

RET DAU Solutions for Fall 2013

1. Learning Objectives:

5. The candidate will be able to evaluate sponsor's goals for the retirement plan, evaluate alternative plan types and features, and recommend a plan design appropriate for the sponsor's goals.

Learning Outcomes:

- (5l) Give examples of plans that are appropriate for multinational companies and their employees including third country nationals and expatriates.
- (5m) Recommend an appropriate plan type and plan design features for providing retirement benefits and defend the recommendations.

Sources:

DA-130-13: International (offshore) Pension Plans - A Growing Trend

DA-133-13: Chapter 34 of The Handbook of Employee Benefits: Health and Group Benefits

Commentary on Question:

Successful candidates listed key points for each questions and accompanied each point with coherent explanation demonstrating understanding. Successful candidates discussed employment arrangements, not pension arrangements.

Solution:

- (a) Describe four arrangements that XYZ could use to employ workers outside XYZ's home country.

The following types of employees can be employed to work outside of XYZ's home country:

Expatriates

- XYZ can hire employees from XYZ's home country and send them on temporary assignments overseas
- Typically compensation and benefit are in accordance with terms and conditions of their home country

Local Nationals

- XYZ can hire employees working and residing on a long term basis in country where XYZ has foreign operations
- Employees may or may not be a citizen of the country where they reside
- Typically compensation and benefits are based on local practices

1. Continued

Locally Hired Foreigners

- XYZ can hire nonlocal individuals in country where XYZ has foreign operations
- Typically reside in nearby countries
- Employed on local terms and conditions
- Often get extra compensation (eg. housing, medical)

Third Country Nationals

- XYZ can hire foreigners and send them on assignment to country where XYZ has foreign operations
- Individuals working for a foreign company on assignment outside of their home country (i.e. Canadian working for a US company on assignment in Germany)
- Typically more than one assignment during career
- Compensation may be provided on a home country, host country or special basis to suit needs

- (b) Explain why XYZ may consider sponsoring an international pension plan.

The following are reasons XYZ may consider sponsoring an international pension plan (IPP):

There is an increase in number of expatriates that XYZ employs

- Creating an IPP meets the wants and the needs of the employees
- The number employees must be large enough to make plan viable (economies of scale)
- Allows for continuity in retirement benefits, uniform/equitable treatment
- Solves the problem of fragmented retirement benefit caused by work in multiple locations
- Meets social obligation
- Provide flexible benefits
- Cost savings and simplified administration

Competition

- Growing competition, need to offer at least equivalent benefits as competitors
- Employees who are globally mobile are typically talented and high performers that expect to receive retirement benefits
- Need competitive benefits package to attract and retain employees

There is a lack of home or host country plan provisions

- Employees are unable to participate in home or host plan
- No home or host country plan exist
- Employers want to provide the minimum home or host country provisions as not to deter employees from accepting positions
- Employees who are globally mobile expect to accumulate home or host country retirement benefits

1. Continued

XYZ may want to provide top-up provision

- Allows for XYZ to provide supplementary benefits for key expats/employees
- Allows XYZ to offset loss of social security benefits due to mobility

XYZ may want to implement an IPP as a response to legislation

- Having expats in a home country or host country plan may be complex as a result of legislation (i.e. difficult to joining or leaving), may be easier to sponsor IPP
- Easy to settle if an employee leaves the company
- Legislation is introduced that does not allow you to participate in a home or host country plan
- IPP's are not normally tax effective, contributions normally taxed in host country, typically receive tax free investment returns, benefit payments typically taxed in country in which they are received.

XYZ has goals of becoming a global management company

- XYZ wants a structure in place that can provide an IPP to expatriates hired on contract
- globally designed to deal with expatriate population and special employees

- (c) Describe the key features of a global benefit policy statement.

The key features of a global benefit policy statement are as follows:

- Statement of the company's philosophy and overall attitude for employee benefits
- Outline of the process to receive approval for new programs or plan changes
- Provides guidance on implementation, modification and ongoing administrations
- Focuses on polices and principals in general, not specifics
- Contains broad policy statements on the following:

Total Remuneration

- Competitiveness of each element of pay: salary, bonus, pension, health benefits
- Tax effectiveness and state of the business;
- Preferences for specific levels and types of benefits included

Competitive practice

- Dictates how XYZ will compete
- Outlines XYZ stance on competitors
- Provides general guidelines for identifying competitors,
- Competitors may be based on industry, geographic location; size, activity, type of ownership or by employee group

1. Continued

Uniformity of treatment and internal equity

- Equity amongst employee groups across borders
- Equity amongst employee groups within each location

Mergers & Acquisitions

- Specify how company should deal with M&A
- Due diligence
- Methods:
 - Immediate integration,
 - Maintain current arrangements
 - Gradual integration

Costs

- How to budget and report costs
- Levels of cost-sharing with employees
- Preferred funding levels and investment guidelines

Employee communications

- Availability of information to employees
- Frequency of communications and method of deliver

2. Learning Objectives:

3. Candidate will be able to analyze the risks faced by retirees and the participants of retirement plans and retiree health plans.
4. The candidate will be able to evaluate plan design risks faced by sponsors of retirement plans and retiree health plans.
7. The candidate will be able to analyze/synthesize the factors that go into selection of actuarial assumptions.

Learning Outcomes:

- (3a) Identify risks face by retirees and the elderly.
- (3b) Describe and contrast the risks face by participants of:
 - (i) Government sponsored retirement plans
 - (ii) Single employer sponsored retirement plans
 - (iii) Multiemployer retirement plans, and
 - (iv) Social insurance plans
- (4a) Identify how plan features, temporary or permanent, can adversely affect the plans sponsor.
- (4b) Assess the risk from options offered, including:
 - (i) Phased retirement
 - (ii) Postponed retirement
 - (iii) Early Retirement
 - (iv) Option factors
 - (v) Embedded options
 - (vi) Portability options
- (7b) Describe and explain the different perspectives on the selection of assumptions.
- (7c) Describe and apply the techniques used in the development of economic assumptions.
- (7d) Recommend appropriate assumptions for a particular type of valuation and defend the selection.

Sources:

Key Findings and Issues: Understanding and Managing the Risk of Retirement, 2011
Risks and Process of Retirement Survey Report, March 2012

Fundamentals of Private Pensions, McGill, 9th Edition Ch. 5

“Downsizing and Plan Design”, RSA 1995, Vol. 21 No. 3A

DA-122-13: Turner & Watanabe, Private Pension Policies in Industrialized Countries, chap 5, “Pension Risk and Insurance,” pp 65-81

2. Continued

DA-136-13: 2009 Selection of Actuarial Assumptions, Consultant Resource Manual, SOA Version, Mercer (excluding pp. 13-31, pp. 34-37 and pp. 63-64)

DA-139-13: ASOP 35, Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations

DA-140-13: ASOP 27 Selection of Economic Assumptions for Measuring Pension Obligations

Commentary on Question:

Part (a), most candidates identified 1-2 of the main points of each section. Additional points were available for a description of how assumptions are generally determined, . Successful candidates discussed assumptions in context with the question.

Part (b), most candidates identified the risks faced by retirees, while generally identifying fewer of the risks faced by the sponsor. Points were awarded for all reasonable descriptions but no points were awarded for simply listing the risks.

Part (c), most candidates identified 2-3 points for each of the employer and employee perspective, while higher scoring candidates identified 4-5. Successful candidates provided an in depth analysis.

Solution:

(a) Describe the impact of the window on the following valuation assumptions:

(i) Salary increases

Salary increase = Inflation + real wage growth + employer specific adjustments + age component

The window encourages high level/senior employees to terminate. The remaining employees will be younger/lower salaried and will see more promotion to the vacated senior positions, increasing the salary increase assumption

A select and ultimate table should be used to reflect the short term nature of the window.

If the assumption was already graded by age/service, it's possible that no change to the assumption is required.

(ii) Retirement rates

Valuations should in general use a retirement rate table.

Increase rates at ages where early retirement subsidies are first available.

Reduce rates immediately before subsidies take effect.

Use separate rates for those eligible and those not eligible for a subsidy.

A single age assumption does not reflect the effects of subsidized early retirement.

2. Continued

A select and ultimate table should be used.
Rate should increase during the window.

Rate should be reduced after the window for a short period (i.e. 1 year) after the window.

Rate may be reduced for a longer period if employees wait for the next window.

Rate should increase amongst those with 25+ years of service

(iii) Termination of employment

ASOP 35 advises the actuary to consider:

- Occupation
- Employment policies
- Work Environment
- Unionization
- Hazardous work conditions
- Location of employment

Termination rates should take into account plan provisions such as early retirement benefits.

Those who will be eligible for the window will have a very low rate of termination prior to the window. After the window, with a shorter average service turnover will likely be higher.

(b) Describe the risks of the plan changes from the perspectives of both the plan sponsor and the eligible employees.

Risks to employers

- Employee that you want to retain leave, and those you want to leave remain
- Liquidity of plan assets is a concern because of the lump sum option
- The full cost of the window is an accounting charge in the current period.
- Employee communications are critical, as morale may be affected by the reasoning for the window
- A culture shift after the window (younger workers, more mobile) may make the DB plan less effective, and a new design should be considered
- The plan would become more underfunded.
- Legal issues such as ratio percentage test, non-discrimination

Risks to employees

- Longevity risk – Outliving assets
- Inadequate replacement ratio – Will need to spend less
- Interest rate/investment risk – The lump sum option is at risk of providing less income than the pension plan would.

2. Continued

- Inflation Risk – The real value of the pension will erode if it is not increased periodically. Future salary increases will not be considered as they would have been if retirement occurred at the normal retirement age.
- Medical coverage – Retirees may face higher costs without coverage as compared to an employee.
- Risk of wrong doing – Retirees are at risk that the sponsor or fund manager inappropriately invests the plan assets.
- Risk of public policy changes – new taxes, means testing of government benefits

- (c) Critique this proposal from the perspectives of both the plan sponsor and the active employees.

Plan sponsor perspective

- The program may be retaining the employees who are no longer effective, rather than the highly skilled employees.
- There may be workforce disruption issues, which may be more costly than a normal early retirement window would have been.
- Should consider only offering the program to specific groups who have specialised knowledge the company wants to be passed on
- The full pension accrual will put added pressure on the funded status of the plan
- Liquidity concerns and the immediate consequences to the funded status are less severe as there is no lump sum option and the early retirement is delayed for two years.
- The funded status and industry outlook may improve in two years.
- 60% pay for 50% working hours is overpaying for labor.
- Retirement during the period will slow down.

Employee perspective

- Gives employees a chance to adjust to retirement
- Gives employees who do not want to retire time to search for other full time work
- 60% of pay may not be adequate so a new job or additional part time job may be required
- Morale and productivity may decrease during the two year period for those leaving
- Employees do not lose any value of their pension
- Lower level employees have more opportunity to advance

3. Learning Objectives:

8. The candidate will be able to recommend and advise on the financial effects of funding policy and accounting standards in line with the sponsor's goals, given constraints.

Learning Outcomes:

- (8a) Perform valuations for special purposes, including:
- (i) Plant termination/windup
 - (ii) Accounting valuations
 - (iii) Open group valuations
 - (iv) Plan mergers, acquisitions and spinoffs
- (8e) Advise plan sponsors on accounting costs and disclosures for their retirement plans.
- (8f) Demonstrate the sensitivity of financial measures to given changes in plan design.

Sources:

DA-804-13: FASB Accounting Standards Codification Topic 715

Commentary on Question:

This question tested candidates' ability to perform curtailment and settlement accounting, as well as calculate the standard components of pension expense in a future year. Some candidates set up a prior service cost base and some candidates interpreted the 2014 service cost associated with terminated employees as the 2014 service cost for the remaining employees. Credit was awarded for both interpretations.

Solution:

- (a) Calculate the impact of this event on the 2013 pension expense. Show all work.

	12/31/2013	Before Curtailment	Curtailment	After Curtailment	Settlement	After Settlement				
a)										
PBO		1,407,239	-150,000	1,257,239	-425,000	832,239				
Assets		1,275,172	0	1,275,172	-600,000	675,172				
Funded Status		-132,067	150,000	17,933	-175,000	0				
Unrecog (Gain)/Loss		-43,482	0	-43,482	175,000	-55,096				
Unrecog PSC		0	0	0	0	0				
Prepaid/(Accrued) Benefit Cost		-175,549	150,000	-25,549	0	-55,096				
Before Curtailment Calculations:										
PBO @ 12/31/13 = 1,436,463 (PBO@1/1/13) + 66,869 (SC) + 66,907 (IC) - 33,000 (BP) - 130,000 (gain) = 1,407,239										
Assets @12/31/13 = 1,188,240 (Assets@1/1/13) + 77,541 (EROA) + 42,391 (Cont) - 33,000 (BP) = 1,275,172										
Unamortized (gain)/loss @12/31/13 = 86,518 (Unrec (Gain)/Loss @1/1/13) - 0 (amortization in 2013) - 130,000 (new gain in 2013) = -43,482										
Impact of Curtailment Calculations:										
Post Curtailment PBO = 1,407,239 (PBO@12/31/13) - 175,000 (removal of salary projections) + 25,000 (immediate vesting) = 1,257,239										
Post Curtailment Assets = Assets (@12/31/13) = 1,275,172										
Unrecognized (gain)/loss = Unrecognized gain before curtailment = -43,482										
Curtailment Gain* = 175,000 (decrease in PBO for removal of salary projections) - 25,000 (increase in PBO due to immediate vesting) = 150,000										
* Curtailment gain is recognized immediately due to the existing unrecognized gains.										
Impact of Settlement Calculations										
PBO for affected members = 575,000 (original PBO) - 175,000 (removal of salary projections) + 25,000 (immediate vesting) = 425,000										
Cost of Annuity Purchase = 600,000 (Annuity Purchase) - 425,000 (PBO for affected members) = 175,000										
Post Settlement PBO = 1,257,239 (PBO post curtailment) + 175,000 (cost of annuity purchase) - 600,000 (annuity purchase) = 832,239										
Post Settlement Assets = 1,275,172 (Assets post curtailment) - 600,000 (annuity purchase) = 675,172										
Unrecognized (gain)/loss = -43,482 (@post curtailment) + 175,000 (cost of annuity purchase) = 131,518										
Settlement Loss = 131,518 (Unrecognized Loss) * 600,000 / 1,432,239 (PBO right before settlement) = 55,096										
Unrecognized (gain)/loss (post settlement) = 131,518 - 55,096 (impact of settlement) = 76,422										
Total impact of Curtailment and Settlement = 150,000 - 55,096 = 94,904										
Final 2013 expense = 56,235 (original 2013 expense) - 94,904 (impact of curtailment and settlement) = -38,669 (income item)										

4. Learning Objectives:

3. Candidate will be able to analyze the risks faced by retirees and the participants of retirement plans and retiree health plans.
4. The candidate will be able to evaluate plan design risks faced by sponsors of retirement plans and retiree health plans.

Learning Outcomes:

- (3a) Identify risks face by retirees and the elderly.
- (3b) Describe and contrast the risks face by participants of:
 - (i) Government sponsored retirement plans
 - (ii) Single employer sponsored retirement plans
 - (iii) Multiemployer retirement plans, and
 - (iv) Social insurance plans
- (3d) Propose ways in which retirement plans and retiree health plans can manage the range of risks faced by plan participants and retirees.
- (4a) Identify how plan features, temporary or permanent, can adversely affect the plans sponsor.
- (4c) Recommend ways to mitigate the risks identified with a particular plan feature.
- (4d) Analyze the issues related to plan provisions that cannot be removed.

Sources:

McGill: Fundamentals of Private Pensions – Ch. 4, 5, 9

Solution:

- (a) (a) Compare and contrast the two plan design options from the employees' perspective with respect to each of the following risks:
 - (i) Longevity risk
 - (ii) Inflation risk
 - (iii) Investment return risk

(i) Longevity risk

Option 1 provides protection against longevity risk since the normal form of payment would be an annuity benefit

Option 2 provides no protection again longevity risk since the benefit is payable as a lump sum.

Option 2 – members can protect themselves against longevity risk by purchasing an annuity

4. Continued

(ii) Inflation risk

Option 1 provides protection against pre-retirement inflation as it relates to salary since final average pay is used to determine benefit amounts.

An additional note is that contributions are based on pay each year, while the final benefit is determined based on final average pay.

This offsets some of the inflation risk protection since there is a higher chance benefits will need to be cut if salary inflation is high because assets are less likely to be sufficient.

Option 2 provides less protection against pre-retirement inflation as it related to salary since a career average pay is used

Neither option 1 nor option 2 provide protection against inflation after retirement

(iii) Investment return risk

Option 1 provides no protection against investment return risk since employees' benefits may be reduced if there are unfavorable asset returns

Option 2 provides protection against investment return risk since there is a minimum guaranteed interest crediting rate

Post-retirement risk born by employee

- (b) Describe the advantages and disadvantages of each plan design option to XYZ.

Option 1 - Advantages

The contributions each year are predetermined as a fixed % of pay

The investment return risk is hedged since benefits may be reduced if assets perform poorly

Option 1 - Disadvantages

The company retains longevity risk since the benefit payable upon retirement is an annuity benefit

There are higher administrative costs since employees remain plan participants after termination/retirement (until annuity payments are complete)

Option 2 - Advantages

The contributions each year are predetermined as a fixed % of pay

The interest crediting rate is tied to the plan's asset return, so that hedges some of the investment risk

The company does not retain longevity risk since the benefit is paid as a lump sum upon termination/retirement

Administrative fees are lower since employees are paid out upon termination/retirement

4. Continued

Option 2 - Disadvantages

There is higher exposure to downside investment return risk since there is a floor crediting rate

The company is not rewarded for good plan asset performance since the excess asset returns are passed on to participants.

The potential long-term savings that cash balance plans can offer to companies is not available if the plan cannot earn higher asset returns than what is credited to accounts

- (c) XYZ has decided to implement Option 2, but the CEO is concerned with the risks associated with the interest crediting rate design. Propose ways the company can reduce the risks through both plan design and investment strategy.

Reduce the interest rate floor to something lower

Change the basis used to determine the interest crediting rate. The company can use another measure, like government bonds or another standard indice, which would reduce volatility

The company could structure the asset portfolio to closely align with the securities in the index used to credit accounts

The company could use a flat interest crediting rate each year, like 5%. That would ensure no volatility in the interest crediting rate. There would still be risk that the asset return is not sufficient to cover the crediting rate.

Introduce a ceiling on the interest crediting rate

Allow the employee to invest the assets or choose the index for the interest crediting rate

5. Learning Objectives:

1. The candidate will be able to analyze different types of registered/qualified retirement plans and retiree health plans.
5. The candidate will be able to evaluate sponsor's goals for the retirement plan, evaluate alternative plan types and features, and recommend a plan design appropriate for the sponsor's goals.
7. The candidate will be able to analyze/synthesize the factors that go into selection of actuarial assumptions.
8. The candidate will be able to recommend and advise on the financial effects of funding policy and accounting standards in line with the sponsor's goals, given constraints.

Learning Outcomes:

Describe the structure of the following plans:

- (a) Traditional defined benefit plans
- (b) Hybrid plans
- (c) Defined contribution plans
- (d) Retiree Health plans

Given a plan type, explain the relevance, risks and range of plan features including the following:

- (a) Plan eligibility requirements
 - (b) Benefit eligibility requirements, accrual, vesting
 - (c) Benefit/contribution formula, including the methods of integration with government-provided benefits
 - (d) Payment options and associated adjustments to the amount of benefit
 - (e) Ancillary benefits
 - (f) Benefit subsidies and their value, vest or non-vested
 - (g) Participant investment options
 - (h) Required and optional employee contributions
 - (i) Phased retirement and DROP plans
- (5a) Describe ways to identify and prioritize the sponsor's goals related to the design of the retirement plan.
 - (5b) Assess the tradeoffs between different goals.
 - (5c) Assess the feasibility of achieving the sponsor's goals for their retirement plan.
 - (5d) State relationships or recognize contradictions between a sponsor's plan design goals and the retirement risks faced by retirees.
 - (5e) Identify the ways that regulation impacts the sponsor's plan design goals.
 - (5f) Design retirement programs that manage retirement risk and are consistent with sponsor objectives.

5. Continued

- (5g) Design retirement programs that promote employee behavior consistent with sponsor objectives.
- (5h) Evaluate the pros and cons from both a sponsor and employee perspective of introducing options that impact the labor force demographics.
- (5i) Recommend a method to integrate government-provided benefits with retirement plan designs in order to meet the plan sponsor's particular goals and defend the recommendation.
- (5j) Advise a plan sponsor regarding the choice of design elements for their retiree health program.
- (5k) Evaluate and incorporate, as appropriate, different social insurance and employer sponsored plan types and features that occur internationally in providing recommendations.
- (5l) Give examples of plans that are appropriate for multinational companies and their employees including third country nationals and expatriates.
- (5m) Recommend an appropriate plan type and plan design features for providing retirement benefits and defend the recommendations.
- (7a) Evaluate appropriateness of current assumptions.
- (7b) Describe and explain the different perspectives on the selection of assumptions.
- (7c) Describe and apply the techniques used in the development of economic assumptions.
- (7d) Recommend appropriate assumptions for a particular type of valuation and defend the selection.
- (7e) Select demographic and economic assumptions appropriate for a projection valuation.
- (8a) Perform valuations for special purposes, including:
 - (i) Plant termination/windup
 - (ii) Accounting valuations
 - (iii) Open group valuations
 - (iv) Plan mergers, acquisitions and spinoffs
- (8b) Analyze, recommend, and defend an appropriate funding method and asset valuation method in line with the sponsor's investment policy and funding goals.
- (8c) Demonstrate how the retirement plan's cash inflows and outflows can affect the plan sponsor.

5. Continued

- (8d) Advise retirement plan sponsors on funding costs including tax deductibility, required contributions and other alternatives to meet the sponsor's goals, consistent with government regulation.
- (8e) Advise plan sponsors on accounting costs and disclosures for their retirement plans.
- (8f) Demonstrate the sensitivity of financial measures to given changes in plan design.
- (8g) Describe how a plan's funded status can impact union negotiations and multiemployer plans.
- (8h) Perform and interpret the results of projections for short and long range planning including the effect of proposed plan changes.

Sources:

CIA General Standards of Practice Part 1

CIA General Standards of Practice Part 2

CIA SOP Practice Specific Standards for Pension Plans

Commentary on Question:

Part (a) – successful candidates commented on the methods and the assumptions.

Part (c) – successful candidates made a recommendation on what should be done.

Solution:

- (a) Discuss the appropriateness of the actuarial assumptions and methods.
 - 1. Mortality table is outdated and may not be sufficient to reflect current experience
 - 2. Reflecting sufficient provision for future mortality improvement should also be considered
 - 3. If a significant number of retirements is expected to occur at different ages, a single retirement age may not be appropriate.
 - 4. Assuming 100% retirement at earliest retirement age with unreduced pension may be overstating the liabilities
 - 5. Liability breakdown shows significant liability for inactive vesteds and disabled pensioners
This means that it is probably not appropriate to have no disability and turnover assumptions
Since the disability pension is unreduced, the lack of disability assumption result in cumulative losses in future years
 - 6. Lack of turnover assumption may result in overstating the liabilities

5. Continued

7. Since there is a significant amount of disability pension, a different mortality table for disabled lives should have been used
 8. Net investment return (discount rate) assumption may be too high considering asset allocation
 9. J&S pension is fully subsidized so assuming 100% electing life only could understate the liabilities
 10. The magnitude of understatement in the liabilities will partly depend on the percent of population assumed to be married at retirement
 11. Given that the average future working lifetime is 15 years, calculating the recommended contribution rate using a 5-year amortization schedule might be too conservative.
 12. Liability breakdown shows a relatively smaller percentage from actives which indicates that the plan is mature
 13. Given that the plan is relatively mature, Unit Credit cost method could result in rising normal costs if the plan has aging demographics
 14. Entry age normal method produces a stable level of costs and may be more appropriate for a plan with aging demographics if a stable level of costs is desired
 15. Adopting an asset valuation method that smoothes asset values to promote contribution stability may also be appropriate since contributions to a multiemployer plan is based on the length of the collective bargaining agreement.
 16. 20% margin might result in more contributions than necessary to fund the plan.
- (b) Identify additional information that may be necessary to perform an independent evaluation of the recommended hourly contribution rate.
1. Historical rates of investment return to evaluate past performance and appropriateness of current assumption
May be used to evaluate actuarial value of assets under different asset valuation methods and effect on recommended contribution rate
Building blocks used to determine/justify investment return assumption
 2. Historical demographic experience of mortality, retirement, disability, turnover and form of payment chosen used to evaluate current demographic assumptions
 3. Input from Trustees about future industry activity or assumed employment level to determine hourly recommended rate

5. Continued

Historical information on hours worked (or employment level) and demographic statistics to evaluate whether assuming a stable active population implicit in the determination of the recommended contribution rate is reasonable.

Historical information on employers withdrawing from the Fund and whether any withdrawal liability amounts were collected.

4. Information explaining selection of an assumption that deviates (or perceived to deviate) from actuarial standards, if any

5. Projections of minimum funding requirements including plan solvency

Used to determine whether recommended contribution rate is sufficient to meet minimum funding requirements

6. Sensitivity analysis on various assumptions such as investment return, level of work and utilization of earlier retirement provisions.

This is especially important because plan is mature and therefore if plan's funding deteriorates, it can be extremely difficult to increase contributions enough to meet funding requirements.

This analysis can be used to evaluate whether there is enough or too much margin in the recommended contribution rate

7. Information pertaining to possibility of having a companion retiree health plan. Provisions of retiree health plan can affect the retirement patterns in the plan

- (c) The union representing the employees of Employer A has indicated that it wants to maintain a defined benefit plan.

Recommend alternative ways to redesign the XYZ Plan to lower the recommended hourly contribution rate.

1. Remove/modify unreduced service pension at 25 years of service
 - Add age requirement to service pension
 - Make service requirement higher than 25 years of service
 - Provide an actuarially equivalent early retirement reduction from NRA
 - Eliminate the provision altogether
2. Remove/modify early retirement provision
 - Increase age/service requirement above 55/10
 - Provide an actuarially equivalent early retirement reduction from NRA
 - Eliminate the provision altogether
3. Reduce future accrual rate below \$100
4. Modify plan design from flat dollar formula to percent of contributions/hours formula that caps the accrual rate at \$100
5. Require a greater number of hours worked above 800 hours to obtain full benefit credit for the year

5. Continued

6. Remove/modify disability benefit provision
 - Add age requirement
 - Make service requirement higher than 10 years of service
 - Provide an actuarially equivalent early retirement reduction from NRA
 - Eliminate the provision altogether
7. Remove both lump sum death benefits
8. Reduce accrued benefits to the extent possible under the law. In US, can only do this if plan is in the Red zone status. In Canada, some jurisdictions may permit reduction in accrued benefits.
9. Implement a reduced actuarially equivalent 50% joint-and-survivor annuity option

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Learning Outcomes:

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- (h) Retiree Health plans

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- (j) Plan eligibility requirements
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- (l) Benefit/contribution formula, including the methods of integration with government-provided benefits
- (m) Payment options and associated adjustments to the amount of benefit
- (n) Ancillary benefits
- (o) Benefit subsidies and their value, vest or non-vested
- (p) Participant investment options
- (q) Required and optional employee contributions
- (r) Phased retirement and DROP plans

- (5b) Assess the tradeoffs between different goals.
- (5d) State relationships or recognize contradictions between a sponsor's plan design goals and the retirement risks faced by retirees.
- (5f) Design retirement programs that manage retirement risk and are consistent with sponsor objectives.

Sources:

DA-107-13: Green DB: Eliminate Wasteful Practices and Make Your DB Plan Sustainable

Retirement Plans (Allen) Chapter 14

Commentary on Question:

Many candidates were able to identify the key features of a Green DB plan, however to achieve full credit, candidates were required to link their response to the case study. Candidates were granted credit for other correct answers not listed below, such as employee contributions to a DC provision which would allow for higher accruals, ancillary benefits, assumption reviews, etc. Successful candidates discussed the impact a change will make.

6. Continued

Solution:

- (a) List possible ways of lowering the risk, volatility and costs of defined benefit pension plans resulting in a more sustainable or “Green” program. The following features of a Green DB plan help to reduce risk, volatility and costs:

Investment Strategy

- Move assets from equities to duration-matched bonds and other interest-sensitive investments

Form of Payment

- Eliminate lump sum benefits and only provide pensions on retirement

Benefit Level & Formula

- Provide a modest amount of guaranteed income
- Replace final average pay provisions in favor of career pay or career units

Subsidized Benefits

- Eliminate subsidized benefits and replace with actuarial equivalence
- Eg. Early retirement subsidy or subsidized normal form for married members

Defined Contribution Provision

- Employees can contribute to a defined contribution provision to provide ancillary benefits

- (b) Analyze the impact of adopting a “Green” retirement program for the Full-Time Salaried Pension Plan from the perspectives of both NOC and the plan members.

NOC’s perspective:

- Currently 40% invested in fixed income, under Green approach would move to a higher percentage
 - o will result in higher, but more steady and predictable contributions
 - o will likely result in lower asset returns with less volatility
- Currently allow lump sum cash-outs, under Green approach this would not be allowed
 - o will increase the long term liability and longevity risk exposure
 - o will increase the longevity-pooling effect and cost-efficiency of the plan
- Currently offer a generous early retirement subsidy, which would be eliminated under a Green approach
 - o Will lower the overall cost of the plan
 - o Could lead to workforce management issues since employees will be working later
- Reduce overall benefit levels (i.e. reduced accrual rate, FAE to CAE, no indexing, definition of earnings)
 - o Will lower the overall cost of the plan

6. Continued

Employees' perspective:

- Higher fixed income allocation will lead to more secure benefits
- Receiving an annuity benefit rather than a lump sum cash-out will provide members with guaranteed income during retirement
 - o Some employees prefer a lump sum and will be unhappy with the change
- Elimination of the early retirement subsidy will result in lower benefits for retirees, reducing the incentive for them to retire early
- Reduction in overall benefit level will mean less retirement income
- Changes could lead to lower employee morale, resulting in workforce management issues

7. Learning Objectives:

7. The candidate will be able to analyze/synthesize the factors that go into selection of actuarial assumptions.
9. The candidate will be able to apply the standards of practice and guides to professional conduct.

Learning Outcomes:

- (7a) Evaluate appropriateness of current assumptions.
- (7b) Describe and explain the different perspectives on the selection of assumptions.
- (9a) Apply the standards related to communications to plan sponsors and others with an interest in an actuary's results (i.e., participants, auditors etc.).
- (9b) Explain and apply the Guides to Professional Conduct.
- (9c) Explain and apply relevant qualification standards.
- (9d) Demonstrate compliance with requirements regarding the actuary's responsibilities to the participants, plan sponsors, etc.
- (9e) Explain and apply all of the applicable standards of practice related to valuing retirement obligations.
- (9f) Recognize situations and actions that violate or compromise Standards or the Guides to Professional Conduct.
- (9g) Recommend a course of action to repair a violation of the Standards or the Guides to Professional Conduct.

Sources:

ASOPs: 4, 23, 35, 41

Solution:

- (a) List the reporting requirements that must be included in actuarial communications under the applicable professional standards.

General Requirements for Actuarial Communications (ASOP 41)

The requirements for the cumulative communications with respect to each specific engagement or assignment so that all of the communications, taken together, satisfy this standard even though individual communications may not.

- 3.1.1 Principal and Scope of Engagement
- 3.1.2 Form and Content
- 3.1.3 Timing of Communication

7. Continued

- 3.1.4 Identification of Responsible Actuary
- 3.1.5 Non-Independence
- 3.1.6 Reliance on Other Sources
- 3.1.7 Advocacy
- 3.1.8 Methods or Assumptions Prescribed by a Principal
- 3.1.9 Obligations Imposed by Law, Regulation, or Another Profession's Requirements

With respect to oral communications:

3.3.1 Oral Communications

The actuary's oral communications should not conflict with the actuary's written or electronic communications of related actuarial findings.

With respect to communication of significant actuarial findings:

3.3.2 Communication of Significant Actuarial Findings

Actuarial findings that the actuary considers to be significant should be in written or electronic form, and when appropriate, they should be incorporated into an actuarial report, unless otherwise agreed to by the principal and the actuary.

Actuarial reports should contain the following in addition to the requirements regarding significant actuarial findings:

3.3.3 Actuarial Report

Identify the data, assumptions, and methods used by the actuary with sufficient clarity that another actuary qualified in the same practice area could make an objective appraisal of the reasonableness of the actuary's work as presented in the actuary's report.

To the extent the data, assumptions, and methods used have been described in a previous actuarial report that is available to the intended audience, the actuary may, if appropriate under the circumstances, incorporate this information by reference into the actuarial report.

Communication Requirements (ASOP 4)

Any actuarial communication prepared to communicate the results of work subject to ASOP 4 must comply with the requirements of ASOP Nos. 23, 27, 35, 41, and 44.

In addition, such communication should contain the following elements, where relevant and material:

- a. a statement of the intended purpose of the measurement and a statement to the effect that the measurement may not be applicable for other purposes;
- b. the measurement date;
- c. a description of adjustments made for events after the measurement date;
- d. an outline or summary of the benefits included in the actuarial valuation and of any significant benefits not included in the actuarial valuation;
- e. the date(s) as of which the participant and financial information were compiled;

7. Continued

- f.** a summary of the participant information;
- g.** if hypothetical data are used, a description of the data;
- h.** a description of the actuarial cost method and the manner in which normal costs are allocated, in sufficient detail to permit another actuary qualified in the same practice area to assess the material characteristics of the method
- i.** a description of the cost or contribution allocation procedure, including a description of amortization methods and any pay-as-you-go component (i.e., the intended payment by the plan sponsor of some or all benefits when due);
- j.** if applicable in accordance with section 3.13.2, a statement indicating that the actuarial cost method or amortization method is significantly inconsistent with the plan accumulating adequate assets to make benefit payments when due;
- k.** if the actuary measured the value of accrued or vested benefits, a description of the types of benefits regarded as vested and accrued and, to the extent the attribution pattern of accrued benefits differs from or is not described by the plan provisions, a description of the attribution pattern;
- l.** a statement, appropriate for the intended audience (as defined in ASOP No. 41), indicating that future measurements (for example, of pension obligations, costs, contributions, or funded status as applicable) may differ significantly from the current measurement.
- m.** a description of known changes in assumptions and methods from those used in the immediately preceding measurement prepared for a similar purpose;
- n.** a description of adjustments of prior measurements
- o.** if, in the actuary's professional judgment, the actuary's use of approximations or estimates could result in a significant margin for error relative to the results if a detailed calculation had been done, a statement to this effect.

- (b) Describe potential violations of the applicable professional standards and the steps that should be taken to remedy the violations.

Violation #1

With respect to the data, the prior actuary did not disclose the following items as per ASOP 41 & 23:

- a. the source(s) of the data;
- b. whether the actuary reviewed the data and, if not, any resulting limitations on the use of the actuarial work product;
- c. the extent of the actuary's reliance on data and other information relevant to the use of data supplied by others;
- d. any material judgmental adjustments or assumptions that the actuary applied to the data, or are known by the actuary to have been applied to the data, to allow the actuary to perform the analysis;
- e. any limitations on the use of the actuarial work product due to uncertainty about the quality of the data;

7. Continued

f. any unresolved concerns the actuary may have about the data that could have a material effect on the actuarial valuation as of January 1, 2013;

g. (1) the existence of results that are highly uncertain or have a potentially material bias of which the actuary is aware due to the quality of the data; and (2) the nature and potential magnitude of such uncertainty or bias, if they can be reasonably determined; and

h. any conflicts that arose from complying with applicable law, regulation, or other binding authority.

3.3.3 Actuarial Report (ASOP 41)

Identify the **data**, assumptions, and methods used by the actuary **with sufficient clarity that another actuary qualified in the same practice area could make an objective appraisal of the reasonableness of the actuary's work as presented in the actuary's report.**

Steps to Remedy

As the new actuary you should:

1. verify the actual date of the membership data used for the actuarial valuation
 2. review the adjustments made to age the data from January 1, 2012 to January 1, 2013
 3. review notes from the prior actuary to determine why it was not possible to obtain new data for the valuation as of January 1, 2013
- You should consult with another actuary within your firm or seek legal counsel within your firm.
 - Using actual data at January 1, 2013 (vs. data at January 1, 2012 with adjustments) may not have a material impact on the financial position of the plan or funding recommendations. Therefore, may or may not have to withdraw or amend report.

Violation #2

It is not clear from the question whether exclusion of the impact of the amendment was simply a typo in the report (e.g., using a report template that required additional edits), or if the increased retirement benefits were excluded from the valuations (i.e., valuation program was not adjusted to reflect amended provisions).

If the increased retirement benefits were not reflected in the valuation results on January 1, 2013, then the exclusion is a clear violation of the ASOP 4.

The actuary should take into account adopted plan provisions consistent with the following when determining costs or contributions for a period, unless contrary to applicable law:

a. Provisions adopted on or before the measurement date (January 1, 2013) should be reflected for at least the portion of the period during which the provisions are in effect. [ASOP 4.3.5.1]

Steps to Remedy

As the new actuary, you should verify whether the financial impact of the amendment is included in the valuation results at January 1, 2013

You should consult with another actuary within your firm or seek legal counsel within your firm

7. Continued

Depending on the outcome of investigation/ internal discussions, you have to:

- withdraw or amend the report if the your findings invalidates the report
- engage the client and other users (e.g., regulators) of the report in discussions to withdraw or amend the report based on your findings

Violation #3/Potential Violation #3

“There have been significant retirement gains in the past five consecutive years.”

To extrapolate pertinent past experience and its trend to the near future is often, but not necessarily appropriate.

The provisions of the plan were recently amended to provide higher early retirement benefits - the change may have been inspired by the consistent retirement gains over the past 5 years.

This change in provisions may affect future retirement rates subsequent to January 1, 2013.

So despite the past experience, given the new early retirement benefits, it may be prudent to leave current retirement rates unchanged for the actuarial valuation as of January 1, 2013 and continue to monitor future retirement experience.

- *Assuming the prior actuary left the retirement rates unchanged.*

Steps to Remedy

None

8. Learning Objectives:

4. The candidate will be able to evaluate and recommend a plan design appropriate for the sponsor's goals.

Learning Outcomes:

- (4d) Given a context and sponsor objectives, evaluate the pros and cons from both a sponsor and employee perspective of introducing options allowing for flexible retirement such as phased retirement, DROPS and flexible pension plans.

Sources:

R-D812-12 Deferred Retirement Option Plans ("DROPS")

Commentary on Question:

Successful candidates described how a DROP works. Successful candidates included a significant explanation in part c, including an assessment of actuarial and operational risks. Partial credit was awarded if a risk was listed under either actuarial or operational risk.

Solution:

- (a) List the basic features of a DROP.

An employee who would otherwise be eligible to retire under the DB plan continues working for a period. Employee gives up future DB plan accruals in exchange for a lump sum deposited into a separate account for each year of continued employment.

Benefit is frozen at early retirement date

The DROP payments are deposited into an account that earns interest based on:

- Fixed rate tied to an index (e.g., T-bills)
- Based on a rate that is set on discretion of the employer or Trustees
- Actual rate of return

- (b) Describe the advantages and disadvantages of a DROP from an employee's perspective.

Advantages:

Drop accruals may be worth more to the employee than continued DB accruals because additional DB accruals have less value after your earliest unreduced retirement date.

Opportunity for someone who has maxed out their current benefit due to reaching service limits to continue earning additional benefits.

Feature provides more flexibility to employee at retirement because DROP is paid as a lump sum while DB pension is paid as an annuity.

8. Continued

Disadvantages:

In some instances, the employee can only receive a DROP benefit by foregoing the right to continued employment at the end of the DROP period (so the employee is forced to retire at that point).

If interest credited is based on actual plan returns, then there is risk that account balance could decrease due to negative returns.

Employee faces pre-retirement inflation risk in a salary related plan as final average salary will not include later years of earnings.

- (c) The Human Resources Manager claims that implementing the DROP will be a cost-neutral change to the pension plan.

Critique this conclusion and describe the actuarial and operational risks associated with a DROP.

Actuarial Risks

In theory, if DROP is added as an actuarially equivalent option and offered to everyone, then there should be no direct costs associated with the DROP. However, this conclusion is not necessarily true when a plan offers subsidized early retirement reductions.

Without a DROP, if an employee eligible to retire with subsidized Early Retirement Factors continues working, there is a gain to the plan.

With a DROP, that same employee may decide to retire early than expected, resulting in a loss to the plan.

If the actual retirement experience changes after the DROP is added, then retirement assumption may need to be revised to use lower retirement ages.

Operational Risks

Cannot pick specific employees to offer the DROP to, so the employees you want to retain may not be the ones that decide to continue working or use the DROP.

May actually encourage more employees to retire earlier than expected creating workforce issues - lack of resources, turnover.

Investment risk - if interest crediting rate is a flat rate or guaranteed rate, then Plan will have to ensure assets are invested to earn at least that rate or else Plan will have to make up the difference and take a loss.

Plan may not pass non-discrimination testing.

9. Learning Objectives:

7. The candidate will be able to analyze/synthesize the factors that go into selection of actuarial assumptions.
9. The candidate will be able to apply the standards of practice and guides to professional conduct.

Learning Outcomes:

- (7a) Evaluate appropriateness of current assumptions.
- (7b) Describe and explain the different perspectives on the selection of assumptions.
- (9a) Apply the standards related to communications to plan sponsors and others with an interest in an actuary's results (i.e., participants, auditors etc.).
- (9b) Explain and apply the Guides to Professional Conduct.
- (9c) Explain and apply relevant qualification standards.
- (9d) Demonstrate compliance with requirements regarding the actuary's responsibilities to the participants, plan sponsors, etc.
- (9e) Explain and apply all of the applicable standards of practice related to valuing retirement obligations.
- (9f) Recognize situations and actions that violate or compromise Standards or the Guides to Professional Conduct.
- (9g) Recommend a course of action to repair a violation of the Standards or the Guides to Professional Conduct.

Sources:

ASOPs: 4, 23, 35, 41

Commentary on Question:

Successful candidates calculated the PBO using the attribution period. Extra points were awarded for additional analysis..

Solution:

- (a) Compare and contrast the arrangements from the perspectives of both NOC and the executive.

Option 1

Executive Perspective:

- There are no vesting rules.
- Compensation is taxed at current tax bracket, which may be different than at retirement.
- Executive may have to save for retirement, as there is no retirement benefit.

9. Continued

NOC Perspective:

- Additional cash in first three years may put a strain on cash flow.
- The compensation cannot be used to retain the executive, as there are no vesting rules
- The bonus may provide incentive for the executive to perform well

Option 2

Executive Perspective:

- Compensation is taxed at current tax bracket, which may be different than at retirement.
- Executive may have to save for retirement, as there is no retirement benefit.
- Overall compensation may decrease if stock does not perform well

NOC Perspective:

- Can be used to motivate the executive, as it ties his compensation to company performance
- Can impose vesting restrictions on stock, to ensure executive stays until retirement

Option 3

Executive Perspective:

- Compensation is taxed at retirement tax bracket, which may be different than at current.
- Retirement benefit is not secure, since have to work three years to get it
- Lower cash in first three years, offset by large payoff at retirement

NOC Perspective:

- Golden handcuffs, since nothing payable until retirement
- Significant cash outlay at retirement
- Need to record an accounting expense each year
- No linkage to executives performance

On January 1, 2014, NOC enters a contract with the executive with the arrangement

outlined in Option 3. You are given the following information:

- Discount rate of 3% as of January 1, 2014.
- Assume no decrements over the contract period.

- (b) Calculate the 2014 pension expense and impact on Other Comprehensive Income (OCI). Show all work.

Expense = Service Cost + interest cost – expected return on assets + amortizations

PBO @ 1/1/14 = 0, since new member and cost should be spread over the three years of employment.

9. Continued

Present Value of benefit @ 1/1/14 = $\$2,500,000 / (1.03)^3 = 2,287,854$

Service Cost = $2,287,854 / 3 = 762,618 \times 1.03 = 785,497$ (alternatively, interest on service cost can be included with interest cost)

Interest cost = interest on PBO = $.03 \times 0 = 0$ (alternatively, is the interest on service cost of 22,879)

Amortizations = 0, since no unrecognized gains/losses or prior service cost at 1/1/14

OCI = 0, since no gains/losses or prior service cost

- (c) Calculate the 2015 pension expense and impact on Other Comprehensive Income (OCI). Show all work.

Expected PBO = $\$2,500,000 / (1.03)^2 \times 1/3 = 785,497$ (alternatively, roll forward from last year with service and interest cost, getting to same answer).

Actual PBO, prior to plan change = $\$2,500,000 / (1.04)^2 \times 1/3 = 770,464$

Gain of $785,497 - 770,464 = 15,033$

Actual PBO after plan change = $[25\% \times 2,500,000 / (1.04)^2 + 75\% \times 2,500,000 / (1.04)^3] \times 1/3 = 748,239$

Prior service credit = $770,464 - 748,239 = 22,225$

Service cost = $\{[25\% \times 2,500,000 / (1.04)^2 + 75\% \times 2,500,000 / (1.04)^3] \times 1/3\} \times 1.04 = 778,168$ (again, can included interest on service cost with interest cost)

Interest cost = $.04 \times 748,230 = 29,930$ (or 58,860, if included interest on service cost here)

Prior service cost amortization = $22,225 / 2 = 11,113$

Gain amortization = Excess, if any, of 15,033 or 74,824 (10% of greater of PBO or assets) / 2 = 0

Pension expense = $778.168 + 29,930 + 0 - 11,112 = 796,986$

OCI = $-22,225 + 11,112 - 15,033 = (26,146)$

10. Learning Objectives:

1. The candidate will be able to analyze different types of registered/qualified retirement plans and retiree health plans.
2. The candidate will understand the impact of the regulatory environment on plan design.

Learning Outcomes:

Describe the structure of the following plans:

- (a) Traditional defined benefit plans
 - (b) Hybrid plans
 - (c) Defined contribution plans
 - (d) Retiree Health plans
- (2a) Explain and apply restrictions on plan design features to a proposed plan design.
- (2b) Explain and test for limits on plan designs and features that protect participation rights.
- (2c) Test for plan design restrictions intended to control the use of tax incentives.

Sources:

Allen, 10th edition, Ch. 6 - 14, Ch 17, ch 21, ch 31, pp 579-592 U.S. Only

Commentary on Question:

Successful candidates compared plans as instructed in part a. The solution for part a has more detail than what was needed to be successful on the question.

Solution:

- (a) Compare and contrast the following types of defined contributions (DC) plans:
- (i) 401(k);
 - (ii) Money purchase; and
 - (iii) Leveraged ESOP.
- 401(k)
- Profit sharing type of plan
 - Employer contributions are not required, but plans often have a match component
 - Employee contributions are optional
 - There is a limited tax benefit
 - Employee has choice of investment options
 - There is no annuity requirement
 - The Employee bears the risk
 - Full distribution is allowed at 59½ , with hardship or with a 10% penalty

10. Continued

- Loans are often permitted
- The plan is easy to understand
- No tax until distribution unless Roth

Money Purchase

- Is a DC Hybrid plan
- Subject to funding requirements
- Employer contributions are fixed and altered with amendment
- Amounts are subject to the 415 limit
- Employee contributions are after tax
- Employee has investment choices
- Typically paid as a lump sum or annuity
- QJSA annuity option is required
- Loans are optional
- Is not a prevalent design

Leveraged ESOP

- Borrowed funds to buy Employer stock
- Is a qualified plan
- Helpful to convert public companies into private companies or to avoid hostile take overs
- Employer contributions are used to repay the loan and the stock is allocated to employees
- No employee contributions are allowed
- More than 50% of assets must be held in employer stock
- Employees can take stock or diversify
- Links employees to the company

(b) Explain in detail the 401(k) ADP and ACP testing process.

- ADP Test
 - Employee contributions divided by compensation
 - Also include Employer contributions that are fully vested (QNEC and QMAC)
 - Split group into HCE and NHCE
 - Determine average ADP for the two groups
 - Pass if:
 - $HCE < NHCE * 1.25$ Or
 - $HCE < NHCE + 2\%$
- ACP Test
 - Same numerical test as ADP, except the numerator is after tax employee contributions plus any employer match amounts

10. Continued

- (c) Describe three ways in which an employer can increase the likelihood of its 401(k) plan passing ADP and ACP testing.
- Design the plan to be safe harbor
 - Design the plan to provide the same benefit as a percent of pay to all participants
 - Add autoenrollment and autoescalation to the plan
 - Make additional QNEC or QMAC contributions or refund monies to HCEs