Filing at a Glance

Company:	Family Heritage Life Insurance Company of America
Product Name:	Juvenile Life Rates
State:	District of Columbia
TOI:	L07I Individual Life - Whole
Sub-TOI:	L07I.101 Fixed/Indeterminate Premium - Single Life
Filing Type:	Rate
Date Submitted:	03/28/2014
SERFF Tr Num:	FHLA-129477086
SERFF Status:	Closed-FILED FOR INFORMATION
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Implementation Date Requested:	On Approval
Author(s):	Kevin Wicktora, Kim Scott, Arthur Chu
Reviewer(s):	Donghan Xu (primary)
Disposition Date:	04/03/2014
Disposition Status:	FILED FOR INFORMATION
Implementation Date:	04/03/2014

State Filing Description:

State: *District of Columbia* **Filing Company:** *Family Heritage Life Insurance Company of America*

TOI/Sub-TOI: *L07I Individual Life - Whole/L07I.101 Fixed/Indeterminate Premium - Single Life*

Product Name: *Juvenile Life Rates*

Project Name/Number: */*

General Information

Project Name:
Project Number:
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Submission Type: New Submission
Overall Rate Impact:

Deemer Date:
Submitted By: Kevin Wicktora

Status of Filing in Domicile: Authorized
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Domicile Status Comments:
Market Type: Individual
Individual Market Type:
Filing Status Changed: 04/03/2014
State Status Changed:
Created By: Kevin Wicktora
Corresponding Filing Tracking Number:

Filing Description:

Family Heritage Life Insurance Company of America would like to submit an actuarial memorandum and premium rates for FORM L4POL-DC when selling the policy as a juvenile life product (ages 15 days to 18 years). The policy form was approved by the Department on 11/6/2008. The rates were approved on 11/6/2008 under SERFF Tracking Number FHLA-125824652. An application for this policy when sold as a juvenile life product was submitted to the Department yesterday under SERFF Tracking Number FHLA-129476456.

Also included in this filing is an actuarial memorandum and premium rates for the policy and term insurance rider with return of premium (FORM L4TRR-ST also approved on 11/6/2008) for ages 18 through 22. These are premium rates we did not include with our initial filing of the policy and rider.

Company and Contact

Filing Contact Information

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Filing Company Information

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CoCode: 77968
Group Code: 290
Group Name:
FEIN Number: 34-1626521

State of Domicile: Ohio
Company Type: Life & Health
State ID Number:

Filing Fees

Fee Required? No
Retaliatory? No
Fee Explanation:

SERFF Tracking #:	*FHLA-129477086*	***State Tracking #:***		***Company Tracking #:***	*DCL6RATES*

State:	*District of Columbia*	***Filing Company:***	*Family Heritage Life Insurance Company of America*
TOI/Sub-TOI:	*L07I Individual Life - Whole/L07I.101 Fixed/Indeterminate Premium - Single Life*		
Product Name:	*Juvenile Life Rates*		
Project Name/Number:	*/*		

Supporting Document Schedules

Satisfied - Item:	Actuarial Justification
Comments:	
Attachment(s):	ActMemo-HLE-WL - 2014 - ST.pdf ActMemo-HLE-TROP - 2014 - ST.pdf HLE Premium Ratesheets - ST.pdf
Item Status:	
Status Date:	

Family Heritage Life Insurance Company of America

Actuarial Memorandum

Whole Life

Form: L4POL, et al.

Contents

1. Product Description

This contract is a whole life policy endowing for the face amount at age 100. The contract provides a level $1,000 death benefit of insurance per unit of coverage and a $1,000 endowment benefit at age 100. Prior to death, the contract may be surrendered for its cash value. Premiums are level and payable for the life of the contract. Underwriting is on a simplified issue basis and rates vary by issue age, gender and nicotine use.

2. Basis of Values

2.1 Cash Values

Cash values are determined using:

- 2001 CSO ALB ultimate gender distinct and tobacco distinct mortality for ages above 18 and composite tobacco for ages 18 and under,
- The assumption that deaths occur at the end of the policy years; and adjusted premiums are payable at the beginning of the policy year, and
- 4.50% interest.

Cash values equal or exceed the minimum amounts required by the Standard Nonforfeiture Law (SNL).

2.2 Life Insurance Reserves

Reserves are calculated as the present value of death benefits and the endowment benefit less the present value of net premiums using the following assumptions:

- 2001 CSO ALB ultimate gender distinct and tobacco distinct mortality for ages above 18 and composite tobacco for ages 18 and under,
- Immediate payment of claims; and adjusted premiums are payable at the beginning of the policy year,
- The maximum interest rate permitted in the valuation of whole life insurance for a guarantee duration of more than 20 years, and the
- Commissioners Reserve Valuation Method (CRVM)

Reserves equal or exceed the minimum amounts required by the Standard Valuation Law (SVL).

3. Formulas

3.1 Definition of Symbols

Symbol	*Definition*
t	Policy year.
x	Issue Age
C_x, M_x, D_x, N_x	Standard commutation functions based on reserve or nonforfeiture mortality and interest assuming deaths occur at the end of policy years.
$\overline{M}_x, \overline{C}_x$	Standard commutation functions based on reserve mortality and interest assuming IPC.
$\overline{A}_{x:\overline{100-x}\rceil}$	Present Value at age x of $1 of insurance with IPC to age 100 and a $1 endowment benefit paid at age 100.
$\overline{A}_x$	Present Value at age x of $1 of insurance for whole life with IPC.
$\overline{A}^{1}_{x:\overline{1}\rceil}$	Present Value at age x of $1 of insurance in year 1 with IPC.
$A_{x:\overline{100-x}\rceil}$	Curtate Present Value at age x of $1 of insurance to age 100 and a $1 endowment benefit paid at age 100.
$a_{x:\overline{100-x}\rceil}$	Present Value at age x of $1 annuity at the beginning of each year to age 100.
$\overline{P}_{x:\overline{100-x}\rceil}$	Semi-Continuous Net Level Premium to age 100 with IPC.
${}_{19}\overline{P}_{x+1}$	Semi-Continuous 19-pay Net Level Premium at age x+1 with IPC for whole life.
$P_{x:\overline{100-x}\rceil}$	Curtate Net Level Premium at age x to age 100 with curtate payment of claims.
${}^{adj}P_x$	Curtate Adjusted Net Level Premium at age x to age 100.
$\overline{\alpha}_{x:FPT}$	Semi-Continuous 1st year Full Preliminary Term Net Premium at age x with IPC.
$\overline{\beta}_{x:FPT}$	Semi-Continuous Renewal year Full Preliminary Term Net Premium at age x to age 100 with IPC.

$\overline{\alpha_x}$	Semi-Continuous 1st year CRVM Net Premium at age x with IPC.
$\overline{\beta_x}$	Semi-Continuous Renewal year CRVM Net Premium at age x to age 100 with IPC.
ELDB	Equivalent Level Death Benefit
EA_x	Nonforfeiture Expense Allowance at age x.
${}_tCV_x$	Cash value for issue age *x* at the end of policy year *t*.
${}_tV_x$	Basic death benefit reserve for issue age *x* at the end of policy year *t*.
${}_tIV_x(d)$	Basic death benefit interpolated reserve for issue age *x* during policy year *t* and d days from policy anniversary where the number of days is based on the standard banker's year definition.
i	Valuation interest rate for Life Insurance Reserves, or Cash Value interest rate
d	= i/(1+i)
δ	$= ln(1+i)$
$\frac{i}{\delta}$	Adjustment factor for converting curtate basis commutation functions to immediate payment of claims basis commutation functions.

3.2 Cash Values

$$A_{x+t:\overline{100-x-t}|} = \frac{M_{x+t} - M_{100} + D_{100}}{D_{x+t}}$$

$$a_{x+t:\overline{100-x-t}|} = \frac{N_{x+t} - N_{100}}{D_{x+t}}$$

$$P_{x:\overline{100-x}|} = \frac{A_{x:\overline{100-x}|}}{a_{x:\overline{100-x}|}}$$

$$ELDB = 1{,}000$$

$$EA_x = 1.25 \bullet \text{Min}\{1{,}000 \bullet P_{x:\overline{100-x}|}, 0.04 \bullet \text{ELDB}\} + 0.01 \bullet \text{ELDB}$$

$${}^{adj}P_x = \frac{1{,}000 \bullet A_{x:\overline{100-x}|} + EA_x}{a_{x:\overline{100-x}|}}$$

$${}_tCV_x = \text{Max}\{0, 1{,}000 \bullet A_{x+t:\overline{100-x-t}|} - {}^{adj}P_x \bullet a_{x+t:\overline{100-x-t}|}\}$$

3.3 Life Insurance Reserves

$$\overline{A}_{x+t:\overline{100-x-t}|} = \frac{\overline{M}_{x+t} - \overline{M}_{100} + D_{100}}{D_{x+t}}$$

$$a_{x+t:\overline{100-x-t}|} = \frac{N_{x+t} - N_{100}}{D_{x+t}}$$

$$\overline{A}_{x+1} = \frac{\overline{M}_{x+1}}{D_{x+1}}$$

$$\overline{A}^{\,1}_{x:\overline{1}|} = \frac{\overline{C}_x}{D_x}$$

$$\overline{P}_{x:\overline{100-x}|} = \frac{\overline{A}_{x:\overline{100-x}|}}{a_{x:\overline{100-x}|}}$$

$${}_{19}\overline{P}_{x+1} = \frac{\overline{A}_{x+1}}{a_{x+1:\overline{19}|}}$$

$$\overline{\alpha}_{x,FPT} = 1{,}000 \bullet \frac{\overline{A}^{1}_{x:\overline{1}|}}{a_{x:\overline{1}|}}$$

$$\overline{\beta}_{x,FPT} = 1{,}000 \bullet \frac{\overline{A}_{x+1:\overline{100-x-1}|}}{a_{x+1:\overline{100-x-1}|}}$$

If $\overline{\beta}_{x,FPT} > 1{,}000 \bullet {}_{19}\overline{P}_{x+1}$, $\quad \overline{\beta}_{x} = 1{,}000 \bullet \overline{P}_{x:\overline{100-x}|} + \frac{1{,}000 \bullet {}_{19}\overline{P}_{x+1} - \overline{\alpha}_{x,FPT}}{a_{x:\overline{100-x}|}}$

If $\overline{\beta}_{x,FPT} < 1{,}000 \bullet {}_{19}\overline{P}_{x+1}$, $\quad \overline{\beta}_{x} = \overline{\beta}_{x,FPT}$

$$\overline{\alpha}_{x} = \overline{\beta}_{x} - \text{Min}\{\, \overline{\beta}_{x,FPT}\,,\, 1{,}000 \bullet {}_{19}\overline{P}_{x+1} \,\} + \overline{\alpha}_{x,FPT}$$

For t = 1, $\quad {}_{t}V_{x} = 0$

For t > 1, $\quad {}_{t}V_{x} = 1{,}000 \bullet \overline{A}_{x+t:\overline{100-x-t}|} - \overline{\beta}_{x} \bullet a_{x+t:\overline{100-x-t}|}$

For t > 1, $\quad {}_{t}IV_{x}(d) = \frac{({}_{t-1}V_{x} + \overline{\beta}_{x}) \bullet (360 - d) + {}_{t}V_{x} \bullet d}{360}$

For t = 1, $\quad {}_{t}IV_{x}(d) = \frac{\overline{\alpha}_{x} \bullet (360 - d)}{360}$

4. Sample Calculations

The sample calculations are for a male nicotine free issue age 35 with $1,000 of insurance.

4.1 Cash Values

$$A_{35:\overline{65}|} = \frac{M_{35} - M_{100} + D_{100}}{D_{35}}$$

$$= \frac{35{,}830.10 - 67.52 + 75.26}{209{,}146.29}$$

$$= 0.17135$$

$$a_{35:\overline{65}|} = \frac{N_{35} - N_{100}}{D_{35}}$$

$$= \frac{4{,}024{,}787.01 - 179.72}{209{,}146.29}$$

$$= 19.24303$$

$$1{,}000 \cdot P_{35:\overline{65}|} = 1{,}000 \cdot \frac{A_{35:\overline{55}|}}{a_{35:\overline{55}|}}$$

$$= 1{,}000 \cdot \frac{0.17135}{19.24303}$$

$$= 8.90468$$

$$ELDB = 1{,}000$$

$$A_{35+20:\overline{100\text{-}35\text{-}20}|} = \frac{M_{55} - M_{100} + D_{100}}{D_{55}}$$

$$= \frac{29{,}807.89 - 67.52 + 75.26}{82{,}418.30}$$

$$= 0.36176$$

$$a_{35+20:\overline{100-35-20}|} = \frac{N_{55} - N_{100}}{D_{55}}$$

$$= \frac{1{,}221{,}730.56 - 179.72}{82{,}418.30}$$

$$= 14.82135$$

$$EA_{35} = 1.25 \bullet \text{Min}\{1{,}000 \bullet P_{35:\overline{65}|}\ ,\ 0.04 \bullet \text{ELDB}\} + 0.01 \bullet \text{ELDB}$$

$$= 1.25 \bullet \text{Min}\{8.90468,\ 0.04 \bullet 1{,}000\} + 0.01 \bullet 1{,}000$$

$$= 1.25 \bullet 8.90468 + 10$$

$$= 21.13085$$

$${}^{adj}P_{35} = \frac{1{,}000 \bullet A_{35:\overline{65}|} + EA_{35}}{a_{35:\overline{65}|}}$$

$$= \frac{1{,}000 \bullet 0.17135 + 21.13085}{19.24303}$$

$$= 10.00278$$

$${}_{20}CV_{35} = \text{Max}\{0,\ 1{,}000 \bullet A_{35+20:\overline{100-35-20}|} - {}^{adj}P_{35} \bullet a_{35+20:\overline{100-35-20}|}\}$$

$$= \text{Max}\ \{0,\ 1{,}000 \bullet 0.36176 - 10.00278 \bullet 14.82135\}$$

$$= 213.51$$

4.2 Life Insurance Reserves

$$\overline{A}_{35+1:\overline{100-35-1}|} = \frac{\overline{M}_{36} - \overline{M}_{100} + D_{100}}{D_{36}}$$

$$= \frac{72{,}455.53 - 183.91 + 196.86}{282{,}605.79}$$

$$= 0.25643$$

$$a_{35+1:\overline{100-35-1}|} = \frac{N_{36} - N_{100}}{D_{36}}$$

$$= \frac{6{,}251{,}086.63 - 475.95}{282{,}605.79}$$

$$= 22.11777$$

$$\overline{\beta}_{35,\,FPT} = 1{,}000 \bullet \frac{\overline{A}_{35+1:\overline{100-35-1}|}}{a_{35+1:\overline{100-35-1}|}}$$

$$= 1{,}000 \bullet \frac{0.25643}{22.11777}$$

$$= 11.59382$$

$$\overline{A}_{35+1} = \frac{\overline{M}_{35+1}}{D_{35+1}}$$

$$= \frac{72{,}455.53}{282{,}605.79}$$

$$= 0.25638$$

$$a_{35+1:\overline{19}|} = \frac{N_{36} - N_{55}}{D_{36}}$$

$$= \frac{6,251,086.63 - 2,299,926.58}{282,605.79}$$

$$= 13.98117$$

$$1,000 \cdot {}_{19}\overline{P}_{35+1} = 1,000 \cdot \frac{\overline{A}_{35+1}}{a_{35+1:\overline{19}|}}$$

$$= 1,000 \cdot \frac{0.25638}{13.98117}$$

$$= 18.33779$$

If $\overline{\beta}_{35,FPT} < 1,000 \cdot {}_{19}\overline{P}_{35+1}$, $\quad \overline{\beta}_{35} = \overline{\beta}_{35,FPT} = 11.59382$

$$\overline{A}_{35+20:\overline{100-35-20}|} = \frac{\overline{M}_{55} - \overline{M}_{100} + D_{100}}{D_{55}}$$

$$= \frac{63,167.20 - 183.91 + 196.86}{139,862.21}$$

$$= 0.45173$$

$$a_{35+20:\overline{100-35-20}|} = \frac{N_{55} - N_{100}}{D_{55}}$$

$$= \frac{2,299,926.58 - 475.95}{139,862.21}$$

$$= 16.44083$$

$$
\begin{aligned}
{}_{20}V_{35} &= 1{,}000 \bullet \bar{A}_{35+20:\overline{100\text{-}35\text{-}20}|} - \bar{\beta}_{35} \bullet a_{35+20:\overline{100\text{-}35\text{-}20}|} \\
&= 1{,}000 \bullet 0.45173 - 11.59382 \bullet 16.44083 \\
&= 261.12
\end{aligned}
$$

$$
\begin{aligned}
{}_{20}IV_{35}\,(180) &= \frac{({}_{19}V_{35} + \beta_{35}) \bullet (360 - 180) + {}_{20}V_{35} \bullet 180}{360} \\
&= \frac{(244.48 + 11.59382) \bullet (360 - 180) + 261.12 \bullet 180}{360} \\
&= 258.60
\end{aligned}
$$

Russell J. Mortensen

Russell J. Mortensen, ASA, MAAA
Senior Actuarial Assistant

2/19/14
Date

Family Heritage Life Insurance Company of America

Actuarial Memorandum

Term Insurance Rider with Return of Premium

Form: L4TRR, et al.

Contents

1. Product Description

This rider is 20 year level term life insurance with an endowment at the end of the term period. The contract provides a level $1,000 death benefit of insurance per unit of coverage for 20 years. The endowment provided at the end of the 20 year term period is set equal to the cumulative premiums paid for the rider. Prior to death, the rider may be surrendered for its cash value. Premiums are level and payable for the term of the rider. Underwriting is on a simplified issue basis and rates vary by issue age, gender and nicotine use.

2. Basis of Values

2.1 Cash Values

Cash values are determined using:

- 2001 CSO ALB ultimate gender and tobacco distinct mortality,
- The assumption that deaths occur at the end of the policy years; and adjusted premiums are payable at the beginning of the policy year, and
- 4.75% interest rate.

Cash values equal or exceed the minimum amounts required by the Standard Nonforfeiture Law (SNL) and Actuarial Guideline 45.

2.2 Life Insurance Reserves

Reserves are calculated as the present value of death benefits and the endowment benefit less the present value of net premiums using the following assumptions:

- 2001 CSO ALB ultimate gender and tobacco distinct mortality,
- Immediate payment of claims; and adjusted premiums are payable at the beginning of the policy year,
- The maximum interest rate permitted in the valuation of whole life insurance for a guarantee duration of more than 10 years, but not more than 20 years, and the
- Commissioners Reserve Valuation Method (CRVM).

Reserves equal or exceed the minimum amounts required by the Standard Valuation Law (SVL).

3. Formulas

3.1 Definition of Symbols

Symbol	*Definition*
t	Policy year.
x	Issue Age
C_x, M_x, D_x, N_x	Standard commutation functions based on reserve or nonforfeiture mortality and interest assuming deaths occur at the end of policy years.
$\overline{M}_x, \overline{C}_x$	Standard commutation functions based on reserve mortality and interest assuming IPC.
$\bar{A}_{x:\overline{k}\rceil}$	Present Value at age x of $1 of insurance with IPC to year k and a $1 endowment benefit paid at end of year k.
$\overline{A}_x$	Present Value at age x of $1 of insurance for whole life with IPC.
$\bar{A}^{1}_{x:\overline{1}\rceil}$	Present Value at age x of $1 of insurance in year 1 with IPC.
$A_{x:\overline{k}\rceil}$	Curtate Present Value at age x of $1 of insurance to year k and a $1 endowment benefit paid at end of year k.
${}^{RES}PVFB_{x:t}$	Present Value of Future Benefits of issue age x, policy year t on a reserve basis with IPC.
${}^{CV1}PVFB_{x:t}$	Curtate Present Value of Future Benefits of issue age x, policy year t on a nonforfeiture basis
${}^{CV2}PVFB_{x:t}$	Curtate Present Value of Future Benefits of issue age x, policy year t on a nonforfeiture basis using the benefits defined in Actuarial Guideline 45.
$a_{x:\overline{k}\rceil}$	Present Value at age x of $1 annuity paid at the beginning of each year for k years.
ROP_x	Return of Premium benefit of issue age x paid at end of year 20. Return of Premium benefit is equal to the cumulative 20 year Gross Premium.
${}_{19}\overline{P}_{x+1}$	Semi-Continuous 19-pay Net Level Premium at age x+1 with IPC for whole life.
${}^{1}NP_x$	Curtate 20 year Net Level Premium at age x with curtate payment of claims.

${}^{2}NP_x$	Curtate 20 year Net Level Premium at age x with curtate payment of claims using the Net Premium defined in Actuarial Guideline 45.
${}^{adj1}NP_x$	Curtate 20 year Adjusted Net Level Premium at age x with curtate payment of claims.
${}^{adj2}NP_x$	Curtate 20 year Adjusted Net Level Premium at age x with curtate payment of claims using the Adjusted Net Premium defined in Actuarial Guideline 45.
$\overline{\alpha}_{x:FPT}$	Semi-Continuous 1st year Full Preliminary Term Net Premium at age x with IPC.
$\overline{\beta}_{x:FPT}$	Semi-Continuous Renewal year Full Preliminary Term Net Premium at age x to age x+20 with IPC.
$\overline{\alpha}_x$	Semi-Continuous 1st year CRVM Net Premium at age x with IPC.
$\overline{\beta}_x$	Semi-Continuous Renewal year CRVM Net Premium at age x to age x+20 with IPC.
ELDB	Equivalent Level Death Benefit
$EA1_x$	Nonforfeiture Expense Allowance at age x.
$EA2_x$	Nonforfeiture Expense Allowance at age x using the Expense Allowance defined in Actuarial Guideline 45.
${}_tCV1_x$	Cash value for issue age *x* at the end of policy year *t*.
${}_tCV2_x$	Cash value for issue age *x* at the end of policy year *t* using the Cash Value defined in Actuarial Guideline 45.
${}_tCV_x$	= Max $({}_tCV1_x, {}_tCV2_x)$
${}_tV_x$	Basic death benefit reserve for issue age *x* at the end of policy year *t*.
${}_tIV_x(d)$	Basic death benefit interpolated reserve for issue age *x* during policy year *t* and d days from policy anniversary where the number of days is based on the standard banker's year definition.
i	Valuation interest rate for Life Insurance Reserves, or Cash Value interest rate
d	= i/(1+i)
δ	= $ln(1+i)$
$\frac{i}{\delta}$	Adjustment factor for converting curtate basis commutation functions to immediate payment of claims basis commutation functions.

3.2 Cash Values

$$ {}_tCV_x = \text{Max}\{{}_tCV1_x, {}_tCV2_x\} $$

$$ a_{x+t:\overline{20-t}|} = \frac{N_{x+t} - N_{x+20}}{D_{x+t}} $$

$$ ELDB = 1{,}000 $$

<u>${}_tCV1_x$</u>

$$ {}^{CV1}PVFB_{x:t} = \frac{1{,}000 \bullet (M_{x+t} - M_{x+20}) + ROP_x \bullet D_{x+20}}{D_{x+t}} $$

$$ {}^{1}NP_x = \frac{{}^{CV1}PVFB_{x:0}}{a_{x:\overline{20}|}} $$

$$ EA1_x = 1.25 \bullet \text{Min}\{{}^{1}NP_x, 0.04 \bullet \text{ELDB}\} + 0.01 \bullet \text{ELDB} $$

$$ {}^{adj1}NP_x = \frac{{}^{CV1}PVFB_{x:0} + EA1_x}{a_{x:\overline{20}|}} $$

$$ {}_tCV1_x = \text{Max}\{0, {}^{CV1}PVFB_{x:t} - {}^{adj1}NP_x \bullet a_{x+t:\overline{20-t}|}\} $$

<u>${}_tCV2_x$ (minimum required by Actuarial Guideline 45)</u>

$$ {}^{CV2}PVFB_{x:t} = \frac{ROP_x \bullet D_{x+20}}{D_{x+t}} $$

$$ {}^{2}NP_x = \frac{{}^{CV2}PVFB_{x:0}}{a_{x:\overline{20}|}} $$

$$ EA2_x = 1.25 \bullet \text{Min}\{{}^{2}NP_x, 0.04 \bullet \text{ELDB}\} + 0.01 \bullet \text{ELDB} $$

$$ {}^{adj2}NP_x = \frac{{}^{CV2}PVFB_{x:0} + EA2_x}{a_{x:\overline{20}|}} $$

$$ {}_tCV2_x = \text{Max}\{0, {}^{CV2}PVFB_{x:t} - {}^{adj2}NP_x \bullet a_{x+t:\overline{20-t}|}\} $$

3.3 Life Insurance Reserves

$$^{RES}PVFB_{x:t} = \frac{1{,}000 \bullet (\overline{M}_{x+t} - \overline{M}_{x+20}) + ROP_x \bullet D_{x+20}}{D_{x+t}}$$

$$a_{x+t:\overline{20-t}|} = \frac{N_{x+t} - N_{x+20}}{D_{x+t}}$$

$$\overline{A}_{x+1} = \frac{\overline{M}_{x+1}}{D_{x+1}}$$

$$\overline{A}^{1}_{x:\overline{1}|} = \frac{\overline{C}_x}{D_x}$$

$$_{19}\overline{P}_{x+1} = \frac{\overline{A}_{x+1}}{a_{x+1:\overline{19}|}}$$

$$\overline{\alpha}_{x,FPT} = 1{,}000 \bullet \frac{\overline{A}^{1}_{x:\overline{1}|}}{a_{x:\overline{1}|}}$$

$$\overline{\beta}_{x,FPT} = \frac{^{RES}PVFB_{x:1}}{a_{x+1:\overline{19}|}}$$

$$\text{If } \overline{\beta}_{x,FPT} > 1{,}000 \bullet {}_{19}\overline{P}_{x+1}, \quad \overline{\beta}_x = \frac{^{RES}PVFB_{x:0} + 1{,}000 \bullet {}_{19}\overline{P}_{x+1} - \overline{\alpha}_{x,FPT}}{a_{x:\overline{20}|}}$$

$$\text{If } \overline{\beta}_{x,FPT} < 1{,}000 \bullet {}_{19}\overline{P}_{x+1}, \quad \overline{\beta}_x = \overline{\beta}_{x,FPT}$$

$$\overline{\alpha}_x = \overline{\beta}_x - \text{Min}\left\{ \overline{\beta}_{x,FPT}, 1{,}000 \bullet {}_{19}\overline{P}_{x+1} \right\} + \overline{\alpha}_{x,FPT}$$

For t = 1, $\quad {}_tV_x = 0$

For t > 1, $\quad {}_tV_x = {}^{RES}PVFB_{x:t} - \overline{\beta}_x \bullet a_{x+t:\overline{20-t}|}$

For t > 1, $\quad {}_tIV_x(d) = \dfrac{({}_{t-1}V_x + \overline{\beta}_x) \bullet (360 - d) + {}_tV_x \bullet d}{360}$

For t = 1, $\quad {}_tIV_x(d) = \dfrac{\overline{\alpha}_x \bullet (360 - d)}{360}$

4. Sample Calculations

The sample calculations are for a male nicotine free issue age 35 with $1,000 of insurance.

4.1 Cash Values

$$a_{35:\overline{20}|} = \frac{N_{35} - N_{55}}{D_{35}}$$

$$= \frac{3{,}574{,}770.72 - 1{,}045{,}096.64}{192{,}366.40}$$

$$= 13.15029$$

$$a_{35+10:\overline{20-10}|} = \frac{N_{45} - N_{55}}{D_{45}}$$

$$= \frac{2{,}008{,}265.19 - 1{,}045{,}096.64}{119{,}088.34}$$

$$= 8.08785$$

$$ELDB = 1{,}000$$

${}_tCV1_x$

$${}^{CV1}PVFB_{35:0} = \frac{1{,}000 \bullet (M_{35} - M_{55}) + ROP_{35} \bullet D_{55}}{D_{35}}$$

$$= \frac{1{,}000 \bullet (30{,}264.63 - 24{,}877.29) + 158.40 \bullet 72{,}268.31}{192{,}366.40}$$

$$= 87.51340$$

$$ {}^{1}NP_{35} = \frac{{}^{CV1}PVFB_{35:0}}{a_{35:\overline{20}|}} $$

$$ = \frac{87.51340}{13.15029} $$

$$ = 6.65486 $$

$$ {}^{CV1}PVFB_{35:10} = \frac{1{,}000 \bullet (M_{35+10} - M_{55}) + ROP_{35} \bullet D_{55}}{D_{35+10}} $$

$$ = \frac{1{,}000 \bullet (28{,}021.43 - 24{,}877.29) + 158.40 \bullet 72{,}268.31}{119{,}088.34} $$

$$ = 122.52615 $$

$$ EA1_{35} = 1.25 \bullet \text{Min}\{{}^{1}NP_{35}, 0.04 \bullet \text{ELDB}\} + 0.01 \bullet \text{ELDB} $$

$$ = 1.25 \bullet \text{Min}\{6.65486, 0.04 \bullet 1{,}000\} + 0.01 \bullet 1{,}000 $$

$$ = 1.25 \bullet 6.65486 + 10 $$

$$ = 18.31858 $$

$$ {}^{adj1}NP_{35} = \frac{{}^{CV1}PVFB_{35:0} + EA1_{35}}{a_{35:\overline{20}|}} $$

$$ = \frac{87.51340 + 18.31858}{13.15029} $$

$$ = 8.04788 $$

$$ {}_{10}CV1_{35} = \text{Max}\{0, {}^{CV1}PVFB_{35:10} - {}^{adj1}NP_{35} \bullet a_{35+10:\overline{20-10}|}\} $$

$$ = \text{Max}\{0, 122.52615 - 8.04788 \bullet 8.08785\} $$

$$ = 57.44 $$

${}_tCV2_x$ (minimum required by Actuarial Guideline 45)

$$^{CV2}PVFB_{35:0} = \frac{ROP_{35} \bullet D_{55}}{D_{35}}$$

$$= \frac{158.40 \bullet 72{,}268.31}{192{,}366.40}$$

$$= 59.50779$$

$$^{2}NP_{35} = \frac{^{CV2}PVFB_{35:0}}{a_{35:20\rceil}}$$

$$= \frac{59.50779}{13.15029}$$

$$= 4.52521$$

$$^{CV2}PVFB_{35:10} = \frac{ROP_{35} \bullet D_{55}}{D_{35+10}}$$

$$= \frac{158.40 \bullet 72{,}268.31}{119{,}088.34}$$

$$= 96.12443$$

$$EA2_{35} = 1.25 \bullet \text{Min}\{^{2}NP_{35}\ ,\ 0.04 \bullet\ \text{ELDB}\} + 0.01 \bullet\ \text{ELDB}$$

$$= 1.25 \bullet \text{Min}\{4.52521,\ 0.04 \bullet\ 1{,}000\} + 0.01 \bullet\ 1{,}000$$

$$= 1.25 \bullet 4.52521 + 10$$

$$= 15.65651$$

$$^{adj2}NP_{35} = \frac{^{CV2}PVFB_{35:0} + EA2_{35}}{a_{35:20\rceil}}$$

$$= \frac{59.50779 + 15.65651}{13.15029}$$

$$= 5.71579$$

$$ {}_{10}CV2_{35} = \text{Max}\{0, {}^{CV2}\text{PVFB}_{35:10} - {}^{adj2}\text{NP}_{35} \bullet a_{35+10:\overline{20-10}|}\} $$

$$ = \text{Max}\{0, 96.12443 - 5.71579 \bullet 8.08785\} $$

$$ = 49.90 $$

$$ {}_{10}CV_{35} = \text{Max}\{{}_{10}CVI_{35}, {}_{10}CV2_{35}\} $$

$$ = \text{Max}\{57.44, 49.90\} $$

$$ = 57.44 $$

4.2 Life Insurance Reserves

$$ {}^{RES}\text{PVFB}_{35:1} = \frac{1{,}000 \bullet (\overline{M}_{35+1} - \overline{M}_{35+20}) + \text{ROP}_{35} \bullet D_{35+20}}{D_{35+1}} $$

$$ = \frac{1{,}000 \bullet (60{,}857.25 - 52{,}560.93) + 158.40 \bullet 122{,}482.44}{259{,}096.68} $$

$$ = 106.90039 $$

$$ a_{35+1:\overline{20-1}|} = \frac{N_{36} - N_{55}}{D_{36}} $$

$$ = \frac{5{,}515{,}426.45 - 1{,}961{,}098.07}{259{,}096.68} $$

$$ = 13.71815 $$

$$ \overline{\beta}_{35,\,\text{FPT}} = \frac{{}^{RES}\text{PVFB}_{35:1}}{a_{35+1:\overline{20-1}|}} $$

$$ = \frac{106.90039}{13.71815} $$

$$ = 7.79262 $$

$$\overline{A}_{35+1} = \frac{\overline{M}_{35+1}}{D_{35+1}}$$

$$= \frac{60{,}857.25}{259{,}096.68}$$

$$= 0.23488$$

$$1{,}000 \bullet {}_{19}\overline{P}_{35+1} = 1{,}000 \bullet \frac{\overline{A}_{35+1}}{a_{\overline{35+1:19}|}}$$

$$= 1{,}000 \bullet \frac{0.23488}{13.71815}$$

$$= 17.12201$$

$$\text{If } \overline{\beta}_{35,FPT} < 1{,}000 \bullet {}_{19}\overline{P}_{35+1}, \qquad \overline{\beta}_{35} = \overline{\beta}_{35,FPT} = 7.79262$$

$${}^{RES}PVFB_{35:10} = \frac{1{,}000 \bullet (\overline{M}_{35+10} - \overline{M}_{35+20}) + ROP_{35} \bullet D_{35+20}}{D_{35+10}}$$

$$= \frac{1{,}000 \bullet (57{,}774.47 - 52{,}560.93) + 158.40 \bullet 122{,}482.44}{183{,}373.23}$$

$$= 134.23314$$

$$a_{35+10:\overline{20-10}|} = \frac{N_{45} - N_{55}}{D_{45}}$$

$$= \frac{3{,}504{,}140.68 - 1{,}961{,}098.07}{183{,}373.23}$$

$$= 8.41476$$

$$ {}_{10}V_{35} = {}^{RES}PVFB_{35:10} - \bar{\beta}_{35} \bullet a_{35+10:\overline{20-10}|} $$

$$ = 134.23314 - 7.79262 \bullet 8.41476 $$

$$ = 68.66 $$

$$ {}_{10}IV_{35}\,(180) = \frac{({}_{9}V_{35} + \beta_{35}) \bullet (360 - 180) + {}_{10}V_{35} \bullet 180}{360} $$

$$ = \frac{(60.41 + 7.79262) \bullet (360 - 180) + 68.66 \bullet 180}{360} $$

$$ = 68.43 $$

Russell J. Mortensen

Russell J. Mortensen, ASA, MAAA
Senior Actuarial Assistant

2/19/14

Date

Family Heritage Life Insurance Company of America

Individual Whole Life Annual Premium rates per $1,000 Form L4POL

Issue Age	Male		Female	
	Nicotine Free	Nicotine	Nicotine Free	Nicotine
19	9.00	11.64	7.20	9.48
20	9.24	11.88	7.56	10.08
21	9.36	12.24	7.92	10.56
22	9.60	12.48	8.40	11.16
23	9.96	12.96	8.76	11.76
24	10.08	13.08	8.88	11.88
25	10.20	13.20	9.00	12.00
26	10.44	13.56	9.24	12.36
27	10.68	13.92	9.48	12.72
28	10.92	14.28	9.72	13.08
29	11.16	14.64	9.96	13.44
30	11.40	15.00	10.20	13.80
31	11.88	15.60	10.56	14.28
32	12.36	16.20	10.92	14.76
33	12.84	16.80	11.28	15.24
34	13.32	17.40	11.64	15.72
35	13.80	18.00	12.00	16.20
36	14.40	18.84	12.48	16.80
37	15.00	19.68	12.96	17.40
38	15.60	20.52	13.44	18.00
39	16.20	21.36	13.92	18.60
40	16.80	22.20	14.40	19.20
41	17.52	23.16	14.88	19.92
42	18.24	24.12	15.36	20.64
43	18.96	25.08	15.84	21.36
44	19.68	26.04	16.32	22.08

Issue Age	Male		Female	
	Nicotine Free	Nicotine	Nicotine Free	Nicotine
45	20.40	27.00	16.80	22.80
46	21.36	28.20	17.52	23.64
47	22.32	29.40	18.24	24.48
48	23.28	30.60	18.96	25.32
49	24.24	31.80	19.68	26.16
50	25.20	33.00	20.40	27.00
51	26.52	34.80	21.24	28.44
52	27.84	36.60	22.08	29.88
53	29.16	38.40	22.92	31.32
54	30.48	40.20	23.76	32.76
55	31.80	42.00	24.60	34.20
56	33.24	44.40	25.68	35.76
57	34.68	46.92	26.88	37.20
58	36.00	49.32	27.96	38.76
59	37.44	51.84	29.16	40.20
60	38.88	54.24	30.24	41.76
61	41.16	57.36	31.92	44.04
62	43.44	60.60	33.48	46.32
63	45.84	63.72	35.16	48.72
64	48.12	66.96	36.72	51.00
65	50.40	70.08	38.40	53.28
66	53.76	75.60	40.56	57.00
67	57.12	81.24	42.84	60.72
68	60.48	86.76	45.00	64.56
69	63.84	92.40	47.28	68.28
70	67.20	97.92	49.44	72.00

$60 Annual Policy Fee per Household

Family Heritage Life Insurance Company of America

Individual Children Whole Life Annual Premium rates per $1,000 Form L4POL

Issue Age	Male	Female
0-5	4.08	3.60
6-10	5.10	4.50
11-15	6.30	5.40
16-18	8.40	7.50

$12 Annual Policy Fee

Family Heritage Life Insurance Company of America

Rider Annual Premium Rates per $1,000

Term Insurance Rider with Return of Premium Form L4TRR

Issue Age	Male		Female	
	Nicotine Free	Nicotine	Nicotine Free	Nicotine
19	2.88	5.16	1.92	3.00
20	3.00	5.40	2.04	3.12
21	3.12	5.64	2.16	3.36
22	3.24	5.76	2.28	3.48
23	3.36	6.00	2.40	3.72
24	3.48	6.12	2.52	3.84
25	3.60	6.24	2.64	4.08
26	3.72	6.60	2.76	4.56
27	3.84	6.96	2.88	4.92
28	4.08	7.20	2.88	5.40
29	4.20	7.56	3.00	5.76
30	4.32	7.92	3.12	6.24
31	5.04	8.88	3.60	6.96
32	5.76	9.72	4.20	7.80
33	6.48	10.68	4.68	8.52
34	7.20	11.52	5.28	9.36
35	7.92	12.48	5.76	10.08
36	8.64	13.92	6.24	11.04
37	9.36	15.48	6.84	12.00

Issue Age	Male		Female	
	Nicotine Free	Nicotine	Nicotine Free	Nicotine
38	10.08	16.92	7.32	12.96
39	10.80	18.48	7.92	13.92
40	11.52	19.92	8.40	14.88
41	12.60	21.60	9.24	16.08
42	13.68	23.28	10.08	17.28
43	14.64	24.96	10.80	18.48
44	15.72	26.64	11.64	19.68
45	16.80	28.32	12.48	20.88
46	18.24	30.24	13.32	22.08
47	19.68	32.04	14.16	23.40
48	21.12	33.96	15.12	24.60
49	22.56	35.76	15.96	25.92
50	24.00	37.68	16.80	27.12
51	25.68	39.60	17.88	28.32
52	27.36	41.40	18.96	29.64
53	29.04	43.32	19.92	30.84
54	30.72	45.12	21.00	32.16
55	32.40	47.04	22.08	33.36

Accidental Death Benefit Rider Form L4ADR

Issue Age		Rate/ 1,000
19-55		1.92

Children Term Insurance Rider Form L4CHR

Issue Age		Rate/ 1,000
19-55		6.00