VARWG March 2005 Analysis Report

List of Attachments

Attachment 1: Model vs. Standard Scenario
- **Model Results with December & Proposed Calibration Criteria**
- **August Standard Scenario**
- **Update to Attachment 3 from December 2004 Analysis Report**

Attachment 2: Alternatives for Standard Scenario Reserve
- **Non-Integrated vs. Integrated Calculation**
- **Level of Aggregation (None, Full, and Limited)**

Attachment 3: Population Summary

Attachment 4: Modeling Specs

Attachment 1: Model vs. Standard Scenario Results

		Addl Rx		AAR	
	No Shock to Initial Account Value			AV =	$ 748.9
Model		$ in MM	% AV	$ in MM	% AV
	December Calibration				
1	Seriatim	$16.5	2.21%	$26.4	3.52%
2	Aggregate	$8.0	1.06%	$18.0	2.40%
	Proposed Calibration				
3	Seriatim	$23.3	3.11%	$32.3	4.31%
4	Aggregate	$11.9	1.59%	$23.3	3.11%
Standard Scenario					
5	Seriatim	$20.2	2.70%	$28.4	3.79%
6	Aggregate	$2.9	0.39%	$19.7	2.63%
	Shock Initial Account Value UP 20%			AV =	$ 898.7
Model	December Calibration	$ in MM	% AV	$ in MM	% AV
7	Seriatim	$7.5	0.83%	$15.4	1.71%
8	Aggregate	$2.4	0.27%	$6.6	0.73%
	Proposed Calibration				
9	Seriatim	$10.8	1.20%	$19.5	2.17%
10	Aggregate	$3.1	0.34%	$8.7	0.97%
Standard Scenario					
11	Seriatim	$7.9	0.88%	$14.9	1.66%
12	Aggregate	$1.1	0.12%	$1.1	0.12%
	Shock Initial Account Value DOWN 20%			AV =	$ 599.1
Model	December Calibration	$ in MM	% AV	$ in MM	% AV
13	Seriatim	$35.3	5.89%	$44.0	7.34%
14	Aggregate	$25.9	4.33%	$36.8	6.15%
	Proposed Calibration				
15	Seriatim	$46.7	7.79%	$52.1	8.70%
16	Aggregate	$36.2	6.04%	$45.2	7.54%
Standard Scenario					
17	Seriatim	$44.3	7.39%	$48.6	8.10%
18	Aggregate	$32.2	5.38%	$44.4	7.41%

Amounts shown are excess over Surrender Value.

Notes to Standard Scenario

Based on August Specs   Dynamic Rate is based on 10 Yr UST from December 2003; DR = 4.82%

Aggregate Results are obtained by first summing respective year-ends across all cells and then finding LPV

For Additional Reserve, Annual time step with Basic Reserve equal to AG 33.

For AAR, Quarterly time step and adjusted for excess of AG 33 over Surrender Value.

Attachment 2: Alternatives To Standard Scenario Reserve Calculation
Product has Basic Annuity Charge 1.15%; 5% GMDB includes 5% GMIB
Results may differ for other populations, assumptions, or product designs

	Shock Used	Up 20%		None		Down 20%	
1	Account Value (AV)	$898.7	as % AV	$748.9	as % AV	$599.1	as % AV
2	Surrender Value	$875.3	97.40%	$725.0	96.80%	$574.7	95.91%
3	AG 33 Reserve	$876.4	97.52%	$726.7	97.04%	$578.2	96.50%
	Model Results -- Excess above Surrender Value -- **65 CTE**						
4	December Calibration	$2.4	0.27%	$8.0	1.06%	$25.9	4.33%
5	Proposed Calibration	$3.1	0.34%	$11.9	1.59%	$36.2	6.04%
	Std Scenario with Alternatives -- Excess above Surrender Value -- **65 CTE**						
	Non-Integrated Calculation*						
6	No Aggregation	$7.9	0.88%	$20.2	2.70%	$44.3	7.39%
7	Full Aggregation	$1.1	0.12%	$2.9	0.39%	$32.2	5.38%
8	Limited Aggregation	$4.1	0.45%	$10.7	1.43%	$32.2	5.38%
	Integrated Calculation						
9	No Aggregation	$7.5	0.84%	$20.9	2.79%	$46.8	7.81%
10	Full Aggregation	$0.0	0.00%	$5.7	0.76%	$36.1	6.03%
11	Limited Aggregation	$3.6	0.40%	$11.3	1.51%	$36.1	6.03%

Description of Methods

6 This is the amount specified in Aug Specs. It is a contract-by-contract calculation where the result for each contract is the AG33 Reserve plus the PV of the largest accumulated loss.

7 This is the Fully aggregated amount using the Aug Specs. The PV of Accumulated Loss for each projection year-end is obtained by summing the result at that projection year-end over all cells; the largest loss is then calculated using those summed results for each projection year-end. The sum of the AG33 results is added to this PV of largest accumulated loss

8 This is the limited aggregation approach. It is similar to Full aggregation EXCEPT that any accumulated gains are zeroed out at the cell level for end of the first 5 projection years (but these gains are reflected in the results for subsequent projection years).

9 This calculation has Start Reserve = Surrender Value and working reserve = Surrender Value. Assumptions are same as Std Scenario EXCEPT that allowed revenue is product charges less 0.25% during the Surrender Charge period and 0.50% after Surrender Charge period.

10 This is the Fully aggregated amount; same approach as with SS Full Aggregation (line 7).

11 This is the limited aggregation approach; same approach as line 8

* Non-Integrated Calculations use the AG33 Reserve rather than the Surrender Value. AG33 ignores partial withdrawal paths and always uses A2000 with Type A Val Interest Rate for the calendar year of issue. Results may differ from earlier work due to the use of an annual time step in model created to model and investigate alternatives to Standard Scenario.

Attachment 3: Population Summary

GMDB Type	ROP	MAV	5% R/U	Combo	All
GMIB	none	none	5% R/U	none	

	ROP	MAV	5% R/U	Combo	All
Number of Cells	86	91	72	72	321
Premium	$ 216.0	$ 276.2	$ 55.6	$ 138.5	$ 686.3
GMDB Value	$ 216.0	$ 315.1	$ 71.0	$ 156.5	$ 758.6
Acct Value					
Up 20%	$ 313.0	$ 347.5	$ 72.5	$ 165.8	$ 898.7
No Adjust	$ 260.8	$ 289.6	$ 60.4	$ 138.2	$ 748.9
Down 20%	$ 208.6	$ 231.7	$ 48.3	$ 110.5	$ 599.1
Acct Value by Age					
Under 65	40.6%	43.9%	45.6%	43.2%	42.8%
From 65 upto 70	10.5%	20.1%	10.0%	25.3%	16.9%
From 70 upto 75	15.0%	15.2%	16.7%	12.1%	14.7%
From 75 upto 80	11.1%	14.1%	14.8%	14.9%	13.3%
From 80 upto 95	22.8%	6.6%	12.8%	4.4%	12.3%
	100.0%	100.0%	100.0%	100.0%	100.0%
Contract NAR on Val Date					
Up 20%	$ 2.3	$ 12.1	$ 5.5	$ 10.1	$ 30.0
No Adjust	$ 10.5	$ 35.7	$ 13.1	$ 23.3	$ 82.5
Down 20%	$ 32.8	$ 83.8	$ 23.2	$ 46.0	$ 185.8
In The Money					
Up 20%	0.75%	3.47%	7.63%	6.09%	3.96%
No Adjust	4.02%	12.31%	21.71%	14.86%	10.88%
Down 20%	15.74%	36.16%	48.02%	41.59%	24.49%

Associated One Yr Term Cost (using level NAR on Val Date, 100% 1994 MGDB Table, and no interest)

	ROP	MAV	5% R/U	Combo	All
Up 20%	$ 0.10	$ 0.39	$ 0.15	$ 0.29	$ 0.93
as % AV	0.03%	0.11%	0.21%	0.17%	0.10%
No Adjust	$ 0.45	$ 1.17	$ 0.38	$ 0.69	$ 2.69
as % AV	0.17%	0.40%	0.63%	0.50%	0.36%
Down 20%	$ 1.40	$ 2.62	$ 0.70	$ 1.33	$ 6.05
as % AV	0.67%	1.13%	1.45%	1.20%	1.01%

Attachment 4: Modeling Specs

Standard Product:

Basic Annuity Charge (M&E): 1.50% or 1.15%, as indicated

Annual Fee: None

Surrender Charge is 7% of premium in first contribution year, down by 1% per year, with a Free Withdrawal Amount equal to 10% of Account Value (non-cumulative).

Basic Death Benefit: waiver of surrender charges

Max. Annuitization Age: All policies terminate at age 95

Optional Guaranteed Minimum Death Benefits:

Return of Premium: charge is 0.05% of account value

5% Roll-up: Premium accumulated continuously at 5% interest; roll-up frozen at age 80 or 250% of premium, if earlier; charge is 0.20% of account value

Max Annual Value (Annual Ratchet): frozen at age 80; charge is 0.15% of account value

High or Combo: greater of 5% Roll-up or Max Anniv. Value; charge is 0.25% of account value

Optional Guaranteed Minimum Income Benefit:

Waiting Period: later of attained age 60 or 7 years after issue

Restrictions: can be elected only on contract anniversary; cannot be elected after age 85 Guaranteed Annuity Option: 15 year annuity certain with interest at 3%

Cost of Annuitization: is the excess of the current cost of guaranteed income (using 7 Year Treasury for scenario plus 0.35%) over the Account Value; never negative.

5% Roll-up GMIB: Premium accumulated continuously at 5% interest; roll-up frozen at age 80 or 250% of premium, if earlier; charge is 0.35% of benefit base

Experience Assumptions:
Mortality: 65% of 1994 MGDB Table (ALB)

Base Lapse Rates:

Policy Yr.	1	2	3	4	5	6	7	8	9	10+
Lapses	1.5%	4%	4%	4%	6%	8%	10%	30%	20%	10%

Attachment 4: Modeling Specs (con't.)

Dynamic Lapse Multiplier: The actual lapse rate is the product of the base lapse rate and the dynamic lapse multiplier. The dynamic lapse adjustment depends on the ratio of Guaranteed Value to Market Value (GV / MV) and is calculated separately for the GMDB and GMIB, if any. If both benefits are on the contract, then the large ratio is used. The dynamic adjustment has a value of 1 when the ratio is 1.1 or less and grades linearly to a value of 50% when the ratio of GV / MV is 1.5.

Partial Withdrawals: Ignored

GMIB Utilization: This depends on attained age and the ratio GV / MV, with a special adjustments on the first and last anniversaries on which the customer is eligible to elect the benefit. The maximum utilization rate is 10% at age 60 through 65, grading linearly to 20% at age 70 and remaining at 20% through age 79. Thereafter, it grades linearly down to 10% at age 84 and remaining level thereafter. On the first eligibility date the cap is never less than 15% and equals 20% on the last eligibility date.

The utilization rate is assumed to be 0% when the ratio of GV / MV is less than 1 and equal to the base annuitization rate of 5% when the ratio is between 1 and 1.1. For higher values of the ratio, the utilization rate is 5% plus a dynamic factor. The dynamic factor adds 2% to the utilization rate for each 10% that the benefit goes deeper "in the money". For example, when the GV/ MV ratio is 1.8, the utilization rate is (before applying any cap) is 19%, consisting of a 5% base level plus 14% from the dynamic factor.

Investment Allocation:
100% US Diversified Equity with a mutual fund expense ratio of 1.00%. Revenue sharing is 0.25%.

Expenses: $85 per policy with inflation of 3% beginning in the second projection year plus 0.05% of account value.

Other Financial Assumptions:
Statutory reserve is assumed to be Cash Surrender Value.
Discount Rate for PV of Worst Surplus: 5.77% before-tax or 3.75% after-tax.
Federal Income Tax: 35%

Cell Characteristics: All male; attained age and duration depends on cell. Average size (depends on cell) is approximately $50,000.

Scenarios: 1,000 scenarios were selected using the picking tool developed by the C3P2 Working Group. The corresponding 7 Year US Treasury Rate to each scenario / duration was used in calculating the Cost of Annuitization.