



Case Study

SPRING/FALL 2018

Design & Accounting Exam–U.S.

EXAM RETDAU

RETDAU Morning

U.S. Exam Case Study - Course DA Retirement

National Oil Company • Background

National Oil Company (NOC) is a large well-established company that services oil wells all over the country of Gevrey. NOC has been in existence for over 30 years and has approximately 9,000 full-time salaried and union hourly employees and up to a further 7,000 non-skilled seasonal employees during the non-winter months. Approximately one-half of the seasonal employees return for another season. 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 on 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 Gevrey. Although NOC is the largest player in the industry within Gevrey, 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.

Country of Gevrey - Background

Gevrey is a modern developed country with a simplified tax system. Both corporations and individuals are subject to income tax at a flat rate of 40%. Reasonable operating expenses, including contributions to Eligible Retirement Plans (ERPs), reduce taxable income.

No pension legislation exists apart from the rules outlined herein.

Rules that apply to gain ERP status are as follows:

General

- if a company has one or more ERPs, then all employees are entitled to be in at least one of the company's ERPs.

Defined Benefit Plans (DB ERPs)

- employer contributions may not exceed those recommended by an actuary, in accordance with generally accepted actuarial practice
- employer contributions are an eligible expense to reduce the employer's taxable income
- periodic pensions may not exceed \$3,000 per annum for each year of service regardless of form or commencement age
- periodic pensions cannot commence prior to age 55
- investment earnings generated by the ERP pension fund are not taxable
- pension payments are taxed as received in the hands of the recipient
- no employee contributions are permitted

Defined Contribution Plans (DC ERPs)

- employer contributions for any individual plan member cannot exceed \$20,000 annually
- employer contributions are an eligible expense to reduce the employer's taxable income
- investment earnings generated by the ERP pension fund are not taxable until withdrawn
- benefit distributions are taxed as received in the hands of the recipient
- employer contributions may or may not be dependent on employee contributions
- individuals may contribute up to \$20,000 annually
- such contributions are tax deductible to the individual

The tax assistance available under each of the above two arrangements does not depend on the extent of participation under the other one. For example, an individual could participate in a DC ERP and, if eligible under the plans' rules, also a DB ERP of his or her employer.

Supplemental Retirement Plans (SRPs)

Contributions to a retirement plan that does not meet ERP status are not tax-deductible. Benefits paid to participants under such plans are tax deductible to the company and are taxable to participants, when paid to participants. Such a plan is known as a Supplemental Retirement Plan (SRP). An example of an SRP is a plan that restores the benefits lost by the imposition of the ERP maximums.

Retiree Health Care Plans

Employers in Gevrey may provide health care benefits to retirees and their spouses through a separate plan which is not intended to qualify for ERP status. Benefits (including insurance premiums) paid under such plans are tax deductible to the company when paid on behalf of participants. Benefits payable as an indemnity for health related services are not taxable to plan participants at any time.

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No social security pension system exists in Gevrey and there are no state-provided life or health-care benefits.

For financial reporting purposes, Gevrey adopted GAAP Accounting Standards.

The investment market in Gevrey is well developed, with substantial trading in government and corporate bonds and equities.

Summary of National Oil's Retirement Benefits

NOC maintains three defined benefit plans:

1. a final-average pay defined benefit ERP for its full-time salaried employees;
2. a unit benefit defined benefit ERP for its full-time hourly union staff; and
3. a non-eligible pension plan (referred to as the SRP) for its executives that is supplemental to the salaried ERP. This plan has no assets.

In addition, the company has a defined contribution ERP for its seasonal workforce.

Furthermore, eligible full-time salaried and union employees retiring with the company are covered for their lifetime by health benefits.

Extracts of Retirement Benefits Provisions and Financial Information

National Oil Full-Time Salaried Pension Plan

Eligibility	Immediate
Vesting	100% after 5 years of service
Normal Retirement Age	65
Early Retirement Age	55 with 5 years of service
Best Average Earnings	Average annual earnings during 60 consecutive months in which earnings were highest
Earnings	Base pay, excluding overtime and bonuses
Normal Retirement Benefit	2% of best average earnings times years of service, subject to tax system maximum 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, 50% joint & survivor benefit, without reduction. If not married, single life annuity
Optional Forms of Benefit	None
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 Salaried Pension Plan
Historical Actuarial Valuation Results

2017

2018

Participant Summary - January 1

Active Participants

(a) count	3,280	3,290
(b) average age	49.0	49.2
(c) average service	19.0	18.8
(d) average future working lifetime	10.2	10.6
(e) average future working lifetime to vesting (for those not)	3.0	2.5
(f) average plan earnings (prior year)	89,800	91,000

Deferred Vested Participants

(a) count	-	-
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Pensioners (incl beneficiaries)

(a) count	1,080	1,130
(b) average age	67.3	67.0
(c) average annual benefit	23,000	23,650

Duration of plan liabilities	14.3	14.5
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Plan Assets (numbers in \$000's) •

Change in Plan Assets during Prior Year:

Market Value of Assets at January 1 of prior year	1,344,520	1,443,551
Employer Contributions during prior year	41,182	40,002
Benefit Payments during prior year	(22,700)	(24,800)
Expenses during prior year	-	-
Investment return during prior year	80,549	116,382
Market Value of Assets at January 1 of current year	1,443,551	1,575,135
Rate of return during prior year	5.95%	8.02%

Average Portfolio Mix During Prior Year:

(a) Domestic Large Cap Equities	32%	31%
(b) Domestic Small Cap Equities	22%	23%
(c) Domestic Fixed Income	34%	32%
(d) International Equities	4%	5%
(e) Real Estate	3%	4%
(f) Cash	5%	5%
(g) Total	100%	100%

Duration of Domestic Fixed Income	10.0	10.0
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Asset Class Returns during Prior Year:

(a) Domestic Large Cap Equities	7%	11%
(b) Domestic Small Cap Equities	8%	12%
(c) Domestic Fixed Income	6%	4%
(d) International Equities	-5%	8%
(e) Real Estate	2%	3%
(f) Cash	1%	1%

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

2017

2018

Expense Valuation - January 1 (numbers in \$000's) •		
1. Funded Status and Deferred Costs:		
(a) Accumulated Benefit Obligation	(1,034,173)	(1,115,705)
(b) Projected Benefit Obligation		
(i) Vested	(1,282,375)	(1,368,599)
(ii) Non-vested	(96,523)	(119,009)
(iii) Total	(1,378,898)	(1,487,607)
(c) Fair Value of Assets	1,443,551	1,575,135
(d) Funded Status: (b) + (c)	64,653	87,528
(e) Unrecognized (gains)/losses	(203,656)	(207,680)
2 Net Periodic Benefit Cost		
(a) Service Cost (beg. of year)	64,067	70,213
(b) Interest Cost	57,223	57,918
(c) Expected return on assets	(94,325)	(102,849)
(d) Amortization of prior service cost	-	-
(e) Amortization of actuarial (gain)/loss	(5,814)	(4,733)
(f) Total Net Periodic Benefit Cost	21,151	20,549
All plan administrative expenses are paid and accounted for outside of the plan fund.		
3 Actuarial Basis and Supplemental Data		
(a) Discount rate	4.00%	3.75%
(b) Return on assets	6.50%	6.50%
(c) Salary scale	3.50%	3.25%
(d) Consumer Price Index	3.00%	3.00%
(e) Mortality	GAM83	
(f) Turnover	Based on NOC experience for 2000-2005	
(g) Proportion married and age difference	80% married; male spouses 3 years older than female spouses	
(h) Retirement age	Age 62	
(i) Expenses	Assume all expenses paid by company	
(j) Asset Valuation Method	Market value of assets	
(k) Actuarial Cost Method	Projected unit credit	
(l) Expected Employer contributions	40,002	41,002
(m) Expected Benefit payments	(24,800)	(26,700)

• numbers may not add due to rounding

**National Oil Full-Time Salaried Pension Plan
Reconciliation of Plan Participants**

	<u>Active</u>	<u>Pensioners/ Beneficiaries</u>	<u>Total</u>
Participants as of January 1, 2017	3,280	1,080	4,360
- New Entrants/Rehires	210	-	210
- Terminated Nonvested	(40)	-	(40)
- Terminated Vested (Lump Sum Cashout)	(60)	-	(60)
- Retirement	(90)	90	-
- Death w/ Beneficiary	(4)	4	-
- Death w/o Beneficiary	(6)	(44)	(50)
- Net change	10	50	60
Participants as of January 1, 2018	3,290	1,130	4,420

**National Oil Full-Time Salaried Pension Plan
Age/Svc/Earnings as of January 1, 2018**

		<i>SeNice (Years)</i>					Totals	
		< 5	5-10	10-15	15-20	>20		
Age (Years)	< 25	# Participants	60	20	-	-	-	80
		Average Salary	55,000	70,000	-	-	-	58,800
	25-35	# Participants	130	40	90	120	-	380
		Average Salary	65,000	80,000	90,000	75,000	-	75,700
	35-45	# Participants	90	60	150	120	150	570
		Average Salary	75,000	90,000	90,000	95,000	95,000	90,000
	45-55	# Participants	90	40	120	250	720	1,220
		Average Salary	80,000	95,000	95,000	95,000	100,000	96,800
	55-65	# Participants	30	60	80	200	580	950
		Average Salary	80,000	85,000	95,000	95,000	95,000	93,900
	> 65	# Participants	-	-	30	40	20	90
		Average Salary	-	-	75,000	85,000	80,000	80,600
	Totals	# Participants	400	220	470	730	1,470	3,290
		Average Salary	70,300	85,900	91,200	91,200	97,200	91,000
		Avg Age	49.2					
		Avg Svc	18.8					
		Avg Salary	91,000					

National Oil Full-Time Salaried Supplemental Retirement Plan (SRP)

Eligibility	Immediate
Normal Retirement Age	65
Early Retirement Age	55 with 5 years of service
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

2017

2018

Participant Summary

1. Active Participants		
(a) count	50	47
(b) average age	57.0	57.5
(c) average service	21.0	21.4
(d) average future working lifetime	4.8	4.5
(e) average future working lifetime to vesting (for those not)	2.0	1.0
(f) average plan earnings (prior year)	450,000	460,000
2. Deferred Vested Participants		
(a) count	-	-
3. Pensioners (incl beneficiaries)		
(a) count	35	38
(b) average age	66.8	67.2
(c) average annual benefit	16,800	17,500
Duration of plan liabilities	14.5	13.8

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

1. Funded Status and Deferred Costs:		
(a) Accumulated Benefit Obligation	(73,441)	(81,530)
(b) Projected Benefit Obligation		
(i) Vested	(64,801)	(76,844)
(ii) Non-vested	(21,600)	(16,868)
(iii) Total	(86,401)	(93,713)
(c) Fair Value of Assets	-	-
(d) Funded Status: (b) + (c)	(86,401)	(93,713)
(e) Unrecognized (gains)/losses	20,714	20,677
2. Net Periodic Benefit Cost		
(a) Service cost (beg. of year)	1,901	1,872
(b) Interest Cost	3,520	3,572
(c) Expected ROA	-	-
(d) Amort of prior service cost	-	-
(e) Amort of unrec (gains)/losses	2,515	2,512
(f) Total Net Periodic Benefit Cost	7,937	7,956
All plan administrative expenses are paid out of general assets of NOC (outside of plan accounting).		
3. Expected Benefit Payments	588	665
4. Actuarial Basis		
(a) Discount rate	4.00%	3.75%
(b) Return on assets	N/A	N/A
(c) Salary scale	3.50%	3.25%
(d) CPI	3.00%	3.00%
(e) All other assumptions	Same as for Full-time Salaried Pension Plan	

* numbers may not add due to rounding

National Oil Full-Time Hourly Union Pension Plan

Eligibility	Immediate
Vesting	100% after 5 years of service
Normal Retirement Age	65
Early Retirement Age	55 with 10 years of service
Normal Retirement Benefit	\$80 per month times years of service for terminations/ retirements prior to 2010 \$81 per month times years of service for terminations/ retirements during 2010 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	If married, 50% joint & survivor benefit without reduction If not married, single life annuity.
Optional Forms of Benefit	None
Post-Retirement Indexing	Lesser of 1% or CPI each year after pension commencement
Termination Benefit	Lump sum equal to actuarial present value of accrued benefit assuming no indexing
Pre-Retirement Death Benefit	Lump sum equal to actuarial present value of accrued benefit assuming no indexing, payable to named beneficiary
Disability Benefit	None

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

2017

2018

Participant Summary • January 1

<i>Active Participants</i>		
(a) count	5,930	5,620
(b) average age	50.0	50.2
(c) average service	20.5	20.9
(d) average future working lifetime	9.8	9.6
(e) average future working lifetime to vesting (for those not)	3.0	2.5
(f) average plan earnings (prior year)	49,000	49,700
<i>Deferred Vested Participants</i>		
(a) count	-	-
<i>Pensioners (incl beneficiaries)</i>		
(a) count	1,299	1,394
(b) average age	71.0	71.1
(c) average annual benefit	11,750	12,500
Duration of plan liabilities	14.0	13.8

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	900,101	990,452
Employer Contributions during prior year	50,000	50,000
Benefit Payments during prior year	(14,000)	(15,000)
Expenses during prior year	-	-
Investment return during prior year	54,352	45,055
Market Value of Assets at January 1 of current year	990,452	1,070,508
Rate of return during prior year	5.92%	4.47%
<i>Average Portfolio Mix During Prior Year:</i>		
(a) Domestic Large Cap Equities	7%	8%
(b) Domestic Small Cap Equities	0%	0%
(c) Domestic Fixed Income	90%	89%
(d) International Equities	0%	0%
(e) Real Estate	0%	0%
(f) Cash		11%
(g) Total	100%	100%
Duration of Domestic Fixed Income	15.0	15.0
<i>Asset Class Returns during Prior Year:</i>		
(a) Domestic Large Cap Equities	7%	11%
(b) Domestic Small Cap Equities	8%	12%
(c) Domestic Fixed Income	6%	4%
(d) International Equities	-5%	8%
(e) Real Estate	2%	3%
(f) Cash	1%	1%

• numbers may not add due to rounding

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

	2017	2018
1 Funded Status and Deferred Costs:		
(active multiplier)	81.00	81.00
(a) Accumulated Benefit Obligation	(996,997)	(1,059,198)
(b) Projected Benefit Obligation		
(i) Vested	(947,147)	(1,006,238)
(ii) Non-vested	(49,850)	(52,960)
(iii) Total	(996,997)	(1,059,198)
(c) Fair Value of Assets	990,452	1,070,508
(d) Funded Status: (b) + (c)	(6,545)	11,310
(e) Unrecognized prior service costs	4,488	3,641
(f) Unrecognized (gains)/losses	(51,000)	(48,400)
2 Net Periodic Benefit Cost		
(a) Service Cost (beg. of year)	41,124	41,924
(b) Interest Cost	46,378	46,436
(c) Expected return on assets	(57,957)	(61,928)
(d) Amortization of prior service cost	847	847
(e) Amortization of actuarial (gain)/loss	-	-
(f) Immediate recognition of past service costs & (gains)/losses	-	-
(g) Total Net Periodic Benefit Cost	30,391	27,279
All plan administrative expenses are paid and accounted for outside of the plan fund.		
3 Actuarial Basis and Supplemental Data		
(a) Discount rate	4.50%	4.25%
(b) Return on assets	5.75%	5.75%
(c) Salary scale	N/A	N/A
(d) Consumer Price Index	3.00%	3.00%
(e) Mortality	GAM83	
(f) Turnover	Based on NOC experience for 2000-2005	
(g) Retirement age	Age 62, with appropriate early retirement reduction, if any	
(h) Proportion married and age difference	80% married, male spouses 3 years older than female spouses	
(i) Expenses	Assume all expenses paid by company	
(j) Post-retirement indexing	1.00%	1.00%
(k) Asset Valuation Method	Market value of assets	
(l) Actuarial Cost Method	Projected unit credit	
(m) Expected Employer contributions	50,000	30,000
(n) Expected Benefit payments	(15,000)	(17,000)

• numbers may not add due to rounding

**National Oil Full-Time Hourly Union Pension Plan
Reconciliation of Plan Participants**

	<u>Active</u>	<u>Pensioners/ Beneficiaries</u>	<u>Total</u>
Participants as of January 1, 2017	5,930	1,299	7,229
- New Entrants/Rehires	20	-	20
- Terminated Nonvested	(80)	-	(80)
- Terminated Vested (Lump Sum Cashout)	(100)	-	(100)
- Retirement	(140)	90	(50)
- Death w/ Beneficiary	(5)	5	-
- Death w/o Beneficiary	(5)	-	(5)
- Net change	(310)	95	(215)
Participants as of January 1, 2018	5,620	1,394	7,014

**National Oil Full-Time Hourly Union Pension Plan
Age/Svc/Earnings as of January 1, 2018**

		<i>Service (Years)</i>						
		< 5	5-10	10-15	15-20	>20	Totals	
Age (Years)	< 25	# Participants	40	40	-	-	-	80
		Average Salary	30,000	40,000	-	-	-	35,000
	25-35	# Participants	40	70	90	-	-	200
		Average Salary	30,000	40,000	45,000	-	-	40,300
	35-45	# Participants	20	100	120	510	740	1,490
		Average Salary	30,000	40,000	45,000	50,000	45,000	46,200
	45-55	# Participants	30	50	120	350	1,320	1,870
		Average Salary	35,000	45,000	50,000	50,000	60,000	56,700
	55-65	# Participants	30	60	100	300	1,210	1,700
		Average Salary	35,000	36,000	45,000	50,000	50,000	48,900
	> 65	# Participants	-	10	80	100	90	280
		Average Salary	-	30,000	30,000	40,000	40,000	36,800
	Totals	# Participants	160	330	510	1,260	3,360	5,620
		Average Salary	31,900	39,700	43,800	49,200	52,600	49,700
		Avg Age	50.2					
		Avg Svc	20.9					
		Avg Salary	49,700					

National Oil Part-Time DC Pension Plan

Eligibility	Immediate
Vesting	Immediate
Employee Contributions	Employee may defer between 1% to 20% of pay
Employer Contributions	3% of pay
Plan Fund Investment Options	The employer invests in funds elected by employee
Account Balance	Contributions are accumulated in member's individual account earning a rate of return based on the investments elected by the employee
Loans/Withdrawals	Not permitted.
Benefit on Termination or Retirement	Account balance is payable to employee upon termination or retirement. Employee has the option to leave the balance in the fund or withdraw entire balance immediately upon termination or retirement.
Benefit on Death	Account balance is payable to named beneficiary

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

2017 **2018**

Participant Summary

(a) number participating during prior year	7,100	7,000
(b) average age	29.0	29.5
(c) average pay	39,000	39,500

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	109,540	122,440
Employee Contributions during prior year	13,845	13,825
Company Contributions during prior year	8,307	8,295
Benefit Payments during prior year	(14,910)	(14,700)
Expenses during prior year	-	-
Investment return during prior year	5,658	7,569
Market Value of Assets at January 1 of current year	122,440	137,429
Rate of return during prior year	5.00%	6.00%

** 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.
Pre-retirement / termination benefits	None
Spousal Coverage	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
Life Insurance benefit	Effective January 1, 201 Q introduced \$50,000 life insurance benefit payable upon death after retirement

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

2017

2018

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

1. Funded Status and Deferred Costs:		
(a) Accumulated Postretirement Benefit Obligation		
(i) <i>actives - fully vested</i>	(1,218,466)	(1,254,095)
(ii) <i>actives - not fully vested</i>	(522,200)	(537,469)
(iii) <i>retirees</i>	(1,387,852)	(1,537,354)
(iv) <i>total</i>	(3,128,517)	(3,328,918)
(b) Fair Value of Assets	-	-
(c) Surplus: (a) + (b)	(3,128,517)	(3,328,918)
(d) Unrecognized prior service costs	6,590	3,908
(e) Unrecognized (gains)losses	782,724	766,788
2. <i>Net Periodic Benefit Cost</i>		
(a) Service cost (beg. of year)	108,792	111,973
(b) Interest Cost	120,274	119,294
(c) Expected ROA	-	-
(d) Amort of prior service cost	2,682	2,682
(e) Amort of (gain)loss	47,271	43,520
(f) Total Net Periodic Benefit Cost	279,018	277,469
All plan administrative and claims expenses are included in the claims costs used to determine the plan liability.		
3. Expected Benefit Payments	60,000	65,000
4. Average Future Working Lifetime to Retirement	9.94	9.97
5. Average Future Working Lifetime to FEA	6.94	6.97
6. Average Future Working Lifetime to Fully Vested <i>(for those not vested)</i>	6.94	6.97
7. Duration of plan liabilities	13.00	13.00
8. Actuarial Assumptions:		
(a) Discount rate	3.75%	3.50%
(b) Return on assets	N/A	N/A
(c) Medical trend		
Initial rate	6.00%	5.50%
Annual decrease	0.50%	0.50%
Ultimate rate	4.50%	4.50%
Year ultimate trend rate reached	2020	2020
(d) CPI	3.00%	3.00%
(e) Per capita claims cost	18,000	18,500
(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