



# Case Study

**FALL 2017/SPRING 2018**

Retirement Funding & Regulation Exam  
EXAM RETFRC

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## **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 5,000 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, 2017 and was filed with the regulators. The prior valuation for funding purposes was prepared as at January 1, 2014.

The following pages contain extracts from the January 1, 2017 valuation report for funding purposes.

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### 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 the latest of age 55 and 85 points 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

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### Going Concern Valuation Results

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

	2017	2014
<b>1. Actuarial Accrued Liability:</b>		
(a) Active participants	651,434	630,093
(b) Deferred vested participants	11,191	6,535
(c) Pensioners and beneficiaries	372,919	249,777
(d) Total	1,035,544	886,405
<b>2. Actuarial Value of Assets:</b>		
(a) Market value of assets	1,145,371	950,297
(b) Asset smoothing adjustment	(5,449)	(7,231)
(c) Actuarial value of assets	1,139,922	943,066
<b>3. Going Concern Excess (Shortfall): (2c)-(1d)</b>	104,378	56,661
<b>4. Normal Cost (beginning of year):</b>	46,871	38,961
<b>5. Normal Cost (percentage of pay):</b>		
(a) Pensionable earnings in the following year	232,115	241,129
(a) Percent of pensionable earnings	20.2%	16.2%
<b>6. Actuarial Basis:</b>		
(a) Discount rate	5% per year	6% 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	

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*Solvency Valuation Results*

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

	<b>2017</b>	<b>2014</b>
<i>1. Actuarial Accrued Liability:</i>		
(a) Active participants	729,613	685,966
(b) Deferred vested participants	15,955	8,654
(c) Pensioners and beneficiaries	413,704	264,914
(d) Total	1,159,272	959,534
<i>2. Wind-Up Assets:</i>		
(a) Market value of assets	1,145,371	950,297
(b) Estimated termination expenses	(1,000)	(1,000)
(c) Wind-up assets	1,144,371	949,297
<i>3. Solvency Excess (Shortfall): (2c)-(1d)</i>	(14,901)	(10,237)
<i>4. Actuarial Basis:</i>		
(a) Interest - Benefits settled by lump sum payment	2.3% per year for 10 years, 3.7% per year thereafter	3.1% per year for 10 years, 4.6% per year thereafter
(b) Interest - Benefits settled by annuity purchase	3.1% per year	3.8% per year
(c) Mortality	CPM2014 Combined - Generational with Scale CPM-B	UP 1994 - Generational with Scale AA
(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	
(i) Special payments	Discounted at the average discount rate of 2.9% per year	

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### Wind-Up Valuation Results

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

	<b>2017</b>	<b>2014</b>
<b>1. Actuarial Accrued Liability:</b>		
(a) Active participants	827,215	766,241
(b) Deferred vested participants	17,895	9,589
(c) Pensioners and beneficiaries	456,970	288,870
(d) Total	<u>1,302,080</u>	<u>1,064,700</u>
<b>2. Wind-Up Assets:</b>		
(a) Market value of assets	1,145,371	950,297
(b) Estimated termination expenses	(1,000)	(1,000)
(c) Wind-up assets	<u>1,144,371</u>	<u>949,297</u>
<b>3. Wind-Up Excess (Shortfall): (2c)-(1d)</b>	(157,709)	(115,403)
<b>4. Wind-Up Incremental Cost:</b>	250,975	205,220
<b>5. Actuarial Basis:</b>		
(a) Interest - Benefits settled by lump sum payment	2.3% per year for 10 years, 3.7% per year thereafter	3.1% per year for 10 years, 4.6% per year thereafter
(b) Interest - Benefits settled by annuity purchase	3.1% per year	3.8% per year
(c) Post-retirement indexing	1% per year	1% per year
(d) Mortality	CPM2014 Combined - Generational with Scale CPM-B	UP 1994 - Generational with Scale AA
(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	

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*Special Payments and Discount Rate Sensitivity*

**Special payments determined at the 1.1.2017 valuation (numbers in \$000's)**

<b>Type</b>	<b>Start Date</b>	<b>Monthly Payment</b>	<b>End Date</b>
Solvency	1/1/2014	91	12/31/2018
Solvency	1/1/2015	96	12/31/2019
Solvency	1/1/2018	175	12/31/2022

**Discount Rate Sensitivity at 1.1.2017 (numbers in \$000's)**

	<b>Valuation Basis</b>	<b>Discount rate(s) reduced by 1%</b>
Total Going Concern Liability	1,035,544	1,192,481
Total Normal Cost	46,871	56,942
Total Wind-Up Liability	1,302,080	1,514,799

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*Information on Plan Assets*

**Plan Assets (numbers in \$000's)**

	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
Market Value of Assets at January 1	837,633	950,297	1,040,227	1,067,285
Employer Contributions during the year	55,324	38,961	40,325	41,736
Benefit Payments during the year	(29,900)	(31,760)	(37,213)	(41,621)
Expenses during the year	(4,914)	(7,360)	(6,585)	(7,553)
Investment return during the year	92,154	90,089	30,531	85,524
Market Value of Assets at December 31	<u>950,297</u>	<u>1,040,227</u>	<u>1,067,285</u>	<u>1,145,371</u>
<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	<u>4%</u>	<u>4%</u>	<u>4%</u>	<u>4%</u>
(g) Total	100%	100%	100%	100%

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*Information on Plan Membership*

**Reconciliation of Plan Participants (2014 - 2016)**

	<b>Active</b>	<b>Deferred</b>	<b>Pensioners/ Beneficiaries</b>	<b>Total</b>
<b>Participants as of January 1, 2014</b>	<b>4,027</b>	<b>250</b>	<b>1,071</b>	<b>5,348</b>
- New Entrants/Rehires	437	-	-	437
- Terminated and paid-out	(240)	(151)	-	(391)
- Terminated - deferred pension	(186)	186	-	-
- Retirement	(390)	(33)	423	-
- Death	(16)	-	(311)	(327)
- Beneficiaries	-	-	153	153
<b>Participants as of January 1, 2017</b>	<b>3,632</b>	<b>252</b>	<b>1,336</b>	<b>5,220</b>

**Summary of Membership Data**

	<b>1.1.2017</b>	<b>1.1.2014</b>
<b>Active participants</b>		
Number	3,632	4,027
Average age	49.8	48.2
Average annual pensionable earnings	61,747	57,853
Average credited service	12.9	14.6
<b>Deferred vested participants</b>		
Number	252	250
Average age	43.5	43.0
Average annual deferred pension	7,232	3,850
<b>Pensioners /Beneficiaries</b>		
Number	1,336	1,071
Average age	73.1	76.1
Average annual lifetime pension	23,898	21,331
Average annual bridge pension	784	548

**Age/Svc/Earnings as of January 1, 2017**

		<b>Service (complete years)</b>						
		<b>&lt; 5</b>	<b>5-9</b>	<b>10-14</b>	<b>15-19</b>	<b>&gt;19</b>	<b>Totals</b>	
<b>Age (complete years)</b>	<b>&lt; 25</b>	<b># Participants</b>	18	-	-	-	-	<b>18</b>
		<b>Average Salary</b>	41,640	-	-	-	-	<b>41,640</b>
<b>25-34</b>	<b># Participants</b>	166	111	-	-	-	-	<b>277</b>
	<b>Average Salary</b>	45,220	55,330	-	-	-	-	<b>49,271</b>
<b>35-44</b>	<b># Participants</b>	151	302	227	77	-	-	<b>757</b>
	<b>Average Salary</b>	52,960	54,353	57,478	60,129	-	-	<b>55,600</b>
<b>45-54</b>	<b># Participants</b>	128	257	322	386	195	-	<b>1,288</b>
	<b>Average Salary</b>	56,259	59,153	62,122	64,259	65,651	-	<b>62,122</b>
<b>55-64</b>	<b># Participants</b>	77	144	277	333	280	-	<b>1,111</b>
	<b>Average Salary</b>	58,247	62,292	67,464	69,587	69,411	-	<b>67,282</b>
<b>&gt; 64</b>	<b># Participants</b>	5	7	12	36	121	-	<b>181</b>
	<b>Average Salary</b>	52,066	55,785	65,082	72,314	74,226	-	<b>71,914</b>
<b>Totals</b>		<b># Participants</b>	<b>545</b>	<b>821</b>	<b>838</b>	<b>832</b>	<b>596</b>	<b>3,632</b>
		<b>Average Salary</b>	<b>51,742</b>	<b>57,392</b>	<b>62,672</b>	<b>66,358</b>	<b>69,158</b>	<b>61,747</b>