



# Case Study

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Design & Accounting Exam–U.S.  
EXAM RETDAU

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RETDAU Morning Session

## 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
- Plan sponsors have unconditional rights to a refund of surplus assets

### *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 has adopted Generally Accepted Accounting Principles (GAAP).

Gevrey has a well-developed investment market with substantial trading in government bonds, corporate bonds, and equities.

### **Summary of National Oil's Retirement Benefits**

NOC maintains three defined benefit plans:

1. Final-average pay defined benefit ERP for its full-time salaried employees;
2. Unit benefit defined benefit ERP for its full-time hourly union staff; and
3. 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, full-time salaried and union employees retiring with the company are covered for their lifetime by health benefits.

## National Oil Full-Time Salaried Pension Plan

### Key Plan Provisions

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
Early Retirement Benefit	Benefit calculated as under the Normal Retirement Benefit formula using Best Average Earnings and service as of date of calculation  Normal Retirement 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 Normal Retirement Benefit
Pre-Retirement Death Benefit	Lump sum equal to actuarial present value of Normal Retirement Benefit payable to named beneficiary
Disability Benefit	None

## National Oil Full-Time Salaried Pension Plan

Demographic Summary as of January 1, 2019

		Service (Years)					Totals	
		< 5	5-10	10-15	15-20	>20		
Age (Years)	< 25	# Participants	50	10	-	-	-	60
		Average Salary	43,000	54,000	-	-	-	44,800
	25-35	# Participants	380	100	20	-	-	500
		Average Salary	59,000	71,000	73,000	-	-	62,000
	35-45	# Participants	290	180	130	90	10	700
		Average Salary	71,000	84,000	88,000	94,000	82,000	80,600
	45-55	# Participants	200	140	140	200	200	880
		Average Salary	70,000	82,000	90,000	98,000	105,000	89,400
	55-65	# Participants	120	100	100	150	270	740
		Average Salary	68,000	79,000	85,000	95,000	106,000	91,100
	> 65	# Participants	20	30	20	30	50	150
		Average Salary	65,000	79,000	90,000	99,000	114,000	94,300
	Totals	# Participants	1,060	560	410	470	530	3,030
		Average Salary	64,700	79,500	87,300	96,300	105,900	82,600
	Average Age		47.1					
	Average Service		10.8					
	Average Salary		82,600					

	Pensioners/ Beneficiaries		Total
	Actives		
Participants as of January 1, 2018	3,000	1,500	4,500
- New Entrants/Rehires	335	-	335
- Terminated Nonvested	(80)	-	(80)
- Terminated Vested (Lump Sum Cashout)	(120)	-	(120)
- Retirement	(100)	100	-
- Death w/ Beneficiary	(5)	5	-
- Death w/o Beneficiary	-	(10)	(10)
- Net change	30	95	125
Participants as of January 1, 2019	3,030	1,595	4,625

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

2018

2019

**Participant Summary – January 1**

Active Participants		
(a) count	3,000	3,030
(b) average age	46.5	47.1
(c) average service	10.2	10.8
(d) average future working lifetime	12.4	11.9
(e) average future working lifetime to vesting (for those not)	2.5	2.5
(f) average plan earnings (prior year)	82,000	82,600
Deferred Vested Participants		
(a) count	-	-
Pensioners (including beneficiaries)		
(a) count	1,500	1,595
(b) average age	68.0	67.5
(c) average annual benefit	21,600	21,816
Duration of plan liabilities	13.1	13.1

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

Change in Plan Assets during Prior Year		
(a) Market Value of Assets at January 1 of prior year	545,331	590,439
(b) Employer Contributions during prior year	32,930	33,590
(c) Benefit Payments during prior year	(31,610)	(32,400)
(d) Expenses during prior year	-	-
(e) Investment return during prior year	43,788	32,802
(f) Market Value of Assets at January 1 of current year	590,439	624,431
(g) Rate of return during prior year	8.02%	5.55%
Average Portfolio Mix During Prior Year		
(a) Domestic Large Cap Equities	31%	30%
(b) Domestic Small Cap Equities	23%	20%
(c) Domestic Fixed Income	32%	35%
(d) International Equities	5%	5%
(e) Real Estate	4%	5%
(f) Cash	5%	5%
(g) Total	100%	100%
Duration of Domestic Fixed Income	10.0	10.0
Asset Class Returns during Prior Year		
(a) Domestic Large Cap Equities	11%	7%
(b) Domestic Small Cap Equities	12%	6%
(c) Domestic Fixed Income	4%	5%
(d) International Equities	8%	2%
(e) Real Estate	3%	7%
(f) Cash	1%	1%

\* numbers may not add due to rounding

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

2018

2019

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

1. Funded Status and Deferred Costs		
(a) Accumulated Benefit Obligation	(804,994)	(880,050)
(b) Projected Benefit Obligation		
(i) Vested	(935,620)	(1,017,863)
(ii) Non-vested	(49,243)	(53,572)
(iii) Total	(984,863)	(1,071,435)
(c) Fair Value of Assets	590,439	624,431
(d) Funded Status: (b) + (c)	(394,424)	(447,004)
(e) Unrecognized (gains)/losses	113,349	142,723
2. Net Periodic Pension Cost		
(a) Service cost (beg. of year)	55,599	57,706
(b) Interest cost	38,410	41,690
(c) Expected return on assets	(38,417)	(39,029)
(d) Amortization of prior service cost	-	-
(e) Amortization of (gain)/loss	1,199	2,985
(f) Net Periodic Pension Cost	56,791	63,353
[All plan administrative expenses are paid and accounted for outside of the plan fund]		
3. Actuarial Basis and Supplemental Data		
(a) Discount rate	3.75%	3.75%
(b) Return on assets	6.50%	6.25%
(c) Mortality	RP-2014 with no mortality improvement	
(d) Salary scale	3.25%	3.25%
(e) Inflation	3.00%	3.00%
(f) Turnover	NOC experience during period 2000-05	
(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	
(k) Actuarial cost method	Projected Unit Credit	
(l) Expected employer contributions	33,585	34,858
(m) Expected benefit payments	(32,400)	(34,800)
(n) Gain/loss amortization method	10% corridor; amortized over average future working lifetime	

\* numbers may not add due to rounding

## National Oil Supplemental Retirement Plan

### Key Plan Provisions

Eligibility	Immediate
Normal Retirement Age	65
Early Retirement Age	55 with 5 years of service
Accrued Benefit	Normal Retirement Benefit calculated under the provisions of the Salaried Pension Plan without regard to tax system maximums <u>less</u> actual Normal Retirement 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



**National Oil Supplemental Retirement Plan**  
Historical Actuarial Valuation Results

2018

2019

**Participant Summary – January 1**

Active Participants		
(a) count	48	50
(b) average age	57.0	57.2
(c) average service	21.0	21.2
(d) average future working lifetime	4.9	4.7
(e) average future working lifetime to vesting (for those not)	2.0	2.0
(f) average plan earnings (prior year)	255,000	258,300
Deferred Vested Participants		
(a) count	-	-
Pensioners (including beneficiaries)		
(a) count	33	34
(b) average age	70.0	70.1
(c) average annual benefit	34,300	36,900
Duration of plan liabilities	12.5	12.4

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

1. Funded Status and Deferred Costs		
(a) Accumulated Benefit Obligation	(29,079)	(31,871)
(b) Projected Benefit Obligation		
(i) Vested	(30,170)	(32,452)
(ii) Non-vested	(2,283)	(2,980)
(iii) Total	(32,454)	(35,432)
(c) Fair Value of Assets	-	-
(d) Funded Status: (b) + (c)	(32,454)	(35,432)
(e) Unrecognized (gains)/losses	12,543	12,432
2. Net Periodic Pension Cost		
(a) Service cost (beg. of year)	1,087	1,169
(b) Interest cost	1,237	1,349
(c) Expected return on assets	-	-
(d) Amortization of prior service cost	-	-
(e) Amortization of (gain)/loss	1,897	1,875
(f) Net Periodic Pension Cost	4,221	4,393
[All plan administrative expenses are paid and accounted for outside of the plan fund]		
3. Actuarial Basis and Supplemental Information		
(a) Discount rate	3.75%	3.75%
(b) Return on assets	N/A	N/A
(c) Salary scale	3.25%	3.25%
(d) Inflation	3.00%	3.00%
(e) All other assumptions	Same as for Full-time Salaried Pension Plan	
(f) Expected benefit payments	(1,132)	(1,255)
(g) Gain/loss amortization method	10% corridor; amortized over average future working lifetime	

\* numbers may not add due to rounding

## National Oil Full-Time Hourly Union Pension Plan

### Key Plan Provisions

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 benefit commencement
Termination Benefit	Lump sum equal to actuarial present value of Normal Retirement Benefit assuming no indexing
Pre-Retirement Death Benefit	Lump sum equal to actuarial present value of Normal Retirement Benefit assuming no indexing, payable to named beneficiary
Disability Benefit	None

**National Oil Full-Time Hourly Union Pension Plan**  
Demographic Summary as of January 1, 2019

		<b>Service (Years)</b>					Totals	
		< 5	5-10	10-15	15-20	>20		
<b>Age (Years)</b>	< 25	# Participants	60	-	-	-	-	60
		Average Salary	30,000	-	-	-	-	30,000
	25-35	# Participants	340	240	50	-	-	630
		Average Salary	39,000	43,000	54,000	-	-	41,700
	35-45	# Participants	250	330	360	190	60	1,190
		Average Salary	48,000	49,000	51,000	54,000	42,000	49,800
	45-55	# Participants	230	350	480	430	600	2,090
		Average Salary	50,000	52,000	52,000	55,000	58,000	54,100
	55-65	# Participants	100	210	310	310	440	1,370
		Average Salary	55,000	53,000	51,000	53,000	59,000	54,600
	> 65	# Participants	10	40	50	60	50	210
		Average Salary	70,000	54,000	61,000	55,000	65,000	59,300
	Totals	# Participants	990	1,170	1,250	990	1,150	5,550
		Average Salary	45,200	49,600	51,900	54,200	57,900	51,800
	Average Age		48.4					
	Average Service		12.9					
	Average Salary		51,800					

	<b>Reconciliation of Plan Participants</b>		<b>Total</b>
	<b>Actives</b>	<b>Pensioners/ Beneficiaries</b>	
<i>Participants as of January 1, 2018</i>	<b>5,700</b>	<b>1,400</b>	<b>7,100</b>
- New Entrants/Rehires	240	-	240
- Terminated Nonvested	(60)	-	(60)
- Terminated Vested (Lump Sum Cashout)	(80)	-	(80)
- Retirement	(250)	250	-
- Death w/ Beneficiary	-	-	-
- Death w/o Beneficiary	-	(20)	(20)
- Net change	(150)	230	80
<i>Participants as of January 1, 2019</i>	<b>5,550</b>	<b>1,630</b>	<b>7,180</b>

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

**2018**

**2019**

**Participant Summary – January 1**

Active Participants		
(a) count	5,700	5,550
(b) average age	47.6	48.4
(c) average service	12.4	12.9
(d) average future working lifetime	11.5	10.9
(e) average future working lifetime to vesting (for those not)	2.5	2.6
(f) average plan earnings (prior year)	50,800	51,800
Deferred Vested Participants		
(a) count	-	-
Pensioners (including beneficiaries)		
(a) count	1,400	1,630
(b) average age	69.8	69.2
(c) average annual benefit	12,430	13,140
Duration of plan liabilities	14.0	13.8

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

Change in Plan Assets during Prior Year		
(a) Market Value of Assets at January 1 of prior year	500,000	539,065
(b) Employer Contributions during prior year	31,950	32,590
(c) Benefit Payments during prior year	(15,600)	(17,402)
(d) Expenses during prior year	-	-
(e) Investment return during prior year	22,715	27,333
(f) Market Value of Assets at January 1 of current year	539,065	581,586
(g) Rate of return during prior year	4.47%	5.00%
Average Portfolio Mix During Prior Year		
(a) Domestic Large Cap Equities	8%	8%
(b) Domestic Small Cap Equities	0%	0%
(c) Domestic Fixed Income	89%	88%
(d) International Equities	0%	0%
(e) Real Estate	0%	0%
(f) Cash	<u>3%</u>	<u>4%</u>
(g) Total	100%	100%
Duration of Domestic Fixed Income	15.0	15.0
Asset Class Returns during Prior Year		
(a) Domestic Large Cap Equities	11%	7%
(b) Domestic Small Cap Equities	12%	6%
(c) Domestic Fixed Income	4%	5%
(d) International Equities	8%	2%
(e) Real Estate	3%	7%
(f) Cash	1%	1%

\* numbers may not add due to rounding

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

2018

2019

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

1. Funded Status and Deferred Costs		
(a) Accumulated Benefit Obligation	(745,505)	(806,753)
(b) Projected Benefit Obligation		
(i) Vested	(723,139)	(782,550)
(ii) Non-vested	(22,365)	(24,203)
(iii) Total	(745,505)	(806,753)
(c) Fair Value of Assets	539,065	581,586
(d) Funded Status: (b) + (c)	(206,439)	(225,166)
(e) Unrecognized (gains)/losses	45,387	51,371
2. Net Periodic Benefit Cost		
(a) Service cost (beg. of year)	42,283	41,386
(b) Interest cost	33,111	37,684
(c) Expected return on assets	(30,066)	(32,312)
(d) Amortization of prior service cost	-	-
(e) Amortization of (gain)/loss	-	-
(f) Net Periodic Pension Cost	45,328	46,758
[All plan administrative expenses are paid and accounted for outside of the plan fund]		
3. Actuarial Basis and Supplemental Information		
(a) Discount rate	4.25%	4.50%
(b) Return on assets	5.50%	5.50%
(c) Mortality	RP-2014 with no mortality improvement	
(d) Salary scale	N/A	N/A
(e) Inflation	3.00%	3.00%
(f) Turnover	NOC experience during period 2000-05	
(g) Proportion married and age difference	80% married; male spouses 3 years older than female spouses	
(h) Retirement age	Age 62 with early retirement reduction if applicable	
(i) Expenses	Assume all expenses paid by company	
(j) Asset valuation method	Market value	
(k) Actuarial cost method	Projected Unit Credit	
(l) Expected employer contributions	32,585	33,242
(m) Expected benefit payments	(17,402)	(21,418)
(n) Gain/loss amortization method	10% corridor; amortized over average future working lifetime	

\* numbers may not add due to rounding

## National Oil Part-Time DC Pension Plan

### Key Plan Provisions

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

	2018	2019
<b>Participant Summary – January 1</b>		
Number participating during prior year	7,000	6,900
Average age	29.5	30.0
Average pay	39,500	39,700
<b>Plan Assets (numbers in \$000's) *</b>		
Market Value of Assets at January 1 of prior year	100,000	104,553
Employee contributions during prior year	15,230	14,655
Company contributions during prior year	8,307	8,295
Benefit payments during prior year	(24,942)	(24,618)
Expenses during prior year	-	-
Investment return during prior year	5,958	5,705
Market Value of Assets at January 1 of current year	104,553	108,589
Rate of return during prior year	6.00%	5.50%

\* numbers may not add due to rounding

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

### Key Plan Provisions

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% of the plan cost paid by the employer
Pre-retirement / termination benefits	None
Spousal Coverage	Coverage continues for the life of the spouse after death of an eligible retiree
Benefits Covered	\$0 deductible; \$0 copay No lifetime maximum Office visits Hospital visits Surgery Prescription drugs
Life Insurance benefit	Effective January 1, 2010: 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

2018

2019

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

##### 1. Funded Status and Deferred Costs

###### (a) Accumulated Postretirement Benefit Obligation

(i) actives - fully vested	(1,490,172)	(1,478,003)
(ii) actives - not fully vested	(638,645)	(633,430)
(iii) retirees	(1,110,683)	(1,230,569)
(iv) total	(3,239,500)	(3,342,001)
(b) Fair Value of Assets	-	-
(c) Surplus: (a) + (b)	(3,239,500)	(3,342,001)
(d) Unrecognized prior service costs	3,908	1,226
(e) Unrecognized (gains)/losses	666,185	472,501

##### 2. Net Periodic Postretirement Benefit Cost

(a) Service cost (beg. of year)	182,866	173,661
(b) Interest cost	119,174	131,097
(c) Expected return on assets	-	-
(d) Amortization of prior service cost	2,682	1,226
(e) Amortization of (gain)/loss	28,945	12,296
(f) Net Periodic Postretirement Benefit Cost	333,668	318,280

[All plan administrative and claims expenses are included in the claims costs used to determine the plan liability.]

##### 3. Expected Benefit Payments

(34,800) (39,474)

##### 4. Average Future Working Lifetime to Retirement

11.8 11.2

##### 5. Average Future Working Lifetime to Full Eligibility Age

8.8 8.2

##### 6. Duration of plan liabilities

17.5 17.4

##### 7. Actuarial Assumptions and Supplemental Information

(a) Discount rate	3.50%	3.75%
(b) Return on assets	N/A	N/A
(c) Medical trend		
– Initial rate	5.50%	5.50%
– Annual decrease	0.50%	0.25%
– Ultimate rate	4.50%	4.50%
– Year ultimate trend rate reached	2020	2023
(d) CPI	3.00%	3.00%
(e) Per capita claims cost ( <i>not in \$000</i> )	14,500	14,800
(f) Retirement assumption	Age 62 with 10 years of service	
(g) All other demographic assumptions	Same as those used for pension plans	
(h) Gain/loss amortization method	10% corridor; amortized over average future working lifetime	

\* numbers may not add due to rounding