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**SOCIETY OF ACTUARIES**  
**Funding and Regulation Exam – Canada**

**Exam RETFRC**

**AFTERNOON SESSION**

**Date:** Wednesday, April 30, 2014

**Time:** 1:30 p.m. – 3:45 p.m.

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**INSTRUCTIONS TO CANDIDATES**

**General Instructions**

1. This afternoon session consists of 4 questions numbered 8 through 11 for a total of 40 points. The points for each question are indicated at the beginning of the question. Questions 8 and 9 pertain to the Case Study, which is enclosed inside the front cover of this exam booklet.
2. Failure to stop writing after time is called will result in the disqualification of your answers or further disciplinary action.
3. While every attempt is made to avoid defective questions, sometimes they do occur. If you believe a question is defective, the supervisor or proctor cannot give you any guidance beyond the instructions on the exam booklet.

**Written-Answer Instructions**

1. Write your candidate number at the top of each sheet. Your name must not appear.
2. Write on only one side of a sheet. Start each question on a fresh sheet. On each sheet, write the number of the question that you are answering. Do not answer more than one question on a single sheet.
3. The answer should be confined to the question as set.
4. When you are asked to calculate, show all your work including any applicable formulas.
5. When you finish, insert all your written-answer sheets into the Essay Answer Envelope. Be sure to hand in all your answer sheets because they cannot be accepted later. Seal the envelope and write your candidate number in the space provided on the outside of the envelope. Check the appropriate box to indicate morning or afternoon session for Exam RETFRC.
6. Be sure your written-answer envelope is signed because if it is not, your examination will not be graded.

Tournez le cahier d'examen pour la version française.



## **CASE STUDY INSTRUCTIONS**

**The case study will be used as a basis for some examination questions. Be sure to answer the question asked by referring to the case study. For example, when asked for advantages of a particular plan design to a company referenced in the case study, your response should be limited to that company. Other advantages should not be listed, as they are extraneous to the question and will result in no additional credit. Further, if they conflict with the applicable advantages, no credit will be given.**

**\*\*BEGINNING OF EXAMINATION\*\***

**Afternoon Session  
Beginning with Question 8**

*Questions 8 and 9 pertain to the Case Study.  
Each question should be answered separately.*

**8-9.** The following information applies to both Question 8 and Question 9.

NOC is contemplating a retroactive benefit rate increase, effective July 1, 2013, for all past and future service, for active participants of the Full-Time Hourly Union Pension Plan.

You are given:

**Valuation information as at July 1, 2013 prior to benefit rate increase:**

Normal cost (beginning of period)	\$43,000,000
Going concern liability – active participants	\$750,000,000
Going concern liability – pensioners	\$218,000,000
Solvency liability – active participants	\$1,235,000,000
Solvency liability – pensioners	\$262,000,000
Interest rate – benefits settled by annuity purchase	3.2% per annum
Interest rate – benefits paid by lump sum	2.6% per annum for 10 years and 3.9% per annum thereafter

All other assumptions remain the same as those in effect at January 1, 2013, the date of the most recently filed actuarial valuation.

**Cumulative increase in Average Industrial Wage (AIW) to 2013:**

2012	2.6%	2007	18.7%	2003	33.2%
2011	6.2%	2006	23.4%	2002	33.5%
2010	7.9%	2005	26.7%	2001	36.7%
2009	11.1%	2004	30.1%	2000	38.3%
2008	15.9%				

**Historical normal retirement benefit rates:**

January 1, 2000:	\$75 per month
January 1, 2004:	\$80 per month

**8.** (7 points)

- (a) (3 points) Determine the maximum benefit rate increase NOC can provide without triggering a Past Service Pension Adjustment (PSPA).
- (b) (2 points) Determine the change in normal cost, going concern liability, and solvency liability as at July 1, 2013 if the benefit rate increase is \$15 per month.
- (c) (2 points) You are given the following participant data as at July 1, 2013:

Date of plan entry:                      January 1, 2000  
Credited service:                        13.5 years

Calculate the PSPA if the benefit rate increase is \$30 per month.

Show all work.

**9.** (12 points) NOC will amend the Full-Time Hourly Union Pension Plan to provide a benefit rate increase of \$20 per month for active participants. A cost certificate will be filed with the regulators to reflect this benefit rate increase.

- (a) (8 points) Describe the considerations in preparing the cost certificate.
- (b) (4 points) You are given the following valuation information reflecting the impact of the benefit rate increase:

**Valuation information as at July 1, 2013 after benefit rate increase:**

Normal cost (beginning of period)	\$54,000,000
Going concern liability – active participants	\$938,000,000
Going concern liability – pensioners	\$218,000,000
Solvency liability – active participants	\$1,544,000,000
Solvency liability – pensioners	\$262,000,000

Assume 30% of the active participant solvency liability is settled by annuity purchase and NOC makes their contributions at the end of the month.

NOC did not elect to use solvency relief measures for the January 1, 2013 valuation and has elected immediate commencement of new special payments.

Calculate the increase in minimum annual contribution requirements for the cost certificate effective July 1, 2013.

Show all work.

- 10.** (12 points) You are the actuary for a closed non-contributory flat dollar defined benefit pension plan registered in Ontario.

You are given:

**Valuation information as at January 1, 2014**

Market value of assets:	\$900,000
Going concern liability:	\$1,200,000
Solvency liability:	\$1,500,000
Going concern liability duration:	10 years
Solvency liability duration:	11 years
2014 going concern normal cost:	\$50,000
2014 solvency incremental cost:	\$75,000

**Additional information**

Annual benefit payments:	\$30,000
Wind-up expense assumption:	\$50,000
Going concern interest rate:	5% per annum
Solvency interest rate:	4% per annum
Asset valuation method on going concern and solvency:	Market value

No one-year deferral or funding relief measures were elected.

**Special payment schedules from the prior valuation (January 1, 2013)**

Type	Start date	End date	Annual amount
Going concern	January 1, 2012	December 31, 2026	\$25,000
Solvency	January 1, 2013	December 31, 2017	\$50,000

- (a) (2 points) Calculate the 2014 minimum required employer contributions.

## 10. Continued

You are given:

- Employer contribution on July 1, 2014: \$300,000
- Investment return on plan assets during 2014: 15.0%
- Increase in solvency interest rate during 2014: 0.5%
- There were no other actuarial gains or losses during 2014

- (b) (3 points) Calculate the estimated going concern and solvency funded positions as at January 1, 2015.
- (c) (3 points) Describe the options that would be available to the employer regarding the additional contribution made in 2014.
- (d) (4 points) Calculate the 2015 minimum required employer contributions under each option in (c).

Show all work.

**11.** (9 points) The following email is to be sent to a client.

“May 2, 2014

Dear Ms. Jones,

As requested, we have determined that the financial impact of the requested plan change as at July 1, 2014 is \$1,500,000.

Plan Provisions & Membership Data

These estimates are based on the plan provisions as at January 1, 2012. We’ve adjusted the January 1, 2012 membership data summarized in the most recent actuarial valuation of the Retirement Plan to July 1, 2014.

Actuarial Assumptions & Methods

The liabilities were determined using current market rates and reflecting earnings at July 1, 2014. In determining the financial position as of July 1, 2014, prior to reflecting the plan change, assets and liabilities were projected using normal cost and actual benefit payments during the projection period.

Regards,  
Karen Black, FCIA”

Critique the above email with respect to compliance with Canadian professional standards.

**\*\*END OF EXAMINATION\*\***  
**Afternoon Session**

**USE THIS PAGE FOR YOUR SCRATCH WORK**

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