SOCIETY OF ACTUARIES – INDIVIDUAL DISABILITY EXPERIENCE COMMITTEE

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SOA-IDEC 2012 Tables Workbook Version 1.0.xlsm

Introduction

This document describes the layout and functionality of the workbook called *SOA-IDEC 2012 Tables Workbook Version 1.0.xlsm*. The workbook was developed by the Individual Disability Experience Committee (IDEC) of the Society of Actuaries (SOA) to calculate individual disability income (IDI) claim costs, net premiums, active life reserves and disabled life reserves using the 2012 IDEC Claim Incidence and Termination Tables (Version 1.0), and to compare these values to those based on the 85 CIDA and CIDC tables.

The workbook calculates claim costs, active life reserves and disabled life reserves for the various tables from first principles. The SOA does not endorse this workbook as the "official" methodology for calculating IDI reserves. There may be future revisions to this workbook as the 2012 IDEC Tables are revised, additional functionality is added and corrections are made. The users of the workbook should note that they are using the workbook at their own risk. Users should be knowledgeable in IDI products and the calculation of IDI reserves. They are encouraged to familiarize themselves with the methodology used to derive the various values throughout the workbook.

The 2012 IDEC Tables (Version 1.0), which are stored in the workbook, should be considered *work in progress*. They are based on industry IDI experience from 1990 to 2007 and contain no explicit margins for adverse deviations. The Academy of Actuaries is formulating a valuation committee to develop industry tables to replace the 85 CIDA and CIDC tables for the purpose of calculating statutory minimum reserves. The 2012 IDEC Tables (Version 1.0) will be the starting point of the valuation committee's work. Over the next year or so, there will most likely be revisions to the 2012 IDEC Tables as a result of the valuation committee's review. Furthermore, the final valuation tables will add margins for adverse deviation in some fashion.

The workbook is being released by the SOA with no cell protections. Any user modifications to the workbook that is copied from the SOA website is the user's responsibility. The workbook requires at least 16 megabytes of storage. It is designed to run on Excel® 2007 and later.

Any questions, feedback or suggested corrections regarding the workbook should be directed to Bob Beal, who may be reached at 207-771-1201, or by email, bob.beal@milliman.com.

The remainder of this document describes the content of the various tabs comprising the workbook.

Tab: ALR Calc

This tab calculates active life reserves (ALR) based on the specified input, which are provided in cells D7 to D31. The following describes the input parameters, which are in blue cells in the workbook:

- *Elimination Period (cell D7).* The user can select an elimination period (EP) of 7, 14, 30, 60, 90, 180, 360 or 720 days. At this time, the workbook does not work for an EP of 0-day (Accident Only).

- *Occupation Class (cell D8).* The user can select an occupation class of M, 1, 2, 3 or 4. These are the IDEC occupation classes.

- *Issue Age (cell D9).* The user can select any issue age from 20 to 69.

- *Cause (cell D10).* The user can select Accident, Sickness or Combined.

- *Gender (cell D11).* The user can select either Male or Female. Unisex is not an option.

- *Benefit Period (cell D12).* The user can select a benefit period (BP) of 6M, 12M, 18M, 30M, 36M, 60M, to65, to70 and life.

- *Interest Rate (cell D14).* The user may input any interest rate.

- *COLA? (cell D15).* The user may choose whether to inflate benefits using a cost-of-living adjustment.

- *COLA% (cell D16).* The user may input any annual inflation rate. [Please note that the cost-of-living benefit adjustments do not increase after age 65.]

- *Premium Pay to Age (cell D17).* Calculated net premiums are level at issue and are paid until the Premium Pay to Age, e.g., 65. The user can input any Premium Pay to Age greater than the Issue Age, not to exceed age 70.

- *Coverage to Age (cell D18).* This is the age at which disability coverage ceases. The user can input any Coverage to Age greater than the Issue Age, not to exceed age 70. Typically, the Premium Pay to Age and the Coverage to Age are the same, but they do not have to be.

- *Minimum BP (cell D19).* The user inputs the number of days in the minimum BP, e.g., 720. This is applicable to benefit periods to65, to67 and to70; they cannot be less than the EP plus the minimum BP.

- *Limiting BP #2 (cell D20).* The user selects Yes or No. This limiting BP applies to the shorter term BP (e.g., 60M). This option is provided because some IDI products limit the BP for a short term BP so that it does not exceed the long term BP (e.g., to65) at the higher attained ages.

- *If Yes* (cell D21). If "Yes" is selected in cell D20, the user selects the limiting BP from to65, to67 or to70.

The next set of input parameters select adjustments to the 2012 IDEC claim incidence and/or termination rates.

- *BP Incidence Adj (cell D22).* The user selects either BP Adj or AG. If BP Adj is selected, the 2012 IDEC claim incidence rates are adjusted to reflect the benefit period (Life or all others). As a result, the claim incidence rates for Life are increased and the claim incidence rates for other BP's are decreased. If AG (i.e., Aggregate) is selected, there is no adjustment applied to the 2012 IDEC claim incidence rates. In either case, there are no adjustments applied to the 85 CIDA incidence rates.

- *Market (cell D23).* The user selects AG (i.e., Aggregate – all markets combined), ES (i.e., Employer Sponsored Multi-life) or IS (i.e., Individually Sold). The 2012 IDEC claim incidence and termination rates are adjusted if ES or IS is selected, and no adjustment is applied if AG is selected. No Market adjustments are applied to the 85 CIDA incidence or termination rates.

- *Issue Years (cell D24).* The user selects AG (i.e., Aggregate – all issue years combined), Pre-1990, 1990-94, 1995-99 or 2000-06 to determine the issue year period to be represented. The 2012 IDEC claim incidence and termination rates are adjusted if any issue year period other than AG is selected. No Issue Years adjustments are applied to the 85 CIDA incidence or termination rates.

- *Years of Disablement (cell D25).* The user selects AG (i.e., Aggregate – all years of disablement combined), Pre-1990, 1990-94, 1995-99 or 2000-06 to determine the years of disablement to be represented. Only the 2012 IDEC claim termination rates are adjusted if any period other than AG is selected. There is no claim incidence adjustment (at this time). No Issue Years adjustments are applied to the 85 CIDA termination rates.

- *State (cell D26).* The user selects AG (i.e., Aggregate – all issue states), CA (i.e., California) or FL (i.e., Florida) to determine the issue state to be represented. The 2012 IDEC claim incidence and termination rates are adjusted if any period other than AG is selected. No State adjustments are applied to the 85 CIDA incidence or termination rates.

- *Smoker Status (cell D27).* The user selects AG, NS (i.e., Nonsmoker) or SM (i.e., Smoker) to determine the smoker status to be represented. The 2012 IDEC claim incidence and termination rates are adjusted if any smoker status other than AG is selected. No Smoker Status adjustments are applied to the 85 CIDA incidence or termination rates.

- *Contract (cell D28).* The user selects AS (i.e., Accident & Sickness) or OE (Business Overhead Expense) to determine the contract type to be represented. The 2012 claim incidence rates are reduced if OE is selected, but no adjustment is applied if AS is selected. The 2012 IDEC claim termination rates are not adjusted (at this time) if OE is selected. No Contract adjustments are applied to the 85 CIDA incidence rates.

- *Selection (cell D29).* The user selects AG (i.e., all policy years combined) or Select to have adjustment factors applied to the claim costs, which vary by policy year.

The last two input parameters apply to the ALR calculation methodology:

- *ALR Method (cell D30).* The user selects NLP (i.e., Net Level Premium) or 2PT (i.e., 2-year Preliminary Term).

- *Mortality / Lapse (cell D31).* The user selects from the following mortality or lapse assumptions to be used in the calculation of the net premiums and active life reserves:

    1. 58CSO – the 1958 Commissioner's Standard Ordinary mortality table
    2. 80CSO– the 1980 Commissioner's Standard Ordinary mortality table
    3. 01CSO– the 2001 Commissioner's Standard Ordinary mortality table
    4. Policy Lapse – Sample policy lapse rates are stored in the Mortality and Lapse tab to be used in lieu of the CSO tables.
    5. Policy Lapse_GR – The statutory minimum reserve limitations on pricing policy lapses for Guaranteed Renewable policies are applied to the stored policy lapses.

Please note the following:

a. The CSO mortality tables stored in the workbook do not vary by smoker status.
b. The stored lapse rates in the Mortality and Lapse sheet should not be viewed as endorsed assumptions; they are hypothetical. They only vary by issue age and policy year. The user will need to modify the workbook if more differentiation in the policy lapse rates is preferred.

Once the input parameters are specified, the user hits the **Run Claim Cost Calcs** macro button, which causes the claim costs and the resulting ALR's to be calculated. The claim costs are calculated in the CC for ALR sheet and pasted in the ALR Calc sheet.

The key output in the ALR Calc tab is as follows:

- A comparison of active life terminal reserves based on the 85 CIDA and 2012 IDEC Tables, reflecting the user's input specifications. See columns H, I and J. The ALR's reflect the ALR Method specified by the user.

- A comparison of the claim costs based on the 85 CIDA and 2012 IDEC Tables, reflecting the user's input specifications that were used in the derivation of the active life terminal reserves. See columns M, N and O.

- A comparison of net premiums based on the 85 CIDA and 2012 IDEC Tables, reflecting the user's input specifications. See range D36 to E37. Net premiums for both the NLP and 2PT methods are calculated, although only ALR's reflecting the specified ALR Method are displayed.

- Graphs of the active life reserves and claim costs under the two sets of morbidity assumptions are provided around row 56.

Users may need to revise the scales in the graphs depending upon the displayed values. There are no intentional Print Areas in the workbook. Users will need to set their own Print Areas based on sections they wish to print.

To the right of column L are the details to the active life reserve calculations. The claim costs for each policy year are calculated in the CC for ALR tab and pasted in columns V and X of the ALR Calc tab. The user is encouraged to become familiar with the details of these calculations.

Tab: CC for ALR

This sheet calculates the claim cost for a single attained age based on the 2012 IDEC Tables adjusted by the specified input parameters and for 85 CIDA. The sheet also projects the resulting disabled life reserves for the 2012 IDEC Tables, 85 CIDA and CIDC.

The input parameters in cells C4 to C17 and C21 to C26 are defined similar to the input parameters in ALR Calc. When the macro **Run Claim Cost Calcs** is run in ALR Calc, the input parameters specified in that sheet are pasted in this sheet.

The user can run single attained age calculations in CC for ALR without having to use the macro in ALR Calc by simply changing the input parameters, which are in blue cells in the workbook. The resulting Claim Incidence Adjustments are displayed in cell D20 to D24. Note that the Incidence Adjustment for

Market (D21) also reflects the Incidence Adjustment for Issue Year periods. The combined Claim Incidence Adjustment in cell D28 is the product of the adjustment factors in cells D20 to D24.

The resulting CTR adjustments are found in columns BD to BK. The detail calculations behind the claim costs and disabled life reserves are to the right of column G. Users should familiarize themselves with the formulas.

The following are key output in the CC for ALR tab:

- The resulting claim costs for the specified attained age are displayed in C36 and D36. They are also displayed in range AY15 to BB20, along with the incidence rates (Accident and Sickness) and the Present Value of Future Benefits (PVFB).

- Projected disabled life reserves for the specified attained ages on CIDA, CIDC and the 2012 IDEC claim termination rates are shown in columns BN to BP. Below the table of disabled life reserves is a graph of the reserves for the three bases.

Tab: Incidence Adj

This sheet contains the various claim incidence adjustment factors:

BP Adjustment Factors. These vary by occupation classes M, 1, 2 and BP (Life and Other).

Overhead Expense Factors. These vary by occupation class and gender.

Market and Issue Year Factors. These vary by market, issue year and occupation class (classes M, 1, 2 and 3 & 4 combined). The Aggregate factors apply when the Select input parameter in ALR Calc is set to AG. Otherwise the policy year factors apply (years 1, 2, …, 10 and 11+).

Smoker Status Factors. These vary by smoker status, occupation class (M, 1, 2 and 3-4), gender and elimination period (30 days and under, 60 days and 90 days and over).

State Factors. These vary by state (CA, FL, Other and Aggregate), occupation class (M, 1, 2 and 3-4) and issue year.

Tab: CTR Adj

This sheet contains the various claim termination rate adjustment factors developed from the claim database when the Expected CTR's were set to the 2012 IDEC CTR's. These factors are by annual claim durations: Year 1, Year 2, Years 3-5, Years 6-10. They are not applied to the ultimate durations, Years 11+.

BP Adjustment Factors. These are 1.00 for BP's to65, to67 and to70, greater than 1.00 for short term BP's and less than 1.00 for lifetime BP.

COLA Adjustment. These are 1.00 for non-COLA and all short term BP's. When the COLA benefit is specified, the factors are less than 1.00 for the first two years of disablement and greater than 1.00 for years 3 to 10.

Smoker Status Factors. Smokers have lower CTR's in years 1-5 and higher CTR's thereafter.

Issue State Factors. FL has the lowest CTR's, followed by CA and then Other states.

Market Factors. Employer Sponsored generally has lower CTR's than Individually Sold.

Issue Year Factors. These split between Pre-1990, 1990-94 and 1995+.

Disablement Year Factors. These split between Pre-1990, 1990-94 and 1995+.

Tab: Incidence Compare

Columns A to R in this sheet allow the user to compare the 2012 IDEC claim incidence rates (before the adjustment factors) to 85 CIDA incidence rates for specified occupation class (cell C3), gender (cell E3) and elimination period (cell G3). Please note that the incidence rates for the new IDEC occupation class M are compared to the 85 CIDA occupation class 1 rates.

To the right of column T, the sheet compares the 2012 IDEC claim incidence rates for the 5 IDEC occupation classes given the specified gender (cell W2) and elimination period (cell Y2).

Tab: CTR Compare

This sheet allows the user to compare the CTR's at all durations for the specified scenarios represented by each column. The user specifies the CTR basis (CIDA, CIDC or IDEC) in cell C8. The user hits the **Paste CTR's** macro button to compute the CTR's for each scenario. The appropriate CTR adjustment factors are applied to the base IDEC CTR's. The user may change the number of scenarios to be displayed by adding or deleting columns.

Tab: Claim Cost Compare

This sheet allows the user to compare the claim costs at all policy years from the specified issue age to age 69 for the specified scenarios represented by each column. The user specifies the CTR basis (CIDA, CIDC or IDEC) in cell F3. The user hits the **Compare CC's** macro button to compute the claim costs. The appropriate incidence and termination rate adjustment factors are applied to the base IDEC incidence and CTR's to derive the claim costs that are displayed. The user may change the number of scenarios to be displayed by adding or deleting columns.

Tab: IDEC Incidence

This sheet contains all of the 2012 IDEC claim incidence rates for attained ages 20 to 69. They vary by occupation class, gender, elimination period and cause (accident and sickness).

Tab: IDEC Select CTRs

This sheet contains the IDEC CTR's for the select durations.

Tab: IDEC Ultimate CTRs

This sheet contains the IDEC ultimate CTR's. They are adjusted if either NS or SM smoker status is selected in the CC for ALR sheet in proportion to the relationship between nonsmoker and smoker mortality rates in the 2001 Valuation Basic Table (VBT). Thus, the ultimate CTR's for nonsmoker claims will be lower and higher for smoker claims. The ultimate CTR's are not adjusted if the smoker status is AG.

Tab: CIDA Incidence

This sheet contains all of the 85 CIDA incidence rates. They vary by the 85 CIDA occupation class (1, 2, 3 and 4), gender, elimination period and cause (accident and sickness).

Tab: CIDA CTRs

The sheet contains all of the 85 CIDA termination rates. They vary by occupation class (1, 2, 3 and 4), gender, elimination period and cause (accident and sickness). The ultimate CTR's are included in this sheet along with the select CTR's.

Tab: Mortality and Lapse

This sheet contains the various CSO mortality rates and policy lapse rates that can be selected in the ALR Calc sheet.

Tab: Lookups

This sheet contains miscellaneous ranges used in the calculation of claim costs.