

SERFF Tracking Number: PNMU-125888640 State: Arkansas  
 Filing Company: Penn Mutual Life Insurance Company State Tracking Number: 40882  
 Company Tracking Number: RECOGNITION OF 2001 CSO MORTALITY TABLE  
 TOI: L06I Individual Life - Variable Sub-TOI: L06I.202 Joint (Last Survivor) - Flexible Premium  
 Product Name: Survivorship VUL 2001 CSO Change  
 Project Name/Number: RECOGNITION OF 2001 CSO MORTALITY TABLE/RECOGNITION OF 2001 CSO MORTALITY TABLE

## Filing at a Glance

Company: Penn Mutual Life Insurance Company

Product Name: Survivorship VUL 2001 CSO Change SERFF Tr Num: PNMU-125888640 State: ArkansasLH

TOI: L06I Individual Life - Variable

SERFF Status: Closed

State Tr Num: 40882

Sub-TOI: L06I.202 Joint (Last Survivor) - Flexible Premium

Co Tr Num: RECOGNITION OF 2001 CSO MORTALITY TABLE

State Status: Approved-Closed

Filing Type: Form

Co Status:

Reviewer(s): Linda Bird

Authors: Nancy Yannuzzi, Rita Bellew, Jaime Sperbeck

Disposition Date: 11/24/2008

Date Submitted: 11/17/2008

Disposition Status: Approved

Implementation Date Requested: On Approval

Implementation Date:

State Filing Description:

## General Information

Project Name: RECOGNITION OF 2001 CSO MORTALITY TABLE

Status of Filing in Domicile: Pending

Project Number: RECOGNITION OF 2001 CSO MORTALITY TABLE

Date Approved in Domicile:

Requested Filing Mode: Other

Domicile Status Comments:

Explanation for Combination/Other: To employ the 2001 CSO Mortality Table

Market Type: Individual

Submission Type: Resubmission

Previous Filing Number: Approved 5/29/01

Group Market Size:

Overall Rate Impact:

Group Market Type:

Filing Status Changed: 11/24/2008

State Status Changed: 11/24/2008

Deemer Date:

Corresponding Filing Tracking Number:

RECOGNITION OF 2001 CSO MORTALITY TABLE

Filing Description:

The Penn Mutual Life Insurance Company is submitting the following two forms for your information:

CSO 2001(S) and CSO 2001(U)

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These forms are insert pages for products VALJ-01(S) and VALJ-01(U), previously approved on 5/29/01. The forms VALJ-01(S), VALJ-01(U), SLTIJ-01(S) and SLTIJ-01(U) are being revised to utilize the 2001 CSO Mortality Table. Enclosed please find revised actuarial memorandums for these policies and riders.

Should you have any questions, please contact Jaime Sperbeck by phone at (215) 956-8692 or e-mail at Sperbeck.Jaime@pennmutual.com or by fax at (215) 956-8145.

## Company and Contact

### Filing Contact Information

Jaime Sperbeck, State Filing Coordinator sperbeck.jaime@pennmutual.com  
 600 Dresher Road (215) 956-8692 [Phone]  
 Horsham, PA 19044 (215) 956-8145[FAX]

### Filing Company Information

Penn Mutual Life Insurance Company CoCode: 67644 State of Domicile: Pennsylvania  
 VIM C3G Group Code: 850 Company Type: Life Insurance and Annuity  
 Philadelphia, PA 19172 Group Name: Penn Mutual Life Ins. State ID Number:  
 Co.  
 (215) 956-8893 ext. [Phone] FEIN Number: 23-0952300  
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## Filing Fees

Fee Required? Yes  
 Fee Amount: \$100.00  
 Retaliatory? No  
 Fee Explanation: 2 policy insert pages x \$50  
 Per Company: No

COMPANY	AMOUNT	DATE PROCESSED	TRANSACTION #
Penn Mutual Life Insurance Company	\$100.00	11/17/2008	23984743

SERFF Tracking Number: PNMU-125888640 State: Arkansas  
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## Correspondence Summary

### Dispositions

Status	Created By	Created On	Date Submitted
Approved	Linda Bird	11/24/2008	11/24/2008

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## **Disposition**

Disposition Date: 11/24/2008

Implementation Date:

Status: Approved

Comment:

Rate data does NOT apply to filing.

SERFF Tracking Number: PNMU-125888640 State: Arkansas  
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Item Type	Item Name	Item Status	Public Access
Supporting Document	Certification/Notice		No
Supporting Document	Application		No
Supporting Document	Life & Annuity - Acturial Memo		No
Supporting Document	Statutory Reserves		Yes
Supporting Document	Duration Tables		Yes
Form	Last Survivor Flexible Premium		Yes
	Adjustable Variable Life Insurance Insert Page		
Form	Last Survivor Flexible Premium		Yes
	Adjustable Variable Life Insurance Insert Page		

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## Form Schedule

Lead Form Number: CSO 2001(S)

Review Status	Form Number	Form Type	Form Name	Action	Action Specific Data	Readability	Attachment
	CSO 2001(S)	Policy/Contract	Last Survivor Flexible Premium Adjustable Variable Life Certificate: Insurance Insert Amendmen Page t, Insert Page, Endorsement or Rider	Revised	Replaced Form #: VALJ-01(S), page 9 Previous Filing #: Approved 5/29/01		Pg_9_of_VALJ-01(S),_form_#.pdf
	CSO 2001(U)	Policy/Contract	Last Survivor Flexible Premium Adjustable Variable Life Certificate: Insurance Insert Amendmen Page t, Insert Page, Endorsement or Rider	Revised	Replaced Form #: VALJ-01(U), page 9 Previous Filing #: Approved 5/29/01		Pg_9_of_VALJ-01(U),_form#.pdf

## 8. Policy Value (continued)

The Monthly Deductions will be deducted on the Policy Date and on each Monthly Anniversary from the subaccounts and the Fixed Account on a pro-rata basis in proportion to the current market value of each subaccount and the value of the Fixed Account.

However, no monthly deductions will be deducted from the Policy Loan Account. The Mortality and Expense Risk Asset Charge will not be deducted from the Fixed Account.

**Net Amount at Risk.** The Net Amount at Risk is equal to the Basic Death Benefit at the beginning of the policy month, divided by the Death Benefit Discount Factor, minus the Policy Value at the beginning of the policy month before the Monthly Deduction.

If the Specified Amount does not include Policy Value, the Policy Value will be allocated to the initial Specified Amount segment in order to determine the Net Amount at Risk.

If there have been any increases in the Specified Amount, the Policy Value will be allocated to the initial Specified Amount segment for determining the Net Amount at Risk. If the Policy Value exceeds the initial Specified Amount, the excess will be allocated to the increases in Specified Amount in the order of the increases. Any increases in the Basic Death Benefit in order to maintain the required minimum margin between the Basic Death Benefit and the Policy Value will be allocated to the most recent increase in Specified Amount.

**Cost of Insurance**—The Cost of Insurance is determined on a monthly basis. It is determined separately for the initial segment as well as for each additional segment created as the result of an increase in the Specified Amount. The total Cost of Insurance for a policy month is calculated as the sum of (a) multiplied by (b) for each segment where:

- (a) is the applicable Cost of Insurance Rate divided by 1,000; and
- (b) is the Net Amount at Risk for that segment.

**Cost of Insurance Rate**—The Base Cost of Insurance Rate is based on policy year and on the attained age, sex, and rate class of each Insured. The Cost of Insurance Rate for any increase in Specified Amount will be based on the policy duration since the effective date of the increase and on the attained age, sex, and rate class of each Insured on the effective date of the increase.

The Cost of Insurance Rate will be determined by the Company as described in the Determination of Nonguaranteed Factors provision. However, the rates will not exceed those shown in the Additional Policy CSO 2001(S)

Specifications. Such maximum rates are based on the 2001 Commissioners Standard Ordinary Male and Female Smoker and Nonsmoker Tables, Age Nearest Birthday.

**Expense Charges**—The actual expense charges will be determined by the Company as described in the Determination of Nonguaranteed Factors provision. However, these actual expense charges will not exceed the maximum expense charges stated on Page 3.

**Mortality and Expense Risk Face Amount Charge**—The actual Mortality and Expense Risk Face Amount Charge will be determined by the Company as described in the Determination of Nonguaranteed Factors provision. However, this actual Mortality and Expense Risk Face Amount Charge will not exceed the maximum stated on Page 3.

**Mortality and Expense Risk Asset Charge**—The actual Mortality and Expense Risk Asset Charge will be determined by the Company as described in the Determination of Nonguaranteed Factors provision. However, this actual Mortality and Expense Risk Asset Charge will not exceed the maximum stated on Page 3.

**Determination of Nonguaranteed Factors**—Cost of Insurance Rates, Percent of Premium Charges, Expense Charges, Mortality and Expense Risk Face Amount Charge, Mortality and Expense Risk Asset Charge, and Interest Rates will be determined by the Company based on expectations as to future mortality, investment, expense and persistency experience. The Company will not adjust such rates or charges as a means of recovering prior losses or as a means of distributing prior profits.

**Variable Accumulation Values**—At any valuation time, the current market value of a subaccount is determined by multiplying that subaccount's accumulation unit value times the number of subaccount units held under this policy.

The number of accumulation units is determined by dividing the amount allocated to the subaccount by the subaccount's accumulation unit value for the Valuation Date when the allocation is made.

The number of subaccount accumulation units will increase when:

- (a) net premiums are allocated to that subaccount;
- (b) amounts are transferred to that subaccount; and
- (c) policy loans are repaid and credited to that subaccount.

## 8. Policy Value (continued)

The Monthly Deductions will be deducted on the Policy Date and on each Monthly Anniversary from the subaccounts and the Fixed Account on a pro-rata basis in proportion to the current market value of each subaccount and the value of the Fixed Account. However no monthly deductions will be deducted from the Policy Loan Account. The Mortality and Expense Risk Asset charge will not be deducted from the Fixed Account.

**Net Amount at Risk**—The Net Amount at Risk is equal to the Basic Death Benefit at the beginning of the policy month, divided by the Death Benefit Discount Factor, minus the Policy Value at the beginning of the policy month before the Monthly Deduction.

If the Specified Amount does not include Policy Value, the Policy Value will be allocated to the initial Specified Amount segment in order to determine the Net Amount at Risk.

If there have been any increases in the Specified Amount, the Policy Value will be allocated to the initial Specified Amount segment for determining the Net Amount at Risk. If the Policy Value exceeds the initial Specified Amount, the excess will be allocated to the increases in Specified Amount in the order of the increases. Any increases in the Basic Death Benefit in order to maintain the required minimum margin between the Basic Death Benefit and the Policy Value will be allocated to the most recent increase in Specified Amount.

**Cost of Insurance**—The Cost of Insurance is determined on a monthly basis. It is determined separately for the initial segment as well as for each additional segment created as the result of an increase in the Specified Amount. The total Cost of Insurance for a policy month is calculated as the sum of (a) multiplied by (b) for each segment where:

- (a) is the applicable Cost of Insurance Rate divided by 1,000; and
- (b) is the Net Amount at Risk for that segment.

**Cost of Insurance Rate**—The Base Cost of Insurance Rate is based on the policy year and on the attained age and rate class of each Insured. The Cost of Insurance Rate for any increase in Specified Amount will be based on the policy duration since the effective date of the increase and on the attained age and rate class of each Insured on the effective date of the increase.

The Cost of Insurance Rate will be determined by the Company as described in the Determination of

Nonguaranteed Factors provision. However, the rates will not exceed those shown in the Additional Policy Specifications. Such maximum rates are based on the 2001 Commissioners Standard Ordinary Male and Female Smoker and Nonsmoker Table B, Age Nearest Birthday.

**Expense Charges**—The actual expense charges will be determined by the Company as described in the Determination of Nonguaranteed Factors provision. However, these actual expense charges will not exceed the maximum expense charges stated on Page 3.

**Mortality and Expense Risk Face Amount Charge**—The actual Mortality and Expense Risk Face Amount Charge will be determined by the Company as described in the Determination of Nonguaranteed Factors provision. However, this actual Mortality and Expense Risk Face Amount Charge will not exceed the maximum stated on Page 3.

**Mortality and Expense Risk Asset Charge**—The actual Mortality and Expense Risk Asset Charge will be determined by the Company as described in the Determination of Nonguaranteed Factors provision. However, this actual Mortality and Expense Risk Asset Charge will not exceed the maximum stated on Page 3.

**Determination of Nonguaranteed Factors**—Cost of Insurance Rates, Percent of Premium Charges, Expense Charges, Mortality and Expense Risk Face Amount Charge, Mortality and Expense Risk Asset Charge, and Interest Rates will be determined by the Company based on expectations as to future mortality, investment, expense and persistency experience. The Company will not adjust such rates or charges as a means of recovering prior losses or as a means of distributing prior profits.

**Variable Accumulation Values**—At any valuation time, the current market value of a subaccount is determined by multiplying that subaccount's accumulation unit value times the number of subaccount units held under this policy.

The number of accumulation units is determined by dividing the amount allocated to the subaccount by the subaccount's accumulation unit value for the Valuation Date when the allocation is made.

The number of subaccount accumulation units will increase when:

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## **Rate Information**

Rate data does NOT apply to filing.

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## Supporting Document Schedules

### Review Status:

**Satisfied -Name:** Statutory Reserves

11/17/2008

**Comments:**

**Attachments:**

Statutory Reserves VALJ-01(S)[1].pdf

Statutory Reserves VALJ-01(U)[1].pdf

### Review Status:

**Satisfied -Name:** Duration Tables

11/17/2008

**Comments:**

**Attachment:**

VALJ-01(S) TABLES[1].pdf

**Statutory Reserves**  
**Form VALJ-01(S)**

Because the No-Lapse guarantee is embedded in the policy, the reserves will be the greater of the sum of the reserve calculated under the Commissioner's Reserve Valuation Method (CRVM) for Flexible Premium Adjustable Variable Life and the reserve calculated using Actuarial Guideline XXXVII (AG37) methodology or the Cash Surrender Value. The description and demonstration of the AG37 reserve can be found in the attachment to this memorandum.

The following items will be calculated at time of policy issue.

**Guaranteed Maturity Premium (GMP)** - The GMP is the level annual gross premium paid to the younger insured's age 121, which will endow the policy at the younger insured's age 121. The GMP is calculated based on the underwriting classification of each insured, plan of insurance purchased and policy guarantees including expense charges, interest rates and mortality charges.

**Guaranteed Maturity Fund (GMF)** - The GMF is an accumulation fund value defined for each duration using guaranteed expense charge interest rates and mortality charges, and assuming the GMP's are paid.

**Future Benefits (FB)** - The FB are the Death Benefits associated with each of the GMF values, defined for all policy durations. These Future Benefits are based on the Death Benefit Option (Specified Amount includes Policy Value or Specified Amount does not include Policy Value) and the percentage of Policy Value factors in Section 8 of Form VALJ-01(S), if applicable.

**Present Value of Future Benefits (PVFB<sub>1</sub>)** - The PVFB at issue is the value of the future benefits, discounted for interest and mortality that correspond to the valuation basis for the year of issue. The mortality used is based on the 2001 CSO Smoker and Nonsmoker Mortality Table, Age Nearest Birthday.

$$PVFB_1 = \frac{1}{l_{x,y}} * \frac{\sum_{t=1 \text{ to } 121-x} [(l_{x+t-1,y+t-1} - l_{x+t,y+t}) * FB_t]}{\prod_{k=1 \text{ to } t} (1+i_k)}$$

where:

x = issue age of the younger insured

y = issue age of the older insured

$l_{x+t,y+t}$  = number of joint and last survivor statuses remaining at duration t using valuation mortality

$i_k$  = valuation interest rate for duration k

SA = Specified Amount at issue

**CRVM Expense Allowance (E<sup>CRVM</sup>)** - The E<sup>CRVM</sup> is equal to (a)-(b) where:

(a) is (i) the net level annual premium for the contract as if issued at ages one year older with premiums payable one year less and maturing at the same age, but not greater than (ii) a net level annual premium for a 19 pay whole life contract issued at ages one year older.

$$(i) \quad \frac{\sum_{j=0 \text{ to } 121-x-2} (FB_{j+2} * v^{j+1} * p_{j,x+1,y+1} * q_{x+j+1,y+j+1} + FB_{121-x} * v^{121-x-1} * p_{121-x-1,y+1})}{\sum_{j=0 \text{ to } 121-x-2} v^j * p_{j,x+1,y+1}}$$

(ii)  $ELRA \cdot {}_{19}P_{x+1:y+1}$

where, ELRA is the Equivalent Level Renewal Amount

$$ELRA = \frac{\sum_{j=0}^{121-x-2} (FB_{j+2} \cdot v^{j+1} \cdot {}_j p_{x+1:y+1} \cdot q_{x+j+1:y+j+1})}{A_{x+1:y+1:121-x-1}}$$

and,

$${}_{19}p_{x+1:y+1} = A_{x+1:y+1} / a_{x+1:y+1:19}$$

(b) is the net one year term insurance premium for the benefit provided in the first year.

$$FB_1 \cdot A_{x:1:y+1}$$

The following items will be calculated at each valuation date.

Cash Value ( $CV_m$ ) - The  $CV_m$  is the accumulated fund value of the policy, at the time of valuation.

Net Surrender Value ( $CSV_m$ ) - The  $CSV_m$  is the cash value of the policy less the surrender charge, if any, at the time of valuation.

Ratio ( $r$ ) - equals  $CV_m$  divided by  $GMF_m$ . If the ratio  $r$  is less than zero or greater than one, then it should be set equal to one.

Future Benefits ( $FB$ ) - Using the greater of  $CV_m$  or  $GMF_m$  as a starting value on the valuation date, future benefits are calculated assuming guaranteed interest, mortality and expense charges, with GMP's paid on the policy anniversaries.

Present Value of Future Benefits ( $PVFB_m$ ) - The  $PVFB$  at the time of valuation is the value of the Future Benefits, discounted for interest and mortality using the valuation basis.

Net Level Premium Reserves ( $NLR_m$ ) - The net level premium reserves are equal to

$((A) - (B)) \cdot r$  where:

(A) is  $PVFB_m$

(B) is  $PVNLP = NLP \cdot a_{x+m:y+m:121-x-m}$   
 where  $NLP = PVFB_1 / a_{x:y:121-x}$

$r$  is the ratio defined above.

CRVM Reserve ( $CRVM_m$ ) - The  $CRVM$  at time of valuation  $m$  is defined as follows:

$$CRVM_m = NLR_m - \frac{(E^{CRVM} \cdot a_{x+m:y+m:121-x-m} \cdot r)}{a_{x:y:121-x}}$$



Jay T. Lewellen, F.S.A., M.A.A.A.  
 ACP and Actuary

**STATUTORY RESERVES  
FORM VALJ-01(S)  
SAMPLE CALCULATION**

Male Age 55, Nonsmoker  
Female Age 55, Nonsmoker  
\$200,000 Specified Amount  
Issue Date = 7/1/08

Guaranteed Maturity Premium (GMP) = 4,295.77

Guaranteed Maturity Fund (GMF) - see attached Table

Future Benefits (FB) - see attached Table

Present Value of Future Benefits (PVFB<sub>1</sub>) - using 4% interest and the 2001 CSO Nonsmoker Mortality Table, the PVFB<sub>1</sub> = 55,688.63

CRVM Expense Allowance (E<sup>CRVM</sup>) -

(a) (i) the net level annual premium issued one year older = \$3,112.39

$$(ii) ELRA * {}_{19}P_{x+1:y+1} = \$4,268.58$$

$$ELRA = \$200,000$$

$${}_{19}P_{x+1:y+1} = .021343$$

(b) is the net one year term insurance premium

$$FB_1 * A_{xy:1} = \$0.62$$

$$FB_1 = 200,000$$

$$A_{xy:1} = .0000031$$

$$E^{CRVM} = (a) - (b) = 3,112.39 - 0.62 = 3,111.76$$

Using a valuation date of 12/31/08, m=6.

Cash Value (CV<sub>m</sub>) - Assuming an actual premium of \$4,295.77, actual interest credited at 8%, and current cost of insurance rates, CV<sub>1</sub> = \$2,987.87.

Net Surrender Value (CSV<sub>m</sub>) = 889.07

Ratio (r) - CV<sub>m</sub> / GMF<sub>m</sub>

$$GMF_m = 2,407.75$$

$$r = 2,987.87 / 2,407.75 > 1, \text{ therefore } r = 1.00$$

Present Value of Future Benefits (PVFB<sub>m</sub>) -

$$PVFB_6 = 56,791.25$$

Net Level Premium Reserves (NLR<sub>m</sub>) -

$((A) - (B)) * r$

(A) is  $PVFB_6 = 56,791.25$

(B) is  $PVNLP = NLP * a_{x+m,y+m:121-x-m}$

$$\begin{aligned} \text{where } NLP &= PVFB_1 / a_{x,y:121-x} \\ &= 55,688.63 / 18.89 \\ &= 2,947.68 \end{aligned}$$

$$a_{x+m,y+m:121-x-m} = 18.25$$

$$PVNLP = 2,947.68 * 18.25 = 53,785.52$$

$$NLR_m = (56,791.25 - 53,785.52) * 1.00 = 3,005.73$$

CRVM Reserve ( $CRVM_m$ ) -

$$\begin{aligned} CRVM_m &= \text{Max} \left[ 0, NLR_m - \frac{E^{CRVM} * a_{x+m,y+m:121-x-m} * r}{a_{x,y:121-x}} + \frac{(12-k) * E^{CRVM} * r}{12 * a_{x,y:121-x}} \right] \\ &= 3,005.73 - 3,111.76 * 18.25 / 18.89 * 1.00 \\ &= 0.32 \end{aligned}$$

AG37 Reserve ( $tTV_{[x]}$  from Attachment) = 1,059.40

Statutory Reserve =  $\text{MAX}(CSV_m, CRVM_m + tTV_{[x]}) = \text{MAX}(889.07, 0.32 + 1,059.40) = 1,059.72$

**Statutory Reserves**  
**Form VALJ-01(U)**

Because the No-Lapse guarantee is embedded in the policy, the reserves will be the greater of the sum of the reserve calculated under the Commissioner's Reserve Valuation Method (CRVM) for Flexible Premium Adjustable Variable Life and the reserve calculated using Actuarial Guideline XXXVII (AG37) methodology or the Cash Surrender Value. The description and demonstration of the AG37 reserve can be found in the attachment to this memorandum.

The following items will be calculated at time of policy issue.

Guaranteed Maturity Premium (GMP) - The GMP is the level annual gross premium paid to the younger insured's age 121, which will endow the policy at the younger insured's age 121. The GMP is calculated based on the underwriting classification of each insured, plan of insurance purchased and policy guarantees including expense charges, interest rates and mortality charges.

Guaranteed Maturity Fund (GMF) - The GMF is an accumulation fund value defined for each duration using guaranteed expense charge interest rates and mortality charges, and assuming the GMP's are paid.

Future Benefits (FB) - The FB are the Death Benefits associated with each of the GMF values, defined for all policy durations. These Future Benefits are based on the Death Benefit Option (Specified Amount includes Policy Value or Specified Amount does not include Policy Value) and the percentage of Policy Value factors in Section 8 of Form VALJ-01(U), if applicable.

Present Value of Future Benefits (PVFB<sub>1</sub>) - The PVFB at issue is the value of the future benefits, discounted for interest and mortality that correspond to the valuation basis for the year of issue. The mortality used is based on the 2001 CSO Smoker and Nonsmoker Mortality Table, Age Nearest Birthday.

$$PVFB_1 = \frac{1}{l_{xy}} * \frac{\sum_{t=1 \text{ to } 121-x} [(l_{x+t-1,y+t-1} - l_{x+t,y+t}) * FB_t]}{\prod_{k=1 \text{ to } t} (1+i_k)}$$

where:

x = issue age of the younger insured

y = issue age of the older insured

$l_{x+t,y+t}$  = number of joint and last survivor statuses remaining at duration t using valuation mortality

$i_k$  = valuation interest rate for duration k

SA = Specified Amount at issue

CRVM Expense Allowance (E<sup>CRVM</sup>) - The E<sup>CRVM</sup> is equal to (a)-(b) where:

(a) is (i) the net level annual premium for the contract as if issued at ages one year older with premiums payable one year less and maturing at the same age, but not greater than (ii) a net level annual premium for a 19 pay whole life contract issued at ages one year older.

$$(i) \frac{\sum_{j=0 \text{ to } 121-x-2} (FB_{j+2} * v^{j+1} * {}_j p_{x+1,y+1} * q_{x+j+1,y+j+1} + FB_{121-x} * v^{121-x-1} * {}_{121-x-1} p_{x+1,y+1})}{\sum_{j=0 \text{ to } 121-x-2} v^j * {}_j p_{x+1,y+1}}$$

(ii)  $ELRA * P_{19}^{x+1,y+1}$

where, ELRA is the Equivalent Level Renewal Amount

$$ELRA = \frac{\sum_{j=0}^{121-x-2} (FB_{j+2} * v^{j+1} * p_{x+1,y+1} * q_{x+j+1,y+j+1})}{A_{x+1,y+1:121-x-1}}$$

and,

$$p_{19}^{x+1,y+1} = A_{x+1,y+1} / a_{x+1,y+1:19}$$

(b) is the net one year term insurance premium for the benefit provided in the first year.

$$FB_1 * A_{x:1,y+1}$$

The following items will be calculated at each valuation date.

Cash Value ( $CV_m$ ) - The  $CV_m$  is the accumulated fund value of the policy, at the time of valuation.

Net Surrender Value ( $CSV_m$ ) - The  $CSV_m$  is the cash value of the policy less the surrender charge, if any, at the time of valuation.

Ratio ( $r$ ) - equals  $CV_m$  divided by  $GMF_m$ . If the ratio  $r$  is less than zero or greater than one, then it should be set equal to one.

Future Benefits ( $FB$ ) - Using the greater of  $CV_m$  or  $GMF_m$  as a starting value on the valuation date, future benefits are calculated assuming guaranteed interest, mortality and expense charges, with GMP's paid on the policy anniversaries.

Present Value of Future Benefits ( $PVFB_m$ ) - The  $PVFB$  at the time of valuation is the value of the Future Benefits, discounted for interest and mortality using the valuation basis.

Net Level Premium Reserves ( $NLR_m$ ) - The net level premium reserves are equal to

$((A) - (B)) * r$  where:

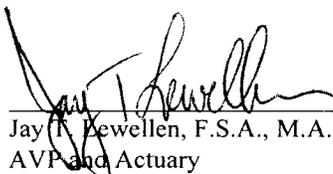
(A) is  $PVFB_m$

(B) is  $PVNLP = NLP * a_{x+m,y+m:121-x-m}$   
 where  $NLP = PVFB_1 / a_{x,y:121-x}$

$r$  is the ratio defined above.

CRVM Reserve ( $CRVM_m$ ) - The  $CRVM$  at time of valuation  $m$  is defined as follows:

$$CRVM_m = NLR_m - \frac{(E^{CRVM} * a_{x+m,y+m:121-x-m} * r)}{a_{x,y:121-x}}$$

  
 Jay T. Sewellen, F.S.A., M.A.A.A  
 AVP and Actuary

**STATUTORY RESERVES  
FORM VALJ-01(U)  
SAMPLE CALCULATION**

Age 55, Nonsmoker  
Age 55, Nonsmoker  
\$200,000 Specified Amount  
Issue Date = 7/1/08

Guaranteed Maturity Premium (GMP) = 4,539.67

Guaranteed Maturity Fund (GMF) - see attached Table

Future Benefits (FB) - see attached Table

Present Value of Future Benefits (PVFB<sub>1</sub>) - using 4% interest and the 2001 CSO Nonsmoker Mortality Table, the PVFB<sub>1</sub> = 60,039.47

CRVM Expense Allowance (E<sup>CRVM</sup>) -

(a) (i) the net level annual premium issued one year older = \$3,462.98

$$(ii) ELRA * P_{19^{x+1}:y+1} = \$4,610.62$$

$$ELRA = \$200,000$$

$$P_{19^{x+1}:y+1} = .0230531$$

(b) is the net one year term insurance premium

$$FB_1 * A_{xy:1} = \$0.76$$

$$FB_1 = 200,000$$

$$A_{xy:1} = .0000038$$

$$E^{CRVM} = (a) - (b) = 3,462.98 - 0.76 = 3,462.22$$

Using a valuation date of 12/31/08, m=6.

Cash Value (CV<sub>m</sub>) - Assuming an actual premium of \$4,539.67, actual interest credited at 8%, and current cost of insurance rates, CV<sub>1</sub> = \$3,182.49.

Net Surrender Value (CSV<sub>m</sub>) = 925.29

Ratio (r) - CV<sub>m</sub> / GMF<sub>m</sub>

$$GMF_m = 2,580.75$$

$$r = 3,182.49 / 2,580.75 > 1, \text{ therefore } r = 1.00$$

Present Value of Future Benefits (PVFB<sub>m</sub>) -

$$PVFB_6 = 61,228.22$$

Net Level Premium Reserves (NLR<sub>m</sub>) -

$$((A) - (B)) * r$$

$$(A) \text{ is } PVFB_6 = 61,228.22$$

$$(B) \text{ is } PVNLP = NLP * a_{x+m,y+m:121-x-m}$$

$$\begin{aligned} \text{where } NLP &= PVFB_1 / a_{x,y:121-x} \\ &= 60,039.47/18.34 \\ &= 3,274.17 \end{aligned}$$

$$a_{x+m,y+m:121-x-m} = 17.68$$

$$PVNLP = 3,274.17 * 17.68 = 57,889.59$$

$$NLR_m = (61,228.22 - 57,889.59) * 1.00 = 3,338.63$$

CRVM Reserve (CRVM<sub>m</sub>) -

$$\begin{aligned} CRVM_m &= \text{Max}[0, NLR_m - (E^{CRVM} * a_{x+m,y+m:121-x-m} * r) + (12-k) * E^{CRVM} * r] \\ &= 3,338.63 - 3,462.22 * 17.68/18.34 * 1.00 \\ &= 0.38 \end{aligned}$$

$$\text{AG37 Reserve (tTV}_{[x]}\text{ from Attachment)} = 977.23$$

$$\text{Statutory Reserve} = \text{MAX}(CSV_m, CRVM_m + tTV_{[x]}) = \text{MAX}(925.29, 0.38 + 977.23) = 977.61$$

Male Age 55 NonSmoker  
 Female Age 55 NonSmoker  
 Guaranteed Interest = 3%  
 Guaranteed COI = 2001 CSO NonSmoker  
 Specified Amount = \$200,000 (includes Policy Value)

Form VALJ-01(S)

GMP = \$4,295.77

Duration	GMP	FB	Duration	GMP	FB
1	1,800	200,000	34	147,420	200,000
2	5,218	200,000	35	150,294	200,000
3	8,724	200,000	36	152,961	200,000
4	12,316	200,000	37	155,635	200,000
5	15,994	200,000	38	158,240	200,000
6	19,755	200,000	39	160,689	200,000
7	23,598	200,000	40	162,914	200,000
8	27,517	200,000	41	164,817	200,000
9	31,507	200,000	42	166,448	200,000
10	35,564	200,000	43	167,777	200,000
11	40,365	200,000	44	169,290	200,000
12	45,243	200,000	45	170,852	200,000
13	50,193	200,000	46	172,340	200,000
14	55,208	200,000	47	173,788	200,000
15	60,282	200,000	48	175,178	200,000
16	65,405	200,000	49	176,504	200,000
17	70,564	200,000	50	177,746	200,000
18	75,738	200,000	51	178,886	200,000
19	80,915	200,000	52	179,932	200,000
20	86,084	200,000	53	180,889	200,000
21	91,231	200,000	54	181,772	200,000
22	96,343	200,000	55	182,575	200,000
23	101,399	200,000	56	183,294	200,000
24	106,379	200,000	57	183,951	200,000
25	111,262	200,000	58	184,574	200,000
26	116,032	200,000	59	185,241	200,000
27	120,639	200,000	60	185,846	200,000
28	125,065	200,000	61	186,447	200,000
29	129,315	200,000	62	187,091	200,000
30	133,373	200,000	63	187,865	200,000
31	137,220	200,000	64	189,139	200,000
32	140,886	200,000	65	192,082	200,000
33	144,285	200,000	66	200,000	200,000