death.

1. Economic Experience and Assumptions

During the intervaluation period, interest credited to the PSS Account was in excess of that assumed. This excess accounted for an increase in the surplus of $1,319.0 million. An increase in the surplus of $282.6 million resulted from pension indexing increases less than assumed. An increase in the surplus of $470.0 million resulted mainly from YMPE increases that were greater than expected.

The change in the margin against adverse fluctuations from a reduction of the relevant projected fund yields by one percentage point but not below the ultimate yield, to an increase of a quarter of a percentage point of the pension indexing factors, resulted in an increase of the surplus of $4,845.3 million and in a reduction of the normal cost of 1.92% of pensionable payroll.

The change in the select period economic assumptions resulted in an increase of the surplus of $2,914.7 million and an increase in the normal cost of 0.11%.

The change in the ultimate real rate of interest from 2.5% to 3.0% resulted in an increase of the surplus of $1,318.4 million and a decrease in the normal cost of 0.86%.

The change in ultimate productivity gains from 1.2% to 1.0% resulted in an increase of the surplus of $98.3 million and a decrease in the normal cost of 0.10%.

The total effect of the changes in economic assumptions resulted in a gain of $9,176.70 million and a decrease in the normal cost of 2.77% of pensionable payroll.

2. Demographic Experience and Assumptions

- **Seniority and Promotional Salary Increases**
  The experience with respect to seniority and promotional salary increases during the three-year intervaluation period resulted in an experience loss of $300.0 million, due to salary increases being greater than expected. The loss is mostly attributable to promotions being greater than expected, the balance due to the late reporting of salaries.
- **Nonvested Terminations**
  The experience during the three-year intervaluation period resulted in an experience gain of $1.0 million. The change in assumptions resulted in an increase in liability of $3.7 million and an increase in normal cost of 0.01% of pensionable payroll.
- **Vested Terminations for Reasons Other Than Disability or Death**
  The experience during the three-year intervaluation period resulted in an experience gain of $4.6 million. The following table shows the further analysis of the cause of the net experience gain.

Termination Rate Assumption	Surplus ($ millions)
Prior to age 55, or prior age to 60 with less than 30 years service	(158.0)
From age 60, or from age 55 with at least 30 years of service	(42.2)
Total	(115.8)

Moreover, as described in section IV, some assumptions were changed from the previous valuation. This includes moving the contributors age 50 and over with at least 25 years of pensionable service from the former to the new assumption. The following table shows the effect of the changes in the assumptions.

Assumption changed	Surplus/(Deficit) ($ millions)	Normal Cost (%)
Contributors aged 50+ with 25+ years of service	(440.3)	0.20
Other	215.8	(0.25)
Total	(224.5)	(0.05)

- **Proportions of Terminating Contributors Electing to Take a Deferred Annuity or Annual Allowance**
  The experience during the three-year intervaluation period resulted in an experience loss of $6.4 million. This excludes the effect of privatizations. The change in assumptions caused an increase in liabilities of $0.6 million and an insignificant effect on the normal cost.
- **Vested Terminations Due to Disability**
  The experience during the three-year intervaluation period was more favourable than expected and resulted in a gain of $11.6 million.
- **Disabled Eligible for Immediate C/QPP**
  The experience in respect of newly emerged disabled pensioners who were eligible for immediate C/QPP disability benefits showed an experience gain of $4.9 million. The change in assumption from 70% to 80% resulted in a decrease in liabilities of $23.8 million and a decrease in normal cost of 0.02%.
- **Mortality**
  The following table breaks down the changes in the surplus due to the difference between the actual and expected mortality during the three-year intervaluation period.

Group	Surplus/(Deficit) ($ millions)
Current contributors	(7.0)
Former contributors (other than disabled)	(14.6)
Former contributors (due to disability)	9.2
Surviving spouses	(0.1)
Total	(12.5)

The following table breaks down the changes in the excess of assets over liabilities and the normal cost due to changes in assumed mortality rates deemed to apply in 1993.

Group	Surplus/(Deficit) ($ millions)	Normal Cost (%)
Former contributors (other than disabled)	69.4	(0.02)
Former contributors (due to disability)	12.9	(0.01)
Surviving Spouses	65.9	(0.01)
Total	148.2	(0.04)

- **Proportion of Contributors Married at Death and Average Age of Spouse**
  The difference between the related actual and expected results during the three-year intervaluation period produced a net gain of $17.6 million.

  The following table breaks down the effect on the excess of assets over liabilities and the normal cost stemming from changes in the assumed proportions of contributors married at death and average age of surviving spouse at death of contributor.

Assumption	Surplus/(Deficit) ($ millions)	Normal Cost (%)
Proportion married at death	(162.1)	0.07
Average age of spouse	18.2	(0.01)
Total	(143.9)	0.06

- **Integration with C/QPP**
  The changes in the related methodology and assumptions have produced an increase of $71.2 million in the surplus and a decrease of 0.07% in the normal cost.

- **Miscellaneous**
  This item includes all other demographic factors of lesser importance. The effect on the surplus was an increase of $21.0 million.