
SOCIETY OF ACTUARIES
Retirement Benefits United States – Design & Pricing

Exam DP-RU

Date: Thursday, October 29, 2009

Time: 8:30 a.m. – 12:15 p.m.

INSTRUCTIONS TO CANDIDATES

General Instructions

1. This examination has a total of 70 points.

This exam consists of 9 questions, numbered 1 through 9.

The points for each question are indicated at the beginning of the question. Questions 2 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 since 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 Exam DP-RU.
6. Be sure your written-answer envelope is signed because if it is not, your examination will not be graded.

Case Study - Course DP Retirement - US

National Oil Company - Background

National Oil Company (NOC) is a large well-established company that services oil wells all over the United States (US). NOC has been in existence for over 30 years and has more than 10,000 full-time salaried and union hourly employees and over 6,000 part-time employees. The full-time workforce is reasonably stable, but turnover in the last 5 years has been greater than desired, due to competitors recruiting NOC's employees.

Normally, an undergraduate degree is a minimum requirement to obtain entry to the salaried workforce and many employees have graduate degrees. About half of NOC's salaried employees are recruited directly from university with the other half coming from competitors.

The company's financial position varies with the price of oil. As oil prices rise, oil companies become increasingly active and in turn require the services of NOC. Conversely, activity slows as oil prices drop. Despite this, the company is usually in a taxable position.

NOC has managed to be successful by staying on the cutting edge of technology. NOC prides itself in being state of the art in processes and software relevant to its industry. This has helped it to stave off competition from both inside and outside of US. Although NOC is the largest player in the industry within US, there are larger players from outside of the country, with which NOC has to compete. From time to time, there are rumors of a takeover of NOC.

United States legislation and social programs will apply to NOC in this case study.

Summary of National Oil's Retirement Benefits

NOC maintains three defined benefit plans:

1. a final-average pay defined benefit (DB) qualified plan for its full-time salaried employees;
2. a flat dollar defined benefit qualified plan for its full-time hourly union staff;
3. a defined contribution (DC) qualified plan for its part-time workforce; and
4. a non-eligible pension plan (referred to as the SERP) for its executives that is supplemental to the salaried plan. This plan has no assets.
5. a retiree health and welfare plan for the full-time salaried and union retirees. This plan has no assets.

Extracts of Retirement Benefits Provisions and Financial Information

National Oil Full-Time Salaried Pension Plan

Eligibility	Immediate
Vesting	100% after 5 years of plan participation
Normal Retirement Age	65
Early Retirement Age	55 with 10 years of plan participation
Best Average Earnings	Average annual earnings during 60 consecutive months in which earnings were highest
Earnings	Basic pay, excluding overtime and bonuses
Normal Retirement Benefit	2% of best average earnings times years of service, subject to tax system maximum
Accrued Benefit	Benefit calculated as under the normal retirement benefit formula using best average earnings and service as of date of calculation
Early Retirement Benefit	Accrued benefit reduced by 0.25% per month that early retirement precedes age 62
Form of Benefit	If married, 60% joint & survivor benefit, without reduction. If not married, single life annuity
Optional Forms of Benefit	Level Income Option, Lump Sum Option, and J&S75% Option
Indexing	None
Termination Benefit	Lump sum equal to actuarial present value of accrued benefit
Pre-Retirement Death Benefit	Lump sum equal to actuarial present value of accrued benefit payable to named beneficiary
Disability Benefit	Accrual of service while on long term disability

National Oil Full-Time Salaried Pension Plan
Historical Actuarial Valuation Results

	2006	2007	2008	2009
Participant Summary - January 1				
<i>Active Participants</i>				
(a) count	4,268	4,286	4,251	4,076
(b) average age	45.6	45.5	45.4	45.2
(c) average service	15.2	15.4	15.3	15.4
(d) average future working lifetime	11.0	11.0	11.0	11.0
(e) average plan earnings (prior year)	67,200	67,300	67,500	67,400
<i>Deferred Vested Participants</i>				
(a) count	-	-	-	-
<i>Retirees (incl beneficiaries)</i>				
(a) count	665	695	720	773
(b) average age	70.9	69.8	68.2	68.0
(c) average annual benefit	19,700	20,100	21,800	22,000

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

<i>Change in Plan Assets during Prior Year:</i>				
Market Value of Assets at January 1 of prior year	772,639	860,847	959,430	928,941
Employer Contributions during prior year	39,789	-	-	-
Benefit Payments during prior year	(20,500)	(20,500)	(21,000)	(21,000)
Expenses during prior year	-	-	-	-
Investment return during prior year	68,919	119,084	(9,489)	(160,727)
Market Value of Assets at January 1 of current year	860,847	959,430	928,941	747,214
Rate of return during prior year	9%	14%	-1%	-17.5%
<i>Average Portfolio Mix During Prior Year:</i>				
(a) Domestic Large Cap Equities	29%	30%	32%	30%
(b) Domestic Small Cap Equities	28%	27%	25%	10%
(c) Domestic Fixed Income	27%	27%	23%	35%
(d) International Equities	11%	11%	15%	20%
(e) Real Estate	3%	3%	3%	0%
(f) Cash	<u>2%</u>	<u>2%</u>	<u>2%</u>	<u>5%</u>
(g) Total	100%	100%	100%	100%
<i>Asset Class Returns during Prior Year:</i>				
(a) Domestic Large Cap Equities	13%	23%	-3%	-30%
(b) Domestic Small Cap Equities	7%	18%	-2%	-45%
(c) Domestic Fixed Income	3%	4%	4%	8%
(d) International Equities	17%	10%	-5%	-35%
(e) Real Estate	12%	8%	5%	5%
(f) Cash	2%	2%	3%	3%

* numbers may not add due to rounding

National Oil Full-Time Salaried Pension Plan
Historical Actuarial Valuation Results

	2006	2007	2008	2009
Valuation - January 1 (numbers in \$000's) *				
1. Actuarial Liability:				
(a) Active participants	633,605	643,703	634,308	628,260
(b) Deferred vested participants	-	-	-	-
(c) Retirees	134,935	143,886	161,669	190,467
(d) Total	768,540	787,589	795,977	818,727
2. Actuarial Value of Assets	860,847	959,430	928,941	747,214
3. Unfunded Actuarial Liability: (1d)-(2)	(92,306)	(171,841)	(132,964)	71,513
4. Normal Cost (beg. Of year)	41,685	41,799	41,458	40,796
5. Change in Unfunded AL during prior year:				
(a) Unfunded AL at prior valuation date	(41,464)	(92,306)	(171,841)	(132,964)
(b) Adjustment for Interest	(2,799)	(6,000)	(11,170)	(8,643)
(c) Normal Cost w/interest less contributions	1,343	44,394	44,516	44,153
(d) (Gain)/Loss on investment	(16,115)	(63,795)	71,170	220,426
(e) (Gain)/Loss on termination	(15,400)	(14,000)	(17,000)	(24,000)
(f) (Gain)/Loss on salary increases less than expected	(23,700)	(25,000)	(30,000)	(50,000)
(g) (Gain)/Loss on mortality	(6,800)	(6,800)	(6,900)	2,000
(h) (Gain)/Loss on retirement	(7,400)	(8,500)	(11,000)	(21,000)
(i) (Gain)/Loss on assumption changes	20,000	-	-	40,800
(j) (Gain)/Loss on expenses	-	-	-	-
(k) (Gain)/Loss on all other factors	28	166	(739)	741
(l) Unfunded AL at current valuation date	(92,306)	(171,841)	(132,964)	71,513
6. Actuarial Basis				
(a) Interest	6.50%	6.50%	6.50%	6.50%
(b) Salary scale	3.50%	3.50%	3.50%	3.50%
(c) Consumer Price Index	3.00%	3.00%	3.00%	3.00%
(d) Mortality	GAM 1983	GAM 1983	GAM 1983	RP2000AA2015
(e) Turnover	Based on NOC experience for 1986-1988			
(f) Retirement age	Age 62			
(g) Proportion married and age difference	80% married, husbands 3 years older than wives			
(h) Expenses	Assume all expenses paid by company			
(i) Asset Valuation Method	Market value of assets			
(j) Actuarial Cost Method	Projected unit credit			

* numbers may not add due to rounding

**National Oil Full-Time Salaried Pension Plan
Reconciliation of Plan Participants (2006 - 2009)**

	<u>Active</u>	<u>Retirees/ Beneficiaries</u>	<u>Total</u>
1. Participants as of January 1, 2006	4,268	665	4,933
- New Entrants/Rehires	300	-	300
- Terminated Nonvested	(130)	-	(130)
- Terminated Vested (Lump Sum Cashout)	(115)	-	(115)
- Retirement	(35)	35	-
- Death w/ Beneficiary	(2)	2	-
- Death w/o Beneficiary	-	(7)	(7)
- Net change	18	30	48
2. Participants as of January 1, 2007	4,286	695	4,981
- New Entrants/Rehires	250	-	250
- Terminated Nonvested	(120)	-	(120)
- Terminated Vested (Lump Sum Cashout)	(130)	-	(130)
- Retirement	(30)	30	-
- Death w/ Beneficiary	(5)	5	-
- Death w/o Beneficiary	-	(10)	(10)
- Net change	(35)	25	(10)
3. Participants as of January 1, 2008	4,251	720	4,971
- New Entrants/Rehires	100	-	100
- Terminated Nonvested	(100)	-	(100)
- Terminated Vested (Lump Sum Cashout)	(120)	-	(120)
- Retirement	(50)	50	-
- Death w/ Beneficiary	(5)	5	-
- Death w/o Beneficiary	-	(2)	(2)
- Net change	(175)	53	(122)
4. Participants as of January 1, 2009	4,076	773	4,849

National Oil Full-Time Salaried Pension Plan
Age/Svc/Earnings as of January 1, 2009

		Service (Years)					Totals	
		< 5	5-10	10-15	15-20	>20		
Age (Years)	< 25	# Participants	180	120	-	-	-	300
		Average Salary	35,900	46,100	-	-	-	40,000
	25-35	# Participants	210	140	90	55	-	495
		Average Salary	47,100	58,000	62,000	65,100	-	54,900
	35-45	# Participants	175	198	176	201	201	951
		Average Salary	59,400	66,300	70,200	76,300	77,800	70,300
	45-55	# Participants	164	153	175	290	739	1,521
		Average Salary	62,600	65,200	72,000	75,600	77,800	73,800
	55-65	# Participants	168	77	77	75	399	796
		Average Salary	61,200	64,100	68,100	73,900	74,200	69,900
	> 65	# Participants	4	3	1	2	3	13
		Average Salary	47,000	52,100	47,000	57,600	53,900	51,400
	Totals	# Participants	901	691	519	623	1,342	4,076
		Average Salary	52,700	60,600	69,000	74,600	76,700	67,400
		Avg Age	45.2					
		Avg Svc	15.4					
		Avg Salary	67,400					

National Oil Full-Time Salaried Supplemental Executive Retirement Plan (SERP)

Eligibility	Immediate
Normal Retirement Age	65
Early Retirement Age	55 with 10 years of plan participation
Accrued Benefit	Accrued Benefit calculated under the provisions of the Salaried Pension Plan without regard to tax system maximums <u>less</u> actual Accrued Benefit under the Salaried Pension Plan
Normal Retirement Benefit	Accrued Benefit
Early Retirement Benefit	Accrued Benefit reduced by 0.25% per month that early retirement precedes age 62
Commencement Date and Form of Benefit	Must be same as under Salaried Pension Plan
Indexing	None
Termination Benefit	None
Pre-Retirement Death Benefit	None
Disability Benefit	None

Supplemental Retirement Plan
 Historical Valuation Results - January 1

2006 2007 2008 2009

Participant Summary

1. Active Participants				
(a) count	49	52	60	50
(b) average age	53.1	53.1	52.0	50.0
(c) average service	18.2	18.2	19.1	17.0
(d) average future working lifetime	6.3	6.3	6.3	8.8
(e) average earnings (prior year)	315,000	325,000	350,000	350,000
2. Deferred Vested Participants				
(a) count	-	-	-	-
3. Retirees (incl beneficiaries)				
(a) count	15	17	20	30
(b) average age	70.4	70.1	69.3	66.1
(c) average annual benefit	13,100	14,000	15,000	16,000

Valuation Results (numbers in \$000's) *

1. Reconciliation of funded status at valuation date:				
(a) Accrued Benefit Obligation	(33,762)	(42,444)	(51,793)	(50,525)
(b) Fair Value of Assets	-	-	-	-
(c) Funded Status: (a) + (b)	(33,762)	(42,444)	(51,793)	(50,525)
2. Service Cost	1,074	1,340	1,597	1,280
3. Benefit Payments	197	238	300	480
4. Actuarial Basis				
(a) Discount rate	5.50%	5.00%	5.25%	7.50%
(b) Salary scale	3.50%	3.50%	3.50%	3.50%
(c) CPI	3.00%	3.00%	3.00%	3.00%
(d) All other assumptions	Same as Salaried Plan			

* numbers may not add due to rounding

National Oil Full-Time Hourly Union Pension Plan

Eligibility	Immediate
Vesting	100% after 5 years of plan membership
Normal Retirement Age	65
Early Retirement Age	55 with 10 years of service
Normal Retirement Benefit	\$75 per month times years of service for terminations/ retirements during 2005 \$80 per month times years of service for terminations/ retirements during 2006 and 2007 \$85 per month times years of service for terminations/ retirements during 2008 and beyond
Accrued Benefit	Benefit calculated as under the normal retirement benefit formula based on service and multiplier as of date of calculation.
Early Retirement Benefit	Unreduced benefit at 62 with 30 years of service, otherwise reduced by 0.25% per month that early retirement precedes Normal Retirement Age.
Form of Benefit	With a spouse, 60% joint & survivor benefit without reduction Without a spouse, single life annuity.
Optional Forms of Benefit	Level Income Option, Lump Sum Option, and J&S75% Option
Post-Retirement Indexing	None
Termination Benefit	Lump sum equal to actuarial present value of accrued benefit
Pre-Retirement Death Benefit	Lump sum equal to actuarial present value of accrued benefit, payable to named beneficiary
Disability Benefit	None

National Oil Full-Time Hourly Union Pension Plan
Historical Actuarial Valuation Results

	2006	2007	2008	2009
Participant Summary - January 1				
<i>Active Participants</i>				
(a) count	6,253	6,321	6,395	6,225
(b) average age	46.5	46.3	46.0	46.1
(c) average service	17.4	17.2	17.0	17.3
(d) average future working lifetime	10.6	10.8	10.8	10.8
(e) average plan earnings (prior year)	39,800	39,600	39,400	39,700
<i>Deferred Vested Participants</i>				
(a) count	-	-	-	-
<i>Retirees (incl beneficiaries)</i>				
(a) count	1,060	1,081	1,120	1,135
(b) average age	72.8	71.8	70.0	68.0
(c) average annual benefit	10,800	11,200	12,200	13,400

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

<i>Change in Plan Assets during Prior Year:</i>				
Market Value of Assets at January 1 of prior year	444,857	504,928	605,648	621,714
Employer Contributions during prior year	34,400	42,000	39,234	46,369
Benefit Payments during prior year	(12,000)	(15,000)	(17,000)	(17,000)
Expenses during prior year	-	-	-	-
Investment return during prior year	37,670	73,720	(6,168)	(111,370)
Market Value of Assets at January 1 of current year	504,928	605,648	621,714	539,714
Rate of return during prior year	8%	14%	-1%	-18%
<i>Average Portfolio Mix During Prior Year:</i>				
(a) Domestic Large Cap Equities	30%	30%	32%	30%
(b) Domestic Small Cap Equities	21%	27%	25%	10%
(c) Domestic Fixed Income	36%	27%	23%	35%
(d) International Equities	9%	11%	15%	20%
(e) Real Estate	2%	3%	3%	0%
(f) Cash	2%	2%	2%	5%
(g) Total	100%	100%	100%	100%
<i>Asset Class Returns during Prior Year:</i>				
(a) Domestic Large Cap Equities	13%	23%	-3%	-30%
(b) Domestic Small Cap Equities	7%	18%	-2%	-45%
(c) Domestic Fixed Income	3%	4%	4%	8%
(d) International Equities	17%	10%	-5%	-35%
(e) Real Estate	12%	8%	5%	5%
(f) Cash	2%	2%	3%	3%

* numbers may not add due to rounding

National Oil Full-Time Hourly Union Pension Plan
Historical Actuarial Valuation Results

	2006	2007	2008	2009
Actuarial Valuation - January 1 (numbers in \$000's) *				
1. Actuarial Liability:				
Active Multiplier	\$ 80	\$ 80	\$ 85	\$ 85
(a) Active participants	507,668	548,941	616,046	576,316
(b) Deferred vested participants	-	-	-	-
(c) Retirees	117,914	124,704	140,739	170,341
(d) Total	<u>625,582</u>	<u>673,645</u>	<u>756,785</u>	<u>746,657</u>
2. Actuarial Value of Assets	504,928	605,648	621,714	539,714
3. Unfunded Actuarial Liability: (1d)-(2)	120,655	67,997	135,071	206,943
4. Normal Cost (beg. Of year)	29,176	31,915	36,238	33,313
5. Change in Unfunded AL during prior year:				
(a) Unfunded AL at prior valuation date	88,534	120,655	67,997	135,071
(b) Adjustment for Interest	5,976	7,843	4,420	8,780
(c) Normal Cost w/interest less contributions	(8,709)	(12,292)	(6,519)	(9,283)
(d) (Gain)/Loss on investment	(6,886)	(40,023)	46,257	152,736
(e) (Gain)/Loss on termination	(10,400)	(6,000)	(8,000)	(38,000)
(f) (Gain)/Loss on salary increases less than expected	-	-	-	-
(g) (Gain)/Loss on mortality	(1,900)	(1,900)	(3,900)	(23,000)
(h) (Gain)/Loss on retirement	(550)	(400)	(600)	(56,000)
(i) (Gain)/Loss on assumption changes	23,400	-	-	37,500
(j) (Gain)/Loss on expenses	-	-	-	-
(k) (Gain)/Loss on all other factors	(539)	114	(822)	(861)
(l) Change in active benefit multiplier	31,729	-	36,238	-
(m) Unfunded AL at current valuation date	<u>120,655</u>	<u>67,997</u>	<u>135,071</u>	<u>206,943</u>
6. Actuarial Basis				
(a) Interest	6.50%	6.50%	6.50%	6.50%
(b) Salary scale	N/A	N/A	N/A	N/A
(c) Consumer Price Index	3.00%	3.00%	3.00%	3.00%
(d) Mortality	GAM83	GAM83	GAM83	RP2000AA2015
(e) Turnover		Based on NOC experience for 1986-1988		
(f) Retirement age		Age 62, with the appropriate early retirement reduction, if any		
(g) Proportion married and age difference		80% married, husbands 3 years older than wives		
(h) Expenses		Assume all expenses paid by company		
(i) Post-retirement indexing		None		
(j) Asset Valuation Method		Market value of assets		
(k) Actuarial Cost Method		Unit credit		

* numbers may not add due to rounding

**National Oil Full-Time Hourly Union Pension Plan
Reconciliation of Plan Participants (2006 - 2009)**

	<u>Active</u>	<u>Retirees/ Beneficiaries</u>	<u>Total</u>
1. Participants as of January 1, 2006	6,253	1,060	7,313
- New Entrants/Rehires	170	-	170
- Terminated Nonvested	(30)	-	(30)
- Terminated Vested (Lump Sum Cashout)	(40)	-	(40)
- Retirement	(30)	30	-
- Death w/ Beneficiary	(2)	2	-
- Death w/o Beneficiary	-	(11)	(11)
- Net change	68	21	89
2. Participants as of January 1, 2007	6,321	1,081	7,402
- New Entrants/Rehires	220	-	220
- Terminated Nonvested	(50)	-	(50)
- Terminated Vested (Lump Sum Cashout)	(50)	-	(50)
- Retirement	(40)	40	-
- Death w/ Beneficiary	(6)	6	-
- Death w/o Beneficiary	-	(7)	(7)
- Net change	74	39	113
3. Participants as of January 1, 2008	6,395	1,120	7,515
- New Entrants/Rehires	50	-	50
- Terminated Nonvested	(50)	-	(50)
- Terminated Vested (Lump Sum Cashout)	(120)	-	(120)
- Retirement	(50)	50	-
- Death w/ Beneficiary	-	-	-
- Death w/o Beneficiary	-	(35)	(35)
- Net change	(170)	15	(155)
4. Participants as of January 1, 2009	6,225	1,135	7,360

**National Oil Full-Time Hourly Union Pension Plan
Age/Svc/Earnings as of January 1, 2009**

		Service (Years)						
		< 5	5-10	10-15	15-20	>20	Totals	
Age (Years)	< 25	# Participants	200	139	-	-	-	339
		Average Salary	25,500	31,300	-	-	-	27,900
	25-35	# Participants	256	105	91	62	-	514
		Average Salary	26,800	31,800	37,800	38,300	-	31,200
	35-45	# Participants	215	330	320	659	441	1,965
		Average Salary	27,000	32,200	39,400	44,300	46,600	40,100
	45-55	# Participants	120	160	315	688	895	2,178
		Average Salary	25,000	32,200	38,600	43,000	46,800	42,100
	55-65	# Participants	95	62	91	180	779	1,207
		Average Salary	24,500	28,700	36,400	39,900	46,400	42,000
	> 65	# Participants	7	6	5	3	1	22
		Average Salary	20,600	21,600	25,700	24,600	25,100	22,800
	Totals	# Participants	893	802	822	1,592	2,116	6,225
		Average Salary	26,000	31,600	38,500	43,000	46,600	39,700
		Avg Age	46.1					
		Avg Svc	17.3					
		Avg Salary	39,700					

National Oil Part-Time DC Pension Plan

Eligibility	Immediate
Vesting	Immediate
Employer Contributions	50% match of employee contributions
Employee Contributions	3% of base pay
Plan Fund	The employer invests the contributions in a balanced fund. There are no employee investment choices.
Account Balance	Contributions are accumulated in member's individual account earning investment income at the rate of return earned by the Plan Fund.
Loans	Not permitted.
Benefit on Termination or Retirement	Roll over options as well as maintaining the account balances in the plan or an option to purchase an annuity
Benefit on Death	Account balance is payable to named beneficiary

National Oil Part-Time DC Pension Plan
Historical Results - January 1

2006 2007 2008 2009

Participant Summary

(a) number participating during prior year	6,250	6,500	7,000	6,800
(b) average age	30.9	28.9	29.2	30.8
(c) average base pay	26,000.00	29,000.00	30,000.00	31,000.00

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

<i>Change in Plan Assets during Prior Year:</i>				
Market Value of Assets at January 1 of prior year	57,871	67,779	75,248	79,166
Employee Contributions during prior year	4,875	5,655	6,300	6,324
Company Contributions during prior year	2,438	2,828	3,150	3,162
Benefit Payments during prior year	(5,625)	(5,850)	(6,300)	(6,120)
Expenses during prior year	-	-	-	-
Investment return during prior year	8,220	4,837	768	(16,170)
Market Value of Assets at January 1 of current year	67,779	75,248	79,166	66,362
Rate of return during prior year	14%	7%	1%	-20%

* numbers may not add due to rounding

National Oil Full-Time Salaried and Union Retiree Health Benefit Program

Eligibility	Immediate
Earliest Retirement Age	55 and 10 years of service
Retirement benefit	Retirees and their spouses may elect to participate in a self insured health plan, with 100% the of cost of the plan paid by the employer.
Death benefit	Coverage continues for the life of the spouse after death of an eligible employee
Benefits Covered	\$0 deductible; \$0 copay No lifetime maximum Office visits Hospital visits Surgery Prescription drugs

Retiree Health and Welfare Program
Historical Valuation Results

2006 2007 2008 2009

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

1. Reconciliation of funded status at valuation date:				
(a) Accrued Benefit Obligation				
(i) actives	(734,147)	(835,331)	(842,433)	(670,434)
(ii) retirees	(511,869)	(538,528)	(594,208)	(514,368)
(iii) total	(1,246,016)	(1,373,859)	(1,436,641)	(1,184,802)
(b) Market Value of Assets	0	0	0	0
(c) Surplus: (a) + (b)	(1,246,016)	(1,373,859)	(1,436,641)	(1,184,802)
2. Service Cost (beg. of year)	45,884	52,208	52,652	41,902
3. Benefit Payments	22,000	27,000	30,000	30,000
4. Actuarial Basis				
(a) Discount rate	5.50%	5.00%	5.25%	7.50%
(b) Return on assets	N/A	N/A	N/A	N/A
(c) Medical trend				
Initial rate	5.50%	6.00%	7.00%	10.00%
Annual decrease	0.50%	0.50%	0.50%	1.00%
Ultimate rate	4.50%	4.50%	4.50%	5.00%
Year ultimate trend rate reached	2008	2010	2013	2014
(d) CPI	3.00%	3.00%	3.00%	3.00%
(e) Per capita claims cost	8,800	9,500	10,500	12,000
(f) Retirement assumption	Age 62 with 10 years of service			
(g) All other demographic assumptions	Same as those used for pension plans			

* numbers may not add due to rounding

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****

- 1.** (8 points) You are the new actuary for a defined benefit pension plan. You have received the following information to conduct the current year valuation:
- Prior year valuation report
 - Prior year membership data
 - Current year membership data
 - Plan document
- (a) Describe how to ensure that the membership data is reasonable and consistent.
- (b) Describe the tasks you are not responsible to complete as part of your review of the membership data.
- (c) Itemize what should be included in your communication of the valuation results to the plan sponsor, as it relates to the membership data.

<p>Question 2 pertains to the Case Study.</p>
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- 2.** (12 points) National Oil Company's (NOC's) CFO is concerned about the long-term cost of the Full-Time Salaried Pension Plan. At the same time, NOC's management is concerned about benefit adequacy for mid-career employees. In order to address these concerns, NOC's management is interested in converting to a cash-balance plan.
- (a) (5 points) Propose a cash balance plan design for NOC, emphasizing the key features that distinguish the cash balance plan from the current Salaried Pension Plan. Provide support for your proposed plan design.
- (b) (5 points) Describe the different transition approaches NOC could use in converting the Salaried Pension Plan.
- (c) (2 points) Recommend a transition plan for the current Salaried Pension Plan members. Provide support for your recommendation.

- 3.** (5 points) Compare and contrast Traditional and Roth IRAs.
- 4.** (7 points) You are the actuary for a global company that would like to establish retirement programs for all of its employees. Describe the fundamental issues in structuring international retirement arrangements.
- 5.** (10 points) You are the actuary for a company that sponsors a retiree health benefit program.
- (a) Describe the economic assumptions for retiree medical valuations and the unique considerations for their selection.
 - (b) Your client performed an internal study of active and retiree medical claim experience and concluded its costs have increased on average 3.5% per year for the past five years. The client suggests that a flat 3.5% per year would suffice as a Long-Term Health Care Trend Rate, as it reflects their experience and the fact that their employees tend to be healthier than average.

Critique this suggestion, providing support for your opinion.

- 6.** (9 points) Your client's CFO returns from a meeting of pension plan sponsors where the topic of Liability Driven Investments (LDI) was discussed. Although interested, the CFO does not believe that it would be an appropriate strategy for the company's pension plan. The CFO is concerned both about sacrificing potential upside investment returns and about timing due to the current low interest rate environment.
- (a) Explain why the use of an LDI strategy might be appropriate for a plan sponsor.
 - (b) Compare and contrast efficient frontiers in asset-liability space versus asset-only space.
 - (c) Prepare a response to the CFO's concerns.

- 7.** (6 points) Several automakers are facing financial difficulty and are considering the creation of a multiemployer pension plan effective January 1, 2009 for future service for their unionized employees.

Explain how multiemployer pension plan designs and features can help mitigate future financial difficulty.

- 8.** (8 points)

- (a) Describe the following types of hedge fund investment strategies:
 - (i) Equity Market Neutral
 - (ii) Convertible Arbitrage
 - (iii) Distressed Securities
 - (iv) Global Macro
- (b) Describe the features which distinguish the different types of hedge fund indices.

Question 9 pertains to the Case Study.

- 9.** (5 points) National Oil Company (NOC) is interested in funding its Full-Time Salaried Supplemental Executive Retirement Plan (SERP).
- (a) Describe the considerations in funding the SERP.
 - (b) Describe the SERP funding vehicles available.

****END OF EXAMINATION****