



Case Study

FALL 2019/SPRING 2020

Retirement Funding & Regulation Exam
EXAM RETFRC

Case Study - Course FR Retirement - Canada

Company Background

Domestic Packaging Company Limited ("DPC") is a large well-established provider of consumer packaging, industrial products and packaging supply chain services in Canada. DPC has been in existence for over 100 years and has more than 3,000 full-time and part-time employees. All DPC's employees are reporting to work in the province of Ontario.

Canadian legislation and social programs will apply to DPC in this case study.

DPC sponsors the Pension Plan for Employees of DPC Limited (the "DPC Plan"), a final-average pay defined benefit registered pension plan for its full-time and part-time employees. The Plan is registered with the Financial Services Commission of Ontario and with Canada Revenue Agency.

The most recent valuation for funding purposes was prepared as at January 1, 2019 and was filed with the regulators. The prior valuation for funding purposes was prepared as at January 1, 2017.

The following pages contain extracts from the January 1, 2019 valuation report for funding purposes.

Case Study - Course FR Retirement - Canada

Summary of DPC Plan provisions

Eligibility	Immediate
Vesting	Immediate
Employee Contributions	Employee contributions are neither required nor permitted
Normal Retirement Age	65
Early Retirement Age	55
Best Average Earnings	Average annual earnings during 60 consecutive months in which earnings were highest
Earnings	Base pay, excluding overtime and bonuses
Benefit formula	1.5% of best average earnings times years of service, subject to legislative maximum
Early Retirement Benefit	Accrued benefit reduced by 0.25% per month that early retirement precedes age 62 for active participants and actuarial equivalent for deferred vested participants
Bridge Benefit	\$20 per month times all years of service for retirements from active status. The bridge benefit is payable starting from age 55 and ceases at earlier of death and age 65
Post-Retirement Indexing	Lifetime pension is increased by the lesser of 1% or CPI each year after pension commencement
Termination Benefit	(1) Lump sum value equal to actuarial present value of accrued pension payable at age 65; or (2) Deferred pension
Pre-Retirement Indexing	No pre-retirement indexing is provided
Pre-Retirement Death Benefit	Lump sum value equal to actuarial present value of accrued pension payable at age 65 to named beneficiary
Disability Benefit	Accrual of service while on long term disability and immediate pension without a reduction upon permanent and total disability
Form of Benefit	(1) If member has a spouse at date of retirement: 60% joint & survivor; (2) If member does not have a spouse at date of retirement: life guaranteed for 5 years
Optional Forms of Benefit	At DPC's discretion, on an actuarial equivalent basis

Case Study - Course FR Retirement - Canada
Going Concern Valuation Results

Going Concern Valuation - January 1 (numbers in \$000's)

	2019	2017
1. Liabilities:		
(a) Active participants	727,366	651,434
(b) Deferred vested participants	13,512	11,191
(c) Pensioners and beneficiaries	413,313	372,919
(d) Total	1,154,191	1,035,544
2. Assets:		
(a) Market value of assets	1,237,947	1,145,371
(b) Asset smoothing adjustment	43,604	(5,449)
(c) Actuarial value of assets	1,281,551	1,139,922
3. Actuarial Surplus (Shortfall): (2c)-(1d)	127,360	104,378
4. Provision for Adverse Deviations (PfAD)		
(a) PfAD percentage	7.60%	N/A
(b) Going concern liabilities subject to PfAD	1,043,463	
(c) PfAD on liabilities	79,303	N/A
5. Going Concern Excess (Unfunded Liability): (3)-(4)	48,057	104,378
6. Normal Cost (beginning of year):		
(a) Normal cost	42,705	46,871
(b) Normal cost subject to PfAD	38,335	
(c) PfAD on normal cost	2,913	
(d) Normal cost including PfAD	45,618	46,871
7. Normal Cost including PfAD as percentage of pay:		
(a) Pensionable earnings in the following year	222,726	232,115
(b) Percent of pensionable earnings	20.5%	20.2%
8. Actuarial Basis:		
(a) Discount rate	5.25% per year	5.00% per year
(b) Salary scale	3.5% per year	3.5% per year
(c) Inflation	2% per year	2% per year
(d) Mortality rates	100% of the rates of the 2014 Private Sector Canadian Pensioners Mortality Table (CPM_Priv)	
(e) Mortality improvements	Fully generational using CPM-B Improvement Scale	
(f) Termination scale	Ontario medium termination table	
(g) Retirement scale	50% of active participants retire at age 55. The other active participants retire at age 62 or attained age if older. Deferred vested participants retire at age 65.	
(h) Proportion with spouse and age difference	90% assumed to have a spouse at retirement. Spouse has same age as member.	
(i) Expenses	Implicit in the discount rate	
(j) Asset Valuation Method	Realized and unrealized capital gains/(losses) are spread on a straight line basis over 5 years	
(k) Actuarial Cost Method	Projected Unit Credit	

Case Study - Course FR Retirement - Canada
Solvency Valuation Results

Solvency Valuation - January 1 (numbers in \$000's)

	2019	2017
<i>1. Liabilities:</i>		
(a) Active participants	858,934	729,613
(b) Deferred vested participants	21,871	15,955
(c) Pensioners and beneficiaries	467,368	413,704
(d) Total	1,348,173	1,159,272
<i>2. Assets:</i>		
(a) Market value of assets	1,237,947	1,145,371
(b) Estimated termination expenses	(1,000)	(1,000)
(c) Net assets	1,236,947	1,144,371
<i>3. Solvency Excess (Shortfall): (2c)-(1d)</i>	(111,226)	(14,901)
<i>4. Actuarial Basis:</i>		
(a) Interest - Benefits settled by lump sum payment	2.8% per year for 10 years, 3.2% per year thereafter	2.3% per year for 10 years, 3.7% per year thereafter
(b) Interest - Benefits settled by annuity purchase	3.2% per year	3.1% per year
(c) Mortality	CPM2014 Combined - Generational with Scale CPM-B	CPM2014 Combined - Generational with Scale CPM-B
(d) Retirement age	Age that produces the highest commuted value	
(e) Proportion with spouse and age difference	Same as for going concern	
(f) Excluded Benefits	Post-retirement indexing	
(g) Asset Valuation Method	Market value	
(h) Actuarial Cost Method	Traditional Unit Credit	

Case Study - Course FR Retirement - Canada

Wind-Up Valuation Results

Wind-up Valuation - January 1 (numbers in \$000's)

	2019	2017
1. Liabilities:		
(a) Active participants	977,204	827,215
(b) Deferred vested participants	24,623	17,895
(c) Pensioners and beneficiaries	519,477	456,970
(d) Total	1,521,304	1,302,080
2. Assets:		
(a) Market value of assets	1,237,947	1,145,371
(b) Estimated termination expenses	(1,000)	(1,000)
(c) Wind-up assets	1,236,947	1,144,371
3. Wind-Up Excess (Shortfall): (2c)-(1d)	(284,357)	(157,709)
4. Wind-Up Incremental Cost:	251,842	250,975
5. Actuarial Basis:		
(a) Interest - Benefits settled by lump sum payment	2.8% per year for 10 years, 3.2% per year thereafter	2.3% per year for 10 years, 3.7% per year thereafter
(b) Interest - Benefits settled by annuity purchase	3.2% per year	3.1% per year
(c) Post-retirement indexing	1% per year	1% per year
(d) Mortality	CPM2014 Combined - Generational with Scale CPM-B	CPM2014 Combined - Generational with Scale CPM-B
(e) Retirement age	Age that produces the highest commuted value	
(f) Proportion with spouse and age difference	Same as for going concern	
(g) Asset Valuation Method	Market value	
(h) Actuarial Cost Method	Traditional Unit Credit	

Case Study - Course FR Retirement - Canada
Discount Rate Sensitivity and Information on Plan Assets

Discount Rate Sensitivity at 1.1.2019 (numbers in \$000's)

	Valuation Basis	Discount rate(s) reduced by 1%
Total Going Concern Liability	1,154,191	1,330,088
Total Normal Cost	42,705	51,927
Total Wind-Up Liability	1,521,304	1,772,819

Plan Assets (numbers in \$000's)

	2015	2016	2017	2018
Market Value of Assets at January 1	1,040,227	1,067,285	1,145,371	1,255,927
Employer Contributions during the year	40,325	41,736	47,058	48,827
Benefit Payments during the year	(37,213)	(41,621)	(38,807)	(36,517)
Expenses during the year	(6,585)	(7,553)	(7,942)	(7,456)
Investment return during the year	30,531	85,524	110,247	(22,834)
Market Value of Assets at December 31	1,067,285	1,145,371	1,255,927	1,237,947
Net Rate of Return (ROR) during the year	2.3%	7.3%	8.9%	-2.4%
<i>Target asset allocation at December 31:</i>				
(a) Canadian Equities	20%	20%	20%	20%
(b) U.S. Equities	20%	20%	20%	20%
(c) International Equities	16%	16%	16%	16%
(d) Canadian Long-Term Bonds	20%	20%	20%	20%
(e) Canadian Universe Bonds	20%	20%	20%	20%
(f) Cash	4%	4%	4%	4%
(g) Total	100%	100%	100%	100%

Case Study - Course FR Retirement - Canada
Information on Plan Membership

Reconciliation of Plan Participants (2017 - 2018)

	Active	Deferred	Pensioners/ Beneficiaries	Total
Participants as of January 1, 2017	3,632	252	1,336	5,220
- New Entrants/Rehires	256			256
- Terminated and paid-out	(110)	(75)		(185)
- Terminated - deferred pension	(95)	95		
- Retirement	(285)	(24)	309	
- Death	(8)		(210)	(218)
- Beneficiaries			102	102
Participants as of January 1, 2019	3,390	248	1,537	5,175

Summary of Membership Data

	1.1.2019	1.1.2017
Active participants		
Number	3,390	3,632
Average age	50.4	49.8
Average annual pensionable earnings	63,479	61,747
Average credited service	15.5	12.9
Deferred vested participants		
Number	248	252
Average age	46.5	43.5
Average annual deferred pension	8,047	7,232
Pensioners /Beneficiaries		
Number	1,537	1,336
Average age	71.7	73.1
Average annual lifetime pension	20,142	23,898
Average annual bridge pension	683	784

Age/Svc/Earnings as of January 1, 2019

Age (complete years)			Service (complete years)					Totals
			< 5	5-9	10-14	15-19	>19	
< 25	# Participants	20	-	-	-	-	20	
	Average Salary	41,788	-	-	-	-	41,788	
25-34	# Participants	123	83	-	-	-	206	
	Average Salary	45,810	55,543	-	-	-	49,732	
35-44	# Participants	151	302	226	77	-	756	
	Average Salary	53,979	55,399	58,844	61,284	-	56,745	
45-54	# Participants	109	218	272	327	164	1,090	
	Average Salary	57,207	60,385	63,680	65,682	67,595	63,563	
55-64	# Participants	74	138	267	320	269	1,068	
	Average Salary	59,595	63,914	68,821	71,204	71,043	68,821	
> 64	# Participants	7	10	17	50	166	250	
	Average Salary	52,656	55,289	65,046	73,719	76,606	73,719	
Totals	# Participants	484	751	782	774	599	3,390	
	Average Salary	52,966	58,425	64,067	68,047	71,641	63,479	