November 2000
Course 8R

Society of Actuaries

****BEGINNING OF EXAMINATION 8****
COMPREHENSIVE SEGMENT
MORNING SESSION

Questions 1 – 5 pertain to the Case Study.

1. *(11 points)* The assets of the National Oil Full-Time Salaried Pension Plan and the National Oil Full-Time Hourly Union Pension Plan are currently invested in several pooled funds of a single investment manager. National Oil Company's Vice President proposes that the assets of these two plans, along with the assets of the National Oil Part-Time DC Pension Plan be commingled and managed as one segregated fund.

(a) Outline a single statement of investment policies and goals covering all three plans, highlighting areas where the policies or goals of the three plans may be in conflict.

(b) Recommend percentage guidelines for the various asset classes that may be represented in the segregated fund. Justify your recommendation.

(c) Evaluate the Vice President's proposal and recommend alternatives.

Questions 1 – 5 pertain to the Case Study.

2. *(11 points)* It is the year 2005 and National Oil Company's (NOC's) revenues have been slipping due to a general depression in oil prices. This has had a profound impact on NOC's Full-Time Salaried Pension Plan demographics.

Liabilities for active full-time members represent only 25% of the Salaried Plan's total projected benefit obligation.

You are given the following data as of December 31, 2004:

	Active full time	**Deferred vested**	**Pensioners & Beneficiaries**
Count	1,000	-	2,500
Average age	41.5	-	67.3
Average service	7.4	-	NA
Average annual pension	NA	-	$26,800

	December 31, 2004	
Projected benefit obligation		
Actives	$(90,000,000)	
Retired	(270,000,000)	$(360,000,000)
Market value of assets		480,000,000
Surplus (Deficit)		$120,000,000
Unrecognized prior service cost 2 years amortization remaining		30,000,000
Unrecognized (gains)/losses		(90,000,000)
Prepaid/(Accrued) expense		$60,000,000

Discount rate and expected rate of return on assets are both 8%.

NOC does not amortize gains or losses inside the 10% corridor. Expected Average Remaining Service Lifetime is 10 years.

2. (CONTINUED)

One of NOC's primary financial objectives is to reduce the volatility of the Salaried Plan's pension expense. However, they have not reviewed the Salaried Plan's investment policy since 1999.

(a) Describe how asset mix decisions affect NOC's ability to meet their financial objective.

(b) NOC is considering purchasing annuities for its 2,500 retirees and beneficiaries. What changes to the investment policy would you recommend in anticipation of this purchase? Support your recommendation.

(c) Describe the impact that the annuity purchase in (b) would have on NOC's balance sheet.

(d) Assume that on January 1, 2005, NOC purchased annuities for its 2,500 retirees and beneficiaries at a cost of $290,000,000. Determine the net effect on NOC's pension expense for the year 2005. Show all work.

Questions 1 – 5 pertain to the Case Study.

3. *(10 points)* The government of Belair decides to enhance executive benefit security. As a result, Belair changes the tax law applicable to Supplemental Retirement Plans (SRPs) such that SRP trust investment income accumulates tax-free. Benefits paid to participants under a SRP continue to be tax deductible to the company and taxable to participants.

Your client is National Oil Company (NOC).

(a) Evaluate NOC's SRP plan design.

(b) Recommend a SRP funding policy. Support your recommendation.

(c) Describe the effect of your recommendation on balance sheet liability and pension expense.

4. *(9 points)* Global Oil, National Oil Company's (NOC's) parent company, is negotiating the sale of NOC to HoldCo, a Belair-based holding company. Purchase accounting will be used in this transaction. The sale will be effective January 1, 2000.

HoldCo currently employs 5,000 individuals. All are covered by the company's defined contribution ERP (DC ERP).

You have been retained by HoldCo to provide assistance in the due-diligence process.

(a) Describe the options available to HoldCo with respect to the NOC Full-Time Salaried Pension Plan.

(b) Critique the assumptions used by NOC for funding their Full-Time Salaried Pension Plan.

(c) Global Oil is proposing that HoldCo maintain the NOC Full-Time Salaried Pension Plan benefits for active participants and accept a transfer of pension plan assets and liabilities. The proposed asset transfer amount is equal to the accrued benefit obligation (ABO) for transferred participants. Describe the risks facing HoldCo, if it chooses to accept this proposal.

Questions 1 – 5 pertain to the Case Study.

5. *(6 points)* The controller of National Oil Company (NOC) has reviewed your funding recommendation for 2000 for the Full-Time Salaried Pension Plan. Due to the large surplus in the plan, you have recommended that NOC not make a contribution for 2000. The controller informs you that he has budgeted a $25,000,000 contribution to the plan for 2000. He is aware that NOC may not contribute an amount in excess of the actuary's recommendation. As such, he has asked you to revise your recommendation.

(a) Given standards of practice consistent with those in the United States and Canada, formulate your response.

(b) Describe the implications of excessive pension plan contributions with respect to plan members, NOC shareholders and taxpayers.

6. *(13 points)* XYZ sponsors a final pay defined benefit pension plan with the following provisions:

Retirement benefit	2.0% of final pay times years of service (maximum 35 years)
Normal retirement age	65
Early retirement age	55 with 10 years of service
Early retirement benefit	Accrued benefit reduced by 5% per year before age 65. Unreduced for employees with 35 years of service.
Vesting	100% after 5 years of service

XYZ proposes to convert to a defined contribution plan and is concerned about employee opposition. XYZ is not looking to save money, but believes a defined contribution plan is a better tool for recruiting new employees. XYZ would give current employees a one-time choice between remaining in the defined benefit plan or transferring to the new defined contribution plan.

The current cost method for the defined benefit plan is Projected Unit Credit. Normal cost for the 1999 plan year was 8% of the total payroll. The CEO reasons that a defined contribution plan that offers an 8% employer contribution would provide approximately the same benefits as employees currently receive and would also keep the employer benefit costs level.

(a) Describe the advantages and disadvantages of offering current employees a choice between plans.

(b) Evaluate the CEO's assertions regarding an 8% defined contribution plan.

(c) Describe the considerations in preparing 10-year expense projections for the existing defined benefit plan and for the proposed conversion.

(d) Assuming that the conversion occurs, describe the information the employees would need to make an informed choice.

****END OF EXAMINATION 8****
Morning Session

****BEGINNING OF EXAMINATION****
COMPREHENSIVE SEGMENT
AFTERNOON SESSION
Beginning With Question 7

Questions 7 – 9 pertain to the Case Study.

7. *(12 points)* The government of Belair has announced that a social security pension system will be introduced effective January 1, 2001. The main provisions of the system are as follows:

- All workers must participate in the new system.
- Retirement benefits will be payable commencing at age 65.
- The retirement benefit will be calculated as 0.5% of a worker's best 5-year average covered earnings times years of covered service.
- Covered earnings will be limited to $50,000 per year.
- A year of covered service will be credited for each year in which a contribution is paid.
- Covered service will commence on January 1, 2001. A maximum of 40 years of service will be covered.
- The system will be funded by contributions of 8% of covered earnings, split equally between employers and employees. These contributions will be tax-deductible to the employer and the employee.

The government has also announced that private pension plans may be amended to provide benefits that are integrated with the benefits provided by the social security pension system. No non-discrimination rules are to be introduced.

National Oil Company (NOC) has retained you to review its pension arrangements and the adequacy of such arrangements in light of the new social security pension system. NOC has defined its adequacy target as a replacement ratio of 70%, where the replacement ratio is defined as:

$$\frac{[\text{Company pension}] + [\text{Social security pension}] - [\text{Income tax}]}{[\text{Pre-retirement earnings}] - [\text{Income tax}]}$$

7. (CONTINUED)

You have been provided with the following information on two NOC employees:

MEMBERSHIP INFORMATION AS OF JANUARY 1, 2001

	Employee A	Employee B
Type of employee	Full-time Salaried	Seasonal
Credited service at age 65	35	35
Projected earnings at age 65	\$180,000	\$40,000
Projected best average earnings at age 65	\$170,000	\$38,000
Projected DC account balance at age 65	N/A	\$100,000
Projected PPA account balance at age 65	\$540,000	Nil
Annual PPA contributions	7% of earnings	Nil
$\ddot{a}_{65}^{(12)}$	9.0	9.0

(a) Assess the appropriateness of NOC's adequacy target.

(b) Evaluate Employee A's retirement income benefits relative to NOC's adequacy target.

(c) Comment on the adequacy of retirement benefits for Employee B relative to Employee A.

(d) Evaluate methods of integrating NOC's Full-Time Salaried Pension Plan with the retirement benefits provided by the new social security pension system.

Questions 7 – 9 pertain to the Case Study.

8. *(10 points)* A few weeks ago, the CFO of National Oil Company (NOC) had dinner with his friend Terry, the CEO of ABC, a large employer in the manufacturing industry operating in Belair. At dinner, Terry mentioned that ABC's defined benefit pension plan had the following returns over the last 3 years:

Annual Rates of Return

Year	ABC Plan
1997	4%
1998	31%
1999	23%

Terry also mentioned that a few years ago, ABC invested a portion of their pension fund assets in derivative securities, which contributed significantly to the performance of the fund.

Based on this conversation, the CFO believes that NOC's defined benefit plan assets are underperforming relative to other pension funds in Belair

NOC's CFO also observed that over the last 2 years, domestic large cap equities and domestic small cap equities were the asset classes with the highest returns. The CFO has proposed a change in asset allocation as follows:

	Salaried Plan		Full-Time Hourly Union Plan	
	Current	Proposed	Current	Proposed
Derivative Securities	0%	20%	0%	20%
Domestic Large Cap Equities	36	41	28	33
Domestic Small Cap Equities	23	28	19	24
Domestic Fixed Income	24	0	43	17
International Equities	11	11	6	6
Real Estate	3	0	2	0
Cash	3	0	2	0

8. (CONTINUED)

The CFO is also considering firing the investment managers and passively investing the assets.

(a) Critique the CFO's analysis of NOC's pension asset performance.

(b) Evaluate the CFO's proposed asset allocation as a strategy to improve asset performance.

(c) Describe the fiduciary liability issues that the CFO should consider in the investment of pension assets. Assume trust law in Belair is similar to that in the United States and Canada.

(d) Critique the proposal to adopt a passive investment strategy.

Questions 7 – 9 pertain to the Case Study.

9. *(8 points)* In response to concerns about benefit security, the government of Belair has proposed that Eligible Retirement Plans (ERP's) be fully funded on a termination basis at all times.

(a) From the perspective of National Oil Company (NOC), discuss the impact of the proposal on the private pension system in Belair. Suggest and support alternatives to the proposal.

(b) Recommend alternative plan designs for NOC to consider for the hourly union employees in light of the proposal. Support your recommendations.

****END OF EXAMINATION 8****